THE PSYCHOPHYSIOLOGICAL AND PERFORMANCE CONSEQUENCES OF IDENTITY LEADERSHIP

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CONTENTS

ABSTRACT

The social identity approach contends that influential processes from within a social group are central to members' cognition and behaviour. Recent theorising and research into this influence process identifies the importance of a leader who represents and promotes a group in developing a shared social identity. A leader who represents, creates, advances, and embeds a shared social identity is perceived to be more trustworthy, cooperative, effective and is respected by followers. Though this is the case, it is uncertain to what extent identity leadership influences psychological and physiological reactivity to stressful situations (e.g. sports competition, pressurized skills). The theory of challenge and threat states in athletes (TCTSA) proposes that individuals' psychological and physiological reactions to stressful situations occur dichotomously; one being maladaptive (a threat state), and one being adaptive (a challenge state). A threat state is a result of a perceived inability to cope with the demands of a stressful scenario, leading to maladaptive physiological reactions, being liable to poorer performances and cardiovascular disease. A challenge state is a result of a perceived ability to cope with the demands of the stressful scenario, being conducive to adaptive physiological reactivity and better performances and general health. In the aim to explain the relationships between identity leadership, psychophysiological stress and performance, this thesis presents one cross-sectional (Chapter 2), one longitudinal (Chapter 3) and two experimental studies (Chapters 4 and 5). Overall, the findings indicate that if a leader represents, creates, advances and embeds a group identity, followers are more likely to approach a stressful situation in a challenge state and thus perform better as a result of heightened emotional connections with both a leader and the group. Specifically, identity leadership encourages greater follower efficacy, perceived control over actions, approach focus (wanting to do well rather than wanting not to fail), perceptions of support and athletic performance (Chapters 2 and 3). Extending both leadership and stress theory, the acute

enactment of identity leadership was conducive to positive appraisals of stressful scenarios (Chapters 4 and 5), leading to adaptive physiological reactivity and motor performance (Chapter 4). This thesis makes an original contribution to the field of leadership and stress by evidencing that the way in which a leader is perceived has significant implications for psychological appraisal and physiological reactivity towards impending stressful situations, and performance within competitive team sports and pressurized tasks in a laboratory.

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PREFACE

This thesis includes manuscripts published and under review while data has been presented at national and international conferences. Details of the thesis outputs are as follows:

Articles within the thesis[1]*:*

Miller, A. J., Slater, M. & Turner, M. J. (2020). Perceptions of coaches' identity leadership behaviours are associated with athletes' resource appraisals: The mediating roles of relational and group identification, *Psychology, Sport and Exercise*, *51*. https://doi.org/10.1016/j.psychsport.2020.101755

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Turner, M. J., Slater, M. J., Dixon, J., & Miller, A. J. (2018). Test-retest reliability of the irrational performance beliefs inventory (iPBI), and the associations between irrational performance beliefs, social desirability, and perceived helpfulness of beliefs.

[1] N.B. As all of the studies in this thesis are either published or under review, each Chapter has an extended literature review as would appear in an empirical article. Therefore, some repetition may be present regarding the description and explanation of theory and research.

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Wood, J., Slater, M. J., Barker, J., & Miller, A. J. (under review). Leading 'us' to wellness: Exercise instructors' identity leadership is associated with exercisers' wellbeing and health: The mediating roles of social identity and mobilization. *Psychology of Sport and Exercise.*

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Romano-Smith, S. L., Miller, A. J., Ollier, W., & Dunn, K. C. (in prep) Action Imagery and Observation and the development of a home training intervention to improve everyday functional actions and the development of imagery ability. *Psychology of Sport and Exercise*.

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Conferences:

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STRUCTURE OF THE THESIS

The purpose of this section is to outline the structure of the thesis. First, given that all studies in this thesis are under review or published, each Chapter has an extended introduction, typical of an empirical article. Chapters two and three together comprise a multi-study empirical article, whilst Chapters four and five comprise of another multi-study empirical article. The introductions may include some repetition detailing research regarding leadership and stress. Chapter two contains a cross-sectional study within sport settings. The aim of this study was to identify the association between identity leadership and psychological appraisals of an event across a variety of sports, accumulating a complete perspective of the phenomena (Levin, 2006). A sport setting was chosen due to: (1) a lack of empirical interest in leadership within this area; and (2) the scope of the theoretical framework used to measure stress was within an athletic population (TCTSA; Jones et al., 2009). Chapter three extends Chapter two, adopting a longitudinal design, addressing calls within identity leadership research, evidencing the temporal nature of leadership and its influences (Slater et al., 2018). Chapter four includes a within-participants double blind counterbalanced experiment, identifying the predictive ability of identity leadership on psychological appraisals, physiological reactivity to stressful situations and subsequent motor performance. Chapter four evidenced the intraindividual differences in perceptions of identity leadership, psychological appraisal, physiological reactivity, and motor performance under two conditions. Chapter five includes a between-participants double blind counterbalanced experiment. Extending on the previous experiment, Chapter five evidences the interaction effects of identity leadership and challenge and threat instructions on psychological appraisal, physiological reactivity and motor performance. Chapter six discusses the results of the studies in light of previous findings, noting the theoretical implications of the research, strengths and limitations of the studies conducted, and discussions for future research.

CHAPTER 1: LITERATURE REVIEW

1.1 Introduction

Stress is a concept coined as a response to something within your surroundings. This response may be a result of an upcoming job interview or sporting competition, which is referred to as a 'stressor' throughout this thesis. We live in a society that values personal performance. Individuals react to upcoming events in different ways, depending on how well an individual manages 'stress'. Leaders are at the forefront of stressful situations, such as coaches in preparation for a match, or a manager within an organisation, playing a crucial role in group success (Hogg & Van Knippenberg, 2003). Research has evidenced that effective leadership practices can influence follower motivation and performance (Van Knippenberg, 2000). To this tune, it is important to identify whether this occurs as a result of the leader manipulating an individual's reaction to an event, either positively or negatively.

This Chapter outlines two bodies of literature, that of: (1) the varying depictions of what leadership is, and (2) the development of stress-based research over time. First, the Chapter begins with a timeline of leadership-based research, followed by definitions of leadership. The social identity approach to leadership is then introduced in detail, including the four principles within this framework. Then, a timeline of stress research is introduced, later identifying the notion, and consequences of, adaptive and maladaptive cognitive and physiological stress. Theoretical backgrounds to research conducted (e.g., Turner et al., 2014) are then detailed, these being; the Biopsychosocial Model of Challenge and Threat (Blascovich & Mendes, 2000) and the Theory of Challenge and Threat States in Athletes (Jones et al., 2009). Integrating the two theoretical standpoints (social identity approach to leadership and challenge and threat theory), research combining the two is discussed, identifying the state of the current research. The summary and aims of the thesis follow.

1.2 Leadership Through the Ages

Leadership is universal, being important to all human life throughout history. Although leadership has affected millions of people's lives, there are still inconsistencies on what 'leadership' is. It can be argued that the birth of explaining 'leadership' was grounded in ancient Greek and Chinese philosophy. Lao Tzu (604-531 BC) and Aristotle (384-322 BC) posited that it is the people, the followers who take ownership of their actions, and it is through them that success is found (Knowles, 2016). Yet, Plato (428-348BC: 380 BC/1993) describes leadership as a craft that can be learned by all who are fit. 'Those who are fit' precludes the majority of people in becoming bold (Socrates, 470-399 BC), tolerant, apathetic, encouraging (Aristotle, 384-322 BC), calm (Zeno, 333-264 BC), and resilient (Epictetus, 55-135 AD) leaders (Sarachek, 1968). Although true to this day, these ideas are gauged through the personality of a singular leader.

Middle age philosophies on 'leadership' quality was defined through the supporters they had. The minority that are able to lead (Plato, 380 BC/1993) have the ability to mobilize the many to achieve the leaders' goal (no matter how it is accomplished). Genghis Khan (1162-1227), although cruel in nature, emphasised togetherness, where only happy followers, comes a happy leader (Man, 2009). Later, in the renaissance period, William Shakespeare (1564-1616) emphasized humility, where leaders should acknowledge that they know "nothing", and that the collective is far greater than one leader's mind, echoing the philosophies of Aristotle (384-322 BC: '*The whole is greater than the sum of its parts'*; Kodish, 2006). In typical Shakespearian style, he further recognised that leadership is about acting. By this, a leader cannot just speak for the people, but must act for his or her people. Comparing leadership to deeds, Shakespeare quotes that "*... it is a kind of good deed to say well; and yet words are not deeds*" (de Vries & Engellau, 2010). Continuing in this fashion, Abraham Lincoln (1809-1865) emphasised consensual leadership, where willingness to

follow marks the true value of what leadership is (Goethals & Allison, 2014). Thus, it is only when the leader and follower agree, can true leadership occur.

The word leadership has since been broadly coated under 'personality' and 'followership' (whether autonomous or not). Yet, superseding these two constructs is that of a vision. Heraclitus (535-475 BC), Lucius Seneca (4 BC-65 AD), John Eriugena (815-877), Joan of Arc (1412-1431), William Shakespeare (1564-1616), Napoleon Bonaparte (1808-1873), Bernard Montgomery (1887-1976), Vince Lombardi (1913-1970), and Nelson Mandela (1918-2013), all leaders who vocalise the importance of a vision (House & Shamir, 1993). A leader who has a direction for followers to navigate, historically, is an effective one. Although the effectiveness of the pedestaled leader has survived the ages, the same cannot be said for a succinct definition of what makes an effective leader, nor what leadership is as a construct.

1.3 Defining Leadership

Continuing inconsistent historical conceptualisations of leadership, a net of definitions has been proposed by notable leadership theorists, describing leadership as:

- "a process whereby an individual influences a group of individuals to achieve a common goal" (Northouse, 2015).
- "a formal or informal contextually rooted and goal-influencing process that occurs between a leader and a follower, groups of followers, or institutions" (Antonakis & Day, 2017, p. 5).
- "a process of influence that enlists and mobilizes the involvement of others in the attainment of collective goals" (Hogg, 2001, p. 194).
- "a process of social influence through which one person is able to enlist the aid of others in reaching a goal" (Chemers, 2014, p. 5).

- "is an influence process that centres on group members being motivated to reach collective goals" (Haslam & Reicher, 2016, p. 21).

Collating these definitions, it is established that leadership: (i) is a process, (ii) involves influence and mobilization (iii) occurs in dyads or groups, (iv) and involves common goals. Yet, as put by Stogdill (1974), there are almost as many definitions of leadership as there are people trying to define it. Shedding light on this, it is useful to postulate this through the lens of what leadership is not, rather than what it is. (i) Leadership is not property, it is a process, about what a leader *does* rather than *owns.* (ii) Leadership quality does not lie in the hands of character, vision, or actions, but lies in the actions of the followers that a leader influence. (iii) Leadership is not something that is done alone. Mobilizing followers is a social process that encompasses multiple others. As Haslam and Reicher (2016) puts it, "*In the books you will read the names of kings. Did the kings haul up the lumps of rock?*", to which the answer to that is no. (iv) Leadership is not about power or hierarchical dictation, but about influence, working with their followers to achieve a common goal (Haslam & Reicher, 2016). This discourse on effective leadership would not be what it is without early theorists, whose propositions formed the rationale for the development of what is known about effective leadership to this day. The following segments explain the timeline of leadership theory, and how this formed the rationale for the social identity approach to leadership.

1.4 Early leadership theory

"I am not afraid of an army of lions led by a sheep; I am afraid of an army of sheep led by a lion." - Alexander the Great (356-323 BC)

Alexander the Greats position on 'lions amongst sheep' echoes the nature of early theoretical inquiry (The Great man approach: Weber, 1946; 1947). The understanding of leadership was calved as an individualistic metatheory, where the leader stands above all to

mobilize the many, the born leader whose personality and 'special' ability dictated their leading capacity (Borgatta et al., 1954; Weber, 1946; 1947). Early work found that personality characteristics set the leader apart from followers (e.g. intelligence, self-confidence, and alertness; Stogdill, 1948). These postulates have later emerged influential as predictors of leadership effectiveness. Within the last 30 years, meta-analytic research identified that verbal communicative ability is positively associated with leadership capacity (Mullen et al., 1989). Although characteristics have been found to positively influence leadership capacity, researchers have since identified the predictive ability of a five-factor model (Costa & McCrae, 1992). At the dawn of the millennia, a meta-analytic review of 222 correlations revealed that neuroticism, extraversion, openness to experience, and conscientiousness was associated with leadership effectiveness (Judge et al., 2002). Specifically, better quality leaders tended to be cooperative, diligent, talkative and friendly, whilst those higher in neuroticism (anxious and fearful) were perceived as less effective. As these five personality characteristics have a biological basis (Costa & McCrae, 1992), an individual's innate leadership ability dictates an individual's capacity to lead. Further empirical links between innate features and leadership ability include; intelligence (Judge et al., 2004), even-handedness (Wit & Wilke, 1988) and charisma (Bono & Judge, 2004). There has been a long-standing debate whether leaders are born or made. Based on research discourse addressed, perception leans towards the innate rather than the created leader.

Despite early backing for innate personality characteristics of an effective leader, the question regarding which characteristics reign supreme over others is inconclusive. Recent research posits that as little as four, to as many as fifty-eight personality characteristics can influence an individual's ability to lead (Haslam et al., 2011; Peters & Haslam, 2008). Adding to this variance, the degree to which certain characteristics matter in specific contexts fluctuate (Stogdill, 1974). To exemplify, Judge and colleagues (2004) found a significantly

larger relationship between intelligence and leadership ability (i.e., small to moderate) than Mann (1959; i.e., very small). Since these discrepancies, research refuted the individualistic nature of leadership (Stogdill, 1948), shifting to a situational perspective. Because of wide variance in characteristics required for a specific context, theorists began to identify whether the environment dictates a leader's actions, rather than a leader dictating the environment around them.

On the back of Stogdill's review (1948), Hersey and Blanchard (1969; 1979; 1996) devised the situational leadership theory (SLT). Extending from personal attributes of a leader, inquiry reversed the importance from being on the leader to the context which the leader is in. By this, researchers posit that successful leadership is a result of congruence between the climate and the leader's behaviours (Larsson & Vinberg, 2010). Specifically, a leader's practice is claimed to fall under two categories: Task-orientation, and relational-orientation. Task-oriented leaders provide specific roles for followers, instructing, and engage in formal communication channels. Relation-oriented leaders attempt to create harmony and eliminate conflict through concern for others and providing equal participation (Bass, 2008; Conger, 2011; Hersey & Blanchard, 1969; 1979; 1996; Shin et al., 2011; Vecchio, 1987). If the leadership style (task or relational) matches the needs of the context they are in, the leader is likely to be successful (Larsson & Vinberg, 2010). However, the flexible nature of SLT has its drawbacks. Research has revealed that, based on SLT, there is no universally effective leadership style or strategy (Glynn & DeJordy, 2010). This is due to a lack of theoretical background to SLT (Northouse, 2010), reducing its validity (Bass, 2008).

As evident, individual characteristics and environmental inferences on leadership have been considered separately. Drawing attention to both theoretical principles, Fiedler's (1967) contingency theory was introduced. Fiedler's interactionist perspective draws upon the stability of personality traits that set leaders apart from others, whilst appreciating the

flexibility of needs in a specific situation. Fiedler's work delves into suitability of a leader. By this, does a leader's style (which is stable and enduring; Northouse, 2010) fit the needs of the situation. Citing Larsson and Vinberg (2010), if a new leader is predominantly relationship focused, and the climate is largely task based, the leader is less likely to be effective. Empirical research in support of this approach is largely mixed and highly variable (Haslam et al., 2011). Even though Fiedler introduced a theory that attempts to identify the traits and characteristics that fit into a specific climate, Fiedler (1993) later admitted to a lack of explanation on why certain leadership styles are more effective than others in different situations; known as the 'black box problem'. Hence, validity of this argument is questionable, especially when effective leadership (typically) hinges on adaptability to the context (Silverthorne & Wang, 2001).

In review of a timeline in literature on leadership, it appears many factors are at play. Largely disputed, traits such as intelligence (Judge et al., 2004) and charisma (Bono & Judge, 2004) were said to be beneficial in mobilizing group members (Chemers, 2000). Following this, Hersey and Blanchard (1969; 1979; 1996) took the stance that it is the environment that dictates whether a leader should act in a specific manner, appreciating the flexibility of leadership and abolishing personality traits. However, with no universal 'formula' for effective leadership, Fiedler proposed a coalition of the two perspectives. Fielder's (1967) propositions on leadership were like a puzzle. With the leader being a particular piece within the puzzle (i.e. fixed traits), the piece may not fit into certain areas within the board (e.g. the team) and cannot be reshaped to fit in a particular spot. This individualistic nature of leadership is non-more reinforced over a decade later within relatively recent leadership theory.

1.5 Recent Leadership Theory

Continuing the fixation on the singular leader, it was the influence of reward and punishment of followers that started to creep through into research (Bass, 1990). The transactional approach to leadership posits that it is through 'reward' and 'punishment' of followers that enables action and performance. The transactional approach places emphasis on a power hierarchy. It was proposed that the leader (e.g. coach) has power over their subordinates (e.g. athlete) through expectations and conditional positive regard, depending on successful completion of his or her expectations (Bass, 1990; Turner, 2005). The view pertained that when a follower demonstrated wanted behaviour, they are rewarded. Conversely, portrayal of unwanted behaviour resulted in punishment (Bass, 1985; Burns, 1978). Although seen as "fair" in certain cultures (Pillai et al., 1999), this dictation dehumanizes the processes of leadership, being comparable to classical conditioning. Focusing on sport, fallibly, it is assumed that coaches have power, or even the authority, to create a conditional climate (see Turner, 2005). Borne from these ideologies, transformational leadership took hold, attempting to humanize the leadership process. Going back in time to personality and leadership, the transformational approach places a leader's charismatic tendencies at the centre of group cohesion and intrinsic motivation of followers (Bass, 1985). The approach posits that it is important for the leader to have a clear vision for the group, and that the influence of said individual will increase follower mobilization towards this vision, without doubt (Bass, 1985)

"*When it was wet, we bore the wet together, when it was cold, we bore the cold together*." – Genghis Khan (1162-1227AD)

It is possible to explain the successes of old through contemporary transformational leadership theory (Man, 2009). Although a ruthless leader, the qualities that Genghis Khan possessed enabled the conquest of the largest self-made kingdom of its time (Man, 2009). Said success can be explained through the four components of transformational leadership

(Bass & Avolio, 1990). Firstly, an 'idealised influence' over followers occurs when leaders act fairly to gain respect and trust. As an advocate of Mongolian conquest, treatment of those who followed Genghis' rule were treated with respect, maintaining integrity and famously leading by example (Man, 2009, p.45). Second of the four is the leader's ability to raise awareness of a vision (Inspirational motivation: Bass & Avolio, 1990). By embedding a vision into the foundations of the culture, and placing high expectations on followers, motivation to achieve the vision increases (Man, 2009 p.42, p. 72). Genghis rose the awareness of a singular vision to "*Unite the whole world in one empire*." This was made known to the Mongolian people, stating, as well as proving that a congruent motive holds prosperous ends; "*Unity of purpose is a fortune in affliction*". Thirdly, Genghis challenged followers to look at old problems in a new, creative manner (Intellectual stimulation: Bass & Avolio, 1990). Genghis' raids into the Western Xia failed, withdrawing in 1208. A year later, with a new unified plan, their army secured the submission of Western Xia by using the ideas of his people to succeed (Fitzhugh et al., 2009). Lastly, Genghis valued and considered the needs of the group, being selfless and serving to the welfare of his people (Man, 2009, p.125), living by the philosophy that only happy followers comes a happy leader (Individualised consideration: Bass & Avolio, 1990; Man, 2009, p.125). In review, transactional leadership places emphasis on power, where punitive control over subordinates is central to this approach (Bass, 1990; Turner, 2005). This ill consideration for followers spurred formation of Transformational leadership (Bass & Avolio, 1990). Much like Abraham Lincoln's approach (1809-1865), transformational leaders stress consensual action, which '*marks the true value of what leadership is*'. This being so, and power and authority being fluid, research remains on a leader, bringing contextual issues (i.e. peer leaders, multiple leaders, leadership as a process; Cotterill & Fransen, 2016; Currie & Lockett, 2007; Graen & Uhl-Bien, 1995).

Thus far, theorists have posited that leadership is a style that is unchangeable and fixed (Northouse, 2010), where the characteristics of a leader (Bass & Avolio, 1990) and the context afoot (Larsson & Vinberg, 2010) is pivotal in leader success. Although literature has acknowledged the two schools of thought interchangeably, sport specific theory into leadership effectiveness had not been considered. From Bass and Avolio's (1990) propositions that individualised consideration was an integral part of leader and group success, Chelladurai (1993) proposed further need for relational type leadership. It was theorized that athlete satisfaction and performance is subject to congruence between athlete and coach behaviour. Specifically, correspondence between required coach behaviour (i.e., the behaviour that best suits the situation), athletes' preferred coach behaviour (i.e., what the athletes want the coach to do), and actual coach behaviour is pivotal to athlete satisfaction and performance. Echoing Aristotle's philosophies ('*It is through (the people) that success is found'*: 384-322 BC), the needs of the athletes are considered, advancing knowledge on effective leadership. However, findings within this area are inconsistent regarding the model's hypotheses (Crust & Azadi, 2009).

From Chelladurai's (1993) relational discourse, research then prioritized athlete/follower's needs, and the ability to cater to these is theorised as being integral to effective leadership (Jowett, 2001; 2005; 2007). Jowett (2001; 2005; 2007) pioneered the coach-athlete relationship approach, positing that the athletic partnership between coach and athlete is at the foundation and heart of coaching. Rather than emphasising actual and required coach/athlete behaviours, Jowett's approach stresses the importance of mutual and causal congruence between a coach's and athlete's interpersonal feelings, thoughts, and behaviours (Jowett & Meek, 2000; Jowett & Shanmugam, 2016). These interconnected feelings, thoughts and behaviours are a result of what Jowett names the 3+1C's (Jowett, 2000). Closeness, commitment, complementarity, and co-orientation are four interpersonal

psychological constructs that underpin effective athletic partnerships. Closeness refers to the emotional connection that coaches and athletes experience in their daily interactions, such as mutual respect, trust, liking and support. Commitment is the desire to work not only towards a goal, but with one another in doing so. Complementarity, similar to commitment, refers to the cooperative and reciprocal interactions between the coach and athlete. As a result of these 3 constructs, co-orientation is likely to occur, this being mutual understanding and agreement with one another's viewpoints. By engendering this relationship, an athletes harmonious passion (Lafreniere et al., 2008), approach goals (Nicholls et al., 2017), perceived performance (Rhind & Jowett, 2010), physical self-concept (Jowett, 2008), intrinsic motivation (Adie & Jowett, 2010) and satisfaction (Jowett & Nezlek, 2011) is likely to be bolstered. Further, a strong dyadic relationship also decreases an athlete's fear of failure (Sagar et al., 2010) and perceptions of burnout (Isoard-Gautheur et al., 2016). To develop this dyadic relationship, Rhind and Jowett (2010) posited that leaders should be able to: prevent and manage conflict, be open, motivational, assuring, supportive and be able to build a social network (Team building, social cohesion). Gould and colleagues (2007) evidenced that leaders should have clear expectations, be accountable for their actions, trustworthy, care for their followers, be open in communication, and provide no personal criticism. By enacting these recommendations, the 3+1C dyadic relationship will develop.

This relational approach to leadership is non-more reinforced by the leader-member exchange (LMX) theory (Gerstner & Day, 1997; Graen & Uhl-Bien, 1995). Much like Jowett's propositions (2001), this approach posits that leadership stems from interactions between leader and followers, being a process rather than a possession. Across leadership contexts, research has evidenced the positive implications of dyadic, triadic and group level relationships between leader and followers/group (Balkundi & Kilduff, 2005; Graen & Uhl-Bien, 1995; Howell & Shamir, 2005; Jowett, 2000). LMX theory goes beyond the

development of dyadic relationships between leader and follower (i.e., Jowett, 2001) towards that of group level relationships (Graen & Uhl-Bien, 1995). Graen and Uhl-Bien (1995) evidenced that leaders should aim to 1) interact with followers to discover intergroup differences (in-group and out-groups), 2) focus on relationship quality and its outcomes, 3) take a prescriptive approach to building relationships, and 4) focus on group level relationships. A central tenant in this theoretical position is that commonality with the in-group and incongruence with the out-group should by exemplified. In doing this, LMX leadership is likely to positively influence job performance, satisfaction with the leader and self, commitment, role conflict, role clarity, member competence and turnover intentions (Gerstner & Day, 1997). This change from the innate leader (Great man; Weber, 1946), to the situation (Chelladuria, 1993) and then to the process (Graen & Uhl-Bien, 1995) dawned the formation of the social identity approach to leadership, emphasising the importance of relationship development through categorization with a group (ingroup vs. outgroup).

1.6 The Social Identity Approach to Leadership

Because leadership quality has been defined through a leader's ability to generate positive relationships with followers (LMX; Graen & Uhl-Bien, 1995), research turned to the social identity approach to leadership (Hogg, 2001). From the support for relational approaches (LMX; Graen & Uhl-Bien, 1995), enquiry delved into how leaders can develop a sense of social identity in followers. Combining conclusions drawn from social identity theory (Tajfel & Turner, 1979) and self-categorisation theory (Turner et al., 1987), a 'new' theoretical standpoint was generated (Haslam et al., 2011; Hogg, 2001). The social identity approach contends that the processes within a group are of importance for cognition and behaviour (Tajfel & Turner, 1979; Turner et al., 1987). At its roots, the social identity approach presents that individuals define themselves in two different ways when within a

social context. People define themselves as individuals (i.e., personal identity; 'I' and 'me') and as group members (i.e., social identity; 'we' and 'us'). To provide an example, an individual may define their personal identity as caring and passionate, though when referring to themselves relative to their social identity, an individual may tell someone that they are a part of a group (i.e. a football team). Our social identities hold meaning and define who we are and the way we behave in specific environments (i.e., I am part of a Manchester united fan group). To separate personal and social identity, personal identity is the perceived distinction between themselves and others (i.e. I am kind), whilst social identity refers to an individual's perception of self in relation to others within a group (i.e. I am part of a football team). For social identities to hold importance, an emotional value and significance towards said group is needed (Tajfel, 1972, p. 292).

Extending on personal and social identity in a sports setting, athletic identity provides a tertiary angle. An athletic identity is the acknowledgement of an individual's identification with an athletic role (i.e. defender within a football team), and how the values this brings devises who they perceive to be as a person within that role (i.e. Encouraging, supportive; Brewer, van Raalte, & Linder, 1993). Conceptually, athletic identity differs from personal and social identity. Summarizing the three, social identity is the perception of belonging with a group (i.e. a football team: Slater et al., 2014). Personal identity is how an individual sees themselves (i.e. caring, passionate), and athletic identity is how an individual identifies with the role they play within a certain context (i.e. I am a defender). As a response to belonging within a group, cooperation (De Cremer & van Vugt, 1999) and mobilisation of efforts is likely to increase (Cregan et al., 2009; Slater et al., 2017; Slater & Barker, 2018). Further, this belonging holds positive implications for resilience (White et al., 2020), life satisfaction, cohesion, and exercise participation (when within an exercise group; Stevens et al., 2019).

Because of the positive effects of social identification, and that leader-follower relationships hold implications for action (LMX; Graen & Uhl-Bien, 1995), a social identity approach to leadership was developed. Since Hogg's (2001) work almost two decades ago, the social identity perspective of leadership has proven pivotal to leadership success. To explain, if an individual has an emotional and meaningful connection to a group, behaviours are likely to align with their social identity, rather than their personal identity (Adarves-Yorno et al., 2006). Whilst identifying with a particular group, typically there is an adjacent group that opposes these groups ideals (i.e. in-groups and out-groups). A group that individuals feel a part of is defined as the in-group (i.e. England football team, Staffordshire University). Conversely, a group that an individual feels no association with is referred to as the out-group (i.e. France football team). As part of this, the in and out groups are likely to be within the same sector, for example opposing football team, university or rival business (Simon & Oakes, 2006). Extending on this, social identities can work at various levels. An individual can be broadly associated with their nations football team (England football team; Reicher & Hopkins, 2001), as well as their local sports team (Manchester united; Wann et al., 2001). Lastly, the strength of the identification with a certain group can have motivational inferences (van Knippenberg, 2011). Holding a strong identification with a group positively influences behaviours (i.e. in-group encouragement and bias; Wann et al., 2001). Namely, those who identify strongly with a group see themselves in terms of that group (i.e. I am what this group represents), and as a result have more to gain/lose from their groups success/failures. In sum, if a leader can help a follower internalise a groups ideals, these individuals are likely to behave within the acceptable structure of that particular social identity (Cremer et al., 2006; Tajfel & Turner, 1979; Turner et al., 1987). From this identification, members are likely to advance the groups interests and ideals (i.e. social creativity).

By defining the self via a meaningful and emotionally connected social identity, an individual is likely to see themselves as one of the group (Turner et al., 1987). To illuminate this connection, similarities with the in-group, and differences with out-groups are emphasized, solidifying in-group behaviour (Turner et al., 1987). Hence, congruent self-motivated in-group behaviours are induced as a result of common aspirations and interests. By this, an individual will act in a way to intensify the difference between the in-group and the out-group to ensure uniqueness (Haslam, 2004). From literary discussion outside of sport contexts, longitudinal research has found that in-group identification within theatre production groups predicted higher levels of citizenship (i.e., working beyond the call of duty), pride (i.e., taking pleasure from group achievements) and work satisfaction. Contrary, in-group members were less likely to burnout when strongly identifying with a group (Haslam et al., 2009). From this, it can be argued that having a strong identification with a group can buffer against negative effects of stressors and enhance positive behaviours within a specific context. The social identity approach evidences the importance of emotional attachments and a sense of belonging to a group (Tajfel & Turner, 1979; Slater et al., 2013). Literary discussion has identified that cognition and behaviour improve as a result of a strong identification with a group. From this position, the following identifies how leaders can develop perceptions of social identity in a group, in the aim to improve cognition and behaviours as found.

1.7 Principles of the Social Identity Approach to Leadership

The social identity approach to leadership aims to understand the processes through which influence is corroborated (i.e. from a leader). Specifically, intrigue lies in the processes that create follower perceptions of leader effectiveness, and how followers are motivated by leader behaviours (Haslam et al., 2011). This field of research is relatively novel in

comparison to other leadership theories (Dinh et al., 2014, p. 42). Yet, significant advancements have been made in social identity literature, now being adept in explaining contextual influences and group dynamics as a result of the social identity approach to leadership (e.g. Slater et al, 2018; Van Dick et al, 2018). This research has dawned from Haslam and colleagues' (2011) culmination of 20 years of social identity literature. This was the introduction of the four principles of the social identity approach to leadership. Effective leaders are those who are: (i) in-group prototypes; (ii) in-group champions; (iii) entrepreneurs of identity; and (iv) impresarios of identity.

1.7.1 Leaders as In-Group Prototypes

"*To love someone is to identify with them*" – Aristotle (384 BC- 323 BC)

Using historical examples, Aristotle states that to love someone (i.e., a group) is to identify with them. By identifying with an individual or group, an individuals' attitude and behaviour aligns within the boundaries of what is acceptable for that group. This attitude and behaviour is being prototypical, being one of 'us' rather than one of 'them'. Using research to explain, Platow and colleagues (2005) used laughter. It was found that if an individual hears a not-so-funny joke, yet those you value around you (in-group) are laughing at the joke, you were likely to laugh too. On the other hand, if you hear a joke and members of the out-group were laughing, you are less likely to laugh along. This bias is a result of in-group influence. Therefore, to influence a fellow, in-group acceptance is required. However, a leader can be one of the group as mentioned, yet not be highly prototypical of the group. A prototypical leader will emphasize what they all have in common, uniting the group under specific values and beliefs (i.e. we are loyal and brave). Yet, it is not enough to emphasize commonality without classifying how 'we' are different to 'them' (Haslam et al., 2011). Put simply, a leader should highlight that the in-group's way of operating is better than the outgroups. The

higher the ratio between “us” and “them”, the greater the in-group prototypicality will be (i.e. “we are worlds apart from the outgroup”).

In research, seminal work by Cartwright and Zander (1960) opened thought into leader prototypicality and power relationships. Within their work, teams were created, one which had chosen a leader based on attributes, and one being randomly selected. On a decision-making task, those who chose a leader based on attributes ended up performing worse than teams with a randomly selected leader. To explain, when those who were randomly selected as a leader, the team members worked together to achieve the goal. Unsurprisingly, when those who were chosen as the leader based on attributes, some followers who were not deemed to have these qualities rebelled against the leader’s decisions. This reaction was seemingly out of spite, as if to say, ‘you do it if you’re so special’. This uncovers the postulate that the higher the power ratio between leader and follower, the less effective the leader and followers will be. Hence, on the face of it, prototypicality (i.e. ‘one of us’) was apparent in the random group, as no one was put in a position of power based on attributes. As a result of this, no spite, jealousy, or power differences came to the fore.

Within stress-based research, a prototypical leader has been found to positively contribute towards job satisfaction when job related stress was high (Cicero et al., 2007). Findings highlighted that when a leader was prototypical of the in-group, team identification was likely to be bolstered. From this enhanced identification, job satisfaction was likely to be high, regardless of mounting job-related stress. It seems that, within an organisational context, prototypical leaders can ameliorate the negative consequences of stress (e.g., burnout). Given the context and findings of the above, it is advantageous to understand the influence of identity leadership on stress within sport settings.

1.7.2 Leaders as In-Group Champions

"*… it is a kind of good deed to say well; and yet words are not deeds*" – William Shakespeare (1564-1616)

Much like Shakespearian remarks, projecting that 'we' as a group are distinct and unique holds limited value without 'doing'. It is the behaviours of a leader that armours the group with collective visions and interests. By this, a leader should advance the interests of the group. Ironically Shakespearian, 'acting' as one of 'us' is that which is necessary to improve follower cognition and behaviours. This 'act' is discussed through the lens of leader fairness. As a historic definition, transactional theorists have posited that rewards and punishments constitute as 'fairness' (Pillai et al., 1999). Wit and Wilke (1988) posited two perspectives on acting fair. The first, echoing power relations in transformational leadership (Bass & Avolio, 1990), a leader who rewards themselves more than their followers will compromise leadership ability. Further, leaders who treat members of a group, or sub-groups differently, will diminish a leader's standing. Wit and Wilke (1988) identified that the latter view of fairness is about the quantity of reward delegated to different followers (i.e. distributive justice), as well as the fair application of the rules in deciding how much reward different members are allocated (i.e. procedural justice). Although fairness is fluid by definition, the concept of fairness in advancing a groups ideals is important in social identity research. Group maintenance hinges on inter group differences, intragroup positive relations, and impartial in-group treatment (Cartwright & Zander, 1960). In-line with procedural justice (i.e. fair application of rules), those leaders who are procedurally fair are more supported (Tyler et al., 1985), are less likely to take days off sick (Schmitt & Dörfel, 1999) and are more committed to their organisation (Brockner et al., 1993). To this end, leaders who treat their followers fairly, in the modern definition of the word, positively influence follower cognition and behaviour.

A significant contributory factor to intragroup survival is respect. Mutual respect within a group has been shown to improve collective self-esteem (i.e. perception of self as a group member; Smith & Tyler, 1997), compliance with rules, citizenship (i.e. going above the call of duty), and commitment to the group. This pattern of relationships was later theorised as the group engagement model (Tyler & Blader, 2000; 2003). Rather than fairness directly refining group maintenance, it may be through dualistic use of fairness and respect that coincides to improve group maintenance and advancement. Yet, what fairness is can also be shined in the lens of favouritism. By this, research has identified that in-group bias, with out-group impartiality is perceived as fair. Turner (1975) found that an individual will allocate more resources (in this case money) to an in-group member than an out-group member when given a choice to allocate. This allocation of resources shows that group members are likely to do more for the in-group than the out-group, hence advancing the groups interests. However, later research has found that this concept is subject to context. Platow and colleagues (2003) identified that within an inclusive Olympic context, leaders who favoured the in-group over the out-group were less likely to be endorsed. Within this context, equal treatment of all groups was better received. Hence, defining 'fairness' through group-led acknowledgement of in-group values and behaviours are necessary for advancement (i.e., champion of identity) to be viable.

Going a level deeper into favouritism, research into in-group and out-group leader behaviours has found tenable results (Subašić et al., 2011). Followers were under variable levels of surveillance from their leaders whilst doing a task. Participants were sanctioned when the task was incorrectly completed (i.e. punished). Without being observed doing the task, in-group leaders were perceived as more influential than out-group leaders. However, whilst being observed, in-group leader influence was reduced. By implication, when observed or punished, in-group leaders lose influence over their followers. This conditional regard

towards followers (i.e. punishment) links to the power over approach, which has negative relational inferences (Turner, 2005).

Power over members of a group (Bass & Avolio, 1990; Turner, 2005) can reduce dyadic trust, and should be avoided if not acting in the group's interests. Power over follower's concern authority and hierarchical position and dictation (French & Raven, 1959; Turner, 2005). Research has showed that followers who are rewarded and punished are more likely to be dissatisfied with their leader (e.g. Rahim & Buntzman, 1989). On the other hand, 'power through' approaches emphasise psychological connections between leaders and group members. By this, a shared identification, through a dyadic emotional connection, underpins a leader's influence (Reicher et al., 2005; Subašić et al., 2011; Turner, 2005). Because of the relational nature of the 'power through' approach, group members internalise collective values of the group. However, because the 'power over' approach involves dictation and conditional positive regard, surveillance is the only effective way a leader can influence a follower (Subašić et al., 2011). Hence, by working with, rather than dictating, and being fair and respecting followers, only then can advancement of group ideals occur.

In relation to stress, in organisational settings, mindful leaders, whom treat their employees with greater respect, were likely to improve the interpersonal leader-follower relationship. As a result, employee stress was likely to reduce, and performance was likely to improve (Reb et al., 2019). Here we can see that the interpersonal relationship between leader and follower both positively effects stress and performance. It would be advantageous to understand the influence identity advancement may have on psychophysiological stress and performance in sport setting, to evidence generalizability of the above results.

1.7.3 Leaders as Entrepreneurs of Identity

"*like Pisistratus before him, Pericles stressed the unity of citizens and state, and he encouraged the Athenians to see in himself the symbolic embodiment of the latter*" (Pericles, 494-429 BC) (Ober, 1989, p. 88)

From earlier need for fairness, comes need for *meaning*. As Pericles emphasised, he is a symbol of what the state stands for, and should unite to what he, and the state set out to achieve. Leaders of this nature are known as *entrepreneurs of identity* (Reicher & Hopkins, 2001). Emphasis here is how social identities (i.e. an Englishman, a football team) shape an individual's social reality. Specifically, how do leaders shape social identities to mobilize and shape collective action to in turn influence social reality. Rationale behind research into this area lies in incongruent meanings within groups. If it is unclear what the meaning behind a social identity is (e.g. to be Scottish, to be a member of the Labour party), it is important to identify the process to make this clear as it will determine how (and whether) members of a group will act collectively. By this, as in-group members, individuals will seek to conform to norms of a group (Haslam et al., 2011, p. 143), and thus without knowledge of these norms, how is it that these are learned and internalised. Internalising a shared sense of 'us' is the basis for a model of influence and leadership (Turner, 1991).

Ensuring clarity on *why* individuals engage within a group, the source of influence, target of said influence, and content of the influence must be identified. The source of influence refers to '*who*' the prototypical individual is within a group. Identifying an integral individual within a group will give an indication of the required, or necessary behaviour that is acceptable within that given context (Haslam et al., 2011, p. 144). Further, the target of influence is all those who identify with a given social identity, stopping at the limit of social identification. By this, if the category (boundary of membership) and constituency (those you seek to mobilize) are aligned, a leader is likely to appeal to all they seek to support (see Reicher & Hopkins, 1996a, 1996b). Content of influence refers to the meanings behind social

identification (Postmes & Spears, 1998; Reicher, 1984; Turner, 1999). A leader will be unable to get across to their followers if the stance of language and behaviour is incongruent with what it means to be part of that group. If an individuals' social identity aligns with congruent social realities (i.e., a shared sense of us), this will exude passion for what it means to be a group member, caring about the groups good standing, and defending the group from attack (Branscombe et al., 1999). As a result, members of a social identity will express shared values in action, achieve collective goals (Reicher & Haslam, 2006), improving wellbeing and promoting mental and physical health (Haslam et al., 2009). Leaders who are able to maintain a shared sense of us (i.e., entrepreneurs of identity) within a group are likely to decrease perceptions of burnout and increase work engagement in an organisational setting (Steffens et al., 2018).

To exemplify the importance of identity content (i.e., a shared sense of 'us'), the BBC prison study (Haslam & Reicher, 2007; Reicher & Haslam, 2006) revealed the power of collective meaning. In a 2-week simulated prison, participants (unknown to one another) were given either high (prison guard), or low (prisoner) power. Within this social system, antagonistic behaviours came to the fore. A new member was then introduced five days into the study. This individual was advised to emphasise inter-role unity, seeing all the participants (i.e., prisoners and guards) as one group (one social identity). From this, the content of identity was changed from acting as a guard or prisoner, to acting as a participant. Because of this change there was a reduction in antagonistic behaviours and the participants started to challenge the experimenters. By emphasising "we" and "us", the identity of the group was re-defined. Having a collective focus and a new meaningful identity for all enabled the leader to gain support and mobilize the group in progressing towards their vision (Haslam & Reicher, 2007). As such, the meaning behind identification has significant implications, thus being an important process for the survival of a group. Echoing

Shakespearian ‘acting’, it is this unified meaning or vision from which a leader should act to make this a reality.

Within an exercise setting, an experimental design, of which manipulated identity entrepreneurship, identified that a shared sense of identity positively influences effort and performance on a cycling trial (relative to low levels of identity entrepreneurship; Stevens et al., 2019). Here, the authors provide causal evidence for the efficacy of identity entrepreneurship in inspiring greater effort and performance from followers. Though what is not understood is the mechanisms through which identity entrepreneurship can influence effort and performance (i.e., identification, appraisals, physiological reactivity). Here too, it is advantageous to understand the mechanisms through which identity entrepreneurship influences performance.

1.7.4 Leaders as Impresarios of Identity

"None of us ever do great things. But we can all do small things, and together we can do something wonderful" – Mother Teresa (1910 – 1997)

Making a collective vision a reality is an integral process in shaping social identification. One eye must be on the vision, whilst one eye must be on *how* it will be achieved. Haslam and colleagues (2011) compare this creation to artistry. As alluded to, knowledge of the context afoot is pivotal for leadership success. Yet, the authors note that it is knowing the culture as well as linguistic skill that adds weight to the development of a groups vision. By linguistic, this refers to managing communication both verbally and visually to choreograph a display of identity within a group. In addition to articulating a vision, steps need to be taken to show that the vision is likely to be achieved. By taking part in social action (e.g. party protests) or meetings to organise steps towards achievement, this will enhance the groups autonomous action towards a shared vision (Haslam et al., 2011).

However, these activities or structures must reflect both leader and group identity content in order to allow for a vision to become a reality (Boen et al., 2008). If an activity aims to achieve something that fits within the meaning of the group, followers are more likely to invest due to the attribution of the self being part of the social group (Haslam, 2004). Hence, taking part in said activity is an improvement of the socially defined self. Though importantly, perceived prototypicality of a leader is likely to dictate influence on followers' cognitions and actions. Prototypical leaders are perceived as more trustworthy (Giessner & van Knippenberg, 2008; Giessner et al., 2009). As such, a leader must be part of a social identity before becoming trustworthy enough to attribute influence over followers. To this tune, it has been found that established, prototypical leaders who set challenging goals positively related with better performances from followers. Yet, this relationship was moderated by trust in the leader. From this, it can be inferred that prototypical leaders can challenge followers without decrements in trust because the challenge is seen as an opportunity to take steps towards the collective vision. In sum, an established, prototypical leader that knows the culture of a group, has the skill to engineer success, and organises opportunities to achieve a congruent vision, is that of an impresario (i.e., embedder) of identity. From this the leader is likely to gain support from all those who fit within the boundaries of social identification.

Within sport research, it has recently been evidenced that the enactment of identity impresarioship (i.e., embedding social identities) is likely to improve follower trust in the leader, influence on the athlete, intentional mobilization, a reduce conflict (Evans et al., 2021). Equally, when identity impresarioship is reduced, trust in the leader is depleted. This research adds to the existing work that identity leadership can improve effort (e.g., Stevens et al., 2019), intimating that identity impresarioship can also play a role in competitive performance. Though again, the mechanisms through which identity impresarioship

influences mobilization and performance is not clear. Thus there is scope to understand whether the enactment of identity impresarioship can influence psychophysiological stress, to in turn manipulate performance.

1.7.5 Summary of the Social Identity Approach to Leadership

The social identity approach to leadership has proved influential in developing interpersonal trust (Giessner & van Knippenberg, 2008), job performance (Zhu et al., 2015), sport and exercise attendance (Stevens et al., 2018), athletic performance (Stevens et al., 2019), and improvements in perceived effectiveness and charismatic tendencies of the leader (Barreto & Hogg, 2018; van Knippenberg & van Knippenberg, 2005). Because this relatively new leadership approach is a significant predictor of a variety of variables, it is not inadmissible that stress can be influenced by a leader. Because identity leadership has been found to positively influence attendance (Stevens et al., 2018) and athletic performance (Stevens et al., 2019), it is not inadmissible that identity leadership can influence psychophysiological stress on approach to competitive scenarios. Here, identity leadership may serve as an antecedent to positive stress responses (i.e., to competition), in turn improving athletic performance (i.e., Stevens et al., 2019). In other words, identity leadership may improve individuals' stress responses to competition, in turn improving athletic performance. Within idiographic research, it has been evidenced that a coach can influence an athletes' effort, expression, development, avoidance behaviour, body language, emotions, confidence, motivation, and performance outcomes (Thelwell et al., 2017). Equally, research involving interviews with elite athletes have also noted the importance of a supportive leader for emotion regulation and athletic success (Poucher et al., 2018). As such, it can be intimated that a leader can influence stress related variables, though it is currently unknown how and whether identity leadership influences psychophysiological stress and motor performance . Therefore, the following elucidates current knowledge on psychophysiological

stress as a mechanism through which performance is manipulated. In order, the following identifies a timeline of knowledge on stress, the stress-based approach utilised within this thesis, and research to date into the effect of leadership on psychophysiological stress.

1.8 Early Knowledge of Stress

Stress is ubiquitous in life, yet how stress is operationalized has seen various conceptualisations. It has been recognised since the philosophies of ancient Greeks that an external event can affect the internal stability of individuals, causing disease in the process (Goldman et al., 1996). Democritus (460-370BC) posited that changes occur to the body as a result of forces placed upon it. Hippocrates (460-380BC) extended this, noting the importance of a balance between humors; blood, phlegm, yellow and black bile content (Bynum, 1993). This balance was said to be pivotal for health, further theorizing that external environments can affect this internal regulation. Although inaccurate in ways, it is an early demonstration on the effects of perception on the internal self, bearing physical consequences such as disease. As such, this very proposition aided formation of the first cognitive behavioural therapy, in the attempt to promote psychological functioning and health (Rational Emotive Behavioural Therapy: Ellis, 1957).

Echoing this, Atticus (c. 175AD) philosophised that those who overcome the physical consequences of stress have a '*glimmer*' to them. This early position on adversarial growth, overcoming negative perceptions of an external event, can have beneficial effects on the physical self. Boethius (480-524 AD) echoes this, proclaiming that it is thought that makes something bad or good. Later in the renaissance period, William Shakespeare (1564-1616), inspired by Hippocrates' philosophies, echoes the effect of a humoral balance on health. Shakespeare theatrically posited that four external elements; earth, fire, water, and air affect internal humoral balance, which in turn will contribute to ill-health, temperament, mood and manner of action. Shakespeare also posited that the positions of the planets, and even the

colour of an individual's socks, can affect humoral balance, and thus your entire being, body and soul (Wheelock, 2011). Although farfetched, it endures discourse that perceptions of external events can affect internal states and subsequent behaviours, forming the basis of modern knowledge of what stress is.

Later within the 17th century, Robert Hooke introduced the notion of mechanical load, stress and strain, known as Hooke's law (1660, 1705). The load is the demand placed on a structure, while stress is the area affected by the demand, with strain being the change as a result of load and stress (Cox, 1978). To relate this to human-like stress, the load is the amount of pressure placed on the person (e.g. work commitments), the stress is the effect this has on the person (e.g. overworking), therefore, the strain is the consequences of both pressure and overworking (e.g. burnout, demotivation, lethargy, anxiety, illness). On this basis, stress discourse posited that the body is like a machine, being susceptible to wear and tear, needing energy to endure stress. Further reflecting the machine-like nature, a body without necessary energy to endure stress, will perform worse, and slowly stop (Doublet, 2000). From this position, it was noted that not only does the physical body suffer from energy depletion, but psychological functioning as well, through nervous energy diminution and exhaustion (*Neurasthenia*; Beard, 1869). Van Deusen (1868) extends this, claiming that nervous energy depletion causes, at least the dated proposition of, 'insanity', manifesting itself in depressive and manic episodes. This mechanical position on stress put forth by Hooke (1660, 1705), Beard (1869) and Van Deusen (1868) is none more echoed than by Claude Bernard (1859).

Ever advancing the Hippocratic 'internal balance and health', Bernard (1859) added that the body's fluids compensate to maintain homeostasis during the influence of external events. In timely Darwinian fashion (1858: Theory of Evolution), Bernard posited that the body adapts, being able to change internal consistencies to cope with external influences. Yet,

forming rationale for Van Deusen's (1868) propositions, Bernard claimed that the compensatory nervous system can be overloaded, which then causes nervous exhaustion, bringing anxiety, 'insanity', and fatigue to the fore. From this, it was conceived that the pressures of life (i.e. external events) act as an antecedent to internal disproportion (Howard & Scott, 1965). As such, showing 'stress' was seen as an indication that an individual had failed to adjust to modern 19th century life (Abbot, 2001). Affirming the concept of adversarial adjustment and consequential illness, Walter Cannon furthered the homeostatic concept.

Cannon (1929b) posits that natural powers, or *vis medicatrix naturae*, are corrective agencies that regulate an organism when 'upset', coined as homeostasis. Running with Greek origins, "homeo" and "stasis" mean "same" and "steady" in Greek. In line with Bernard's (1859) propositions on a compensatory system, homeostasis refers to regulatory procedures after receipt of likely change to the external environment. To elucidate, body temperature is to be maintained between 34.8 and 37.8 degrees celsius, with figures either side of these holding health complications (hyperthermia and hypothermia, Marx, 2006). Yet, the external environment is likely to be different to these figures. As such, homeostatic regulatory processes are at play to maintain stability (Sund-Levander et al., 2002).

Human survival has hinged on adaptivity to dangerous environments. This adaptivity to an imminent scenario is coined as a fight and flight response (Cannon, 1929a). In wake of impending danger, it is an instinctive human trait to fight or to run to avert death. This is represented as anger (fight) or fear (flight) when facing threat to survival. Although much like Hippocratic philosophies on the external affecting the internal, it was Walter Cannon that confirmed the accuracy of these postulates through empirical physiological testing. Responsibility for the fight and flight response, and consequent corrective homeostatic processes, lies in the adrenal medulla, the most primitive part of the brain. By automatically

releasing catecholamines (epinephrine and norepinephrine), the sympathetic arm of the autonomic system is activated, increasing blood flow to the muscles, pupil dilation and respiratory strength in both fight and flight situations. Hence, this provides efficient mobilisation of mental and physical resources to meet the demands of the impending danger (Cannon, 1915). Further, after the danger has surpassed, the parasympathetic arm of the autonomic nervous system is activated (epinephrine release) to attain homeostasis, restoring internal consistency, eradicating the demand on the body (Cannon, 1939). These findings detail that without an autonomic nervous system, homeostasis would not be possible, thus requiring constant favourable environments, without any perceived stressors (Cox, 1978).

Although Cannon's work was the birthplace of stress literature, researchers have criticized his proposals. Developments in what 'fight' and 'flight' responses are were made in the 20th and 21st century (Bracha et al., 2004). These changes came from the notion that Cannon did not consider which response would occur in specific situations. As well as this, threat can elicit more responses than just 'fight' or 'flight' in mammals. Albert Ellis' work (Ellis, 1957), using 'A' as the activating event, 'B' as the belief, and 'C' as the consequence, can be utilized to explain Cannon's position. Cannon would theorise that 'A', the event (e.g. a lion in the room) would cause 'C', being the instinctive reaction (Cannon, 1929a) without a 'B' (i.e., a belief about the activating event). However, research would suggest that 'A' would inform 'B' which then informs 'C' (Turner et al., 2020). It has been shown that 'B' is a heightened awareness and assessment of behavioural markers of others within stressful situations. By adding 'B', an informed decision can be made on what is necessary behaviour for that given situation (C). Because of this, fight and flight responses are not instinctive, but rather malleable to cognition about the activating event.

Cannon pioneered stress literature, yet the explanation behind the stress response was by Hans Selye. Selye devised the conceptually acceptable theory; General Adaptation

Syndrome (GAS). Coining ‘stressors’ as ‘nocuous/noxious agents’, it was found that stressors lead to patterned, non-specific ‘chemical protection’, or ‘adaptation’ to a stressor (Selye, 1979). By this, indefinite meandered change in physiology occurred as a result of an external stressor. Like Hooke’s (1705) robotic depreciation of the body, stressors (noxious agents) deplete the energy of an organism that is making a protective change to the body. Rather than orthogonal reactivity (fight or flight), physiological reactivity differs depending on the stressor afoot and the condition of an organism in response to a stressor (Selye, 1976).

Taking both theorists stances, commonly, they agree that a threatening situation will elicit a physiological response. Yet, the position that stress induces non-specific physiological reactions (Selye, 1979) has received criticism. Marx’s (2006) postulates on homeostatic overload reign true (hyperthermia and hypothermia). By this, when exposed to heat, flushed skin and sweat is produced. Contrary, exposure to cold conditions produces erected body hair and shivering in the attempt to increase body temperature. These physiological responses are specific to certain external conditions, leaving little non-specific physiological reactions (Doublet, 2000). To further critique, both Cannon’s and Selye’s early work disregards potential cognitive factors that can increase knowledge of stress. Like early philosophical discourse (Boethius, 480-524 AD), it can be argued that it is thought that makes a ‘stressor’ ‘stress’-ful. Without physical danger that would justify a ‘fight’ or ‘flight’ response in modern life, a non-life-threatening event still has ‘stressful’ implications (e.g. an exam). As posited, an immediate ‘fight’ or ‘flight’ response (Cannon, 1929a), nor a chemically induced adaptation in response to a dangerous situation (Selye, 1979) is applicable to an upcoming non-life-threatening exam. Thus, it may be so that there is a cognitive mediator between ‘stressor’ and ‘stress’.

In somewhat psychological fashion, Selye then introduced eustress and distress to the GAS (Selye, 1976). Eustress is good stress that increases physical and mental functioning,

including improved emotions. Adversely, distress is bad stress, being associated with negative emotions and anxiety. This refers to the body's inability to cope with the demands of a situation, eliminating homeostatic maintenance. However, this was the limit of Selye's psychological appreciation. By sticking to the hypothesis that the body has a non-specific response to a stressor, bodily eustress and distress manifests itself in the same way. By which, Selye posits that because physiological stress responses are non-specific, the body cannot differentiate between outward portrayals of eustress or distress. Hence, both types of stress can be harmful, due to the non-directional nature of the physiological response. Research within this timeframe also evidenced that two individuals taking part in the same event can produce two different reactions (Cox, 1978). Hence, patterned responses to particular situations are inaccurate within Selye's stress research.

From solely biological beginnings, Harold Wolff dawned cognitive psychology as part of the stress conundrum. Resembling Hippocratic philosophy, stress was seen as a result of perception of a situation. Developed from early aetiology of stress, Wolff claimed that it is the interaction between the external and internal environment that explains an individual's response to a demand. Notably, Wolff found that the evolutionary responses to stressful situations (Cannon, 1929a) held adverse health implications (Wolff, 1953). This is so much so that it was later posited that physiological responses are inappropriate for modern humans (Carruthers, 1981). With psychosomatic understanding of stress, it is an individual's interpretation of a threat that creates adversities within the two (psychological and somatic; Wolf, 1950; p.1090; 1953). By this, if the stressor holds psychological importance, an individual will react in the same way as if there was a physical threat. Although theorized, Wolff did not explain why these incongruent postulates (psychological importance and physical threat) evoke similar stress responses. Further, Wolff did not identify what it is within the interaction between the environment and the individual that arouses a stress

response. This extension of knowledge was largely produced by cognitive psychologist, Richard Lazarus.

1.9 Lazarus and Cognitive Appraisal

"There is nothing either good or bad, but thinking makes it so" – William Shakespeare (1564-1616)

Arguably, the birthplace of modern stress literature came in the 1950's, stemming from the work of Richard Lazarus. Up until this time, the link between the environment and the individual had not been extensively considered, where perceptions of an external event have psychological implications. It was formulated that stress is orthogonal, being facilitative or debilitative, depending on appraisal. Appraisal, simply, is the way we see an event, which can shape the way an individual reacts to a given situation. However, an event is not seen as a sole construct, i.e. just a 'tennis match'. The event evokes thoughts on the inner workings of said match. These thoughts include; what it takes to perform well, what it will mean to us if we perform badly, and not knowing what the result of the event will be. These thoughts are known as demands, that all face. To cope with these demands, adaptive appraisal strategies are necessary.

Lazarus posited that appraisals form two distinct levels; primary and secondary. Primary appraisal refers to the importance or significance placed on an impending event, i.e. a cup final (Wolff 1950; 1953). A secondary appraisal refers to the thoughts that occur in reaction to the event. Using Shakespearian discourse, secondary appraisals determine whether a reaction to an event is 'good or bad'. Lazarus asserted that if the fulfilment of a goal is under threat, stress will occur. Yet, this threat does not necessarily disrupt responses to a situation (Lazarus et al., 1952). Providing scope to determine why this occurs, Lazarus found that differences in cognition, motivation and previous experience influence the stressor –

stress reactivity relationship (Lazarus & Eriksen, 1952). Over a decade later, Lazarus and Alfert (1964) identified that secondary appraisals of an event (i.e., appraising it to be good or bad) can be manipulated by how the event itself is presented (i.e., primary appraisal). Specifically, the experimenters used film to shape cognitive appraisals, heart rate and skin resistance (i.e., stress). Said film included footage of surgical procedures, being intentionally primitive. Undoubtedly, the predicted response would be 'stressful'. However, when the film was introduced as harmless, the consequential 'stress' response reduced. Hence, the event taking place (i.e., surgical film) was not the direct cause of stress, more so the perception and meaning placed on the event that dictated stress reactivity. Specifically, it is the valence of secondary appraisal (i.e., good or bad) that can produce benign, harmful, threatened, or challenged/opportunistic reactivity (Lazarus & Folkman, 1984). Extending Wolff's propositions, this depended on the effect the environmental stressor had on affect, personal growth, development and well-being.

1.10 The Psychophysiological Perspective

Lazarus' research then endeavoured into the influence of neuroendocrinology. Echoing Cannon's fight or flight response, measurement of sympathetic nervous system activation reflects that of a stress response. Consequential mechanisms on health and wellbeing can be determined by measuring physiological markers of psychological stress. Two orthogonal systems have received attention through previous implications in having a role within the stress response (Cannon, 1929a; Selye, 1979). Led in the latter half of the 20th century, the Sympathetic Adreno Medullary (SAM) and the Pituitary Adreno Cortical (PAC) systems have been found to play key roles in the stress response. In wake of an event, the sympathetic nervous system increases heart rate, blood pressure, pupil size, metabolic rate, and noradrenaline. As a necessity for survival, activation of these areas increase our

likelihood to survive in dangerous situations. Yet, life threatening situations are few and far between in modern day society. Without being able to physiologically adapt to modern life, we perceive these threats to our existence through motivated performance situations (Frankenhaeuser, 1981). When the sympathetic nervous system is activated the SAM axis releases adrenaline, increasing oxygen and glucose to the brain and muscles, suppressing non-emergency bodily processes such as digestion.

Seminal research utilised urine testing techniques to measure catecholamine (released via SAM activation) and endocrine responses (fluorometric technique; Euler & Lishajko, 1961). It was found that the greater the release of catecholamines the greater the emotional reaction to a task. Further, it has been identified that the greater the adrenaline release, the better participants performed on a selective attention task (Frankenhaeuser et al., 1968). However, it was found that those who reported low levels of stress released catecholamines (concordant with efficient glucose release) in response to a selective attention task, in turn performing better than those who perceived greater stress. To this tune, self-reported stress may not be congruent with physiological markers. Research has also found that two different responses to stressors can be distinguished by the contents of urine samples (Lundberg & Frankenhaeuser, 1980). It was found that those who experienced distress and negative emotions in highly stressful situations were likely to excrete cortisol (associated with PAC activation), while those less distressed and experiencing positive emotions released catecholamines. These findings open suggestion that there are two systems that determine emotional arousal, where catecholamine release (as a result of SAM activation) and cortisol release (as a result of PAC activation) in urine are dependent on the level of cognitive stress (positive and negative emotion) displayed by an individual.

Further affirming the two stress responses, findings have evidenced that the greater urinary cortisol excretion, the lower the catecholamine release. Aversely, the less cortisol

released, greater catecholamines are released (Frankenhaeuser et al., 1980). This reciprocal relationship demonstrates that SAM and PAC activity work interchangeably, having differential effects on the stress response. Frankenhaeuser and colleagues (1980) evidenced that heightened catecholamine release, as a result of SAM activation, was more prevalent in controllable, self-paced situations. This heightened SAM activation over PAC is said to reflect being 'challenged' to perform well, and that lower levels of cortisol reflects perceptions of control. To this end, it is argued that catecholamine release (as a result of SAM activation) is an adaptive stress response, while cortisol release (as a result of PAC activation) is maladaptive (Frankenhaeuser et al., 1980). Adding to this argument, findings evidence that cortisol release is detrimental for memory, attention, decision making and overall performance (Harvey et al., 2010). In sum, interest in psychological and physiological stress has largely been researched separately. Yet, the above findings spurred interest in identifying the association between psychological and physiological stress.

Research by Ursin and colleagues (1978) identified that psychological evaluation of an event holds important implications for SAM and PAC activation. Military personnel during training were exposed to incrementally fear-provoking training over time. As bouts of training occurred, self-reported fear went down, even though the degree of intensity was increasing (from a 12-metre jump to an eventual airplane jump). Further, directly prior to each training session, spikes in blood and urinary cortisol and catecholamines decreased in time. As self-reported fear went down, so did cortisol and catecholamines. This coping effect identifies the reciprocal relationship between psychological and physiological stress. Further, much like Ellis' (1957) rational emotive approach, it is also clear that the event in question is not what activates fear or stress, but the evaluation or belief about the event. Within Ursin and colleagues' (1978) research it was also found that SAM activation, releasing

catecholamines, was associated with better performance, whilst PAC activation, releasing cortisol, was associated with poorer performances.

Supporting the two-response dichotomy, Williams' (1986) research into skeletal muscle circulation identified two distinct patterns as a result of cognitive appraisal. It was noted that when the risk of threat is heightened (e.g. a sensory task on threatening stimuli) vascular resistance occurs (i.e., vasoconstriction). Conversely, when there is less perceived threat (e.g. a mental arithmetic task), vascular resistance decreases (i.e., vasodilation). Dienstbier (1989; 1992) also identified that individuals can be 'challenged' or 'threatened' by a competitive situation, being dependant on cognitive appraisal and neuroendocrine activity. Specifically, it was found that if an individual perceives to be able to cope with the demands of the stressful situation, SAM activates and catecholamines are released. This catecholamine release was found to be associated with positive secondary appraisals and positive emotions, characterising a challenge response. To this end, acute stress reactivity can be adaptive if coping resources outweigh situational demands. Aversely, an individual's PAC activation is associated with cortisol release. This release represents insufficient psychological resources to cope with the demand of the situation, thus being maladaptive, coined as a threat response. Adding to this, SAM activation is conducive to successful performance, whilst PAC activation is association with unsuccessful performance (Dienstbier, 1989; 1992). To this end, Dienstbier (1989; 1992) posits that a challenge response is conducive to greater glucose release and blood flow to the brain and muscles, along with decreased vascular resistance. Because of this, a challenge cognitive appraisal is more likely and thus contributes to secondary appraisals (Lazarus, 1966).

Elucidating the association between psychological and physiological stress further, Dickerson and Kemeny (2004) identified that cortisol release (a threat appraisal) is more likely when an individual is unfamiliar with the event, when the environment is

uncontrollable, when there is a danger to esteem, and when there is a threat to central goals. Further, Kemeny (2003) identified that this is also the case when the level of demand and novelty is high, and the duration is extensive. Thus, in agreement with Lazarus' (1966) position, appraisal plays a part in the stress process, in particular cortisol excretion (Dickerson & Kemeny, 2004; Harvey et al., 2010; Kemeny, 2003; Schlotz et al., 2011). Noting the effect of change, it has also been found that increments in challenge appraisals is likely to reduce cortisol excretion (Denson et al., 2009). Given this association, appraisals explain how the two responses occur, playing a significant part in the stress process. This position is non-more reinforced by the Biopsychosocial model (BPS) of stress (Blascovich & Mendes, 2000; Blascovich & Tomaka, 1996). The following discusses the BPS model of stress which formulated the rationale for the theoretical position used within this thesis.

1.11 Biopsychosocial Model of Stress

The BPS model of challenge and threat (Blascovich & Mendes, 2000; Blascovich & Tomaka, 1996) posits that of a holistic perspective on appraisals of, and reactivity to, stressful scenarios. Informed by Obrist (1981) and Dienstbier's (1989) dichotomous stress reactions, the BPS model accounts for biological, psychological and social factors that can influence responses to stress inducing events. Two orthogonal reactions occur under different conditions, either being challenged, or threatened by a scenario. A challenge-based reaction to a situation occurs when an individual holds sufficient, or close to sufficient resources in order to meet the demands of the situation (Blascovich et al., 2003). The demands of the situation include; perceptions of danger to esteem, uncertainty of the situation, and effort needed to succeed. To cope with the situation afoot, psychological resources such as perceived skills, knowledge, abilities, dispositional factors, and external support are needed (Blascovich et al., 2003).

Blascovich and colleagues (2003) identified that challenge and threat appraisals reflect reciprocal cardiovascular (CV) reactivity. When an individual's resources meet or exceeds the situational demands of a stressful situation, a cardiovascular challenge state is likely to occur. This, as noted in Cannon's (1929a) work, is characterised by increases in SAM activity (epinepherine/norepinephrine). Specifically, what Blascovich and colleagues (2003) added to research was that changes in four dimensions of CV reactivity from baseline predict challenge states. Increases in heart rate (HR; heart beats per minute [bpm]), cardiac output (CO; litres of blood pumped from the heart per minute [l/min]), attenuated preejection period (PEP; time interval from beginning of electrical stimulation of the ventricles to the opening of the aortic valve [ms]), and decreased total peripheral resistance (TPR; sum of the resistance of all peripheral vasculature in the systemic circulation [dyn.s.cm^{-5}]) typify a challenge state. A challenge state is conducive to efficiency in transfer of blood glucose and free fatty acids to the brain and muscles (Dienstbier, 1989). Conversely, a threat state is likely to occur when under excessive demands, with limited resources to cope. From this, SAM and PAC activation, with accompanying cortisol is excreted. PAC activation deteriorates the positive effects SAM activation has on CV and performance, known as the 'distress system' (Blascovich & Mendes, 2000). A threat state is typified by increases in heart rate, decreased or stable cardiac output, attenuated preejection period and increased or stable total peripheral resistance. Here, PAC activation diminishes energy efficiency, demobilizing blood flow to the brain and muscles. In short, increases in heart rate and attenuated preejection period identifies whether an individual is engaged with a particular task, whilst changes in cardiac output and total peripheral resistance from baseline predict challenge and threat responses (Blascovich & Tomaka, 1996; Seery, 2011).

It was the work of Blascovich and Katkin (1993) that helped clarify both theoretical and methodological enquiry into the two stress responses via impedance cardiography.

Impedance cardiography is a non-invasive method that measures changes in thoracic electrical impedance (Sherwood et al., 1990). Because of this, the dichotomous stress responses have seen vast empirical investigation (Brimmell et al., 2019; Moore et al., 2014; Turner et al., 2012; Turner et al., 2014). Overall, research utilizing the BPS model has evidenced that challenge appraisals lead to challenge CV reactivity and therefore successful coping. On the other hand, threat appraisals lead to threat CV reactivity and unsuccessful coping (Blascovich & Tomaka, 1996). This theoretical standpoint, which is widely used to explain determinants of and responses to stress, has since had much attention regarding how and whether challenge and threat states can be manipulated. The following discusses research around the techniques and findings regarding challenge and threat manipulation.

1.12 Manipulating Challenge and Threat States

As evident, cognitive appraisals have significant implications for challenge and threat reactivity (Blascovich & Tomaka, 1996). To that end, if research wants to investigate how to manipulate challenge and threat responses, appraisals need to change for this to happen. By modifying perceptions, researchers have evidenced that this can have physiological implications (Allred & Smith, 1989; Hemenover & Dienstbier, 1996). In the last 20 or so years this notion of manipulating appraisals to alter CV reactivity has proved to be possible. Tomaka and colleagues (1997) identified that threat task instructions (to 'complete task as quick as possible') encouraged a threat cognitive appraisal and CV reactivity. Further, challenge instructions ('think of yourself as someone capable of meeting [the] challenge') encouraged challenge appraisals and CV reactivity. Given this apparent association between appraisals and physiology, recent research has strengthened this argument. Turner and colleagues' (2014) research echo Tomaka and colleagues' (1997) findings. Turner et al. (2014) used a competitive throwing task and a physically demanding climbing task. For both

tasks, challenge task instructions led to challenge cardiovascular reactivity, whilst threat task instructions led to threat cardiovascular reactivity. Though, what Turner and colleagues (2014) found, that previous research has failed to account for (e.g. Blascovich et al., 2004), was changes in performance from a baseline as a result of CV reactivity. Blascovich and colleagues (2004) identified that better baseball performances over a season was causally linked with challenge CV reactivity. Similarly, poor performances over a season were matched with threat CV reactivity. However, with this research there is no account for what an individual's 'typical' performance is, as a challenge or threat state may just be how an individual responds to stress. Identifying whether any manipulation can then change this 'typical' reaction either positively or negatively will show if CV changes align with performance changes from 'typical'. Turner and colleagues (2014) used this baseline performance and CV response to compare with post manipulation (challenge/threat instruction) performance and CV response. From this, it was found that positive changes in CV response and performance occurred (to a challenge state) after receiving challenge instructions post baseline. Further, it was found that negative change in CV and performance occurred (to a threat state) after receiving threat instructions post baseline. From these studies it is reasonable to suggest that a) manipulating appraisals of an event can influence CV reactivity, and b) CV reactivity holds implications for motor performance. This ability to manipulate appraisals of an event to alter both CV reactivity and performance has gained interest since these laudable pieces of research.

In manipulating appraisals of competitive events, Evans and colleagues (2018) evidenced that during a half time team talk, when using irrational language (e.g., 'you absolutely must play well in the second-half') as opposed to rational language (e.g., 'you want more than anything to play well in the second-half'), athletes reported greater threat appraisals and avoidance goals than the rational condition when approaching the second half.

In addition, incorporating physiological challenge and threat within their study, Slater et al. (2018) used relational identification with a leader to predict cognitive appraisals, CV reactivity and cognitive performance. Said researchers manipulated relational identification by delivering task instructions to participants from a leader who is either from the same institution as the participant, from a rival institution, or from an institution of no affiliation. Results indicated that high levels of relational identification with the leader (from the same institution) improved cognitive appraisals and cognitive task performance (compared to those perceiving low relational identification). Further, instructions received from someone who an individual perceives a low level of relational identification with (i.e. rival institution) is more likely to elicit a maladaptive CV response (i.e. threat) than those who receive instructions from a leader with no affiliation (i.e. from neither the same nor rival institution). Not only does instructions influence appraisals, CV response and performance, but the individual delivering them as well. Further, as challenge and threat research has become a world-wide endeavour, a recent meta-analysis has evidenced the effects of physiological markers of challenge and threat on a variety of performance domains. Behnke and Kaczmarek (2018) identified 18 studies that have utilised cardiovascular indices to predict performance. Results indicated that challenge states predict superior performance, whilst threat states deplete performance. Although this is the case, this was found to be a small effect, with most of the variance on performance being unexplained. Irrespective of these results, it can be argued that challenge and threat physiology can translate to discernible behavioural and cognitive consequences.

Though it is now well established that appraisal manipulation can both influence CV reactivity and performance (e.g. Behnke & Kaczmarek, 2018; Slater et al., 2018; Tomaka et al., 1997; Turner et al., 2014), laudable influences need to be accounted for. It has been noted that appraisals of an event can be made both consciously and non-consciously (Blascovich &

Mendes, 2000). By this, cognitive appraisals of an event can be made without awareness of them, which can determine CV reactivity towards impending stressful situations. The most direct attempt at identifying the effect of nonconscious appraisal is research by Weisbuch-Remington et al. (2005). These researchers used images of religious symbols and speeches to identify whether the non-conscious influences CV reactivity. It was found that when presented with un-reportable (nonconscious) negative religious symbols during a counting task, individuals who delivered a speech about their own death exhibited greater threat responses compared to participants subjected to unreportable positive religious symbols. The participants reported no recollection of the religious symbols, and thus occurred on an unconscious level. Therefore, nonconscious appraisals of the task at hand manipulated CV responses.

Overall, it is clear that there is a dichotomous CV reaction to stressful scenarios (Lundberg & Frankenhaeuser, 1980; Williams, 1986), and that appraisal of a stressful scenario is predictive of CV reactions (Blascovich et al., 2003). Given this relationship, research aimed to manipulate challenge and threat responses through appraisal manipulation (Tomaka et al., 1996; Turner et al., 2014). From this, it was identified that challenge and threat instructions (Turner et al., 2014) influence appraisal, CV reactivity and performance within competitive tasks. With this tripartite of mechanisms (appraisal, CV, and performance), Slater and colleagues (2018) found that identification with a particular individual can serve to influence appraisal, CV, and performance. From the BPS model (Blascovich & Mendes, 2000; Blascovich & Tomaka, 1996) interest grew in stress appraisals and CV reactivity in sport settings, dawning the formation of the Theory of Challenge and Threat States in Athletes (TCTSA; Jones et al., 2009).

1.13 Theory of Challenge and Threat States in Athletes (TCTSA)

The TCTSA combines the BPS model (Blascovich & Tomaka, 1996), the model of adaptive approaches to competition in sport (Skinner & Brewer, 2002; 2004) and the model of debilitative and facilitative competitive state anxiety (Jones, 1995). The model of adaptive approaches to competition notes that association between trait appraisal styles (challenge or threat) and event specific appraisals and emotions are mediated by event-specific coping expectancy (Skinner & Brewer, 2002). By this, those who appraise a situation as a threat are more likely to experience negative emotions and are therefore likely to have lower coping expectancies within a performance situation (e.g. Skinner & Brewer, 2002). That said, when a situation is positively reappraised before competition, positive emotions are likely to be experienced and a challenge state is likely. Further, it has also been found that coping confidence, coping expectancy and positive emotions are positively associated with trait challenge appraisals, and negatively associated with trait threat appraisals (Skinner & Brewer, 2002). Because this lower coping expectancy and negative emotions are associated with threat appraisals, competitive state anxiety is likely to increase (Skinner & Brewer, 2002). Although this is the case, anxiety may not be harmful, and wanting to avoid such harm can be facilitative for anxiety (Skinner & Brewer, 2004). Jones (1995) identified that these emotions can be helpful and unhelpful, depending on facets within an individual's appraisal of an event. Specifically, it was put forth that: perception of control over the self and the environment; positive belief in one's ability to cope; and belief that a goal is achievable is likely to lead to positive interpretations of anxiety (Jones, 1995).

It has been evidenced that the challenge and threat response dichotomy is associated with a dichotomy of emotions (helpful and unhelpful) and coping expectancy (Skinner & Brewer, 2002; 2004). Also, it has been found that perceptions of efficacy and control determine how emotions are interpreted prior to performance (Jones, 1995), hence being relevant to challenge and threat conceptualisations. From this tripartite of theoretical

constructs (BPS model; Blascovich & Tomaka, 1996; Model of debilitative and facilitative competitive state anxiety; Jones, 1995; Model of adaptive approaches to competition in sport; Skinner & Brewer, 2002; 2004) came the development of the TCTSA (Jones et al., 2009). The TCTSA posits how psychological constructs interact to determine challenge and threat responses and consequent performance. Reconceptualizing the appraisal process (Lazarus & Folkman, 1984), the TCTSA combines elements (appraisal and CV reactivity) of the BPS model (Blascovich & Tomaka, 1996) with the premise that positive perceptions of anxiety symptoms predict successful performance (Jones, 1995).

The TCTSA refers to demand and resource appraisals (Jones et al., 2009). Demand appraisals are prompted when a competitive event evokes a degree of perceived danger to esteem, uncertainty, and physical and mental effort. Developed from the BPS model (Blascovich & Tomaka, 1996), the model of debilitative and facilitative competitive state anxiety (Jones, 1995) and the model of adaptive approaches to competition in sport (Skinner & Brewer, 2002; 2004), three interrelated resources are appraised in order to cope with the competitive situation; Self-efficacy, perceptions of control, and goals orientations (Jones et al., 2009). Perceptions of self-efficacy was developed from all three previous models (Blascovich & Tomaka, 1996; Jones, 1995; Skinner & Brewer, 2002; 2004), whilst perceived control was important within the BPS (Blascovich & Tomaka, 1996) and debilitative and facilitative competitive state anxiety models (Jones, 1995). Lastly goal orientations were important within the model of adaptive approaches to competition (Skinner & Brewer, 2004). As such, the TCTSA posits that a heightened level of self-efficacy, perceived control, and approach goals represents sufficient resources in order to cope with the demand of competition, being indicative of a challenge state. Conversely, a low level of self-efficacy, perceived control, and avoidance goals represents insufficient resources in order to cope with the demand of competition, being indicative of a threat state.

Although the three resource appraisals have been theorised as buffers to perceptions of threat, there is scope to extend on these theoretically driven resources. To do this, we must look to others within the athletes' performance environment. Social support as a construct has been found to directly affect self-confidence, and buffer against negative stress (Freeman & Rees, 2010; Rees & Freeman, 2007). Recent work has also identified a link between social support and challenge and threat appraisals (Dixon et al., 2017). Dixon and colleagues (2017) identified that the higher the perceptions of support available to an athlete, the greater the chances of approaching a situation in a challenge state of appraisal. Social support can manipulate affective, behavioural and physiological responses to stress, strengthening the ability to cope with stressful situations (Cohen et al., 2000; Freeman & Rees, 2008; Rees & Hardy, 2004). Specifically, it has been proposed that it is important for individuals to perceive that support is available from people with whom they share a strong connection (e.g., a coach), and as such seek to use these opportunities for support in anticipation of a motivated performance situation (Meijen et al., 2020). To go into greater detail of the determinants of challenge and threat states, each resource appraisal, including social support, is discussed separately.

1.13.1 Self-Efficacy

"*You don't develop courage by being happy in your relationships every day. You develop it by surviving difficult times and challenging adversity*." – Epicurus (341 BC- 270 BC)

Self-efficacy beliefs are judgements of how confident an individual (e.g. an athlete) feels in performing well (see Bandura, 1986). This refers to an athlete's perception of skill necessary to cope with situational demand, or as Epicurus puts it, adversity. Bandura (1986) posited that of four sources of self-efficacy; performance accomplishments, vicarious experiences, verbal persuasion, and physiological states. In addition to this, Maddux (1995)

found that imaginal experiences and emotional states contribute to self-efficacy, with the latter being claimed as being as predictive of self-efficacy as the four sources (Bandura, 1986).

Yet, to display skill, an athlete must be sufficiently in control. To explain, an athlete's perception of how much control they have available to them in a given situation is predictive of functioning (Averill, 1973; Skinner, 1996). For example, a football player may be confident in their ability to score yet may not be confident in their team to provide the player chances to score. In short, an athlete may feel able to execute skills required, yet may not have the control to execute the skills required fully. Therefore, if an athlete fixates on an uncontrollable aspect of performance (e.g. Opponents ability), a threat state is likely to occur. Conversely, focusing on controllable aspects, such as an athlete's own performance, is likely to lead to a challenge state.

1.13.2 Perceived Control

"*It is not in the stars to hold our destiny but in ourselves*." – William Shakespeare (1564-1616)

As previously alluded to, control serves as a central tenant in self-efficacy and coping with the demands of a situation. Previously, control has been used within the debilitative and facilitative competitive state anxiety model (Jones, 1995), and the BPS model (Blascovich & Mendes, 2000; Blascovich & Tomaka, 1996). Expanding on what control is, three notions of control have been developed: Objective control, perceived control and experiences of control (Skinner, 1996). Objective control, much like Shakespeare's discourse, refers to actual control present within a situation and individual. Perceived control refers to the beliefs an individual has regarding the amount of control they have in a given situation. This is argued as the strongest predictor of functioning and action (Averill, 1973; Jones et al., 2009; Skinner,

1996). To this end, perceptions of control influences an athletes' appraisal of an event, and consequent challenge and threat states regarding an upcoming performance situation. Lastly, experiences of control refer to the feelings of the individual in a given context. Perceptions and interpretations of the external environment may influence whether an individual will be given the chance to perform a task. By this, a performer may perceive themselves as able to perform, yet may not feel as if they will get the opportunity to demonstrate said ability in the task, being self-efficacious, with a lack of control.

1.13.3 Achievement Goals

"*To rank the effort above the prize may be called love… the will to win, the desire to succeed, the urge to reach your full potential...these are the keys that will unlock the door to personal excellence*." - Confucius (551 BC - 479 BC)

Achievement goals are motivational dispositions towards demonstrating competence in sport (Duda & Hall, 2001; Duda, & Nicholls, 1992; Dweck, 1986; Nicholls, 1989). By this, individuals can be task (mastery; i.e., desire for understanding and improvement), and/or ego (performance) oriented (i.e., desire for superiority). Echoing Confucius' philosophies, task-oriented individuals feel successful and competent when they have mastered a task (Biddle et al., 2003), being conductive to higher intrinsic motivation, effort, enjoyment, and persistence (Elliot & Harackiewicz, 1994). Ego-oriented individuals feel successful and competent when they have outperformed others, or done just as well as others, with little effort (Kavussanu et al., 2011). This comes with a tendency to want to impress the coach, or cheat where possible (White et al., 2004).

From the categorisation of 'task' and 'ego' orientations, scholars incorporated approach and avoidant valences (Dweck & Bempechat, 1983; Elliot, 1999; Nicholls, 1984). By this, an approach focus towards a specific goal is directed by a desirable event or

possibility, whereas avoidance motivation is based around a negative or undesirable event or possibility. An example of an approach motive is 'I want to do well', where an avoidance motive would be 'I don't want to do badly'. These orientations surfaced from Dweck and Bempechat's (1983) work in performance (e.g., comparing with others), and mastery (e.g., learning for own development) goals, as well as Nicholls' (1984) work in task and ego orientation. Performance based goals are interchangeable, where competence is a determining factor, just like ego-orientations (Nicholls, 1989). Hence, with a low perceived competence, and performance orientation, the likelihood of adopting an avoidant valence increases. Whereas, if an individual is performance oriented, and has high perceived competence, an individual is likely to adopt an approach focus. This developed into an omnibus performance-ego, and mastery-task framework, with both approach and avoidant tendencies in each facet of the framework (Elliot, 1999).

1.13.4 Social Support

"*Tis not enough to help the feeble up, but to support them after*" – William Shakespeare (1564 – 1616)

Another factor that can be, and recently has been considered a part of the stress process is social support (Meijen et al., 2020). Derived from social psychology, research in sport has presented four orthogonal factors that comprise of social support. Received comfort, perceptions of security, advice, and instrumental assistance from significant others complete its form (Cutrona & Russell, 1990). Although unrecognised in original theory (Jones et al., 2009), empirical research has identified that social support improves sport coaches' stress related coping (Dixon & Turner, 2018) and challenge and threat appraisals (Feeney & Collins, 2014). Further, Dixon and colleagues (2017) identified that perceptions of social

support from significant others positively associated with challenge appraisals to an event, whilst autocratic behaviour from coaches drew threat appraisals towards an event.

Social support is based around an individuals' perceived network in helping them cope with stressful events. Social support has an influence on both psychological and physiological factors of stressful situations (e.g., exams, interview, speech). For instance, the stress and coping theory suggests that support from others influences stress appraisals (e.g. enhancing their sense of control), thus causing a psychological reaction, which then triggers a physiological response (Gramer & Reitbauer, 2010). Further, social support is thought to intervene with appraisals by providing a solution to a problem, for example through reducing the perceived importance of it (Cohen & McKay, 1984). Emotional support has also been seen to have an impact on physiological stress reactions, such as cortisol secretion (Heinrichs et al., 2003), and reductions in blood pressure and heart rate (Lepore et al., 1993). It can be concluded that social support serves as a component of an individual's ability to cope with the demands of an event.

Overall, stress research has come a long way from the philosophies of the ancient Greeks. Yet, a part to play that may contribute to knowledge within environmental stressors that an athlete faces is their leader. Previous research has evidenced that stress (appraisals and CV reactivity) can be manipulated through instructions (Turner et al., 2014), social variables such as identification (Slater et al., 2018), and leaders' type of language (irrational; Evans et al., 2018). As such, it is reasonable to suggest that a leader can influence challenge and threat psychophysiological reactivity to, and performance within stressful situations using instructional sets. The following explains the current standing in literature on the effects of leadership on psychological and physiological stress.

1.14 Leadership and Stress

Research within identity leadership (Haslam et al., 2011) and stress theory (TCTSA; Jones et al., 2009) have been largely detached. That being said, although scant, research has attempted to identify the predictive ability of leadership on stress. Within empirical investigations, Lyons and Schneider (2009) found that transformational leadership predicted perceptions of social support, self-efficacy, affect, appraisals (challenge and threat), and task performance. Specifically, transformational leaders had a direct positive effect on follower self-efficacy, positive affect and task performance. Said leadership was also positively associated with greater perceptions of social support and lower threat appraisals towards the task. However, this research adopted a video-scenario based approach, listening to an actor who adopted three different theoretical approaches. Thus, true leadership, for example, embedded components of transformational leadership (Bass, 1990), could not be utilized. Therefore, methodological advancement is necessary to definitively report the results stated. Although this is the case, it is initial evidence that transformational enquiry influences challenge appraisals (Lyons & Schneider, 2009).

Recent research has found that transformational leadership is positively associated with greater task performance under challenge instructions within the marines (LePine et al., 2016). Of those who appraise a situation as a challenge, and led by a transformational leader, were likely to perform better (Cavanaugh et al., 2000; Crawford et al., 2010; LePine et al., 2005). It has been evidenced that being exposed to transformational leadership in a facilitative environment ('Challenge stressors') can bolster performance (LePine et al., 2016). Yet, only two of the four components of transformational leadership were measured in LePine and colleagues' (2016) research, potentially missing critical factors that could have changed the results. Further, these two components, and job performance, were questionnaire based, subjectively rating each. Hence, without objective performance markers, participant response bias may be apparent.

Stordeur and colleagues (2001) found that transactional leadership in a hospital environment increases employee (i.e. nurse) burnout. Conversely, the enactment of transformational leadership resulted in no such increases nor decreases in burnout. Further, a meta analytical review of 13 studies found that abusive leadership (supervision) has a fairly robust positive relationship with follower stress (Schyns & Schilling, 2013). Within this research, 'stress' was coined as 'well-being and individual performance'. However, this research did not take into account the various perceptions of what 'stress' is within the 13 studies. Irrespective of fallible procedures, it is fairly conclusive that leadership behaviours have a significant effect on 'stress', whichever way it is defined.

Idiographic investigations have also identified the influence of a leader on follower stress appraisals and emotional responses (Thelwell et al., 2017). The authors explained that coaches play a significant role in follower effort, expression, development, avoidance behaviour, body language, emotions, confidence, motivation, and performance outcomes. Relatedly, Poucher et al. (2018) identified the salience of supportive coaches for Olympic athletes' emotion regulation and success. These variables are likely manipulated as a result of the strong interpersonal relationship between coach and athlete (Jowett, 2000). Here then, it seems that the actions of a leader, and the resultant relationship with a leader can have a direct effect on follower appraisals and performance outcomes. Whilst there is a plethora of research into stress appraisals and emotions, across quantitative and qualitative studies, there is little to identify the psychophysiological mechanisms through which leadership can influence performance.

One such attempt to identify psychophysiological mechanisms is Slater et al. (2018), utilizing the TCTSA (Jones et al., 2009) as a theoretical foundation. The authors used relational identification with a leader to predict cognitive appraisals, CV reactivity and cognitive performance. Researchers manipulated relational identification by delivering task

instructions to participants from a leader who is either from the same institution as the participant, from a rival institution, or from an institution of no affiliation. Results indicated that high levels of relational identification with the leader (from the same institution) improved intentional mobilization, cognitive appraisals and cognitive task performance (compared to those perceiving low relational identification). Further, instructions received from a leader who an individual perceives a low level of relational identification with (i.e. rival institution) is more likely to elicit a maladaptive CV response (i.e. threat) than those who receive instructions from a leader with no affiliation (i.e. from neither the same nor rival institution). To this tune, it was posited that leaders are in a prime position to influence resource appraisals, CV reactivity and performance. Though not explored empirically, Meijen et al. (2020) proposed that it is important that individuals perceive that support is available from people with whom they share a strong connection (e.g., a coach), and as such seek to use these opportunities for support in anticipation of a motivated performance situation.

The following thesis extends on the above research and propositions, evidencing whether and to what extent the social identity approach to leadership influences resource appraisals, CV reactivity and performance. In addition, given the theoretical basis intimating the potential influence of social variables on stress and performance (TCTSA; Jones et al., 2009; Meijen et al., 2020), the research presented follows this research convention, testing the efficacy of the model (for examples, see Brimmell et al., 2019; Evans et al., 2018; Moore et al., 2012; Slater et al., 2018; Turner et al., 2014). This approach has been taken to inform measurable work, digressing from the idiographic approach as seen in both seminal and recent stress research (Lazarus & Folkman, 1984; Thelwell et al., 2017).

1.15 Summary and Aims

The social identity approach to leadership underpins effective leadership (Haslam et al., 2011; Hogg, 2001; van Knippenberg & Hogg, 2003). With a combination of both social identity theory (Tajfel & Turner, 1979) and self-categorisation theory (Turner et al., 1987), these 'new' theoretical standpoints (Haslam et al., 2011) have proven to be effective for: cooperation (De Cremer & van Vugt, 1999); mobilisation of efforts (Cregan et al., 2009; Slater et al., 2018; Slater & Barker, 2019); burnout, work engagement (Steffens et al., 2018); satisfaction, innovative behaviour, and citizenship (Van Dick et al., 2018). These increments are a result of an individual defining their social identities as part of the self (i.e. I am part of the England football team), being intrinsically motivated to enhance their social identities (Tajfel & Turner, 1979). Adding further theoretical insight, the TCTSA combines the BPS model, the model of adaptive approaches to competition (Skinner & Brewer, 2004), and the model of debilitative and facilitative competitive state anxiety (Jones, 1995). Jones and colleagues (2009) posit that it is resource appraisals in a given moment before competition that predicts whether individuals are likely to be challenged or threatened. By adopting the social identity approach to leadership in predicting challenge and threat responses to competitive situations, novel insight can be made as to how, or whether perceptions of identity leadership are part of the stress process. Broadly the present thesis contributes to knowledge on how leaders, as part of the social environment, can influence the way individuals respond to stressful situations through the development of group level emotional connections. Individually, each Chapter contributes to knowledge in the following ways;

First, in Chapter 2, the thesis utilizes the social identity approach to leadership and the TCTSA within a sporting population. As evident, the social identity approach to leadership can influence an individual's resource appraisals (Slater et al., 2018). To extend on this, serial mediation models will identify whether identity leadership is associated with resource

appraisals through identification with a leader (i.e. relational identification) and group (i.e. psychological connection to the group).

Second, in Chapter 3, the research combining the two standpoints has not taken into account the influence of identity leadership on resource appraisals in sport over time, and thus the consequential effect this may have on sporting performance. Cognitive performance parameters have been investigated within this area on a between subjects' basis (Slater et al., 2018). However, by using real-world sport settings, and a longitudinal design over the course of an athletic season, the hypothesized effect can be observed over a prolonged period.

Third, in Chapter 4, research has not accounted for both the psychological and physiological implications of identity leadership, nor under within subject's conditions. Previous research has identified that high levels of relational identification with a leader can influence, in part, an athlete's perception of resource appraisals (Slater et al., 2018). However, as part of the design, participants were assigned to either high, neutral or low relational identification with the leader. The present research uses a within subject's design to identify whether the principles of identity leadership influence psychological and physiological stress as well as motor performance.

Fourth, research has not identified the boundaries within which identity leadership can influence psychophysiological stress. By this, research has not manipulated perceptions of challenge and threat (through instructions) whilst enacting identity leadership. Identifying whether high levels of identity leadership can exacerbate the effects of resource appraisal manipulation will provide novelty in identifying the influence of identity leadership on stress variables and performance.

1.15.1 Aims of the Thesis

Building on social identity and challenge an threat research, this thesis aims to: (i) examine the effect of identity leadership on perceptions of resource appraisals in sport (via serial mediation models); (ii) examine how identity leadership influences resource appraisals and performance across an athletic season (via serial mediation models); (iii) examine the effect of identity leadership on resource appraisals, physiological CV reactivity and motor performance; and (iv) to examine the dual effect of identity leadership and appraisal manipulation on resource appraisals, CV reactivity and motor performance. Specifically, the aims of this thesis are:

1) To adopt a social identity perspective to analyse the mechanisms through which a leader affects an athlete's resource appraisals in a real-world sports setting (via relational and group identification, Chapter two: study one).

2) To examine the mechanisms through which identity leadership influences resource appraisals and performance satisfaction across an athletic season (via relational and group identification, Chapter three: study two).

3) To examine the influence of high identity leadership (vs. low identity leadership) on resource appraisals, physiological stress reactivity and consequent motor performance (Chapter four: study three).

4) To provide empirical evidence for the effects of high identity leadership (vs. low identity leadership) on psychophysiological stress and performance under variable levels of challenge and threat appraisal manipulation (Chapter five: study four).

1.16 Research Philosophy

It is important to note that the aims as presented above should determine the methodology (Bryant, 2012). On this basis, the research presented within this thesis has been

theoretically grounded on the positivist philosophical assumption (Aliyu et al., 2014), which reflects the researcher's view. This assumption reflects that reality and knowledge is determined by that of scientific evidence (Ali & Chowdury, 2015). By this, the positivist framework is objective in nature, where realities are assessed chiefly by quantitative markers, testing hypotheses through experimental designs (Aliyu et al., 2014). Specifically, the present research assumes that social actors (i.e. the general public) can influence social reality by evidencing cause and effect. To this tune, the research evidence's knowledge and patterns that can help to influence future research practices. Here too, existing research within social identity and psychophysiological challenge and threat has a predominantly positivist ontological and epistemological basis (Brimmell et al., 2019; Moore et al., 2014; Slater et al., 2018). To this end, the present thesis provides an understanding on whether identity leadership serves as a mechanism through which stress is appraised, and performance is manipulated.

CHAPTER 2: COACH IDENTITY LEADERSHIP BEHAVIOURS ARE POSITIVELY ASSOCIATED WITH ATHLETE RESOURCE APPRAISALS: THE MEDIATING ROLES OF RELATIONAL AND GROUP IDENTIFICATION[2]

2.1 Introduction

Chapter one outlined theory and research regarding identity leadership and psychophysiological stress, being largely placed as separate entities. To reiterate, social identity theorizing has identified that group processes are central to cognition and behavior (Tajfel & Turner, 1979; Turner et al., 1987). A significant part of group processes (e.g., communication, commitment to group goals) stem from the leader (Haslam et al., 2011), and this is particularly salient within competitive sport, where it is often the individual representing the group that inspires athletes to unite and mobilize their efforts (see Rees et al., 2015). Recent theorizing into the social identity approach to leadership (Haslam et al., 2011; Steffens et al., 2014a) has endeavoured to identify how such leaders influence a group and create a cohesive and unified environment. When this cohesive environment is created, members will define the self as characteristic of an in-group (e.g., a sport team), seeing themselves as not just "I" but as one of "us". Organizational evidence has indicated that a leader who creates a shared social identity enhances follower trust (Giessner & van Knippenberg, 2008), job performance (Zhu et al., 2015) and the perceived effectiveness and charismatic tendencies of the leader (van Knippenberg & van Knippenberg, 2005).

Identity leadership comprises of four principles (Haslam et al., 2011; Steffens et al., 2014a), whereby leaders: (1) represent the unique qualities that define the group that they lead (i.e., they need to be "one of us"—prototypical); (2) advance and promote the core

[2] The following Chapter reports results from the first study within the following journal article;
Miller, A. J., Slater, M. J., & Turner, M. J. (2020). Coach identity leadership behaviours are positively associated with athlete resource appraisals: The mediating roles of relational and group identification. *Psychology of Sport and Exercise, 51*, 101755. https://doi.org/10.1016/j.psychsport.2020.101755

interests of the group (i.e., they need to "do it for us"—advancement); (3) bring people together by creating a shared sense of "we" and "us" (i.e., they need to craft a sense of us—entrepreneur); and (4) organise events and activities that give weight to the group's existence (i.e., they need to make us matter—impresarioship). In recent years, growing evidence in sport and exercise settings has supported the assertion that leaders who create, embody, advance, and embed a collective sense of "us" are more effective. For example, successful performance directors at the London 2012 Olympic games consistently communicated a positive, distinctive, and enduring sense of social identity in their media communication (Slater et al., 2015). Further, engagement in identity leadership (vs. not) has been associated with greater intentional and behavioral mobilization of effort (Slater et al., 2018). In addition to sport coaches, team captains embodying identity leadership are perceived to have greater influence, instill team confidence, and strengthen group identification and task cohesion (Steffens et al., 2014a: Study 4). Researchers have also identified that perceived leader-entrepreneurship bolsters physical performance and effort within cycling trials (Stevens et al., 2019a). In exercise settings too, leaders that are perceived to create a sense of "us" enhance attendance and participation in sport and exercise classes (Stevens et al., 2019b).

The mechanisms through which this enactment of identity leadership influences variables such as performance, effort and attendance include both relational (i.e., coach) and group identification. Stevens and colleagues (2019b) found that the enactment of identity leadership has a positive effect on sport and exercise attendance through group identification. Group identification refers to the extent to which individuals feel an emotional attachment and a sense of belonging to groups they are a part of (Tajfel & Turner, 1979). Zhu and colleagues (2015) identified that leaders who strengthen follower group identification are likely to improve follower job performance too. Specifically, because leaders can influence followers to internalize a group as part of their self-concept, this becomes the basis for

follower attitude, behavior, and mobilization to engage with the group they identify with, and in turn, perform better. As an antecedent to group level identification as an influence on variables such as attendance and performance, relational identification with a leader has been found to play a role too. Sluss and Ashforth (2007, p. 15) defined relational identification as "a (partial) definition of oneself in terms of a given role-relationship-what the relationship means to the individual". Sluss and Ashforth (2007) posited that to identify with a collective (i.e. group identification), an individual must identify with the individuals that embody and sustain the role-relationship. Simply, an individual is likely to see the collective (i.e. group identification) as an extension of the dyadic role-relationship (Sluss & Ashforth, 2007). Echoing this argument, Sluss and colleagues (2012) evidence that strong relational identification with a leader can, in turn, positively influence group identification. Further, these found effects are more pronounced when the leader is highly prototypical of an organisation. A heightened level of relational identification has proven influential on follower creativity (Gu et al., 2015), perceptions of social support (White et al., 2020), and positive appraisals of motivated performance situations (i.e., important/stress-inducing events such as a competitive sport match; Slater et al., 2018). Compared to poor relational identification, perceiving a strong relational identification with a leader positively influences follower efficacy, perceived control, approach goals, and cognitive performance within competitive (non-sport) situations (Slater et al., 2018). Equally, it has also been evidenced that a sense of relational identification with a leader can be inferred from a follower's social identification with a group that unites follower and leader, in turn influencing charisma (Steffens et al., 2014b). To this tune, evidence points to both relational identification with a leader influencing group identification (Sluss et al., 2012), and group identification in turn influencing relational identification (Steffens et al., 2014b). Accordingly, both identification with a leader and group can influence psychological- and performance-related variables. To

elucidate inconsistencies, researchers have not yet identified: (1) whether the full identity leadership theoretical model influences psychological resources (i.e., the four identity leadership principles); (2) whether relational and group identification are evidence based mechanisms (i.e., serial mediators) of the identity leadership-resource appraisal relationship; and (3) whether identity leadership and psychological stress variables are meaningfully related within an ecologically valid competitive sporting environment. In other words, an investigation of whether identity leadership influences psychological resources (i.e. self-efficacy, control, approach goals, and avoidance goals) through identification (relational and group) within team-based sporting environments would contribute to identity leadership theory.

In the current study, the notion of psychological resources (i.e., self-efficacy, control, approach and avoidance goals) stem from the Theory of Challenge and Threat States in Athletes (TCTSA; Jones et al., 2009). Jones et al. (2009) proposed that when psychological resources meet or exceed perceived situational demands, an individual is likely to approach competition in a *challenge* state, which is adaptive for sports performance and well-being (Turner et al., 2014). In contrast, when psychological resources do not meet or exceed perceived situational demands, an individual is likely to approach competition in a *threat* state, which is maladaptive for sports performance (Jones et al., 2009; Meijen et al., 2020; Turner et al., 2014). These psychological resources are appraisals of an individual's level of skill, knowledge and ability in the order to meet or surpass the demands of the situation (Blascovich et al., 2003). Collectively, researchers have found that an athlete who is self-efficacious, perceives control over their actions and has approach goals, is more likely to be challenged by a stressful performance situation, performing better as a result (e.g., Turner et al., 2012; Turner et al., 2014). Within the TCTSA, avoidance goals (i.e. motivated towards avoiding incompetence) have also been conceptualised as a resource, though being a

contributor towards threat responses and poorer performance rather than challenge responses and enhanced performance (Jones et al., 2009). Moving beyond individual resources (i.e. self-efficacy, perceived control and approach goals and avoidance goals), within the revised TCTSA (TCTSA-R: Meijen et al., 2020), social support has been conceptualised as a resource appraisal. This addition follows advances in research that has considered social support a key contributor to the stress process (Blascovich et al., 2003; Blascovich & Mendes, 2000; Dixon & Turner, 2018; Meijen et al., 2020). Empirical research has identified that social support improves sport coaches' stress related coping (Dixon & Turner, 2018). Though proposed as part of the stress process (Meijen et al., 2020), and evidence identifying the benefits of social support (Dixon & Turner, 2018), it is yet to be operationalised as a resource appraisal in research. Rather, it has been proposed that it is important for individuals to perceive that support is available from people with whom individuals share a strong connection (e.g., a coach), and as such seek to use these opportunities for support in anticipation of a motivated performance situation (Meijen et al., 2020). As part of the coping process, the identity leadership perspective extends on the premise that a dyadic relationship can predict appraisals by considering the dynamicity of a group. A leader can endorse a shared social identity—by behaving in-line with the 4 principles of identity leadership—consequently, athletes develop interpersonal connections with the leader and therefore the group that they are part of (Haslam et al., 2011). With previous reviews suggesting that shared social identities can influence cognitive appraisals (Slater et al., 2016), it is suggested that identity leadership can influence athletes' appraisals of a sporting event through developing connections with a leader and group. Formally, the following hypotheses are examined:

H1: There will be a positive atemporal association between perceived identity leadership and self-efficacy, perceived control, approach goals, and social support. There will

be a negative atemporal association between perceived identity leadership and avoidance goals.

H2: The atemporal association between perceived identity leadership and resource appraisals will be mediated by relational and group identification.

2.2 Overview of study 1

Study 1 is the first to examine the mechanisms (i.e., relational and group identification) by which engagement in identity leadership by sport coaches predicts athletes' resource appraisals in the lead up to a competitive event. Specifically, the aim is to understand whether a sports coach can help athletes internalize the coach-athlete relationship and the athlete-group relationship as part of their self-concept, serving as a basis for athletes' attitude and behaviour, to in turn bolster competitive appraisals. By recognising the influence of these social processes on resource appraisals (Study 1), advances in stress (Meijen et al., 2020) and leadership (Haslam et al., 2011) theory can be made.

2.3 Methods

2.3.1 Participants and Design

An atemporal cross-sectional design was adopted to investigate indirect effects of identity leadership on resource appraisals when approaching competition. Four hundred and twelve athletes (M_{age} = 23.86 ± 5.38; 299 males; white British, n = 383) of various sporting experience (M_{years} = 11.29 ± 6.46) within amateur (64%) and professional sport (36%) took part in the study. Athletes competed across 34 sports, including; football (n = 89), rugby (n = 42), lacrosse (n = 21), hockey (n = 24) netball (n = 20), cricket (n = 19), ultimate frisbee (n = 12), swimming (n = 10), dance (n = 4), tennis (n = 5), american football (n = 4), athletics (n = 4), hurling (n = 2), basketball (n = 23), cheerleading (n = 4), kickboxing (n = 3), handball (n

= 4), futsal (*n* = 15), volleyball (*n* = 18), badminton (*n* = 5), water polo (*n* = 13), airsoft (*n* = 2), ice hockey (*n* = 7), karate (*n* = 2), gymnastics (*n* = 2), softball (*n* = 8), golf (*n* = 4), archery (*n* = 1), mixed martial arts (*n* = 1), running (*n* = 20), korfball (*n* = 3), curling (*n* = 2), equestrian (*n* = 9) and boxing (*n* = 10).

2.3.2 Procedure

Following institutional ethical approval (see appendix 2), convenience and snowball sampling techniques were adopted, contacting coaches via emails, word of mouth, and social media. Convenience sampling was achieved by liaising with athlete groups. Snowball sampling was achieved by encouraging athletes on completion to send details of the study to other potential athletes that may be interested. Once approved by the team coach (via convenience sampling) and athletes (via snowball sampling) a Qualtrics survey was sent to the athletes within an hour of competition. All surveys were completed on the participants' electronic device. To ensure participants filled the forms authentically, the athletes were asked questions which were reversed coded, and were asked how imminent commencement of competition was. Those who did not fill the forms authentically were removed from analyses.

2.3.3 Measures

Identity leadership. The Identity Leadership Inventory (ILI) is a 15-item questionnaire that measures the four principles of identity leadership (Steffens et al. 2014). The ILI is a robust measure of identity leadership and has been validated across 20 countries (van Dick et al., 2018). The questionnaire includes items such as "*My coach embodies what the team stands for*" (Identity-prototypical, α = .92), "*My coach stands up for the team*" (Identity-advancement, α = .88), "*My coach creates a sense of cohesion within the team*" (Entrepreneur of identity, α = .93), and "*My coach devises activities that bring the team together*"

(Impresario of identity, α = .91). In-line with Stevens and colleagues' (2019b), a global identity leadership measure (comprised of all 15 items) demonstrated excellent internal consistency (Cronbach's α = .97). Though a four-factor model of the ILI has been conceptualized, Steffens and colleagues (2014) identified that the intercorrelations between the four principles have significant overlap. Given that this is the case, and to maintain sufficient statistical power, subsequent analyses are run on global identity leadership.

Group and Relational identification. A 3-item questionnaire was used to identify how strongly athletes identified with their sport team (Slater et al., 2018): "*I feel a strong connection with the team"*, "*I identify strongly with the team"* and "*I feel no connection with the team"* (reverse scored). Responses were on a Likert scale from 1 (*not at all*) to 7 (*very true*). This measure has been used by identity leadership researchers (e.g., Slater et al., 2018) and demonstrated good reliability in the current study (α = .86). The same three items and scale used for group identification were edited, replacing the words "*the team*" to "*my coach*". These changes, in-line with Slater and colleagues' (2018) procedure, identified an athletes' level of relational identification with the leader. The measure showed good internal consistency (α = .89).

Self-efficacy. Derived from the self-efficacy scale using Banduras (2006) guidelines, two items measured how confident each athlete felt to perform well in the upcoming match (Turner et al., 2012). Specifically, the questionnaire asked; "*In the next fixture, to what extent do you feel confident that you can perform well?*" and "*In the next fixture, to what extent do you feel confident that you can fulfil your potential?*". Participants reported on a Likert scale from 1 (*not at all*), to 5 (*very much so*). Cronbach's alpha was acceptable (α = .76).

Perceived control. Adapted from the Academic Control Scale (Perry et al., 2001; Turner et al., 2012), a single item was used to identify perceived control over their upcoming performance: "*The more effort I put into the following fixture, the better I will do?*". Typical

of research measuring resource appraisals (e.g. Turner et al., 2014), the item was recorded on a 5-point Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Achievement goals. The Achievement Goal Questionnaire (AGQ: Conroy et al., 2003; Turner et al., 2012) was used to identify an athlete's motivational disposition towards performance. This was condensed to a 4-item measure for brevity, with a single item for each subscale. The scale in this capacity has been individually validated (Conroy et al., 2003) in measuring resource appraisals (Slater et al., 2018; Turner et al., 2013; Turner et al., 2014). These 4 items were used to create two subscales, approach (from mastery approach and performance approach) and avoidance (from mastery avoidance and performance avoidance). Approach ($\alpha = .64$) and avoidance ($\alpha = .72$) subscales were internally consistent.

Athletes' received support. A 22-item questionnaire identified an athlete's perception of received support (ARSQ: Freeman et al., 2014). This measure identifies 4 dimensions of social support: emotional, esteem, informational, and tangible. All items followed from the stem "*In the build up to the upcoming fixture, to what extent has someone*"… "*cheered you up*" (emotional, $\alpha = .92$), "*comforted you*" (esteem, $\alpha = .94$), "*given you tactical advice*" (informational, $\alpha = .93$), and "*helped manage your training sessions*" (tangible, $\alpha = .95$). Freeman and colleagues (2014) found support for both a four-factor and a unidimensional model. Much like Freeman and colleagues, Cronbach's alpha for all subscales combined was excellent ($\alpha = .96$). Given that there is support for a unidimensional model, and aiming to maintain sufficient statistical power, subsequent analyses are run on overall social support.

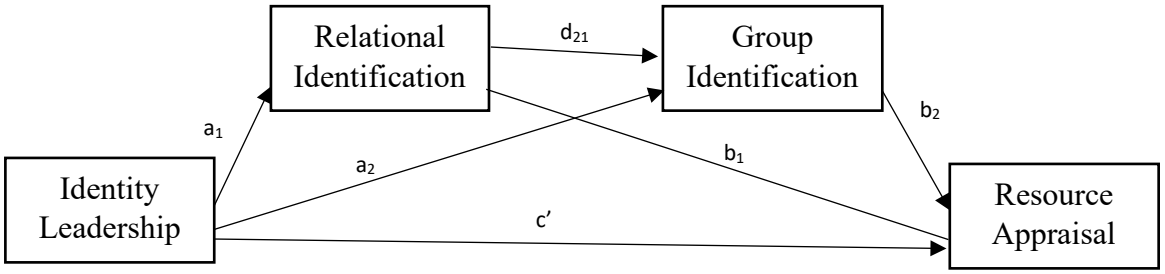
Task importance. A single item identified whether the upcoming fixture is important to them, from 1 (*not at all*) to 5 (*very much so*). This item is commonly used in TCTSA research, providing valid data in measuring task importance (e.g., Slater et al., 2018; Turner et al., 2014). Task importance is a prerequisite of challenge and threat responses (Jones et al., 2009).

2.3.4 Data Analysis

For main analyses, the indirect effects of identity leadership on resource appraisals when approaching competition are investigated (Chadha et al., 2019; Cohen et al., 2003). Specifically, it is identified to what extent identification with a leader and group indirectly effect the relationship between perceived identity leadership and self-efficacy, perceived control, approach goals, avoidance goals and received support. Given that power analyses calculations are necessary for robust research (Schinke et al., 2020), Monte Carlo estimations, via the MARlab application (Schoemann et al., 2017) were conducted. For path a^1, a^2 and d^{21} parameter estimations between, and standard deviations of identity leadership (X) and group identification (M2) reported by Stevens and colleagues (2018) within sports teams were used. For paths b^1, b^2 and c', estimations are based on previous associations between identity leadership parameters and resource appraisals (Slater et al., 2018). From this, small to medium (R^2; b^1, b^2 and c' = .28) associations for paths b^1, b^2 and c' are anticipated (Slater et al., 2018; Thoemmes et al., 2010). In line with previous studies (Stevens et al, 2019b), alpha was set at .05, and 5000 replications were conducted. From this, sample size estimates for the mediated paths indicated at least 135 participants to achieve a power of .80 (a^1b^1 N = 92, a^2b^2 N = 125, $a^1d^{21}b^2$ N = 135). Analyses was conducted via the lavaan package of R software (v. 4.0.0). Structural equational model estimates (with two serial mediators) are reported alongside cluster-robust standard errors to control for non-independence of errors (i.e. controlling for a suspected correlation between error terms within each sports team). Given that (a) research has evidenced that relational identification informs social identification (Sluss & Ashforth, 2007; Sluss et al., 2012), and (b) that relational identification can be inferred as a result of group identification (Steffens et al., 2014b), both mediators (i.e., relational and group identification) are tested as mediator 1 and mediator 2. Simply, relational identification is placed in the models as mediator one, with group identification being placed

as mediator two. Then, group identification is placed in the models as mediator one, with group identification being placed as mediator two. Robust clustering enabled calculation of 95% confidence intervals (CI's) for all indirect effects. If the CI does not cross zero, a significant indirect effect has occurred (Zhao et al., 2010). An intercorrelation matrix (see Table 2.1) identified that intercorrelations between variables (excluding the four identity leadership principles) were below the .80 cut-off (Berry & Feldman, 1985). See Figure 2.1 for a generic model of the serial multiple mediation with two mediators.

Figure 2.1 Serial multiple mediation model with two mediators.



Notes: X—independent variable; Y—Dependent. Variable; M1, M2—Mediators. a1, a2, b1, b2, d21, c'—Regression coefficients.

	Mean +/- SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Prototypical	5.08 +/- 1.32	.92											
2. Advancement	5.16 +/- 1.27	.87*	.88										
3. Entrepreneurship	4.71 +/- 1.53	.79*	.74*	.93									
4. Impresarioship	4.69 +/- 1.53	.71*	.71*	.83*	.91								
5. Global Identity Leadership	4.92 +/- 1.27	.91*	.90*	.93*	.90*	.97							
6. Relational Identification	5.16 +/- 1.45	.76*	.72*	.73*	.67*	.79*	.89						
7. Group Identification	5.61 +/- 1.09	.50*	.48*	.49*	.46*	.53*	.56*	.86					
8. Self-efficacy	3.95 +/- .86	.45*	.44*	.41*	.40*	.47*	.45*	.48*	.76				
9. Control	4.16 +/- .79	.44*	.42*	.40*	.40*	.46*	.41*	.47*	.59*	---			
10. Approach	5.62 +/- 1.12	.41*	.41*	.31*	.30*	.39*	.37*	.37*	.50*	.42*	---		
11. Avoidance	4.45 +/- 1.56	.08	.11*	.04	.07	.08	.03	-.01	.02	-.01	.42*	---	
12. Overall Support	4.13 +/- 1.26	.45*	.44*	.51*	.47*	.51*	.46*	.36*	.34*	.39*	.26*	.13*	.96

Table 2.1 Scale Reliabilities, Descriptive Statistics and Inter-correlations

Note: $p \leq .05$**, $p \leq .01$*

2.4 Results

2.4.1 Preliminary Analyses

No missing data were revealed within all subscales. Following Smith's (2011) guidelines, data-points with *z* scores greater than two were winsorized. This is a process in which extreme values are replaced to reduce the influence of outliers on the data. Overall, 5.24% of the data were winsorized. Across all analyses, the multicollinearity assumption was met, and cook's distance values were less than 1. Variance inflation factor values (≤ 5.432) and tolerance values (≥ .184) were acceptable (Hair et al., 1995). The independent errors assumption was satisfied, with Durbin-Watson values (1.64 – 1.937) all within the ≥1 to ≤3 range (Field, 2017). Normally distributed errors, linearity and homoscedasticity assumptions were satisfied across models.

2.4.2 Prerequisite Check

Perceived importance is a prerequisite of challenge and threat responses (Jones et al., 2009). A one-sample *t*-test indicated that athletes reported the competition to be of significant importance (i.e., significantly different to zero, $t(412) = 94.34$, $p < .001$, $M = 4.16 \pm .90$).

2.4.3 Serial Mediation Model Analyses

When including relational identification as mediator 1, all models were of at least good fit (Std. RMR ≤ .05, RMSEA < .08, CFI > .95). When group identification was included as mediator 1, all models also met at least good fit (Std. RMR ≤ .06, RMSEA < .08, CFI > .95). Within the following analyses, global identity leadership forms the predictor variable (X), with *relational identification* as mediator 1 (MV), and *group identification* as mediator 2

(MV). The dependent (Y) variable is the respective resource appraisal. Total effects of identity leadership on resource appraisals were significant in all models.

There was a non-significant indirect effect for identity leadership on the resource appraisals of self-efficacy, control, approach goals, avoidance goals and social support through relational identification ($\beta \leq .08$, 95% CI = -.23, .19; H2). There was a significant indirect effect for identity leadership on self-efficacy, control and approach goals through group identification ($\beta = .05$, 95% CI = .01, .09; H2). No such effect was found for social support or avoidance goals ($\beta \geq .04$, 95% CI = -.05, .02; H2). Furthermore, there was a significant indirect effect for identity leadership on self-efficacy, control, approach goals, and social support through both relational and group identification ($\beta \geq .03$, 95% CI = .004, .10; H2). No such effect was found for avoidance goals ($\beta = -.02$, 95% CI = -.06, .02). Further, there was a significant positive direct effect for identity leadership on self-efficacy, control, approach goals and social support ($\beta \geq .15$, $p \leq .013$; H1) when both mediators were included in this order (i.e., relational and group identification). No significant direct effect was identified for avoidance goals ($\beta = .06$, $p = .53$; H1).

When analyses were run with group identification placed before relational identification, all indirect effects through *both* mediators were non-significant. Equally, when group identification was included as mediator 1, and relational identification at wave two as mediator 2, there was a significant direct effect of identity leadership on self-efficacy, control, approach goals and social support ($\beta \geq .15$, $p \leq .003$; H1), and this association was mediated by group identification at wave two ($\beta \geq .05$, 95% CI = .007, .16; H2). A summary of standardised coefficients for total, direct and indirect effects of identity leadership on resource appraisals can be found below. Further, all mediation models in Study 1 (with mediators in both directions) can be found in Table 2.2, Figure 2.2 and Figure 2.3 below.

Table 2.2
Summary of Total, Direct and Indirect Effects Study 1

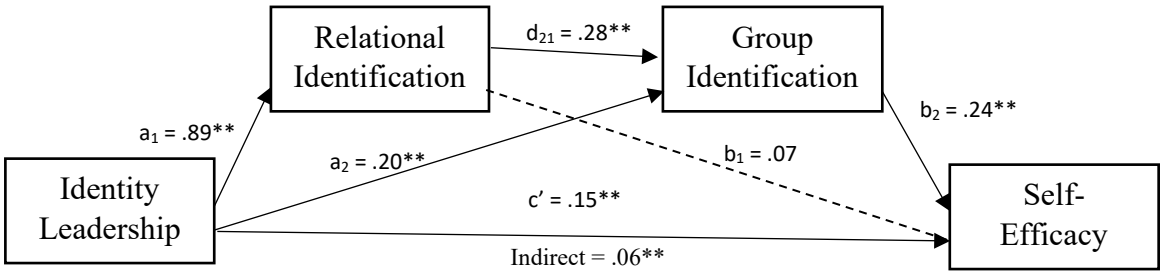
	Self-Efficacy	Control	Approach	Avoidance	Social Support
Total Effect	β = .21*	β = .23*	β = .24*	β = .04	β = .41*
Direct Effect	β = .15*	β = .18*	β = .18*	β = .06	β = .38*
Relational Identification	β = .06	β = .003	β = .06	β = -.04	β = .08
Group Identification	β = .05*	β = .05*	β = .05*	β = -.02	β = .02
Relational*Group Identification	β = .06*	β = .06*	β = .05*	β = -.02	β = .03*
Group*Relational Identification	β = .008	$\beta \leq$ .001	β = .008	β = -.005	β = .01

Note: $p \leq .05$*, Relational*Group Identification = Relational identification as mediator 1, and group identification at wave two as mediator 2. Group*Relational Identification = Group identification as mediator 1, and relational identification as mediator 2.

Figure 2.2

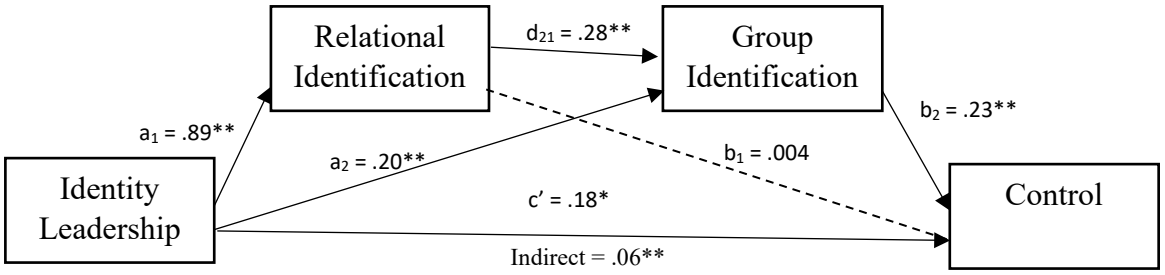
Figures depicting the mediation models presented in Study 1: *Relational Identification* as mediator 1, and *group identification* as mediator 2.

Study 1 Serial multiple mediation model of identity leadership on self-efficacy.



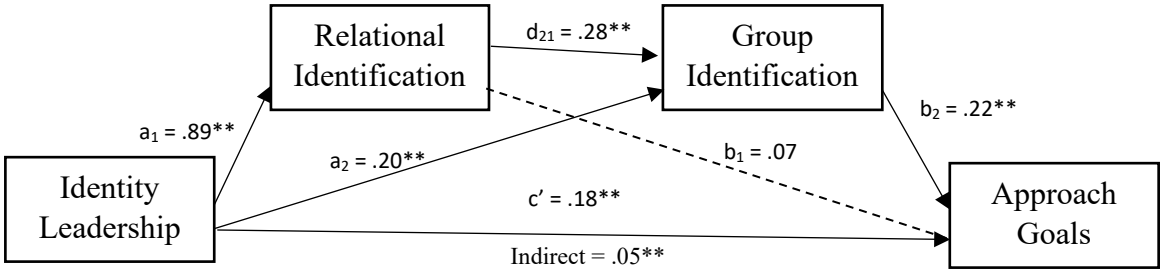
Notes: p < .05, p< .01**, "* – The 95% CI indicate a significant indirect effect. M1 is relational identification and M2 is group identification. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 1 Serial multiple mediation model of identity leadership on control.



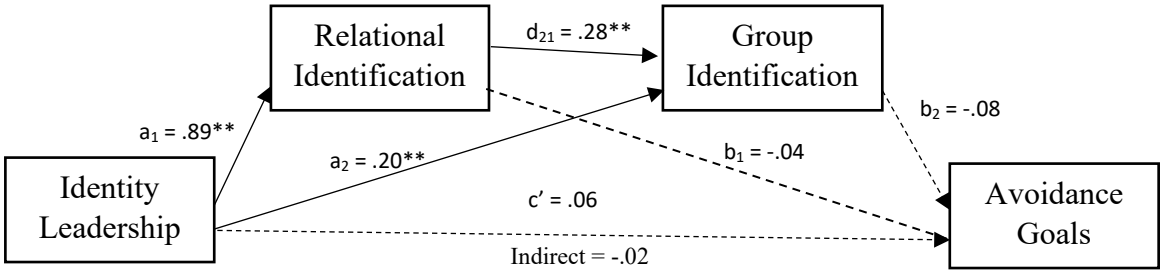
Notes: p < .05, p< .01*\, "* – The 95% CI indicate a significant indirect effect. M1 is relational identification and M2 is group identification. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 1 Serial multiple mediation model of identity leadership on approach goals.



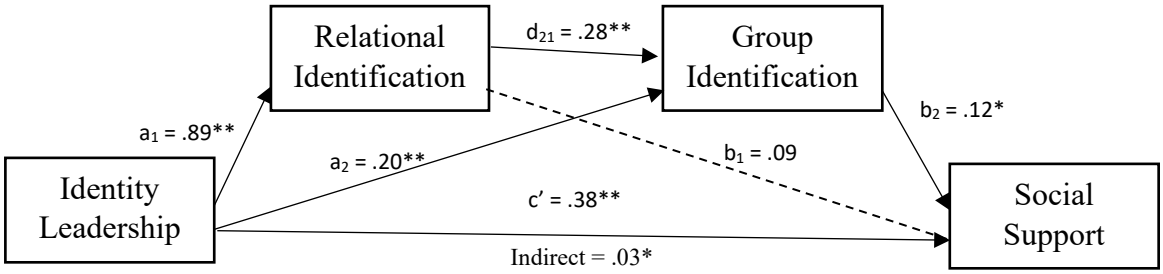
Notes: p < .05, p< .01*\, "* – The 95% CI indicate a significant indirect effect. M1 is relational identification and M2 is group identification. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 1 Serial multiple mediation model of identity leadership on avoidance goals.



Notes: p < .05, p< .01**, “* – The 95% CI indicate a significant indirect effect. M1 is relational identification and M2 is group identification. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 1 Serial multiple mediation model of identity leadership on social support.

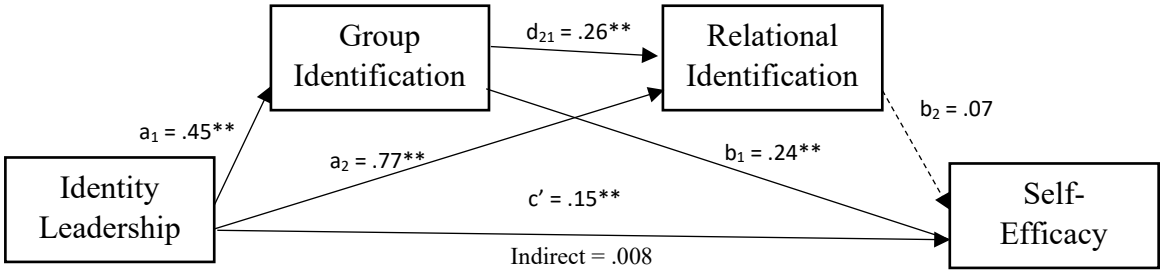


Notes: p < .05, p< .01**, “* – The 95% CI indicate a significant indirect effect. M1 is relational identification and M2 is group identification. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.
Total, direct and indirect effects, study 1; *Group identification* as mediator 1, *Relational identification* as mediator 2

Figure 2.3

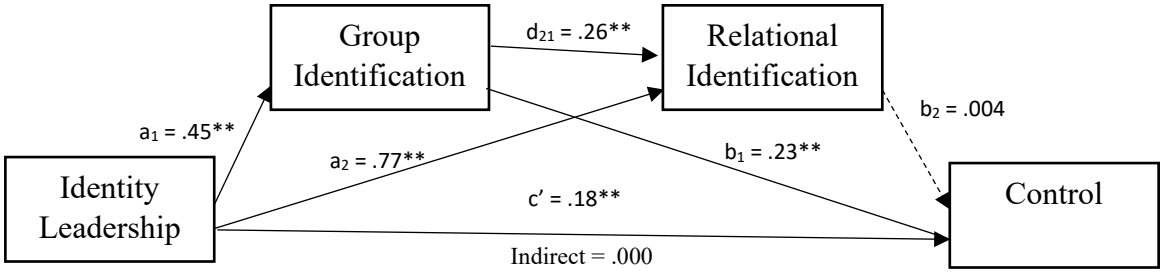
Figures depicting the mediation models presented in Study 1: *Group Identification* as mediator 1, and *relational identification* as mediator 2.

Study 1 Serial multiple mediation model of identity leadership on self-efficacy.



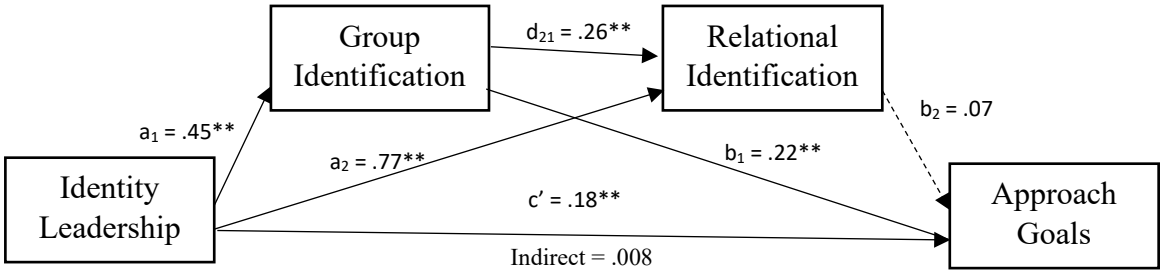
Notes: p < .05, p< .01**, “* – The 95% CI indicate a significant indirect effect. M1 is group identification and M2 is relational identification. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 1 Serial multiple mediation model of identity leadership on control.



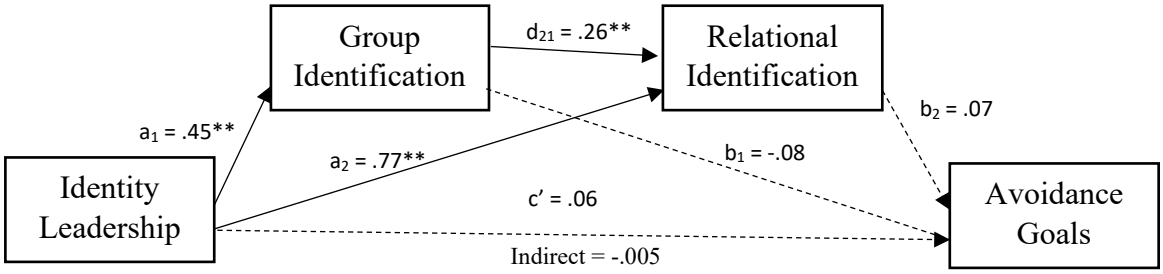
Notes: p < .05, p< .01*\, "* – The 95% CI indicate a significant indirect effect. M1 is group identification and M2 is relational identification. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 1 Serial multiple mediation model of identity leadership on approach goals.



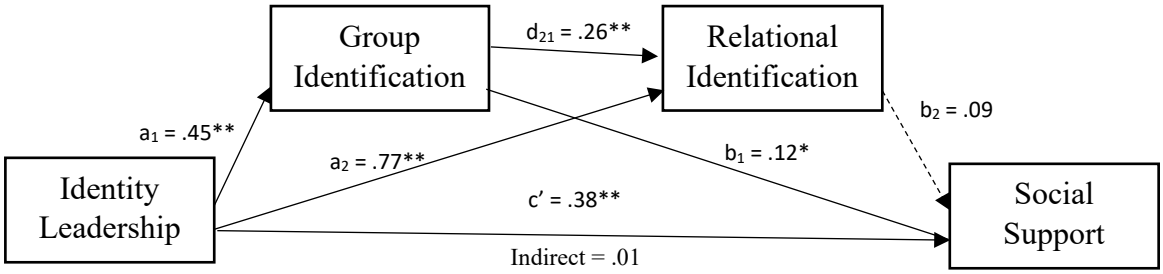
Notes: p < .05, p< .01*\, "* – The 95% CI indicate a significant indirect effect. M1 is group identification and M2 is relational identification. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 1 Serial multiple mediation model of identity leadership on avoidance goals.



Notes: p < .05, p< .01**, "* – The 95% CI indicate a significant indirect effect. M1 is group identification and M2 is relational identification. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 1 Serial multiple mediation model of identity leadership on social support.



Notes: p < .05, p< .01**, "* – The 95% CI indicate a significant indirect effect. M1 is group identification and M2 is relational identification. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

2.5 Discussion

In-line with expectations, in Study 1, it was established that identity leadership is positively associated with self-efficacy, control, approach goals and social support (H1). Identity leadership did not negatively associate with avoidance goals. The positive associations between identity leadership and self-efficacy, approach goals and perceived control were mediated by group identification. Relational, and in turn group identification (H2) mediated the positive association between identity leadership and self-efficacy, control, approach goals and social support. Against expectations, the positive associations between identity leadership and self-efficacy, control, approach goals and social support were not significantly mediated by relational identification. Further, the negative associations between identity leadership and avoidance goals were not significantly mediated by relational identification, group identification, or in serial (H2). When *group identification* was added as mediator 1, and *relational identification* was added as meditator 2, all indirect effects were non-significant. The non-significant reversed models' evidence that, supporting Sluss and colleagues' findings (2012), a dyadic emotional connection with the leader is more likely as a result of identity leadership, which then influences group level identification and athletes' appraisals of events. Extending identity leadership and stress theory, Study 1 provides initial evidence that there is a positive relationship between identity leadership and resource appraisals, which is explained by relational and therefore group identification. While this is a useful step forward, Study 1 involved cross-sectional data, and thus, in Study 2, a longitudinal design was adopted to assess these relationships at two waves at the start and the end of an athletic season. Sport performance satisfaction indicators were also included in Study 2 to assess whether social variables and an athlete's approach to competitive situations is conducive to better perceived performances (Turner et al., 2012; Turner et al., 2014).

The purpose of this Chapter was to examine the influence of athletes' perceptions of sport coach's identity leadership on relational and group identification, and resource appraisals. In sum, findings provided mixed support for hypotheses (thesis aim 1). In-line with H1, perceptions of coach identity leadership were positively associated with athletes' self-efficacy, perceived control, approach goals, and social support. In support of H2, relational and group identification (in this order) mediated the positive association between identity leadership and self-efficacy, control, approach goals and social support. Further, alone, group identification mediated the positive relationship between identity leadership and self-efficacy, control and approach goals. In contrast to H2, alone, relational identification did not significantly mediate the relationship between identity leadership and all resource appraisals. Lastly, group identification did not significantly mediate the positive relationship between identity leadership and social support. Overall, identity leadership did not negatively associate with avoidance goals, nor was the relationship mediated by relational nor group identification. Lastly, when mediators were reversed (i.e., group identification placed before relational identification), no significant indirect effects were identified.

2.5.2 Theoretical Contributions

Overall, the present study contributes to theory in two noteworthy ways. First, extending leadership theory, it is evidenced that perceptions of coaches' identity leadership positively influenced athletes' resource appraisals towards motivated performance situations as a result of a sense of connection with their coach and sport team. One reason for this could be due to a sport coaches role in influencing athletes to internalize their coach-athlete relationship as part of their self-concept (i.e., relational identification), and this may have been the basis for athletes' attitude and behaviour, mobilizing athletes to engage with the group they identify with, in turn appraising the competition more adaptively (i.e., greater resources appraisals). Slater and colleagues (2018) found that relational identification with a

leader aided intentional mobilization and resource appraisals. The present research questions this finding, evidencing that relational identification alone does mediate the direct association between identity leadership and resource appraisals. In extending Slater and colleagues' (2018) findings, the research suggests that relational, and therefore perceptions of group identification (and not the other way around) serve as mechanisms through which identity leadership influences resource appraisals within an ecologically valid setting. With the presented relationship between relational and group identification constructs, future research may consider understanding how the two constructs interact in influencing a multitude of other laudable variables.

Although identification may serve as a mechanism through which identity leadership influences appraisals, there was no associations evidenced between identity leadership and avoidance goals, nor were there any indirect effects. Though theoretically a negative association is expected (Haslam et al., 2011; Jones et al., 2009), recent meta-analytical analyses has found that avoidance motives are not likely to negatively influence outcomes such as performance (Lochbaum & Gottardy, 2015). From this, it can be argued that a) although identity leadership did not influence avoidance goals, an avoidance valence may not hold negative implications for performance situations, and b) more research is needed on understanding how an avoidant valence can be reduced (if theoretically necessary; Lochbaum & Gottardy, 2015). A potential contributor to the reduction in avoidance goals could be the meaning behind the dyadic relationship between leader and follower (i.e., shared identity content; Slater et al., 2019), not explored in ours, nor Slater et al's (2018) research. The belief that a leader and follower have similar ideas about the meaning of the group, such as being results-focused, influences follower mobilization of efforts toward a performance task. As the leader and followers share collective meaning (e.g., to approach tasks with confidence), dyadic identification is likely to be endorsed (i.e., undetermined in the present study), and

thus psychological resources (including avoidance) are likely to be improved alongside enhanced mobilization (Slater et al., 2019). To this end, there is scope for future research to identify whether shared identity content serves as the mechanism through which resource appraisals are improved, and performance is enhanced.

Because perceived identity leadership influenced relational identification, to then influence group identification in the serial mediation models, the evidence suggests that the emotional connection between leader and athlete that was formed may supersede group identification, as per Sluss and colleagues' (2012) propositions. In other words, self-efficacy may form as a result of relational identification rather than group identification. In sum, evidence from the present study indicates that it is pivotal within competitive sport that sport coaches make every effort to display identity leadership in order to retain and develop relational identification, which in turn enhances perceptions of group identification, thus improving resource appraisals in their athletes.

Second, the findings from the present study show that identity leadership and identification (with a leader and group) influences athletes' self-efficacy, perceived control, approach goals, and social support, indicating that such leadership variables support the propositions within the TCTSA-R (Meijen et al., 2020). Meijen et al. (2020) proposed that it is important for individuals to perceive that support is available from people with whom they share a strong connection (e.g., a coach), and as such seek to use these opportunities for support in anticipation of a motivated performance situation. This research supports this proposition, evidencing that support perceived from coach whom an athlete shares an emotional connection with is likely to appraise a competitive scenario positively. This is particularly noteworthy given that leadership and other social factors (e.g., number of positive group memberships) have been found to be vital in other approaches to health/stress (e.g., the social cure; Haslam et al., 2018). As such, the findings support the notion of social

resources, in that an individuals' social resources (friends; memberships in clubs and organizations) have been found to attenuate stressful situations (Billings & Moos, 1981). In turn, within research, these social resources predict greater overall performances as a result of collective supportive climates (Peñalver et al., 2019), which are products of leadership (Zhu et al., 2015). To this tune, the findings add to initial conceptualizations (Slater et al., 2016) and evidence (Slater et al., 2018) that identity-based leadership could be considered within stress theory as proposed (Meijen et al., 2020). Specifically, athletes believing that their coach shows identity leadership behaviours is likely to be associated with greater self-efficacy, perceived control, approach goals and perceived support.

Because the findings point to a relationship between perceptions of identity leadership and psychological appraisals, practically, identity leadership interventions such as the 3R's (Haslam et al., 2011) may prove pivotal in improving athletes' competitive appraisals. By this, leaders should aim to understand the social identities within a group (i.e., *represent*), act in line with group expectations and norms (i.e., *represent*), and help set structures to achieve group goals (i.e., *realize*). In doing this, identification (i.e. relational and group) is likely to be enhanced (Haslam et al., 2011), and competitive appraisals improved. Indeed, it was found that there was a positive association between identity leadership and social support. Given that resource appraisals (González-Morales & Neves, 2015; Jones et al., 2009) and social support (Rees & Freeman, 2010) positively influences sports performance, it is recommended that coaches should enact the 3R's (Haslam et al., 2011) in a) improving athlete perceptions of efficacy, control, approach goals and support, and b) improving sports performance. Though, it is unclear whether social variables such as identity leadership serve as a mechanism through which perceived support is bolstered, and performance is improved. Thus, future research should aim to understand whether the enactment of identity leadership positively influences appraisals (including support), to in turn influence performance.

Overall, the data adds to previous findings, identifying that there are psychological consequences of identity leadership.

2.5.3 Limitations and Future Research Directions

Study 1 is not without limitations. First, the present study did not measure athletes' appraisals of the event in the few seconds immediately before the event started due to ethical reasons. Evidence has indicated that appraisals are fluid (Blascovich & Mendes, 2000), and thus, it is plausible that the appraisals athletes reported an hour before the competition changed in the imminent seconds before the start. Though reappraisal happens in the moments before competition, data was captured as close to competition as feasible. Second, though the research was based on stress theory (Jones et al., 2009), physiological reactivity was not included in identifying cardiovascular markers of challenge and threat on approach to the competitive situation (e.g., Turner et al., 2014). Further, the polychotomous propositions of the TCTSA-R included in this research (Meijen et al., 2020). By this without measuring Lazarusian appraisals of motivational relevance (i.e., the intensity of the competitive stress response) and goal congruence (i.e., the pursuit of goals that align with goals that the group intend to achieve; Lazarus & Folkman, 1984), it was not possible to test the TCTSA-R in this study (Meijen et al., 2020). There is merit in identifying whether physiological reactivity to stressful situations can be influenced by identity leadership and identification variables (Chapters 4 and 5), as well as researchers developing measurement tools that align with the TCTSA-R (Meijen et al., 2020). Speaking of measurement, there has been evidence that single item measures (i.e. AGQ; Conroy et al., 2003; Turner et al., 2012), compared to full-length scales, may not be sufficient indicators of a construct, reducing reliability (Hays et al., 2012). Although this is the case, the used scales have proven valid in measuring resource appraisals (Slater et al., 2018; Turner et al., 2013; Turner et al., 2014). Lastly, leadership and its potential effects occur over time, and as such can be seen as a process, rather than

something that occurs instantaneously (Stevens et al., 2018). As such, Chapter 3 elucidates the long-term influence of identity leadership on resource appraisals across an athletic season.

2.5.4 Conclusion

The present research examined whether the perceptions of sport coach's identity leadership predicted athletes' resource appraisals, and whether these relationships were explained by relational and group identification. Chapter 2 evidences that perceptions of identity leadership influence athletes' self-efficacy, perceived control, approach goals and perceived support, through identification with both the coach and the team. The present research echoes that of Sluss and Ashforth's (2012) findings that a strong relational identification with a leader can, in turn, positively influence group identification. Though in addition, a prerequisite to this relationship is the perception of a leader's portrayal of identity leadership, which in turn, as a result of identification (relational and group), an athlete's resource appraisals is improved. These findings stimulate the need for sport coaches to understand both: (1) the importance of displaying identity leadership behaviours for their athletes' resource appraisals, and 2) how relational and group identification may be key mechanisms through which resource appraisals are optimized. Though this is the case, as mentioned, leadership is a dynamic construct that may influences variables over time (Stevens et al., 2018). As such, Chapter 3 presents a temporal study into the influence of identity leadership on athletes' resource appraisals and performance satisfaction.

2.5.5 Reflection on Chapter 2

Study 1 aimed to examine the mechanisms through which engagement in identity leadership by sport coaches predicts athletes' resource appraisals in the lead up to competition. This was the first study to identify such mechanisms. There was a scarcity in the understanding of whether and to what degree identity leadership behaviours were likely to

influence an athletes' appraisals of an event. From this newfound understanding of the associations between these variables, it was advantageous to explore the temporal nature of these relationships. It was reasonable to suggest, based on the results from Chapter 2, that a sports coach can help athletes internalize the coach-athlete relationship as part of their self-concept (i.e., relational identification), serving as a basis for athletes' attitude and behaviour, mobilizing athletes to engage with the group they identify with, in turn bolstering competitive appraisals. Though this may be the case, a leader's influence on an athlete is likely to change over time. Addressing the call for temporal data (Slater et al., 2018), and evidencing the associations as seen in Chapter 2, these provided rationale for Chapter 3.

Chapter 3 aims to understand the temporal nature of enacting identity leadership on appraisals and performance satisfaction. It has been identified that the behaviours a leader portrays is not likely to influence behaviours instantaneously (e.g., Mertens et al., 2020). By this, developing a sense of social identification takes time. As such, the following Chapter, much like existing research (Mertens et al., 2020), measures perceptions of identity leadership at the start, and the end of the season. From here, we can then understand whether perceptions of the leader at the start of the season influence shared identification and appraisals at the end of a competitive season.

CHAPTER 3: TEMPORAL INVESTIGATIONS INTO THE IDENTITY LEADERSHIP, RESOURCE APPRAISAL AND PERFORMANCE SATISFACTION RELATIONSHIP[3]

3.1 Introduction

Study 1 showed that identification (relational and group) fully mediated cross-sectional relationships between identity leadership and resource appraisals. Extending identity leadership theory, these findings show that the enactment of the identity leadership principles can influence an athlete's perception of efficacy, control, approach and avoidant focus and social support when approaching competition as a result of emotional connections between both leader and follower, and follower and team. Supporting Sluss and Ashforth's (2007; 2012) propositions, an individual is likely to see the collective (i.e. group identification) as an extension of the dyadic role-relationship. Simply, a dyadic connection between leader and follower acts as an antecedent to developing a relationship with a group that the leader acts for. If a leader is does not enact identity leadership behaviours, a dyadic, and therefore group level identification is not likely to occur, at least according to Study 1. However, research has found that a leader's enactment of identity leadership positively influences group identification alone, in turn improving sport and exercise attendance (Stevens et al., 2018). Here however, relational identification was not measured. A study that measured both relational and group identification identified the opposite of what was found in Study 1 (Steffens et al., 2014b). Specifically, Steffens and colleagues (2014b) identified that a sense of relational identification with a leader can be inferred from a follower's social identification with a group that unites follower and leader, in turn influencing charisma (Steffens et al., 2014b). With this disparity in research, it begs the question as to why these

[3] The following Chapter reports the results from the second study within the following journal article; Miller, A. J., Slater, M. J., & Turner, M. J. (2020). Coach identity leadership behaviours are positively associated with athlete resource appraisals: The mediating roles of relational and group identification. *Psychology of Sport and Exercise*, 51, 101755. https://doi.org/10.1016/j.psychsport.2020.101755

differences are being found. It could be argued that the length of time that a group has been established may serve as part of this process. Specifically, a newly formed group, with no particular ties to the group, may be dependent on the leader to bring the group together (at least theoretically; Haslam et al., 2011; Haslam et al., 2017). Hence, relational identification may serve to influence group identification of followers. Contrary to this, it can be argued that (again hypothetically) when the group is already embedded as part of the self, and a new leader is introduced, it may be that the pre-existing group identification may serve to infer identification with the leader. Without empirical understanding of this concept, it is worthwhile evidencing in what situations relational or group identification holds greater influence over dependant variables. Thus, the second study within this thesis evidences long term implications of identity leadership on appraisals and performance, evidencing the direction of the model over time (i.e., relational before group identification, or group before relational identification).

With performance as mentioned, researchers have evidenced that an athlete's appraisal of an event carries implications for performance (González-Morales, & Neves, 2015; Moore et al., 2012). Previous researchers have found mixed evidence regarding how psychological states (e.g., resource appraisals) relate to sports performance. In the TCTSA (Jones et al., 2009) and TCTSA-R (Meijen et al., 2020) it is posited that when resource appraisals meet or exceeds perceived demands, an individual is likely to show a challenge response, in turn positively influencing performance and well-being. With researchers evidencing that challenge-based appraisals positively influence subjective performance (Nicholls et al., 2012), and others finding no such evidence (Turner et al., 2012), research is necessary to address this contradiction. To add, Slater and colleagues (2018) found mixed effects for both resource appraisals and cardiovascular indices (of challenge and threat) on cognitive performance. Specifically, perceiving a stronger identification with a leader was concordant

with greater resource appraisals, mobilization of effort, and cognitive performance on a concentration grid activity (Slater et al., 2018; Study 2). Yet, no such findings were apparent on a separate cognitive task (Slater et al., 2018; Study 3). These mixed results urged Slater and colleagues (2018) to call for future research to investigate the relationships between identity leadership, resource appraisals and performance in more ecologically valid settings. Given that leadership success is evaluated over time, Slater and colleagues (2018) also evidenced the need for longitudinal field investigations into the influence of identity leadership.

Because temporal investigations within identity leadership and stress related variables are scant, the present research applies a longitudinal design that is typical of previous research, applying both causation (i.e., identity leadership influencing appraisals over time, not just associated with appraisals; Zapf et al., 1996) and reverse causation (i.e., appraisals influencing perceptions of identity leadership over time; Zapf et al., 1996) over time. Though this procedure is yet to be examined within leadership and stress research combined, previous projects have determined the influence of identity leadership on sport and exercise attendance over time through group identification (Stevens et al., 2020). Stevens and colleagues (2020) identified that group identification at time 2 (8 weeks after time 1) mediated the relationship between perceptions of identity prototypicality, advancement and entrepreneurship at time 1 and attendance at time 2. However, the direct effect of identity leadership principles (time 1) on attendance (time 2) was non-significant. Group identification mediated a non-significant effect, going against hypotheses set (Stevens et al., 2020). Although there is evident inconsistency in effects over time, Study 1 within the thesis identifies, albeit cross-sectional, that identity leadership positively associates with resource appraisals, and this direct association is mediated by relational and group identification.

In the current Chapter, the aim is to a) address inconsistencies within effects found in previous research (Stevens et al., 2020), b) address calls made for longitudinal investigations within ecologically valid settings (Slater et al., 2018), and c) bring together leadership (Haslam et al., 2011) and stress theory (Meijen et al., 2020). This is actioned by examining whether athletes' perceptions of their coach's identity leadership can predict resource appraisals (including social support; Meijen et al., 2020), and performance satisfaction across an athletic season (thesis aim 2). Like Study 1, it is identified as to whether relational and group identification mediate these temporal relationships. Identifying to what extent sport coaches influence appraisal and performance holds implications for theoretical development given that leadership is not a formally understood proposition within the predominant theory (Jones et al., 2009; Meijen et al., 2020). In proper, the following hypotheses are examined in Study 2:

H1: Their will be a positive temporal association between perceived identity leadership and resource appraisals.

H2: A positive temporal association between perceived identity leadership and resource appraisals will be mediated by group and relational identification.

H3: Identity leadership, relational identification, group identification and resource appraisals at wave one will account for a significant proportion of variance in performance satisfaction at wave two, when controlling for wave one performance satisfaction.

3.2 Overview of Study 2

Extending study 1, study 2 examines the longitudinal associations between identity leadership, relational and group identification, resource appraisals, and sports performance (i.e. satisfaction) in two waves across an athletic season. By assessing variables longitudinally, it can be identified whether perceptions of leadership influence athletes'

resource appraisals through the mechanisms of relational and group identification across a season. Further, the antecedents that contribute towards sports performance over a competitive season are identified. By recognising the influence of these social processes on resource appraisals and performance, advances in stress (Meijen et al., 2020) and leadership (Haslam et al., 2011) theory can be made.

3.3 Methods

3.3.1 Participants and Design

A two-wave longitudinal design was adopted to investigate serial mediation models. One-hundred and thirty-six athletes (M_{age} = 24.73 ± 5.39; 118 males) of various sporting experience (M_{years} = 12.82 ± 6.45) within amateur (43%) and professional sport (57%) took part. The sample included athletes who participated in football (n = 81), rugby (n = 37) and netball (n = 18).

3.3.2 Measures

Identity leadership. Exactly the same as Chapter 2, the Identity Leadership Inventory (ILI) was used. This is a 15-item questionnaire which measures the four principles of identity leadership (Steffens et al. 2014). The ILI is robust in measuring identity leadership, being validated across 20 countries (van Dick et al., 2018). The questionnaire includes items such as "*My coach embodies what the team stands for*" (Identity-prototypical, wave 1; α = .93, wave 2; α = .92), "*My coach stands up for the team*" (Identity-advancement, wave 1; α = .90, wave 2; α = .93), "*My coach creates a sense of cohesion within the team*" (Entrepreneur of identity, wave 1; α = .93, wave 2; α = .90), and "*My coach devises activities that bring the team together*" (Impresario of identity, wave 1; α = .90, wave 2; α = .91). In-line with Stevens and colleagues' (2019b) and Chapter 2, a global identity leadership measure (comprised of all 15 items) demonstrated excellent internal consistency (Cronbach's wave 1;

α = .96, wave 2; α = .97). Though a four-factor model of the ILI has been conceptualized, Steffens and colleagues (2014) identified that the intercorrelations between the four principles have significant overlap. Given that this is the case, and to maintain sufficient statistical power, subsequent analyses are run on global identity leadership.

Group and relational identification. As previously used in Chapter 2, a 3-item questionnaire was used to identify how strongly athletes identified with their sport team (Slater et al., 2018): "*I feel a strong connection with the team"*, "*I identify strongly with the team"* and "*I feel no connection with the team"* (reverse scored). Responses were on a Likert scale from 1 (*not at all*) to 7 (*very true*). This measure has been used by identity leadership researchers (e.g., Slater et al., 2018) and demonstrated at least acceptable reliability in the current study (wave 1, α = .83, wave 2, α = .74). The same three items and scale used for group identification were edited, replacing the words "*the team*" to "*my coach*". These changes, in-line with Slater and colleagues' (2018) procedure, identified an athletes' level of relational identification with the leader. The measure in this capacity showed at least acceptable internal consistency (wave 1, α = .88, wave 2, α = .71).

Self-efficacy. Using Banduras (2006) guidelines, two items measured how confident each athlete felt to perform well in the upcoming match (Turner et al., 2012). Specifically, the questionnaire asked; "*In the next fixture, to what extent do you feel confident that you can perform well?*" and "*In the next fixture, to what extent do you feel confident that you fulfil your potential?*". Participants reported on a Likert scale from 1 (*not at all*), to 5 (*very much so*). Cronbach's alpha was questionable at wave two (wave 1, α = .78, wave 2, α = .54).

Perceived control. Adapted from the Academic Control Scale (Perry et al., 2001; Turner et al., 2012), a single item was used to identify perceived control over their upcoming performance: "*The more effort I put into the following fixture, the better I will do?*". Typical

of research measuring resource appraisals (e.g. Turner et al., 2014), the item was recorded on a 5-point Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Achievement goals. The Achievement Goal Questionnaire (AGQ: Conroy et al., 2003; Turner et al., 2012) was used to identify an athlete's motivational disposition towards performance. Like Chapter 2, this was condensed to a 4-item measure for brevity, with a single item for each subscale. The scale in this capacity has been individually validated (Conroy et al., 2003) in measuring resource appraisals (Slater et al., 2018; Turner et al., 2013; Turner et al., 2014). These 4 items were used to create two subscales, approach (from mastery approach and performance approach) and avoidance (from mastery avoidance and performance avoidance). Both approach and avoidance subscales were internally consistent (wave 1, $\alpha \geq .74$, wave 2, $\alpha \geq .70$).

Athletes' received support. A 22-item questionnaire identified an athlete's perception of received support (ARSQ: Freeman et al., 2014). The ARSQ identifies 4 dimensions of social support: emotional, esteem, informational, and tangible. All items followed from the stem "*In the build up to the upcoming fixture, to what extent has someone*"… "*cheered you up*" (emotional, wave 1, $\alpha = .94$, wave 2, $\alpha = 93$), "*comforted you*" (esteem, wave 1, $\alpha = .95$, wave 2, $\alpha = .92$), "*given you tactical advice*" (informational, wave 1, $\alpha = .94$, wave 2, $\alpha = .95$), and "*helped manage your training sessions*" (tangible, wave 1, $\alpha = .95$, wave 2, $\alpha = .97$). Freeman and colleagues (2014) found support for both a four-factor and a unidimensional model. Much like Freeman and colleagues, Cronbach's alpha for all subscales combined was excellent (wave 1, $\alpha = .97$, wave 2, $\alpha = .97$). Given that the measure supports a unidimensional model, and aiming to maintain sufficient statistical power, subsequent analyses are run on overall social support.

Task importance. A single item identified whether the upcoming fixture is important to them, from 1 (*not at all*) to 5 (*very much so*). This item is commonly used in TCTSA

research (e.g., Slater et al., 2018), and is a prerequisite of challenge and threat responses (Jones et al., 2009).

Performance satisfaction. A further single item measured individual subjective performance (Biddle et al., 2001; Levy et al., 2011; Nicholls et al., 2010; Nicholls et al., 2012). The single item asked, '*please indicate how satisfied you are with your performance in the match you have just participated in*?'. This is a previously validated questionnaire anchored at 1 (totally dissatisfied) to 10 (totally satisfied).

3.3.3 Procedure

Following institutional ethical approval (see appendix 4), convenience and snowball sampling techniques were adopted, contacting coaches via email, word of mouth, and social media. Once approved by the team's coach (via convenience sampling) and athletes (via snowball sampling), paper surveys were given to the athletes within an hour of competition. Wave 1 surveys were handed out within the first two weeks of the season. On the first page it was noted that this was a two-wave study, and that the procedure will be repeated towards the end of the season. If consent was not granted, athletes were thanked for their consideration. Athletes then completed demographic information and the 7 questionnaires. After the competition fixture, within an hour of completion, the players were asked to rate their performance. Wave 2, which was an exact replication of the above, was completed in the final two weeks of the season (8 months later).

3.3.4 Data Analysis

Main analyses involved three stages. First, a series of Multivariate (MANOVA) and univariate (ANOVA) analyses were conducted. Here it was identified whether perceptions of leader engagement in identity leadership, identification with their leader and group, and resource appraisals changed across an athletic season. Second, serial mediation analyses

(Cohen et al., 2003) were conducted. It was tested whether identification (relational and group) at wave 2 mediated the relationship between perceived identity leadership at wave 1 and resource appraisals at wave 2. Like Chapter 2, initially, relational identification at wave 2 formed mediator 1, and group identification at wave 2 formed mediator 2. Then, mediators were reversed, placing group identification at wave two as mediator 1, and relational identification at wave 2 as mediator 2. Typical when assessing longitudinal autoregressive models, wave 1 repeated variables were used as controls (Adachi & Willoughby, 2015). As with Chapter 2, for indirect effects, analyses were conducted via the lavaan package of R software (v. 4.0.0). Structural equational model estimates (with two serial mediators) are reported using the Satorra-Bentler correction (Chou et al., 1991) alongside cluster-robust standard errors to control for non-independence of errors (i.e. controlling for a suspected correlation between error terms within each sports team) and multivariate non-normality. Robust clustering was enabled, with statistical significance of indirect effects being determined using 95% CI's (Zhao et al., 2010). Retaining the power analyses used for Chapter 2[4], sample size estimates for the mediated paths indicated at least 135 participants to achieve a power of .80 across all paths (a^1b^1 N = 92, a^2b^2 N = 125, $a^1d^{21}b^2$ N = 135). Further, mediational research assessing the longitudinal associations between identification (Stevens et al., 2019b; Wakefield et al., 2020) and dependent variables has used similar participant numbers to the present study (N = 186, Stevens et al., 2018; N = 122, Wakefield et al., 2020). Third, typical of challenge and threat research within ecologically valid settings (Blascovich et al., 2004; Turner et al., 2012), hierarchical multiple regression analyses (via R software 4.0.0) were conducted to identify whether facets of social factors and resource appraisals at wave one predicted wave 2 performance satisfaction.

[4] The monte carlo power estimations using the current software packages do not account for control variables as part of power analyses (Schoemann et al., 2017). The present power calculation should be considered an approximate estimate. That said, these results ensure confidence that the final sample (N = 136) for study 2 was sufficient for mediation analyses.

3.4 Results

3.4.1 Preliminary Analyses

Data were cleaned and screened computing a missing values analysis, multiple imputation, and was windsorized (2*SD*'s). Checks for relationship and difference tests include cooks' distance, multicollinearity, tolerance and variance inflation factor, independence of errors, normally distributed errors, linearity, homoscedasticity and multivariate normality. Further, previous research has noted the downfall of the ceiling effect (the maximum score being reached at wave one), where no significant improvements can be made at wave two (Howard et al., 1993). Data was screened to identify whether any individual reported the maximum score on any independent variables (facets of perceived identity leadership) at both wave one and two. No data needed to be removed post screening. Missing values analyses revealed that all missing data, in all subscales, within all measured variables, at both time points were missing completely at random ($\chi^2 \geq .322$, $p \geq .149$), with .1% of overall data responses being missing. From this, multiple imputations were conducted, and following Smith's (2011) guidelines, data-points with *z* scores greater than two were winsorized. Across all regression models, Cook's distance values were less than 1, the multicollinearity assumption was met and variance inflation factor (≤ 1.094) and tolerance values ($\geq .914$) were acceptable (Hair et al., 1995). Independent errors (Durbin-Watson, 1.767 – 2.308), normally distributed errors, linearity, and homoscedasticity assumptions were satisfied across models. The assumption of multivariate normality (Mardia Skewness < .05) was violated across all endogenous variables. In dealing with this, the Satorra-Bentler model was run, and robust-cluster standard errors are reported (Chou et al., 1991). Intercorrelation matrices for wave 1 and wave 2 can be seen in Table 3.1.

3.4.2 Prerequisite Check

Two one-sample t-tests indicated that athletes (at both waves) reported the competition to be of significant importance (i.e., significantly different to zero: wave 1, $t(145) = 48.69$, $p < .001$, $M = 3.86 \pm .96$; wave 2, $t(135) = 57.35$, $p < .001$, $M = 4.01 \pm .82$). A paired samples t-test identified that there was a non-significant increase in perceived importance from wave one to wave two, $t(135) = -1.55$, $p = .123$.

Table 3.1. Pearson's correlations coefficients (r) between the variables across timepoints

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Prototypical	-	.86*	.80*	.76*	.93*	.70*	.39*	.58*	.44*	.50*	18**	.48*	.46*	.39*	.32*	.45*	.27*
2. Advancement	.88*	-	.79*	.74*	.93*	.69*	.40*	.65*	.40*	.52*	.17**	.48*	.46*	.34*	.32*	.44*	.23*
3. Entrepreneur	.74*	.66*	-	.84*	.93*	.68*	.39*	.65*	.46*	.48*	.17**	.47*	.46*	.40*	.38*	.47*	.24*
4. Impresario	.62*	.63*	.79*	-	.89*	.61*	.34*	.60*	.41*	.46*	.21**	.46*	.43*	.38*	.36*	.45*	.29*
5. Global identity leadership	.92*	.89*	.90*	.84*	-	.74*	.43*	.68*	.46*	.54*	.19**	.51*	.49*	.41*	.38*	.49*	.28*
6. Relational Identification	.84*	.77*	.78*	.72*	.88*	-	.64*	.57*	.45*	.48*	-.02	.37*	.35*	.25*	.20**	.32*	.27*
7. Group Identification	.42*	.43*	.46*	.44*	.51*	.54*	-	.41*	.31*	.47*	-.14	.23*	.18*	.03	.01	.12	.16
8. Self-efficacy	.47*	.43*	.43*	.40*	.50*	.43*	.45*	-	.51*	.53*	.20**	.40*	.38*	.26*	.18**	.32*	.27*
9. Control	.51*	.41*	.34*	.31*	.46*	.46*	.43*	.65*	-	.53*	.07	.40*	.39*	.20**	.16	.30*	.19**
10. Approach	.46*	.45*	.36*	.33*	.46*	.36*	.43*	.54*	.58*	-	.23*	.43*	.36*	.28*	.26*	.35*	.21**
11. Avoidance	.36*	.30*	.38*	.28*	.38*	.26*	.29*	.40*	.40*	.71*	-	.21**	.08	.21**	.22*	.19**	.15
12. Emotional	.46*	.36*	.46*	.40*	.49*	.47*	.41*	.49*	.56*	.53*	.46*	-	.87*	.74*	.62*	.87*	.24*
13. Esteem	.42*	.32*	.51*	.42*	.48*	.44*	.4*	.47*	.51*	.47*	.47*	.87*	-	.77*	.68*	.91*	.25*
14. Informational	.31*	.29*	.44*	.36*	.40*	.38*	.27*	.25*	.35*	.22*	.34*	.62*	.66*	-	72*	.90*	.24*
15. Tangible	.25*	.24*	.36*	.28*	.33*	.31*	.16	.17*	.23*	.04	.22**	.43*	.47*	.74*	-	.87*	.11
16. Overall Support	.42*	.35*	.52*	.43*	.49*	.47*	.36*	.40*	.47*	.34*	.42*	.83*	.86*	.90*	.81*	-	.24*
17. Performance Satisfaction	.24*	.21*	.13	.20**	.23*	.30*	.18**	.19**	.21**	.26*	.16	.21**	.20**	.18**	.05	.18**	-

Note: Wave 1 correlations are below the diagonal, and wave 2 correlations are above the diagonal, $p \leq .05$**, $p < .01$*

3.4.3 Multivariate Differences from Wave One to Wave Two

A variety of univariate (ANOVA) and multivariate analyses of variance (MANOVA) indicated that identity leadership, identification with a leader and group and most resource appraisals varied significantly as a function of time (start vs end of season; see Table 3.2). Follow-up simple comparisons indicated that athletes reported significant increases in global identity leadership, Wilks' Λ =, $F(1, 135) = 24.99$, $p \leq .001$, $\eta^2 p = .16$, relational identification with a leader, Wilks' Λ =, $F(1, 135) = 8.91$, $p = .003$, $\eta^2 p = .06$, group identification, Wilks' Λ =, $F(1, 135) = 26.89$, $p \leq .001$, $\eta^2 p = .17$, self-efficacy, Wilks' Λ =, $F(1, 135) = 20.02$, $p \leq .001$, $\eta^2 p = .13$, control, Wilks' Λ =, $F(1, 135) = 24.28$, $p \leq .001$, $\eta^2 p = .15$ and approach focus, Wilks' Λ =, $F(1, 135) = 13.22$, $p \leq .001$, $\eta^2 p = .09$. Perceived avoidance, social support and performance satisfaction did not significantly change from wave one to wave two, $p \geq .05$. Means, standard deviations and simple comparisons can be found in Table 3.2.

Table 3.2. Mean ± Standard deviations and repeated-measures (M)ANOVA simple comparisons between wave one and wave two

Variables	Means ± SD		Simple comparisons	
	Start of season	End of season	*F*	*η2*
Prototypical	4.75 ± 1.37	5.27 ± 1.27	7.29**	.052
Advancement	4.87 ± 1.34	5.31 ± 1.31	6.35*	.045
Entrepreneur	4.35 ± 1.46	5.19 ± 1.23	13.03**	.089
Impresario	4.31 ± 1.50	5.04 ± 1.36	9.47**	.066
Global Identity Leadership	4.60 ± 1.24	5.23 ± 1.14	24.99**	.156
Relational Identification	4.87 ± 1.48	5.31 ± 1.14	8.91**	.062
Group Identification	5.17 ± 1.15	5.77 ± .94	26.89**	.166
Self-efficacy	3.74 ± .97	4.18 ± .72	20.02**	.129
Control	3.80 ± .93	4.29 ± .71	24.288*	.152
Approach	5.32 ± 1.23	5.78 ± 1.03	13.22**	.089
Avoidance	4.83 ± 1.43	4.77 ± 1.46	.12	.001
Overall Support	4.06 ± 1.25	4.24 ± 1.07	2.29	.133
Performance Satisfaction	6.88 ± 1.87	7.26 ± 1.96	2.84	.021

$p \leq .05$, $p \leq .01$***

3.4.4 Serial Multiple Mediation Analysis (SMM)

When including relational identification as mediator 1, self-efficacy, approach goals, avoidance goals and social support models were of at least acceptable fit (Std. RMR ≤ .06, Robust RMSEA < .08, Robust CFI > .90). With mediators in this order, acceptable fit was not identified within the control model (Std. RMR = .06, Robust RMSEA = .13, Robust CFI = .87). When group identification was included as mediator 1, the self-efficacy, control, approach, avoidance and social support models were of at least acceptable fit (Std. RMR ≤ .06, Robust RMSEA < .08, Robust CFI > .90). Within the following analyses, perceived identity leadership at wave 1 forms the predictor variable (X), with *relational identification* at

wave two forming M1. *Group identification* at wave two formed M2 and respective resource appraisal at wave two formed the Y variable. Lastly, all wave one variables were used as covariates to control for stability effects. Total effects of identity leadership at wave one on self-efficacy at wave two was significant (p = .05). All remaining total effects of identity leadership at wave one on resource appraisals at wave two were non-significant. Complete mediation models can be seen below.

Self-efficacy and control. There was a significant indirect effect for identity leadership at wave 1 on self-efficacy and control at wave 2 through relational identification at wave 2 ($\beta \geq .10$, 95% CI = .02, .20; H2). There was a non-significant indirect effect for identity leadership at wave 1 on self-efficacy and control at wave 2 through group identification at wave 2 ($\beta < .001$, 95% CI = -.04, .03; H2). Furthermore, there was a non-significant indirect effect for identity leadership at wave 1 on self-efficacy and control at wave 2 through both relational and group identification at wave 2 ($\beta \leq .01$, 95% CI = -.02, .04; H2). Further, there was a significant positive direct effect for identity leadership at wave 1 on self-efficacy at wave 2 (β = .10, p = .03, H1).

Approach goals, avoidance goals and social support. There was a significant indirect effect for identity leadership at wave 1 on social support at wave 2 through relational identification at wave 2 (β = .06, 95% CI = .004, .12; H2). The association between identity leadership at wave 1 and approach goals, avoidance goals and social support at wave two was not significantly mediated by group identification at wave two ($\beta \leq .04$, 95% CI = -.03, .09; H2). There was a significant indirect effect for identity leadership at wave 1 on approach goals at wave 2 through both relational and group identification at wave 2 (β = .07, 95% CI = .02, .13; H2). Both relational and group identification at wave 2 did not significantly mediate the relationship between identity leadership at wave 1 and social support at wave two (β = -.01, 95% CI = -.05, .02; H2). Further, there was a non-significant direct effect for identity

leadership at wave 1 on approach goals, avoidance goals and social support at wave 2 ($\beta \leq$ .10, $p > .05$; H1).

When analyses were run with group identification at wave two placed before relational identification at wave two, all indirect effects through *both* mediators were non-significant (H2). Equally, when group identification at wave two was included as mediator 1, and relational identification at wave two as mediator 2, there was a significant direct effect of identity leadership at wave one on self-efficacy ($\beta = .10$, $p = .03$; H1), and this was mediated by relational identification at wave two ($\beta = .12$, 95% CI = .06, .18; H2). In assessing bi-directional relationships (e.g. self-efficacy at wave one predicting identity leadership at time 2), no significant associations were found. A summary of standardised coefficients for total, direct and indirect effects of identity leadership at wave one on resource appraisals at wave two can be found below. Further, all mediation models in Study 2 (with mediators in both directions) can be found in Table 3.3, Figure 3.1 and Figure 3.2 below.

Performance Satisfaction. Within hierarchical multiple regression models, wave one performance satisfaction was added at Step one, followed by identity leadership (Step 2), relational identification (Step 3), group identification (Step 4), and all resource appraisals (Step 5). For wave one performance satisfaction (Step 1: $R^2 = .002$, $p > .05$), identity leadership (Step 2: $R^2 = .01$, $p > .05$; H3), relational identification (Step 3: $R^2 = .02$, $p > .05$; H3) and group identification (Step 4: $R^2 = .03$, $p > .05$; H3), there was a non-significant proportion of variance accounted for after each addition. For resource appraisals, a significant proportion of variance was accounted for by the addition of step 5 (Step 5: $R^2 = .08$, $p < .05$; H3). Specifically, wave one social support was significantly associated with performance satisfaction at wave two ($\beta = .40$, $p = .019$; H3).

Table 3.3
Summary of Total, Direct and Indirect Effects Study 2

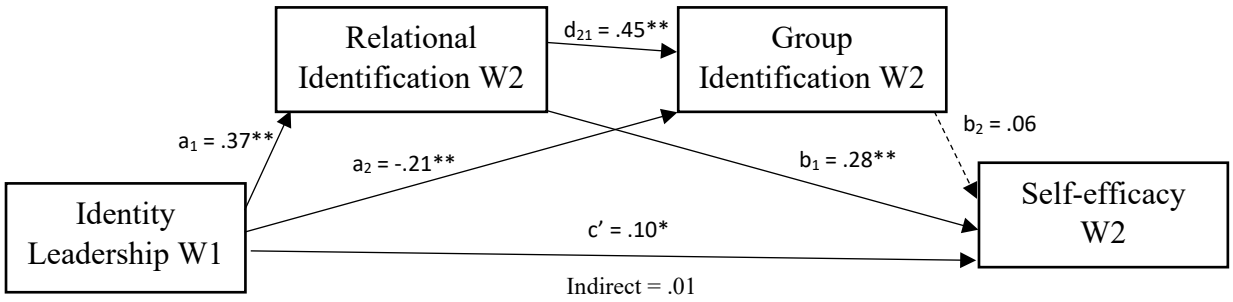
	Self-Efficacy	Control	Approach	Avoidance	Social Support
Total Effect	β = .11*	β = -.001	β = .06	β = .07	β = .02
Direct Effect	β = .10*	β = -.002	β = -.01	β = .10	β = .03
Relational Identification	β = .10*	β = .11*	β = .03	β = .03	β = .06*
Group Identification	β = -.01	β = -.001	β = -.08	β = .04	β = .02
Relational*Group Identification	β = .01	β = .001	β = .07*	β = -.03	β = -.01
Group*Relational Identification	β = -.02	β = -.02	β = -.004	β = -.004	β = -.01

Note: $p \leq .05$*, Relational*Group Identification = Relational identification at wave two as mediator 1, and group identification at wave two as mediator 2. Group*Relational Identification = Group identification at wave two as mediator 1, and relational identification at wave two as mediator 2.

Figure 3.1

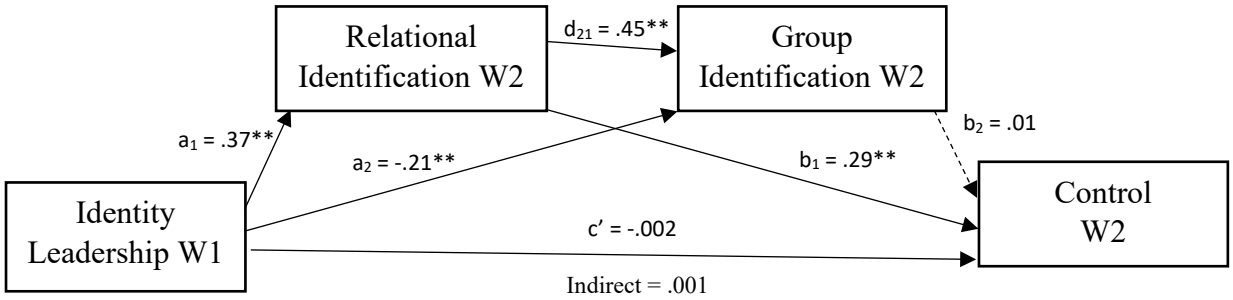
Figures depicting the mediation models presented in Study 2: *Relational Identification at wave 2* as mediator 1, and *group identification at wave 2* as mediator 2.

Study 2 Serial multiple mediation model of identity leadership at wave 1 (W1) on self-efficacy at wave 2 (W2).



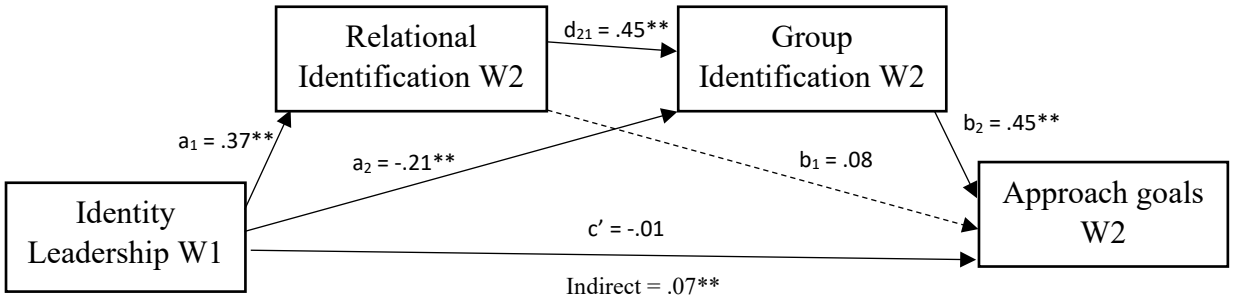
Notes: p < .05, p< .01***. M1 is relational identification at wave two and M2 is group identification at wave two. Wave 1 variables were used within analyses as controls. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 2 Serial multiple mediation model of identity leadership at wave 1 (W1) on control at wave 2 (W2).



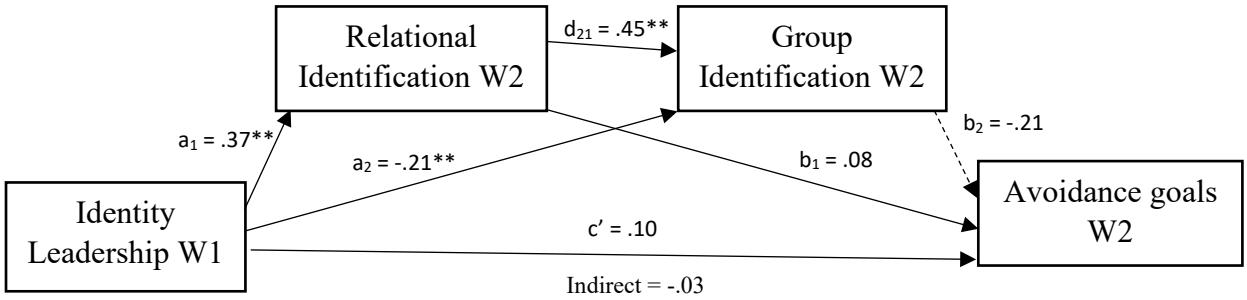
Notes: p < .05, p< .01**.* M1 is relational identification at wave two and M2 is group identification at wave two. Wave 1 variables were used within analyses as controls. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 2 Serial multiple mediation model of identity leadership at wave 1 (W1) on approach goals at wave 2 (W2).



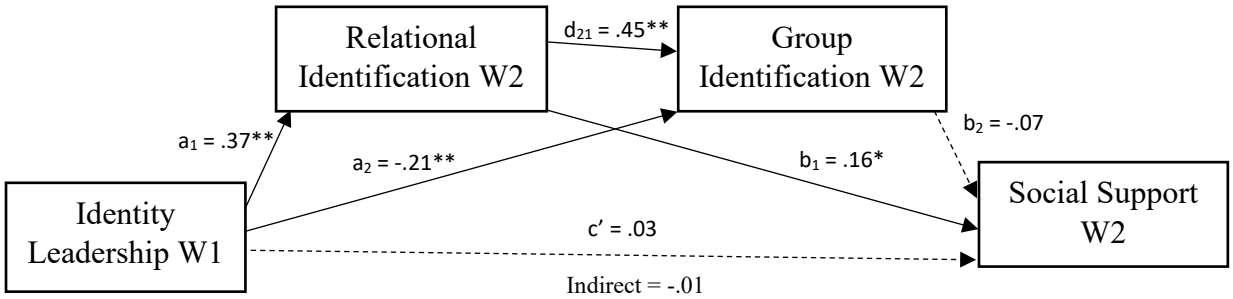
Notes: p < .05, p< .01**.* M1 is relational identification at wave two and M2 is group identification at wave two. Wave 1 variables were used within analyses as controls. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 2 Serial multiple mediation model of identity leadership at wave 1 (W1) on avoidance goals at wave 2 (W2).



Notes: p < .05, p< .01**.* M1 is relational identification at wave two and M2 is group identification at wave two. Wave 1 variables were used within analyses as controls. Solid arrows depict significant associations, and dashed arrows depict non-significant associations

Study 2 Serial multiple mediation model of identity leadership at wave 1 (W1) on social support at wave 2 (W2).

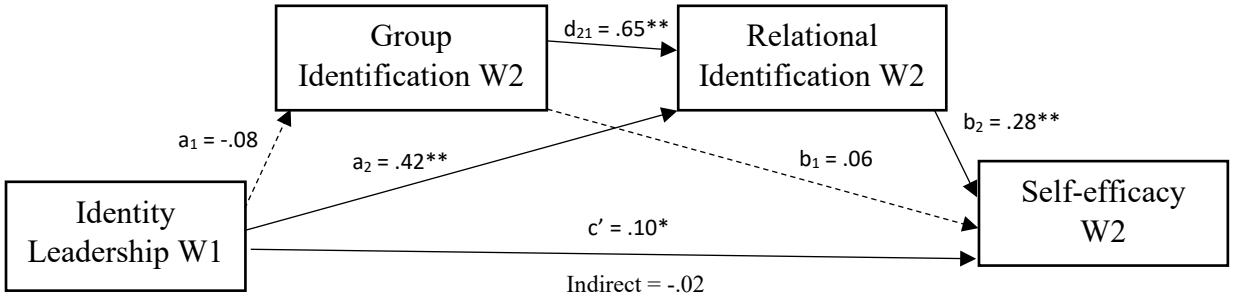


Notes: p < .05, p< .01**.* M1 is relational identification at wave two and M2 is group identification at wave two. Wave 1 variables were used within analyses as controls. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Figure 3.2

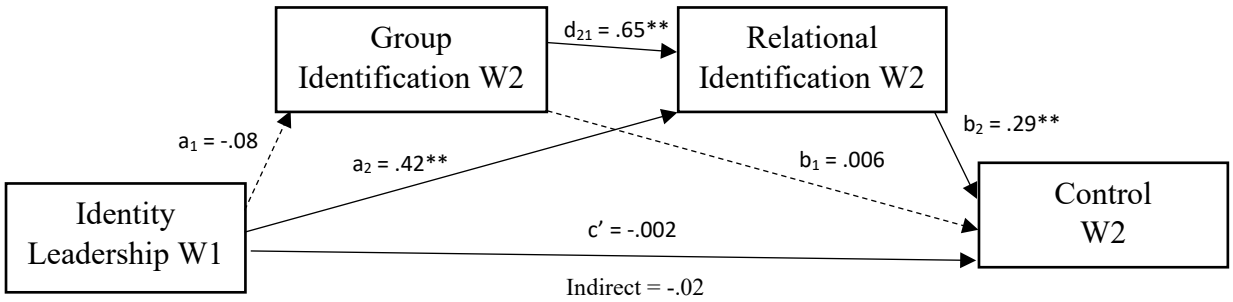
Figures depicting the mediation models presented in Study 2: *Group Identification at wave 2* as mediator 1, and *relational identification at wave 2* as mediator 2.

Study 2 Serial multiple mediation model of identity leadership at wave 1 (W1) on self-efficacy at wave 2 (W2).



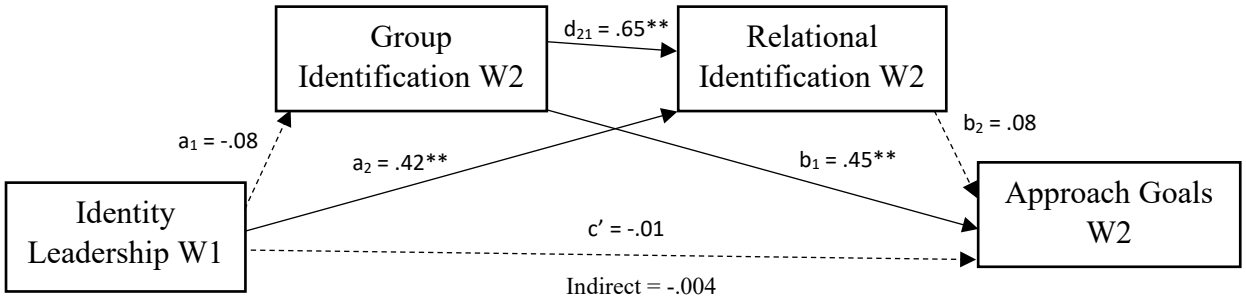
Notes: p < .05, p< .01**.* M1 is group identification at wave two and M2 is relational identification at wave two. Wave 1 variables were used within analyses as controls. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 2 Serial multiple mediation model of identity leadership at wave 1 (W1) on control at wave 2 (W2).



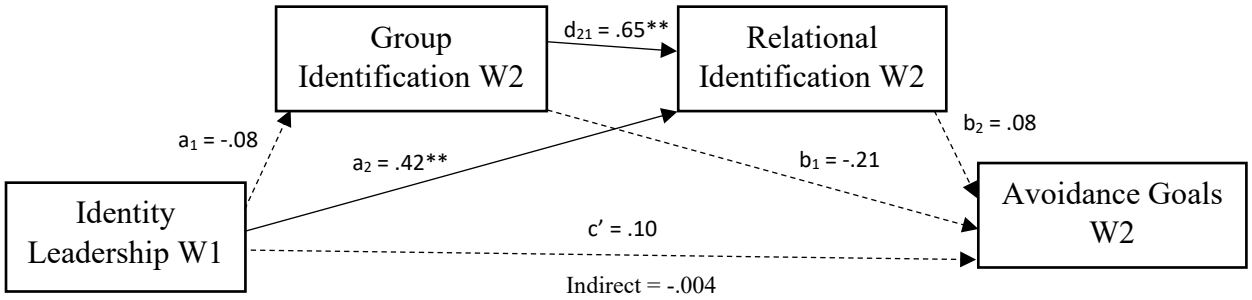
Notes: p < .05, p< .01**.* M1 is relational identification at wave two and M2 is group identification at wave two. Wave 1 variables were used within analyses as controls. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 2 Serial multiple mediation model of identity leadership at wave 1 (W1) on approach goals at wave 2 (W2).



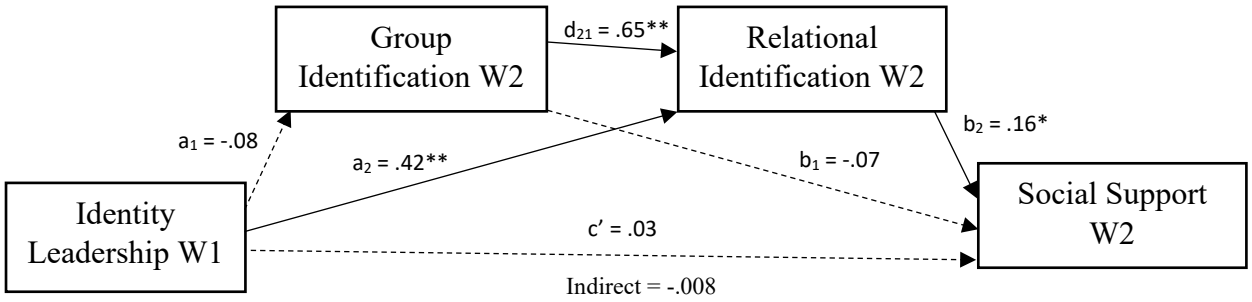
Notes: p < .05, p< .01**.* M1 is relational identification at wave two and M2 is group identification at wave two. Wave 1 variables were used within analyses as controls. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 2 Serial multiple mediation model of identity leadership at wave 1 (W1) on avoidance goals at wave 2 (W2).



Notes: p < .05, p< .01**.* M1 is relational identification at wave two and M2 is group identification at wave two. Wave 1 variables were used within analyses as controls. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

Study 2 Serial multiple mediation model of identity leadership at wave 1 (W1) on social support at wave 2 (W2).



Notes: p < .05, p< .01**.* M1 is relational identification at wave two and M2 is group identification at wave two. Wave 1 variables were used within analyses as controls. Solid arrows depict significant associations, and dashed arrows depict non-significant associations.

3.5 Discussion

Overall, Study 2 indicated mixed support for hypotheses (thesis aim 2). In-line with expectations, identity leadership at wave 1 was positively associated with self-efficacy at wave 2 (H1), and this was mediated by relational (but not group, in simple or serial mediation) identification at wave 2 (H2). Contrary to expectations, identity leadership was not associated with perceived control, approach goals or social support temporally (H1). When group identification was added as the M1 variable, and relational identification as the M2 variable, all indirect effects (i.e. through both group and relational identification) were non-significant. Further, when assessing bi-directional relationships (e.g. self-efficacy at time one predicting identity leadership at time two), all models were non-significant. In-line with hypotheses, perceived social support at the start of the season predicted greater performance satisfaction at the end of the season (H3), but contrary to expectations, no other social factors or resource appraisals did. Collectively, findings evidence that sport coaches who are perceived to display identity leadership at the start of the season are likely to positively influence athletes' self-efficacy on approach to sporting competition at the end of the season.

Further, the association between identity leadership and self-efficacy is explained through a greater relational connection with the coach.

The purpose of this Chapter was to examine the influence of athletes' perceptions of sport coach's identity leadership on relational and group identification, resource appraisals, and athletic performance. In sum, findings provided mixed support for hypotheses (thesis aim 2). Supporting H1, perceptions of coach's identity leadership at wave 1 were positively associated with athletes' self-efficacy (but not control, approach goals, avoidance goals and social support) at wave 2. When relational identification at wave 2 was included as a mediator, there was a positive association between identity leadership at wave 1 and self-efficacy at wave 2 (H2). In contrast to H2, in serial mediation models, relational and group identification at wave 2 did not explain the relationship between identity leadership at wave 1 and resource appraisals at wave 2. Further, when mediators were reversed (i.e., group identification placed before relational identification), no significant indirect effects were identified. Regarding performance satisfaction, supporting H3, perceptions of social support at the start of the season predicted greater performance satisfaction at the end of the season. No other social factors or resource appraisals at the start of the season predicted performance satisfaction at the end of the season.

3.5.2 Theoretical Contributions

Overall, Study 2 contributes to theory in three noteworthy ways. First, extending leadership theory, the present study evidences that perceptions of coaches' identity leadership positively influenced athletes' self-efficacy towards motivated performance situations as a result of a sense of connection with their coach over time. One reason for this could be due to a sport coaches' role in influencing athletes to internalize their coach-athlete relationship as part of their self-concept (i.e., relational identification), and this may have been the basis for athletes' attitude and behaviour, mobilizing athletes to engage, in turn appraising the

competition more adaptively (i.e., greater self-efficacy). Slater and colleagues (2018) found similar results in that relational identification with a leader aided intentional mobilization and resource appraisals. Extending Slater and colleagues' (2018) findings, this research suggests that relational identification serves as mechanisms through which identity leadership influences appraisals within an ecologically valid setting.

Second, Study 2 advances identity leadership theory by providing initial evidence pointing to the temporal mechanisms behind sport team dynamics and athletes' stress appraisals. It was found that perceived identity leadership played a part in creating a strong relationship between athlete and coach over time, in turn, predicting greater perceptions of self-efficacy. That said, similar to Slater et al. (2018), inconsistent findings are presented regarding resource appraisals. A potential reason for this may be the meaning behind the dyadic relationship (i.e., shared identity content; Slater et al., 2019), not explored in this, nor Slater et al's (2018) study. The belief that a leader and follower have similar ideas about the meaning of the group, such as being results-focused, influences follower mobilization of efforts toward a performance task. As the leader and followers share collective meaning (e.g., to approach tasks with confidence), dyadic identification is likely to be endorsed, and thus psychological resources are likely to be bolstered alongside enhanced mobilization (Slater et al., 2019). To this end, there is scope for future research to identify whether shared identity content serves as the mechanism through which resource appraisals are improved, and performance is enhanced.

Inconsistent with the first study, in Study 2, it was found that identity leadership did not contribute to creating a strong relationship between athlete and group over time, nor did group identification predict elevated appraisals. Because perceived identity leadership influenced relational identification within this study and in Study 1 consistently (and in turn group identification in Study 1), the evidence suggests that the emotional connection between

leader and athlete that was formed may supersede group identification, as per Sluss and colleagues' (2012) propositions. In other words, self-efficacy may form as a result of relational identification rather than group identification. In sum, evidence from Study 2 indicates that it is pivotal within competitive sport that sport coaches make every effort to display identity leadership consistently across athletic seasons in order to retain and develop relational identification, which in turn enhances perceptions of efficacy in their athletes.

Third, broadly, the findings from this study provide evidence that identity leadership and identification (with a leader) influences athletes' self-efficacy over time. These findings provide some support the proposition that athletes should perceive that support is available from people with whom they share a strong connection (e.g., a coach) in order to use opportunities for support in anticipation of a motivated performance situation (Meijen et al., 2020). That said, Study 2 notes that it is not the support perceived that necessarily bolsters self-efficacy, but the emotional connection that the athlete and coach share that enhances likelihood of positive appraisal of a competitive scenario. It is known within research discourse that leadership and other social factors (e.g., number of positive group memberships) have been found to be vital in other approaches to health/stress (e.g., the social cure; Haslam et al., 2018). Thus, like Study 1, the findings support the notion of social resources, in that resources (friends; memberships in clubs and organizations) have been found to attenuate stressful situations (Billings & Moos, 1981). In turn, these social resources predict greater overall performances as a result of collective supportive climates (Peñalver et al., 2019), which are products of leadership (Zhu et al., 2015). To this tune, findings add to initial conceptualizations (Slater et al., 2016) and evidence (Slater et al., 2018) that identity-based leadership serves as part of the stress process (Meijen et al., 2020). Specifically, athletes believing that their coach shows identity leadership behaviours is likely to be associated with greater self-efficacy over time.

Collating results from both Study 1 and 2, some inconsistencies were found. In Study 1, group identification, cross-sectionally, influenced the process through which perceived coach identity leadership influenced athlete resource appraisals. Further, it was found that perceptions of identity leadership positively influenced relational identification, in turn, positively influencing group identification and resource appraisals (excluding avoidance). However, in Study 2, longitudinally, only relational identification (not group identification) proved influential in the process through which perceptions of identity leadership at the start of the season influenced resource appraisals at the end of the season (i.e., only self-efficacy). Regarding both thesis aims 1 and 2, it is evident that although the measured constructs meaningfully associate with one another (thesis aim 1), over time, it is the relationship with the leader that proves influential for an athletes' competition related efficacy, not the relationship with the group (thesis aim 2). Overall, because findings evidenced meaningful associations between perceptions of identity leadership and psychological appraisals over time, practically, identity leadership interventions such as the 3R's (Haslam et al., 2011) may prove pivotal in improving athletes' competitive appraisals and performance satisfaction across an athletic season. Leaders that reflect on the identities of the group, represent what it means to be a member of the group, and realize the potential for the group by setting structures to achieve goals (Haslam et al., 2011), are likely to improve relational identification over time, enhancing athlete efficacy over a season. In response to Slater et al. (2018) and Nicholls et al.'s (2012) calls, the data adds to previous findings, identifying that there are psychological consequences of identity leadership over time, and that performance satisfaction can be influenced by perceived social support across an athletic season. Indeed, practically speaking, given the influence of social support at wave 1 on performance satisfaction at wave 2, it would be recommended that at the start of athletic seasons, coaches and sport psychologists should look to develop social support interventions (e.g., proactively

during pre-season). Within systematic reviews (Hase et al., 2019) and more recent empirical research (Dixon et al., 2019) on the relationship between challenge and threat and performance, only two of the 31 papers (Blascovich et al., 2004; Dixon et al., 2019) used completely natural sports performance settings to predict performance. The decision to conduct the study in an authentic setting is likely to induce natural responses (Schatzman & Strauss, 1973), strengthening the evidence that a leader can influence an athlete's appraisal and performance.

3.5.3 Limitations and Future Research Directions

The studies presented thus far are not without limitations. First, in both studies 1 and 2, athletes' appraisals in the few seconds immediately before the event started was not measured due to ethical reasons. Evidence has indicated that appraisals are fluid (Blascovich & Mendes, 2000), and thus, it is plausible that the appraisals athletes reported an hour before the competition changed in the imminent seconds before the start. Though reappraisal happens in the moments before competition, data was captured as close to competition as possible. Second, like Study 1, although the research was based on stress theory (Jones et al., 2009), physiological reactivity was not included in predicting performance (e.g., Turner et al., 2014), nor were polychotomous propositions of the TCTSA-R included in this research (Meijen et al., 2020). Without measuring Lazarusian appraisals of motivational relevance (i.e., the intensity of the competitive stress response) and goal congruence (i.e., the pursuit of goals that align with goals that the group intend to achieve; Lazarus & Folkman, 1984), it was not possible to test the TCTSA-R in this study (Meijen et al., 2020). There is merit in future studies identifying whether physiological reactivity to stressful situations can be influenced by identity leadership and identification variables over time, as well as researchers developing measurement tools that align with the TCTSA-R (Meijen et al., 2020). Finally, regarding performance, other pertinent markers were not considered. Future research may

benefit in taking a holistic perspective when measuring performance, such as individual-objective (i.e., km ran, percentage pass completion) parameters.

3.5.4 Conclusion

The present research examined whether the perceptions of sport coach's identity leadership predicted athletes' resource appraisals over time, and whether these relationships were explained by relational and group identification. The influence of identity leadership on performance satisfaction across a season was also explored. It was evidenced that perceptions of identity leadership at the start of a season was associated with athletes' self-efficacy at the end of the season through relational (but not group) identification. Additionally, receiving social support at the start of the season positively predicted increased performance satisfaction at the end of the season. These findings stimulate the need for sport coaches to understand both: (1) the importance of displaying identity leadership behaviours for their athletes' resource appraisals and performance satisfaction, and 2) how relational and group identification may be key mechanisms through which resource appraisals are optimized. Though it is clear that identity leadership positively influences psychological stress appraisals, and social support positively influences performance, to date, it is unclear to what extent identity leadership influences both psychological and physiological stress reactivity on approach to a competitive scenario. Chapter 4 identifies to what extent identity leadership principles influence psychological and physiological stress reactivity when approaching a motivated performance scenario. Further, Chapter 4 evidences whether identity leadership positively influences motor performance as a result of variations in challenge and threat psychophysiological reactivity.

3.5.5 Reflection on Chapter 3

Study 2 examined the longitudinal associations between identity leadership, relational and group identification, resource appraisals, and performance satisfaction at the start and the end of a competitive season. It was evidenced that identity leadership perceived at the start of the season served to bolster self-efficacy of athletes at the end of the season through relational identification. This finding supports conclusions from Chapter 2, identifying that sports coaches can help athletes internalize the coach-athlete relationship as part of their self-concept (i.e., relational identification). Though, it is this internalization that is the basis for athletes' attitude and behaviour, in turn improving efficacy of the athletes. Thus far, it is evident that the enactment of identity leadership behaviours is likely to predict competitive appraisals of events, be it on an atemporal and temporal basis. However, given the central theoretical basis of the present studies, to date, no physiological markers had been implemented to supplement Chapter 2, nor 3's findings. Chapter 3 evidenced that identity leadership associated with positive competitive appraisals. It has been intimated in theory that competitive appraisals inform challenge and threat psychophysiology and motor performance (Jones et al., 2009). As such, it is advantageous to explore whether identity leadership can bolster competitive appraisals (including social support), physiological reactivity, and motor performance. This necessitated a carefully controlled experimental design in order to measure physiological markers. Given the lack of empirical evidence for these associations, Chapter 4 aims to understand the effects of enacted identity leadership principles on followers' appraisals and CV reactivity ahead of a pressurized motor task.

CHAPTER 4: THE INFLUENCE OF IDENTITY LEADERSHIP PRINCIPLES ON FOLLOWERS' COGNITIVE APPRAISALS, CARDIOVASCULAR REACTIVITY, AND MOTOR PERFORMANCE[5]

4.1 Introduction

Study one identified that a coach who enacts the identity leadership principles influences follower efficacy, perceived control, approach goals and perceived support, through identification with both the coach and the team. Further, Study 2 identifies that identity leadership was associated with self-efficacy across an athletic season (through leader identification). Lastly, greater social support at the start of the season predicted greater performance satisfaction at the end of the season. Because of these findings, Study three aims to identify whether the enactment of identity leadership principles influence both psychological and physiological stress and motor performance (thesis aim 3). As evidenced, influential processes from within a social group are central to members' cognition and behaviour (Tajfel & Turner, 1979; Turner et al., 1987). It is the understanding of the process of this influence that shapes the dynamics of a group. To reiterate, recent theorising into this influence process identifies the importance of a leader who represents and promotes a group in developing a shared social identity (see Haslam et al., 2011; Reicher et al., 2018). Researchers within the social identity approach to leadership contend that group members define themselves – to a greater or lesser extent – as part of an in-group, seeing themselves as not only "I" but as one of "us". Accordingly, the success of any leader hinges on their ability to develop, manage, and advanced a shared sense of "us" that leaders and followers share. In-line with the social identity approach, a substantial body of evidence has found that a leader who is able to create a shared social identity enhances trust (Giessner & van Knippenberg,

[5] The following Chapter reports results from the first study within the following journal article;
Miller, A. J., Slater, M. J., & Turner, M. J. (2021). The influence of identity leadership principles on followers' challenge and threat states and motor performance. *Psychology of Sport and Exercise*, *54*, 101909.

2008; Haslam et al., 2012), respect, cooperation, perceptions of social support (Haslam et al., 2012), confidence (Fransen et al., 2016), performance (Fransen et al., 2017; Zhu et al., 2015) and perceived effectiveness (van Knippenberg & van Knippenberg, 2005).

The enactment of identity leadership falls into 4 principles (Haslam et al., 2011; Reicher et al., 2018; van Dick et al., 2018) through leaders: (1) endorsing the unique qualities that define a group that they lead (i.e., identity prototypical); (2) advancing and promoting the core interests of the group (i.e., identity advancement); (3) bringing people together by creating a shared sense of "we" and "us" (i.e., entrepreneur of identity); and (4) organising events and activities that give weight to the group's existence (i.e., impresario of identity). In the present article, advancements have been made in the understanding of identity leadership by identifying whether the enactment of identity leadership – via the four principles – can drive psychophysiological responses to, and performance in, a pressurised motor task.

The importance of group dynamics and leadership have been recognised as part of the transactional process through which stress is appraised. As noted, social support (e.g., from peers and/or family) has a stress-buffering effect, enabling greater confidence and control over actions taken (Dixon et al., 2017). Recently, social support has been found to improve stress related coping within coaches (Dixon & Turner, 2018). From this, it is clear that perceptions of social support can manipulate the stress response. Within experimental research, investigations have identified that challenge and threat instructions can influence the stress process. Turner et al. (2014) found that challenge and threat-based instructions manipulated the way individuals physiologically reacted to motivated performance situations (i.e., pressurised situations). Yet, challenge and threat instructions did not significantly influence an individual's cognitive appraisal (e.g., individual's having confidence in their ability) of the situation. Further, Slater and colleagues (2018) evidenced that relational identification with a leader, as part of the social environment, can manipulate followers'

cognitive appraisal and physiological reactivity. Findings indicated that those who perceived low relational identification with a leader reported lower confidence and perceived control than those perceiving greater relational identification with a leader. Results also indicated that, compared to a control condition, followers perceiving low levels of relational identification lead to greater cardiovascular threat reactivity when approaching a pressurised situation. Thus, it is evident in initial research that cognitive and physiological reactivity ahead of a pressurised event can be influenced by challenge and threat instructions (i.e., Turner et al., 2014) and relational identification with a leader (i.e., Slater et al., 2018).

Given that facets of identification influenced psychological and physiological responses to competitive situations (Slater et al., 2018), it is advantageous to understand whether global identity leadership can manipulate psychological responses, physiological responses, and performance within competitive situations. Relational and group identification has been found to be a consequence of identity leadership behaviours, bolstering appraisals of competitive events (Miller et al., 2020). As such, by manipulating identity leadership in ways previously conducted (Stevens et al., 2018), and utilizing stress markers as used in comparable research (Slater et al., 2018), novel insight can be made in identifying the influence of identity leadership on group identification, psychophysiology and performance.

4.1.1 Conceptual background and hypothesis development

The social identity approach to leadership.

Formulated from social identity (Tajfel & Turner, 1979) and self-categorization theories (Turner et al., 1987), the social identity approach asserts that the definition of self is derived from both our individuality (i.e., personal identity) and our connection and level of belonging with groups (i.e., social identities). Within research it is recognised that individuals' perceived connection and belonging with a group provides the foundation for

group functioning (e.g., Haslam, 2004), performance (e.g., Zhu et al., 2015) and leadership (see Haslam et al., 2011, Hogg, 2001). By developing, managing and advancing a shared sense of group identity, leaders are perceived to be trustworthy (Giessner & van Knippenberg, 2008; Haslam et al., 2012) supportive (Haslam et al., 2012) and effective (van Knippenberg & van Knippenberg, 2005). As a result, identity leadership endorses improvements in mobilization of efforts (Slater et al., 2019) and performance (Fransen et al., 2017; Zhu et al., 2015). It has been found that successful leaders at the London 2012 Olympic games were able to identify and communicate clear values and visions for their team, knowing what it means to belong, which helped athletes towards performance excellence (Slater et al., 2015). In other words, evidence suggests that: (1) leadership influences the stress response and performance (Slater et al., 2015; Slater et al., 2018); and (2) challenge and threat responses influence health and performance (Turner et al., 2014; Turner et al., 2012). On this basis, the influence of identity leadership (via the four principles) on stress and performance is investigated.

Stress reactivity

Seminal theory has noted that individual's psychophysiological stress response to motivated performance situations occurs orthogonally: challenged or threatened (Biopsychosocial model; Blascovich et al., 2003; Blascovich & Mendes, 2000). Further, researchers have noted that challenge reactivity is adaptive for health, whilst threat reactivity is maladaptive (Blascovich et al., 2003; Jones et al., 2009). As stated, challenge and threat are two distinct psychophysiological responses that occur when an individual perceives danger to esteem, a degree of uncertainty, and effort required (demand appraisals; Blascovich et al., 2011). An individual also appraises the resources they have in order to cope with the demands of the situation. Within Study 3, the resource appraisals as outlined within the Theory of Challenge and Threat States in Athletes are used (TCTSA; Jones et al., 2009). The

resources involve individuals' perceptions of self-efficacy, perceived control over abilities, and the extent to which individuals are focused on what can be achieved (approach goals) versus what could be lost (avoidance goals) in the situation (Jones et al., 2009; Turner et al., 2014). A cardiovascular challenge state occurs if the resources are perceived to meet or exceed the demands, and a threat state occurs if the demands are perceived to exceed resources. Moving beyond individual resources (i.e. self-efficacy, perceived control and approach goals and avoidance goals), within the revised TCTSA (TCTSA-R: Meijen et al., 2020), social support has been conceptualised as a resource appraisal. This addition follows advances in research that has considered social support a key contributor to the stress process (Blascovich et al., 2003; Blascovich & Mendes, 2000; Dixon & Turner, 2018; Meijen et al., 2020). Empirical research has identified that social support improves sport coaches' stress related coping (Dixon & Turner, 2018). Though proposed as part of the stress process (Meijen et al., 2020), and evidence identifying the benefits of social support (Dixon & Turner, 2018), it is yet to be operationalised as a resource appraisal in research. Rather, it has been proposed that it is important for individuals to perceive that support is available from people with whom individuals share a strong connection (e.g., a coach), and as such seek to use these opportunities for support in anticipation of a motivated performance situation (Meijen et al., 2020). To this end, social support has been incorporated within Study 3. Researchers have found that challenge-based appraisals of an event positively relate to helpful affective states (e.g., positive affect; Chadha et al., 2019), in turn positively relating to task-oriented coping (e.g., mental imagery; Nicholls et al., 2012). Nicholls and colleagues (2012) then called for future research to explore some of the underlying mechanisms that can influence appraisals of motivated performance situations. Although this recommendation has seen response from scholars (e.g. Moore et al., 2012; Nicholls et al., 2016), the present research aims to address this recommendation through a novel identity leadership lens.

Alongside the cognitive elements of stress, theory (Blascovich & Mendes, 2000) and research (Tomaka et al., 1997) draw on physiological indices of challenge and threat. As stated, these are hemodynamic CV markers that objectively identify whether an individual perceives a stressor as adaptive (i.e., challenge) or maladaptive (i.e., threat). Both challenge and threat are characterized by an increase in Sympathetic Adreno-Medullary (SAM) activity and catecholamine release (epinephrine and norepinephrine), elevating heart rate (HR; heart beats per minute [bpm]). What distinguishes the two responses is cardiac output (CO; litres of blood pumped from the heart per minute [l/min]), and total peripheral resistance (TPR; sum of the resistance of all peripheral vasculature in the systemic circulation [dyn.s.cm-5]). A challenge response is indexed by increases in CO, and decreased TPR. This encourages efficient energy usage through increases in blood glucose, free fatty acids (fuel for the nervous system and muscles, respectively) and volume of blood flow to the brain and muscles (e.g., Dienstbier, 1989). Conversely, Pituitary Adreno-Cortical (PAC) activity and the release of cortisol characterizes a threat state. This is further characterized by slight CO change and an increase or stabilization in TPR. Markedly different, PAC activity discards any positive effects of SAM activation, restricting efficient energy usage, limiting blood flow to the brain and muscles (e.g., Dienstbier, 1989).

In sum, research has evidenced that social variables such as identification can influence psychological and physiological stress responses and performance (Slater et al., 2018). It has been proposed that the mechanisms through which social variables influence psychophysiological stress is the presence of support from an individual who the athlete identifies with (e.g., a coach). With this presence of support, athletes can seek to use these opportunities for support in anticipation of a motivated performance situation, bolstering positive psychophysiological responses and performance (Meijen et al., 2020). The present research contributes to both identity leadership and stress theory by addressing whether

global identity leadership can influence perceptions of group identification, psychological and physiological stress responses, and performance. Further, addressing a call by Turner and colleagues (2014), a repeated measures methodology is used to examine intraindividual differences in psychological and physiological challenge and threat. Given that a) identity leadership has been treated as a global construct in previous research (i.e., van Dick et al., 2018; Stevens et al., 2018), b) that previous research has manipulated leadership in ways proposed (high vs. low identity leadership; Stevens et al., 2019), and that c) identification influences performance through manipulating psychophysiological responses (Slater et al., 2018), Study 3 fully tests the extent to which global identity leadership (high vs. low) can influence perceptions of group identification, psychological, and physiological responses to competitive performance, as well as performance on a motor task. Formally, the following hypotheses is tested:

H1: High (vs. low) identity leadership will result in a challenge state (adaptive appraisal and CV reactivity) in followers on approach to a pressurised motor task.

Turner and colleagues (2014) used a bean bag throw as a performance indicator when manipulating the way an individual sees a motivated performance situation. This novel indicator was performed under competitive conditions to create a motivated performance situation. The authors' aim was to eliminate prior task experiences that nullify the effects of task instructions. To this end, the performance indicator in the present studies created the same climate by using a novel ring toss throw on various targets. A key component here is that challenge and threat responses have an effect on decision making processes (Jones et al., 2009). Unlike Turner and colleagues' research, distinct targets were created that have to be aimed at individually (e.g., either aim for a score of 2, 4, 6, 8, or 10) to identify how an individual's performance intention marries up to their stress reactivity. Thus, the present research aims to identify the effect challenge and threat responses have on both throwing

intention and actual performance, detecting any discrepancies between the two. It is unknown how challenge and threat responses will affect performance intention (e.g., aiming for 10's vs aiming for 2's on all 10 throws).

H2: High (vs low) identity leadership will result in better performance compared to baseline on a pressurised motor task.

4.2 Overview of study 3

Despite demonstrable evidence identifying the effects of identification on individual's resource appraisals (e.g., Slater et al., 2018), previous research has not identified whether leading in-line with the four principles of identity leadership (vs. not) effects followers' resource appraisals, CV stress reactivity, and pressurised motor performance. This gap is addressed by examining H1 and H2 in a bid to enhance theoretical understanding of identity leadership and stress. Study 3 is the first to demonstrate the effects of enacted identity leadership principles on followers' appraisals and CV reactivity ahead of a pressurized motor task (thesis aim 3).

4.3 Methods

4.3.1 Participants and Design

Priori G*Power (v 3.1.6) repeated measures ANOVA calculations (α error probability = 0.05, 1 – β error probability = 0.95) based on comparable research (Evans et al., 2018; Slater et al., 2018; $\eta^2_p \geq 0.13, f \geq 0.39$) were conducted, evidencing the need for a minimum total sample of 16 participants. Because our sample size estimates are based on a few articles that do not directly assess the variables within the present study, this calculation should be considered a vague approximation. 80 undergraduate sport and exercise students (M_{age} = 21.14, ± 4.52; 56 males) took part in a within-subjects double-blind counterbalanced

experimental design. The double-blind design allowed for complete impartiality in data collection, therefore desired effects cannot be unconsciously manipulated by the researcher. Further, by using a within-subjects counterbalanced design, intraindividual differences in appraisal, physiological reactivity, and motor performance can be identified between conditions. Therefore, any effects found are attributable to condition, not extraneous variables.

4.3.2 Procedure

Laboratory set up. Data collection was facilitated within a singular laboratory on campus. Prior to agreement to come to the laboratory, participants were asked to refrain from heavy exercise 24 hours prior to data collection. Further, participants were also asked to refrain from drinking caffeine, eating food, or drinking sports drinks in the 2 hours prior to coming into the laboratory. From entry into the laboratory, protocol was verbalized, including the measurement of cardiovascular markers, and that performance on the task would be video recorded. This was done to desensitize participants to the environment. From here, the information sheet and consent forms were presented to the participants, reinforcing what had been verbalized, including that of confidentiality of data, ethical approval and data protection (see appendix 6).

Preparation and actions taken. Participants were then connected to a Finometer Pro on their non-dominant arm and hand, being prepared following relevant guidelines (Blascovich et al., 2011; Sherwood & Turner, 1993). A Finometer Pro was used to measure all cardiovascular responses (i.e., HR, CO, TPR) through an inflating finger cuff around the middle finger of the non-dominant hand. Once connected, the participants performed 40 practice ring toss throws, with their back on the chair, seated 1 metre away from the first pole. This was done to enable familiarization of the task, minimizing carry over effects (see Keren, 2014), being a procedure used within challenge and threat research (Turner et al.,

2012). From this practice, the participant threw another 10 rings, with this 10 formulating a baseline score. During the baseline, the participants were instructed to call what they were aiming for on each throw. Following the baseline trial, participants were asked to sit upright for 2 minutes, remaining as still as possible, keeping their arm rested on a support set at heart level, keeping their feet at a ninety-degree angle facing forward. This was done to bring their heart rate back to resting after the baseline throws and to acclimatise to the Finometer Pro. Throughout the data collection process (for both Study 3 and 4) the lab temperature was maintained between 18 and 21˚ Celsius to ensure measurable circulation of blood to the hands during physiological assessment (Freeman et al., 1936) without vasoconstriction (Krog et al., 1960). After the two-minute familiarization period, a 5-minute relaxation script played. Next, replicating similar research (e.g., Evans et al., 2018; Slater et al., 2018; Stevens et al., 2019), one of two conditions were played (high or low identity leadership) instructing participants of the task. In uniform, the manipulations a) portrayed the individual as a leader of the team that the participants are a member of, b) used ego-threatening instructions (i.e. comparing performance scores with everyone else) to elicit a stress response (e.g., Turner et al., 2013), and c) used a sentence on each of the identity leadership principles to depict whether the leader was high or low in each (Haslam et al., 2011). Here, group-based identity was made salient by emphasizing the importance of the team (or not). The research team are experts on the social identity approach to leadership and created these manipulations. As an additional validation check, the developed scripts were rated and validated by six independent social identity experts not involved in the project. The six experts were asked to rate the scripts (/10) to identify whether they depicted each of the identity leadership principles. The six experts noted that the sentences accurately depicted the leaders' prototypicality (M = 9.2), advancement (M = 9.2), entrepreneurship (M = 9.5) and impresarioship (M = 9.2).

Both audio instructions (high vs. low identity leadership) were the same length to ensure that the double-blind counterbalanced design was adhered to (Greenwald, 1976). Forty participants listened to high identity leadership first (week 1) and then low identity leadership when they returned to the laboratory a week later, whilst 40 participants listened to low identity leadership instructions first. In addition, the audio clips were randomised to blind them to the experimenter. The author sent the two audio clips to the authors primary supervisor, who then sent the two files back coded as 1 and 2, blinding the author from condition. Following the audio, CV responses were recorded for a further 2 minutes. Directly after the 2 minutes, participants completed self-report measures. Once the Finometer Pro was turned off, participants then took part in the final performance trial (10 throws, again calling their intention on each shot). The participants were asked to come back a week later to repeat the process, listening to the other condition.

4.3.3 Measures

4.3.3.1 Manipulation checks

Identity leadership. The Identity Leadership Inventory (ILI) is a 15-item questionnaire that assesses the four principles of identity leadership (Steffens et al., 2014; van Dick et al., 2018). The questionnaire included items such as: '*The leader embodies what the team stands for*' (Identity-prototypical), '*The leader stands up for the team*' (Identity-advancement), '*The leader creates a sense of cohesion within the team*' (Entrepreneur of identity), and '*The leader devises activities that bring the team together*' (Impresario of identity). 'The Leader' was changed to 'John' for all items, referring to the leader in the audio script. The ILI has been validated for use with an adult population in 20 countries (van Dick et al., 2018), and each sub-scale showed good internal consistency ($\alpha \geq .837$).

Group Identification. A 3-item questionnaire assessed how strongly participants identified with the team (cf., Haslam, 2004; Slater et al., 2018), with one item being reverse

scored. The items were: '*I feel a strong connection with the team*', '*I identify strongly with the team*', and '*I feel no connection with the team*', on a Likert scale from 1 (*not at all*), to 7 (*very true*). Good internal consistency was identified (α = .827). This consistency has also been found in previous research (α = .81, Slater et al., 2018).

Task importance. As used in previous challenge and threat research (e.g., Slater et al., 2018; Turner et al., 2014), a single item identified whether the upcoming task was perceived to be important by participants, rated on a Likert scale from 1 (*not at all*) to 5 (*very much so*). Perceived importance is the mechanism through which cardiovascular challenge and threat responses occur (Blascovich et al., 2003; Jones et al., 2009).

4.3.3.2 Test variables

Self-Efficacy. Derived from the self-efficacy scale using Banduras (2006) guidelines, two items measured how confident the participant felt in performing well in the upcoming task (Turner et al., 2012). Specifically, the questionnaire asked: '*In the following ring toss task, to what extent do you feel confident that you can perform well?*' and '*In the following ring toss task, to what extent do you feel confident that you fulfil your potential?*'. Participants reported on a Likert scale from 1 (*not at all*), to 5 (*very much so*). Internal consistency was good in both conditions (α ≥ .82).

Perceived control. Adapted from the Academic Control Scale (Perry et al., 2001), and extensively used within challenge and threat research (e.g., Turner et al., 2012), a single item was used to identify perceived control over their upcoming performance. The item was recorded on a 5-point Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The participants were asked to what extent they agree with the statement; '*The more effort I put into the task, the better I will do*'.

Achievement Goals. The Achievement Goal Questionnaire (AGQ: Conroy et al., 2003; Turner et al., 2012) was used to identify an athlete's motivational disposition towards

performance. This was condensed to a 4-item measure for brevity, with a single item for each subscale. The scale in this capacity has been individually validated (Conroy et al., 2003) in measuring resource appraisals (Slater et al., 2018; Turner et al., 2013; Turner et al., 2014). These 4 items were used to create two subscales, approach (from mastery approach and performance approach) and avoidance (from mastery avoidance and performance avoidance).

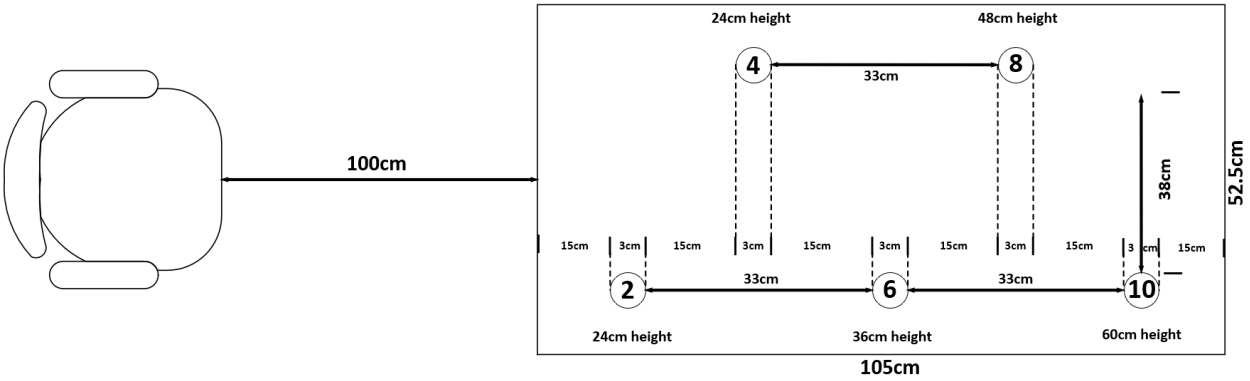
Received Support Scale. A 14-item questionnaire identified participants' perception of received support (Schwarzer & Schulz, 2013). The questionnaire assesses 3 dimensions of social support: emotional, instrumental, and informational. All items followed from the statement: '*Please indicate the frequency with which you received each type of support by John in the build up to the following throwing task*'. Example items include: '*John made me feel valued and important*' (emotional), '*John was there when I needed him*' (instrumental), and '*John helped me find something positive in my situation*' (informational). Internal consistency for two of the three subscales were good (Emotional, $\alpha \geq .813$; Instrumental, $\alpha \geq .883$). Informational support was acceptable ($\alpha \geq .60$) and scores should be interpreted with caution.

CV reactivity. A Finometer Pro was used to measure participants' CV responses. In-line with previous theory (Blascovich & Mendes, 2000, Jones et al., 2009) and research (e.g., Turner et al., 2012, Turner et al., 2013, Turner et al., 2014) challenge and threat is assessed via: HR (beats per minute), CO (l/min), and TPR ($dyn \cdot s \cdot cm^{-5}$). CO is calculated from stroke volume (SV) and HR (CO = SV × HR). To calculate TPR, mean arterial pressure (MAP; average blood pressure) is calculated from systolic and diastolic blood pressure (Systolic BP + [Diastolic BP × 2] / 3). Therefore, TPR is calculated from MAP and CO (TPR = [MAP/CO] × 80). Typical of challenge and threat research (e.g., Turner et al., 2013; Moore et al., 2012), TPR and CO was converted into a single interrelated challenge and threat index (CTI). This was done by converting TPR and CO into z-scores and summing them. CO was

weighted +1, while TPR was weighted -1. A positive value indicated challenge reactivity and a negative value indicated threat. In-line with research convention (e.g., Blascovich et al., 2004), as with task importance, HR was used as a prerequisite of challenge and threat states, acting as a further manipulation check to identify task engagement.

Motor performance. Resembling Turner et al.'s (2014) procedure, participants took 10 throws with their dominant hand towards 5 separate targets starting from 1 meter away from the seated throwing position (see Figure 4.1). The targets started from small and near, to large and far away in equal distances from each other (15 cm distance; 38cm width between poles, 12cm increments in height per pole, 3cm diameter poles). The first target was worth 2 points, with the second worth 4, third worth 6, fourth worth 8, and the fifth worth 10 points. Zero points were scored if a participant missed a pole. Higher scores indicated better performance, with a possible maximum total score of 100 and minimum of 0. In addition, participants' performance intention scores were taken by asking them to call out loud which pole they were aiming for before they threw each ring. Finally, the time taken from start to finish of the 10 throws for both baseline and performance trials were identified. Performance, intention, and time change scores were created (from baseline to performance).

Figure 4.1 Dimensions of the motor performance task in centimetres



4.3.4 Data Analysis

Prior to main analyses, Shapiro Wilks tests were performed, noting significant outliers of *z*-scores greater than two (Mendes et al., 2003; Seery et al., 2008). In line with previous research (Smith, 2011), the data were winsorized, replacing extreme values to reduce the influence of outliers on the data. Overall, 6.95% of the data were winsorized. In assessing cardiovascular indices, HR was averaged for the first minute of post-task instructions and compared to HR in the last minute of the baseline data collection trial. Comparing HR at baseline and post instructions determined whether the task represented a motivated performance situation for participants. Much like challenge and threat research convention (Turner et al., 2012), indicators of challenge and threat (TPR and CO) for the entire post-task instruction phase was subtracted from the final minute of baseline data. All multicollinearity, normality and outlier checks met the assumptions necessary for all data analysis.

Initially, cardiovascular and performance change scores were created (from baseline to performance) to allow for comparison in change between high and low identity leadership conditions. Main analyses in assessing H1 and H2 involved three stages. First, repeated univariate analysis of variance (ANOVA) and repeated multivariate analysis of variance (MANOVA) were used to identify the differences in resource appraisals on approach to competition between the high and low identity leadership conditions. Second, repeated univariate analysis of covariance (ANCOVA) was used to identify physiological challenge and threat differences between the high and low identity leadership groups. Gender was used as a covariate for physiological challenge and threat variables given the physiological stress differences between males and females (e.g., Polefrone & Manuck, 1987; Stoney et al., 1987). Third, repeated ANOVA's were used to measure the differences in performance score, intention and performance time between the two groups. Additional analysis, using Pearson's correlations, identified the association between identity leadership, psychological and physiological components of the TCTSA and performance within the two conditions (see

Table 4.1). Further, two paired samples *t*-tests were used to identify whether identity leadership influences thoughts and feeling during performance (iterative appraisals; Blascovich & Mendes, 2000).

4.4 Results

4.4.1 Manipulation Checks

Heart rate. Two paired samples *t*-tests identified that heart rate (beats per minute) significantly increased from baseline ($M = 74.97 \pm .12.32$) to performance phase ($M = 79.74 \pm .12.41$) in the low, $t(79) = -16.66$, $p < .001$, and high identity leadership conditions, $t(79) = -13.58$, $p < .001$, $M = 73.83 \pm .10.63$ to $M = 78.87 \pm 10.54$. A further paired samples *t*-test indicated that heart rate change did not vary between high ($M = 5.04 \pm 2.93$) and low identity leadership ($M = 4.77 \pm 2.42$) conditions, $t(79) = .44$, $p = .662$.

Task Importance. Two paired samples *t*-tests identified that task importance was significantly greater than zero in both the low, $t(79) = 46.61$, $p < .001$, $M = 3.98 \pm .76$, and high identity leadership, $t(79) = 47.20$, $p < .001$, $M = 4.11 \pm .78$, conditions. A further paired samples *t*-test indicated that perceived importance of the task was significantly greater in the high ($M = 4.11 \pm .78$) than in the low identity leadership condition, $t(79) = 2.01$, $p = .048$, $M = 3.98 \pm .76$. Critically though, perceptions of importance were high in both conditions.

Identity leadership. Repeated measures MANOVA identified that there was a significant main effect of condition on prototypicality, advancement, entrepreneur, and impresario of identity, Wilks' $\Lambda = .18$, $F(4, 76) = 89.38$, $p < .001$, $\eta^2_p = 0.83$. As expected, follow up comparisons identified that the perceived enactment of leader prototypicality (high: $M = 5.90 \pm .95$; low: $M = 2.28 \pm 1.29$), advancement (high: $M = 5.56 \pm 1.07$; low: $M = 2.05 \pm 1.18$), entrepreneurship (high: $M = 5.54 \pm 1.07$; low: $M = 2.22 \pm 1.28$), and impresarioship

(high: $M = 4.63 \pm 1.34$; low: $M = 2.07 \pm 1.19$) were significantly greater in the high identity leadership condition than the low condition (all $ps < .001$).

Group identification. A paired samples *t*-test identified that compared to the low identity leadership condition ($M = 3.25 \pm 1.61$), group identification was significantly greater in the high ($M = 4.98 \pm 1.24$) condition, $t(79) = 8.20$, $p < .001$.

4.4.2 Main Analyses

Self-efficacy and control. Two repeated ANOVA's identified that perceived self-efficacy was significantly greater in the high ($M = 3.69 \pm .78$) than in the low identity leadership condition ($M = 3.49 \pm .64$), $F(1,79) = 6.60$, $p = .012$, H1. Further, it was also identified that perceived control was significantly greater in the high ($M = 4.19 \pm .73$) than in the low identity leadership condition ($M = 4.02 \pm .76$), $F(1,79) = 4.29$, $p = .042$, H1.

Achievement goals. Repeated measures MANOVA identified that there was a significant main effect of condition on MAp, MAv, PAp and PAv goals, Wilks' $\Lambda = .82$, $F(4, 76) = 4.31$, $p = .003$, $\eta^2_p = 0.19$. Follow up comparisons identified that MAp goals (high: $M = 5.94 \pm 1.01$; low: $M = 5.46 \pm 1.30$) and MAv goals (high: $M = 3.89 \pm 1.58$; low: $M = 3.54 \pm 1.57$) were significantly greater in the high condition than the low condition (all $ps \leq .039$). In contrast, there were no differences in PAp goals (High: $M = 4.71 \pm 1.61$; Low: $M = 4.71 \pm 1.51$) and PAv goals (high: $M = 4.10 \pm 1.83$; low: $M = 4.09 \pm 1.81$) between the conditions (all $ps \geq .937$; H1).

Social Support. Repeated measures MANOVA identified that there was a significant main effect of condition on emotional, instrumental, and informational support, Wilks' $\Lambda = .42$, $F(3, 77) = 35.03$, $p < .001$, $\eta^2_p = .58$. Follow up comparisons identified that perceived emotional (high: $M = 4.05 \pm 1.07$; low: $M = 2.69 \pm .83$), instrumental (high: $M = 3.30 \pm 1.42$; low: $M = 1.78 \pm .89$) and informational support (high: $M = 3.36 \pm 1.42$; low: $M = 2.14 \pm$

1.22) were significantly greater in the high compared to the low identity leadership condition (all *ps* < .001; H1).

CV reactivity. A repeated measures ANCOVA, controlling for gender, indicated that CTI varied as a function of condition, $F(1, 78) = 12.21$, $p = .001$, $\eta^2_p = .14$, H1. The high identity leadership condition ($M = .52 \pm .94$) produced a significantly greater level of challenge compared to the low identity leadership condition ($M = -.01 \pm 1.37$).

Motor performance. Three repeated measures ANOVA's identified that there was a significant difference in performance (score, intention, and time) between conditions. First, there was a significant difference in performance score change between high and low identity leadership conditions, $F(1, 79) = 18.69$, $p < .01$; $\eta^2_p = .19$, H2. Specifically, performance scores improved after listening to the high identity leadership condition ($M = 4.63 \pm 11.23$), whilst performance score decreased after listening to the low identity leadership condition ($M = -1.98 \pm 9.51$). Second, performance intention did not significantly differ between high ($M = 3.04 \pm 9.13$) and low identity leadership conditions ($M = 3.03 \pm 8.16$), $F(1, 79) = .00$, $p = .992$; $\eta^2_p \leq .001$, H2. Third, performance time (seconds.milliseconds) did not significantly differ between high ($M = -.13 \pm 3.31$) and low identity leadership conditions ($M = .08 \pm 3.05$), $F(1, 79) = .22$, $p = .640$; $\eta^2_p \leq .001$, H2.

To further test effects of motor performance, aligned with Turner and colleagues' (2013) study, performance change scores were coded (from baseline) as 1 (improvements) and 0 (decrements). ANOVA identified that those who performed better ($n = 44$) in the low identity leadership condition perceived greater control ($M = 4.16 \pm .78$) than those who performed worse ($n = 36$), $F(1, 78) = 4.06$, $p = .047$, $M = 3.81 \pm .79$. In addition, CTI was coded as 1 (challenged) and 0 (threatened). ANOVA's indicated that those in the high identity leadership condition, were physiologically threatened, and performed worse ($n = 8$) reported lower levels of control ($M = 3.5$ vs 4.23, $p = .008$) than those who were

physiologically challenged and performed better (n = 40). Means and standard deviations of all main analysis variables can be found in Table 4.1, with a correlation matrix of all variables in Table 4.2.

As an additional variable, it was identified whether participants' thoughts changed during performance as a result of being successful or unsuccessful on their first throw. Researchers have identified that emotions, thoughts, and feelings change up to and during competition (iterative appraisals; Blascovich & Mendes, 2000), which in turn, can have implications for performance (Calmeiro et al., 2014). By this, the reported appraisal may not be the one taken forth to competition, and if the individual misses, thought processes may change (i.e. reductions in perceived resources) To analyse whether individuals were more robust in confidence and performance, similar to Calmeiro and colleagues' (2014) research, it was noted which participants who were not successful with their first shot on the intended pole in each condition. It was then noted how many times these participants hit the remaining 9 intended targets (e.g., participant 64 scored 22, with 3 shots going on the poles) in each condition (high vs. low identity leadership). Two paired samples t-tests were used for analyses. First, there was a non-significant difference in first shot hit-rate between high (29%) and low identity leadership conditions (35%), $t(79) = .897$, $p = .372$. Second, those who missed their first shot, and were in the high identity leadership condition hit significantly more poles in the following 9 throws ($M = 2.91 \pm 1.70$) than those in the low identity leadership condition ($M = 2.30 \pm 1.43$), $t(79) = 3.11$, $p = .003$. In other words, if an individual missed their first throw, and was in the low identity leadership condition, they were more likely to go ahead and continue to miss compared to the high identity leadership condition. These results show that thoughts and feelings (iterative appraisals; Blascovich & Mendes, 2000) in the moment may be influenced by identity leadership, having implications for performance.

Table 4.1 Means and standard deviations of all main analyses variables post condition instructions.

	Low identity leadership	High identity leadership
Control*	4.02 ± .76	4.19 ± .73
Mastery Approach**	5.46 ± 1.3	5.94 ± 1.01
Mastery Avoidance*	3.54 ± 1.57	3.89 ± 1.58
Performance Approach	4.71 ± 1.51	4.71 ± 1.61
Performance Avoidance	4.1 ± 1.83	4.09 ± 1.81
Self-efficacy*	3.49 ± .64	3.69 ± .78
Emotional Support**	2.69 ± .83	4.05 ± 1.07
Instrumental support**	1.78 ± .89	3.3 ± 1.42
Informational support**	2.14 ± 1.22	3.36 ± 1.42
Challenge-threat index**	-.01 ± 1.37	.52 ± .94
Performance score change**	-1.98 ± 9.51	4.63 ± 11.23
Performance intention change	3.03 ± 8.16	3.04 ± 9.13
Performance time change	.08 ± 3.05	-.13 ± 3.31

Note: $p \leq .05$, $p \leq .01$**

Table 4.2 Pearson's correlations coefficients (*r*) between the variables across both conditions (Low and High identity leadership)

1. Prototypical	-	.80*	79*	.54*	.46*	.25**	.05	.32*	.11	.43*	.22**	.44*	.35*	.24**	-.01	.07	-.04	.03
2. Advancement	.82*	-	.84*	.56*	.42*	.26**	.05	.40*	.13	.44*	.129	.49*	.40*	.32*	-.13	.17	.05	.01
3. Entrepreneur	.77*	.80*	-	.62*	.38*	.27**	.14	.41*	.16	.33*	.15	.50*	.41*	.35*	-.08	.13	-.02	-.05
4. Impresario	.79*	.78*	.73*	-	.40*	.19	.02	.15	.09	.13	.08	.47*	.52*	.40*	-.03	.03	.02	.04
5. Group Identification	.34*	.46*	.49*	.50*	-	.31*	.18	.25**	.08	.16	.01	.49*	.47*	.47*	.02	-.12	-.04	.13
6. Self-efficacy	.05	-.06	.03	-.06	.01	-	.35*	.58*	.15	.46*	.06	.29*	.25**	.28**	.17	.05	-.01	.17
7. Control	.14	.23**	.19	.20	.33*	.29**	-	.46*	.11	.10	.16	.19	.24**	.25**	.01	.02	.03	.01
8. MAp	.15	.10	.26**	.12	.21	.38*	.40*	-	.21	.52*	.14	.22**	.20	.27**	.06	.02	-.11	-.10
9. MAv	.11	.21	.23**	.10	.32*	-.20	.02	.43*	-	.28*	.36*	.13	.10	.10	-.00	-.01	.08	-.11
10. PAp	.16	.18	.18	.13	.02	.37*	.19	.48*	.23**	-	.40*	.04	-.00	.01	.15	.07	.02	.08
11. PAv	.14	.18	.10	.22**	-.04	-.17	.06	.09	.29*	.34*	-	.03	-.04	-.07	-.06	.03	-.06	.09
12. Emotional	.60*	.57*	.52*	.57*	.36*	.07	-.01	.14	.21	.03	.19	-	.66*	.65*	-.16	.11	.18	.01
13. Instrumental	.57*	.59*	.49*	.58*	.43*	-.06	.10	-.00	.15	-.04	.12	.68*	-	.76*	-.14	-.04	.10	.03
14. Informational	.39*	.49*	.48*	.41*	.54*	.06	.19	.16	.23**	.10	-.07	.53*	.62*	-	-.02	.15	.13	.00
15. CTI	-.02	-.10	-.09	-.03	-.15	-.03	-.12	-.12	-.09	-.07	-.13	-.01	-.14	-.13	-	.09	-.01	-.06
16. Score	-.11	-.11	.00	.07	.26**	.00	.20	.09	.07	-.11	-.03	-.00	.11	.13	-.12	-		.06
17. Intention	.41*	.45*	.42*	.48*	.16	-.07	.25**	.22	.05	.01	-.03	.27**	.33*	.15	.11	.09	-	.06
18. Time	-.10	.01	.01	.04	-.09	-.04	-.06	-.00	.07	.11	.19	-.02	-.18	-.14	-.01	-.05	.04	-

Note: Low identity leadership correlations are below the diagonal, and High identity leadership correlations are above the diagonal. $p \leq .05$**, $p < .01$*

4.5 Discussion

Study 3 showed support for H1 and H2 in that enactment of identity leadership principles (vs not) induced greater challenge-based appraisals, physiology and fine motor performance. Advancing challenge and threat theory, one of the aims was to identify the influence of identity leadership principles on the appraisal of a motivated performance situation (thesis aim 3). As hypothesised (H1), it was found that, in comparison to perceptions of low identity leadership, when led by an individual displaying high levels of identity leadership, participants reported greater self-efficacy, control, mastery (approach and avoidance) goals, and social support. Further supporting H1, high identity leadership instructions (vs. low) induced greater challenge CV reactivity. Supportive of H2, in comparison to the low identity leadership condition, performance was better in the high identity leadership condition. However, no differences in intention or time taken were found between conditions. Participants also reported that the performance task was more important after listening to the high identity leadership condition (vs low).

It was also identified that those who performed better in the low identity leadership condition perceived greater control (but no other differences in appraisals) than those who performed worse. Further, in the high identity leadership condition, those who were physiologically threatened and performed worse reported lower levels of control than those who were physiologically challenged and performed better. Additionally, it was evidenced that individuals who were in the low identity leadership condition, and missed their first throw, were more likely to go ahead and continue to miss compared to those in the high identity leadership condition. Accordingly, the present research demonstrates that low identity leadership can negatively influence both thoughts before as well as during performance. In sum, Study 3 findings indicate that identity leadership principles influence

followers' challenge and threat psychophysiological reactivity and performance. Therefore, in Study 4 it is examined whether an interaction effect occurs when challenge and threat-based instructions are introduced alongside identity leadership instructions for followers' psychophysiological CV reactivity and motor performance. Providing rationale for Study 4, Study 3 identifies that identity leadership principles influence challenge and threat reactivity and performance. Therefore, study 4 identifies whether an interaction effect occurs when challenge and threat-based instructions are introduced alongside identity leadership instructions in manipulating appraisal CV reactivity and motor performance.

This Chapter sought to examine whether the enactment of the four identity leadership principles influenced followers' resource appraisals, CV reactivity, and motor performance on a pressurised motor task. In sum, self-report, CV, and motor performance measures indicated mixed support for the hypotheses (thesis aim 3). In support of H1, it was identified that participants perceived greater self-efficacy, control, mastery approach goals, mastery avoidance goals, perceived support, and greater challenge CV when a leader enacted the four principles (vs. when they did not). Supporting H2, greater perceptions of identity leadership improved motor performance (both score and iterative appraisals during the task), while performance decreased when the leader enacted low identity leadership. No such results were identified for performance intention or time taken.

Overall, the findings of Study 3 identify that the enactment of identity leadership positively influences self-efficacy, perceived control, approach goals, cardiovascular responses, and motor performance. Research by Slater and colleagues (2018) evidenced that identification with a leader serves to bolster resource appraisals and cognitive functioning. However, authors found limited results with regard to cardiovascular indices of challenge and threat. Specifically, Slater and colleagues (2018) found that low relational identification leads to a threat response, whilst greater identification does not necessary lead to a challenge

response. Building on Slater and colleagues' (2018) findings, it was identified that the enactment of identity leadership induces a challenge state, whilst low levels of enactment is conducive to a threat state.

A significant contributor towards the results of this study was iterative appraisals (Blascovich & Mendes, 2000). It may be possible that the appraisal – CV reactivity – performance relationship as outlined in the TCTSA is affected by reappraisal of the event (Jones et al., 2009; Turner et al., 2013). Participants completed their performance trial after the questionnaires and while the time between elements were minimized, the short time is enough for reappraisal to occur (Turner et al., 2013). Therefore, it may not be the reported appraisal that was taken forth to performance in that thoughts both prior to, and during performance can counteract threat, or revert challenge responses. In Study 3, it was found that those who missed their first performance throw (after baseline) in the low identity leadership condition continued to miss, whereas in the high identity leadership condition, this was less likely. Because this was a counterbalanced within participants design, it can be argued that identity leadership positively influences iterative appraisals before as well as during performance. Though inferred, the findings may shed some light on potential mechanisms through which iterative appraisals are manipulated. To this end, those who perceive a greater emotional connection with a group (as a result of identity leadership) may appraise, as well as re-appraise situations positively, focusing on efficacy beliefs and performance approach goals both before, and after adversity within competition.

4.5.2 Theoretical implications

Collectively, the findings have important implications for leadership and stress theory. Advancing the social identity approach to leadership (see Haslam et al 2011; Hogg, 2001), this study identified that the enactment of the identity leadership principles had positive effects on follower self-efficacy, perceived control, approach valence and perceived support

(aligned with a challenge appraisal) towards a motivated performance situation. The enactment of identity leadership was found to be adaptive for cardiovascular reactivity to a stressful situation. Advancing identity leadership and challenge and threat theory, the enactment of the four identity leadership principles has implications for followers' psychophysiological responses to stress. Speaking to the TCTSA (Jones et al., 2009), a leader's perceived enactment of identity leadership principles should now be considered an antecedent of psychological and physiological stress reactivity. Indeed, social antecedents in this capacity are currently overlooked in the model, but more broadly, are seen to be vital in other approaches to stress (e.g., the social cure; Haslam et al., 2018). These findings, like Study 1 and 2, hold true to the notion of social resources, in that researchers have found that these resources (friends; memberships in clubs and organizations) attenuate stressful situations (Billings & Moos, 1981). In turn, these social resources predict greater overall performances as a result of collective supportive climates (Peñalver et al., 2019), which are products of leadership (Fransen et al., 2017; Zhu et al., 2015). In addition, these findings are in-line with the sociopsychobio proposition that social factors influence and shape psychological and biological parameters of group members (Haslam et al., 2019). Within the sociopsychobio debate it is posited that an appraisal of an event is shaped by a salient group-member (i.e., the leader) who is likely to influence physiological stress reactivity (Haslam et al., 2019). Broadly, this programme of research adds weight to this position in that the enactment of identity leadership is influential in individuals' psychological and physiological responses to stress and fine motor performance.

4.5.3 Practical implications

Previous links between identity leadership and stress related variables are largely under-researched (see Slater et al., 2018). The current findings show that identity-based leadership improves an individual's perceptions of efficacy, control, approach, perceived

support and CV response to stressful scenarios. CV reactivity to stressors can have major implications for health (Kivimäki et al., 2012), and because leadership is an integral element that can define the extent of an environmental stressor (e.g., work-based), findings such as this can shape performance environments. To shape a shared social identity, the 4R's process (Slater et al., 2016) may provide a useful framework in order to encourage positive (i.e., challenge) responses to stress. Building on the 3R framework as mentioned in the previous studies, leaders should: (1) Reflect; (2) Represent; and (3) Realize to develop a shared sense of collective identity. What aligns with the present research is Slater and colleagues (2016) proposition that the enactment of the 3R's would, in turn, enhance the likelihood of positive Reappraisal. The key element of the Reappraisal phase, that is supported by the findings, is that strong levels of social identification (as a result of identity leadership) can improve likelihood of positive reappraisal of events. To this tune, by using the 3R's as posited by Haslam and colleagues (2011), individuals can re-appraise an event as a challenge from what was a threat due to the psychological connections between individuals within a group.

4.5.4 Limitations and future research directions

The current study is not without its limitations. Although an integral part of the TCTSA, the leadership situation hinged on an acute task and therefore only has implications for acute stressors. An extensive period of time was not given to the participants to accrue any long-term stressful reactions in the run up to the event. Further, and thinking longitudinally, leadership and its effects occur over time (as evidenced in Chapter 3). The study introduced the leader directly before performance. Hence, there would be merit in identifying how identity leadership, namely the embodiment of the four principles, effect psychophysiological stress reactivity temporally, using accessible, manoeuvrable equipment such as an ambulatory Finapres. In addition, previous researchers have identified that neighbourhood identification can directly influence how we react to our surroundings (Fong

et al., 2019). On this basis, it is not inadmissible that the perceived accent portrayed (a sign of geographical location) within the audio conditions in this study could have influenced how participants reacted to the competitive throwing task. As such, it is also worth noting that a) the leader was presented as a male (i.e., John), and b) the faces of the leader and team was not shown. Perceptions of a leader can be influenced by their gender (Crites et al., 2015). To minimize this influence, the leader and team was presented using an audio to avoid implicit biases and perceptions of both (Willis & Todorov, 2006), being typical practice within challenge and threat research (Turner et al., 2014). Whilst the manipulations of identity leadership are explicit (high vs. low) and therefore challenge ecological validity, these manipulations aligned with typical research convention in assessing two polarized constructs (e.g., high vs. low relational identification; Slater et al., 2018). Further, the manipulations aligned with the four theorized identity leadership principles (Haslam et al., 2011), eliciting group identification (i.e., manipulation check) without introducing potential confounds such as faces of other team members that could influence the results (i.e., initial impressions; Willis & Todorov, 2006). Finally, regarding the task, although lab-based and therefore lacking realism, the task mimicked a competitive scenario that requires a decision on how best to score points, enhancing likeness to a real-world scenario and important to induce participants' stress reactivity. This said, future researchers should look to measure real-life performance in natural pressurised environments.

4.5.5 Conclusion

This Chapter aimed to identify whether and to what extent perceived identity leadership influenced followers' psychophysiological stress reactivity and motor performance. It was found that the enactment of identity leadership positively influences resource appraisals, cardiovascular stress reactivity, and motor performance. Those in a position to influence should endeavour to endorse follower group identification through the

enactment of the four identity leadership principles, which in turn will enhance efficacy, perceived control, approach focus, avoidance focus, perceived support, cardiovascular reactivity and performance within stressful situations. In sum, leaders should be acutely aware of how they are perceived by their followers with regards to identity leadership principles due to their implications for follower psychophysiological responses to stress and performance under pressure. None more so is this reinforced within Chapter 5, identifying the interaction between identity leadership and challenge and threat instructions on psychophysiological and performance parameters.

4.5.6 Reflection on Chapter 4

Study 3 examined effects of enacted identity leadership principles on followers' appraisals and CV reactivity ahead of a pressurized motor task. It was evidenced that identity leadership positively influences resource appraisals, cardiovascular stress reactivity, and motor performance. This finding supports conclusions from Chapter 2 and 3. By this, it can be intimated that the group's identity can be internalized by a leader, providing a foundation for a follower to behave, in turn improving competitive appraisals (Chapter 2 and 3), leading to adaptive physiological reactivity and motor performance (Chapter 4). From this new knowledge that a leader can influence psychophysiological reactivity and motor performance, it was advantageous to understand how a combination of manipulation techniques influence psychophysiological reactivity and motor performance. Existing research has been able to manipulate challenge and threat responses through satisfying or thwarting psychological resources (Turner et al., 2014). Equally, Chapter 4 identified that the enactment of identity leadership can manipulate challenge and threat. From this, it was deemed advantageous to identify how a combination of both appraisal manipulations influenced challenge and threat responses, and motor performance. This aim necessitated a need for a carefully controlled experimental design to come to the correct conclusion.

CHAPTER 5: CHALLENGE AND THREAT STATES AND FINE MOTOR PERFORMANCE: THE ROLE OF IDENTITY LEADERSHIP ON EGO-MANIPULATION[6]

5.1 Introduction

Study 3 data showed that identity leadership can manipulate how individuals' approach, as well as perform on, a motivated performance task. Specifically, manipulating identity leadership (vs a lack of identity leadership) led to improvements in self-efficacy, perceived control, approach focus, physiological challenge states and motor performance. Because a within subject's design was utilized, intraindividual differences in appraisal, physiological reactivity and performance could be identified. Equally, perceptions of group identification, and perceptions of identity leadership differed between groups, evidencing that it was because of the condition that changes occurred. Whilst identity leadership and group identification manipulated dependent variables, findings evidenced that a lack of identity leadership did not necessarily lead to a cardiovascular threat state. Instead, identity leadership (and resultant group identification) bolstered challenge responses, while a lack of identity leadership did not lead to either challenge nor threat responses. Previous research evidenced that low relational identification (i.e., a leader being from an outgroup institution) is likely to lead to a threat state, while neutral leadership (no particular affiliation) led to a challenge state (Slater et al., 2018). Slater and colleagues (2018) evidenced that that non-affiliated, moderate-level identification with a leader is most adaptive (in comparison to high and low identification). Given that low identity leadership in Study 3 does not lead to either challenge or threat responses, it begs to question the validity of the argument that moderate

[6] The following Chapter reports results from the second study within the following journal article; Miller, A. J., Slater, M. J., & Turner, M. J. (2021). The influence of identity leadership principles on followers' challenge and threat states and motor performance. *Psychology of Sport and Exercise*, *54*, 101909.

identification is adaptive for cardiovascular reactivity, especially given the intraindividual, counterbalanced nature of the study. Rather, Study 3 portrays that identity leadership is adaptive for psychophysiology, whilst a lack of identity leadership (and affiliation; Slater et al., 2018) is not necessarily maladaptive. Study 3 finds that group level identification is manipulated by the enactment of identity leadership, which in turn positively influences psychophysiology. Slater and colleagues' (2018) work evidences that low levels of relational identification negatively influences psychophysiology. Thus, there may be mechanisms through which dyadic relationships negatively influence psychophysiology, and group level relationships that bolster psychophysiology. To this tune, it is evident that, combining results from Study 3 with Slater and colleagues (2018), dyadic and group level identification is pivotal for psychophysiological reactivity.

To advance leadership (Haslam et al., 2011) and stress (Jones et al., 2009; Meijen et al., 2020) theory, the present research (Study 4) manipulates challenge and threat through both identity leadership and resource appraisal influencing instructions. Psychophysiological challenge and threat can be manipulated by instructions (Slater et al., 2018; Turner et al., 2014). In other words, researchers have found that it is possible to manipulate CV reactivity by using language pertaining to theorised resource appraisals (e.g., by increasing or reducing self-efficacy: Turner et al., 2014). In turn, individuals approach motivated performance situations in either a challenge or threat state and this has implications for their performance (see Turner et al., 2014). Specifically, challenge instructions are aimed to improve self-efficacy ('*You will have performed similar actions in the past. Because of this experience, you can feel confident that you will score highly*'), perceived control ('*The equipment is set up to allow you to complete the task without complications*'), and approach focus ('*We would like you to try your upmost to score as highly as possible*'). Conversely, threat instructions are aimed to reduce self-efficacy ('*It is unlikely that you will have done a task like this before,*

so you obviously can't be sure that you will perform well'), perceived control ('*complications are likely, as unavoidable nerves can majorly influence your throw*'), and increase avoidant focus ('*do try to avoid missing the poles*'). Accordingly, the present research aims to manipulate perceptions of identity leadership to identify whether there is an interaction effect between identity leadership and challenge and threat instructions on followers' psychophysiological stress reactivity and motor performance. It has been established that both: (1) challenge instructions induce challenge states, which, in turn, leads to greater motor performance; and (2) threat instructions induce threat states, which, in turn, leads to depleted performance (Turner et al., 2014). Regarding leadership, low psychological connections between follower and leader have been found to be more likely to evince threat reactivity (Slater et al., 2018), and thus it is hypothesized that high (compared to low) identity leadership will exacerbate cognitive and CV stress responses. Specifically, it is expected that high identity leadership will further enhance challenge responses (when challenge instructions are given) as well as further enhance threat responses (when threat instructions are given). Drawing on identity leadership literature, it has been found that under conditions of elevated perceived group identification (through providing the same kit for all participants), leaders who express high levels of team confidence (i.e., a resource appraisal) improve follower confidence, in turn improving motor performance (Fransen et al., 2015). On the other hand, again under conditions of elevated perceived group identification, when a leader expresses low team confidence, this depletes follower confidence, negatively influencing motor performance (Fransen et al., 2015). With the common research finding that identity leadership positively influences group identification (Stevens et al., 2018), and on the grounds that resource manipulation (i.e., expressing or not expressing confidence) has consequential effects on performance (i.e., both positively and negatively) irrespective of

group identification (Fransen et al., 2015), the following hypothesis is examined (thesis aim 4):

H1: There will be an interaction effect such that compared to the low identity leadership conditions, high identity leadership will exacerbate challenge and threat responses to pressure.

The performance indicator in the present study is the exact same as Study 3. Like Turner and colleagues' (2014) procedure, participants performed under competitive conditions to create a motivated performance situation. Turner and colleagues (2014) eliminated prior task experiences that could nullify the effects of task instructions. Challenge and threat responses also influence decision making processes (Jones et al., 2009). Unlike Turner and colleagues' (2014) research, the present research uses distinct targets that have to be aimed at individually (e.g., either aim for a score of 2, 4, 6, 8, or 10) to identify how an individual's performance intention marries up to their stress reactivity. Thus, the present research aims to identify the effect challenge and threat responses have on both throwing intention and actual performance. It is unknown how challenge and threat responses will affect performance intention (e.g., aiming for 10's vs aiming for 2's on all 10 throws).

H2: There will be an interaction effect such that compared to the low identity leadership conditions, high identity leadership will exacerbate motor performance improvements (in challenge) and decrements (in threat).

5.2 Methods

5.2.1 Participants and Design

With a change in design, priori G*Power (v 3.1.6) between subjects ANCOVA calculations (α error probability = 0.05, 1 – β error probability = 0.95, 4 conditions,

controlling for gender; Stoney et al., 1987) based on the results in Study one ($\eta^2_p \geq 0.14, f \geq 0.40$; large) were conducted, evidencing the need for a minimum total sample of 110 participants (the minimum η^2_p reported in Study one). This is supported by results of manipulated challenge and threat responses (Turner et al., 2014; $d \geq .99$; large) that is procedurally similar to the current study. The power analysis is based on Study one primarily due to Study one directly assessing the variables within the present study, enhancing efficacy of the power analysis (Schinke et al., 2020). One hundred and twenty undergraduate and postgraduate students (M_{age} 22.62 ± 5.65; 60 males and 60 females) participated in Study 4. Fifteen males and fifteen females took part in each condition, thus controlling for any sex-based differences in stress reactivity and performance. Participants were assigned to one of four conditions in a 2 (identity leadership: high vs. low) X 2 (appraisal: challenge vs. threat) between-participant double blind experimental design: (1) high identity leadership challenge instructions; (2) low identity leadership challenge instructions; (3) high identity threat instructions; and (4) low identity leaderships threat instructions. The present research adopted a between-subjects design to mitigate against the elevated chances of order effects with four repeated conditions (Charness et al., 2012).

5.2.2 Procedure

Laboratory set up. Exactly the same as Study 3, data collection was facilitated within a singular laboratory on campus. Prior to agreement to come to the laboratory, participants were asked to refrain from heavy exercise 24 hours prior to data collection. Participants were also asked to refrain from drinking caffeine, eating food, or drinking sports drinks in the 2 hours prior to coming into the laboratory. From entry into the laboratory, protocol was verbalized, including the measurement of cardiovascular markers, and that performance on the task would be video recorded. This was done to desensitize participants to the environment. From here, the information sheet and consent forms were presented to the

participants, reinforcing what had been verbalized, including that of confidentiality of data, ethical approval and data protection (see appendix 11).

Preparation and actions taken. Like Study 3, participants were then connected to a Finometer Pro on their non-dominant arm and hand, being prepared following relevant guidelines (Blascovich et al., 2011; Sherwood & Turner, 1993). A Finometer Pro was used to measure all cardiovascular responses (i.e., HR, CO, TPR) through an inflating finger cuff around the middle finger of the non-dominant hand. Once connected, the participants performed 40 ring toss throws, with their back on the chair, seated 1 metre away from the first pole. This was done to enable familiarization to the task, minimizing carry over effects (Keren, 2014). From this, 10 performance throws were taken, formulating a baseline score. During the baseline, the participants were instructed to call what they were aiming for on each throw. Following the baseline trial, participants were asked to sit upright for 2 minutes, remaining as still as possible, keeping their arm rested on a support set at heart level, keeping their feet at a ninety-degree angle facing forward. This was done to bring their heart rate back to resting after the baseline throws and to acclimatise to the Finometer Pro. Throughout the data collection process the lab temperature was maintained between 18 and 21˚ Celsius to ensure measurable circulation of blood to the hands during physiological assessment (Freeman et al., 1936) without vasoconstriction (Krog et al., 1960). After the two-minute familiarization period, a 5-minute relaxation script played. Next, one of four conditions were played (high identity leadership-challenge, low identity leadership-threat, low identity leadership-challenge, low identity leadership-threat) instructing participants of the task. In-line with previous studies (e.g., Turner et al., 2013), ego-threatening instructions (i.e., comparing performance scores with everyone else) were used to elicit a stress response. The scripts included a sentence enacting high or low levels of each of the four identity principles (Haslam et al., 2011), portraying the individual as a leader of the team that the participants

are a member of for the purpose of the experiment. Group-based identity was made salient by emphasizing the importance of the team (or not). The research team are experts on the social identity approach to leadership and created these manipulations. The scripts depicting identity leadership were previously validated by six independent social identity experts not involved in the project, evidencing that each script depicted the necessary construct. In addition, challenge and threat instructions were used to manipulate appraisal and performance (Turner et al., 2014).

All four audio instructions were the same length to ensure that the double-blind counterbalanced design was adhered to (see Greenwald, 1976). Participants were assigned to a condition according to the counterbalanced order as sent to the author (by the primary supervisor). In ensuring double-blind procedures, the audio clips were randomised to blind them to the experimenter (author). The author sent the four audio clips to the primary supervisor, who then sent the four files back coded as 1, 2, 3 and 4, blinding the author from condition. Following the audio, CV responses were recorded for a further 2 minutes. Directly after the 2 minutes, participants completed self-report measures. Once the Finometer Pro was turned off, participants then took part in the final performance trial (10 throws, again calling their intention on each shot).

5.2.3 Measures

5.2.3.1 Manipulation checks

Identity leadership. The Identity Leadership Inventory (ILI) is a 15-item questionnaire that assesses the four principles of identity leadership (Steffens et al., 2014; van Dick et al., 2018). The questionnaire included items such as: '*The leader embodies what the team stands for*' (Identity-prototypical), '*The leader stands up for the team*' (Identity-advancement), '*The leader creates a sense of cohesion within the team*' (Entrepreneur of identity), and '*The leader devises activities that bring the team together*' (Impresario of

identity). 'The Leader' was changed to 'John' for all items, referring to the leader in the audio script. The ILI has been validated for use with an adult population in 20 countries (van Dick et al., 2018), and each sub-scale showed excellent internal consistency in study 4 ($\alpha \geq .96$).

Group Identification. A 3-item questionnaire assessed how strongly participants identified with the team (cf., Haslam, 2004; Slater et al., 2018), with one item being reverse scored. The items were: '*I feel a strong connection with the team*', '*I identify strongly with the team*', and '*I feel no connection with the team*', on a Likert scale from 1 (*not at all*), to 7 (*very true*). Good internal consistency was identified ($\alpha = .90$). This consistency has also been found in previous research ($\alpha = .81$, Slater et al., 2018).

Task importance. As used in previous challenge and threat research (e.g., Slater et al., 2018; Turner et al., 2014), a single item identified whether the upcoming task was perceived to be important by participants, rated on a Likert scale from 1 (*not at all*) to 5 (*very much so*). Perceived importance is the mechanism through which cardiovascular challenge and threat responses occur (Blascovich et al., 2003; Jones et al., 2009).

5.2.3.2 Test variables

Self-Efficacy. Derived from the self-efficacy scale using Banduras (2006) guidelines, two items measured how confident the participant felt in performing well in the upcoming task (Turner et al., 2012). Specifically, the questionnaire asked: '*In the following ring toss task, to what extent do you feel confident that you can perform well?*' and '*In the following ring toss task, to what extent do you feel confident that you fulfil your potential?*'. Participants reported on a Likert scale from 1 (*not at all*), to 5 (*very much so*). Internal consistency was acceptable ($\alpha = .79$).

Perceived control. Adapted from the Academic Control Scale (Perry et al., 2001), and extensively used within challenge and threat research (e.g., Turner et al., 2012), a single item was used to identify perceived control over their upcoming performance. The item was

recorded on a 5-point Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The participants were asked to what extent they agree with the statement; '*The more effort I put into the task, the better I will do*'.

Achievement Goals. The Achievement Goal Questionnaire (AGQ: Conroy, Elliot & Hofer, 2003) was used to identify participants' motivational disposition towards the task. The AGQ assesses mastery approach goals (MAp), mastery avoidance goals (MAv), performance approach goals (PAp), and performance avoidance goals (PAv). This was condensed to a 4-item measure for brevity (Turner et al., 2013), with a single item for each subscale. The scale in this capacity has been individually validated and used extensively in previous research (Conroy et al., 2003).

Received Support Scale. A 14-item questionnaire identified participants' perception of received support (Schwarzer & Schulz, 2013). The questionnaire assesses 3 dimensions of social support: emotional, instrumental, and informational. All items followed from the statement: '*Please indicate the frequency with which you received each type of support by John in the build up to the following throwing task*'. Example items include: '*John made me feel valued and important*' (emotional), '*John was there when I needed him*' (instrumental), and '*John helped me find something positive in my situation*' (informational). Internal consistency for two of the three subscales were at least acceptable (Emotional, $\alpha = .79$; Instrumental, $\alpha = .91$, Informational, $\alpha = .87$).

CV reactivity. A Finometer Pro was used to measure participants' CV responses. In-line with previous theory (Blascovich & Mendes, 2000, Jones et al., 2009) and research (e.g., Turner et al., 2012, Turner et al., 2013, Turner et al., 2014) challenge and threat is assessed via: HR (beats per minute), CO (l/min), and TPR ($dyn \cdot s \cdot cm^{-5}$). CO is calculated from stroke volume (SV) and HR ($CO = SV \times HR$). To calculate TPR, mean arterial pressure (MAP; average blood pressure) is calculated from systolic and diastolic blood pressure (Systolic BP

+ [Diastolic BP × 2] / 3). Therefore, TPR is calculated from MAP and CO (TPR = [MAP/CO] × 80). Typical of challenge and threat research (e.g., Turner et al., 2013; Moore et al., 2012), TPR and CO was converted into a single interrelated challenge and threat index (CTI). This was done by converting TPR and CO into z-scores and summing them. CO was weighted +1, while TPR was weighted -1. A positive value indicated challenge reactivity and a negative value indicated threat. In-line with research convention (e.g., Blascovich et al., 2004), as with task importance, HR was used as a prerequisite of challenge and threat states, acting as a further manipulation check to identify task engagement.

Motor performance. Resembling Turner et al.'s (2014) procedure, like Study 3, participants took 10 throws with their dominant hand towards 5 separate targets starting from 1 meter away from the seated throwing position (see Figure 4.1). The targets started from small and near, to large and far away in equal distances from each other (15 cm distance; 38cm width between poles, 12cm increments in height per pole, 3cm diameter poles). The first target was worth 2 points, with the second worth 4, third worth 6, fourth worth 8, and the fifth worth 10 points. Zero points were scored if a participant missed a pole. Higher scores indicated better performance, with a possible maximum total score of 100 and minimum of 0. In addition, participants' performance intention scores were taken by asking them to call out loud which pole they were aiming for before they threw each ring. Finally, the time taken from start to finish of the 10 throws for both baseline and performance trials are assessed. Performance, intention, and time change scores were created (from baseline to performance).

5.2.4 Data Analysis

Prior to main analyses, Shapiro Wilks tests were performed, noting significant outliers (Mendes et al., 2003; Seery et al., 2008). Like Study 3, *z*-scores greater than two (Smith, 2011) were winsorized (4.84% of the dataset). Assessment of cardiovascular indices and inclusion of cardiovascular and performance change scores (baseline to performance) was

consistent with Study 3. All multicollinearity, normality and outlier checks met the assumptions necessary for all data analysis.

Main analyses assessing H1 and H2 involved three stages. First, assessing H1, 2 (identity leadership: high vs. low) X 2 (appraisal: challenge vs. threat) between-subjects ANOVA's and MANOVA's were used to identify whether there was an interaction of identity leadership (high vs. low) and appraisal instructions (challenge vs. threat) on resource appraisals. Second, a 2 (identity leadership: high vs. low) X 2 (appraisal: challenge vs. threat) between-subjects ANOVA was used to identify whether there was an interaction of identity leadership (high vs. low) and appraisal instructions (challenge vs. threat) on cardiovascular challenge and threat. Gender was not used as a covariate for physiological challenge and threat variables due to an equal sample of males and females within each condition. Third, another 2 (identity leadership: high vs. low) X 2 (appraisal: challenge vs. threat) between-subjects ANOVA was used to identify whether there was an interaction of identity leadership (high vs. low) and appraisal instructions (challenge vs. threat) on motor performance. Additional analysis, using Pearson's correlations, identified the association between identity leadership, psychological and physiological components of the TCTSA and performance within the four conditions (see Table 5.2 and Table 5.3). Further, a 2 (identity leadership: high vs. low) X 2 and (appraisal: challenge vs. threat) X 2 (hit rate: hit vs. miss) between-subjects ANCOVA was used to identify whether identity leadership (high vs. low) and appraisal instructions (challenge vs. threat) influence iterative appraisals.

5.3 Results

5.3.1 Manipulation Checks

Heart rate. Assessing task engagement, a paired samples *t*-test identified that there was a significant increase in heart rate from baseline to post instructions in the sample, *t*(119)

= 33.62, $p < .01$; $M_{bpm} = 9.21 \pm 13.09$. ANOVA identified a main effect of condition on heart rate change, $F(3, 116) = 2.96$, $p = .035$. Though, Bonferroni adjusted pairwise comparisons identified that there was no significant difference in heart rate change between conditions ($M_{high/challenge} = 9.43 \pm 2.22$; $M_{high/threat} = 8.26 \pm 1.75$; $M_{low/challenge} = 10.05 \pm 2.95$; $M_{low/threat} = 8.59 \pm 3.07$; p's $\geq .181$).

Task importance. A paired samples *t*-test identified that task importance was significantly different from 0, $t(119) = 70.75$, $p < .01$; $M = 4.23 \pm .65$. ANOVA identified that this difference did not vary as a function of condition, $F(3, 116) = 1.33$, $p = .269$, $M_{high/challenge} = 4.40 \pm .50$; $M_{high/threat} = 4.27 \pm .74$; $M_{low/challenge} = 4.13 \pm .68$; $M_{low/threat} = 4.10 \pm .66$.

Identity leadership. MANOVA identified that there was a significant main effect of identity leadership (high vs. low) on identity prototypicality, advancement, entrepreneurship, and impresarioship, Wilks' $\Lambda = .32$, $F(4, 113) = 60.37$, $p < .001$, $\eta^2_p = .68$. As expected, follow up comparisons identified that the perceived enactment of leader prototypicality (high: $M = 5.72 \pm .86$; low: $M = 2.54 \pm 1.41$), advancement (high: $M = 5.58 \pm 1.03$; low: $M = 2.43 \pm 1.30$), entrepreneurship (high: $M = 5.51 \pm 1.01$; low: $M = 2.73 \pm 1.47$) and impresarioship (high: $M = 4.89 \pm 1.12$; low: $M = 2.55 \pm 1.55$) were significantly greater in the high conditions than the low conditions, $p < .01$. Further MANOVA identified that there was a significant main effect of appraisal (challenge vs. threat) on identity prototypicality (challenge: $M = 4.30 \pm 1.86$; threat: $M = 3.95 \pm 2.08$), advancement (challenge: $M = 4.29 \pm 1.83$; threat: $M = 3.72 \pm 2.07$), entrepreneurship (challenge: $M = 4.38 \pm 1.74$; threat: $M = 3.85 \pm 1.98$) and impresarioship (challenge: $M = 3.86 \pm 1.61$; threat: $M = 3.58 \pm 1.95$), Wilks' $\Lambda = .90$, $F(4, 113) = 3.20$, $p = .016$, $\eta^2_p = .10$. Follow up comparisons identified that the perceived enactment of leader advancement ($p = .008$) and entrepreneurship ($p = .021$) was significantly greater in the challenge conditions than the threat conditions. There was a

non-significant interaction of identity leadership (high vs. low) and appraisal (challenge vs. threat) on identity leadership, Wilks' $\Lambda = .97$, $F(4, 113) = .819$, $p = .516$, $\eta^2_p = .03$.

Group identification. ANOVA revealed that group identification significantly varied as a function of identity leadership (high vs. low), $F(1, 116) = 72.52$, $p < .001$, $\eta^2_p = .39$. Pairwise comparisons identified that group identification was significantly greater in the high ($M = 5.4 \pm 1.05$) than the low identity leadership conditions ($M = 3.54 \pm 1.37$; $p < .01$). Group identification did not significantly as a function of appraisal (challenge vs. threat), $F(1, 116) = 3.82$, $p = .053$, $\eta^2_p = .03$. There was a non-significant interaction of condition (high vs. low) and appraisal (challenge vs. threat) on identification with the team, $F(1, 116) = 3.46$, $p = .066$, $\eta^2_p = .03$.

5.3.2 Main Analyses

Self-efficacy and control. ANOVA identified that self-efficacy significantly varied as a function of identity leadership (high vs. low), $F(1, 116) = 14.24$, $p < .001$, $\eta^2_p = .11$. Follow up comparisons indicated that self-efficacy was significantly greater in the high ($M = 3.69 \pm .68$) than the low identity leadership conditions ($M = 3.19 \pm .76$), $p < .001$. ANOVA identified that self-efficacy did not significantly vary as a function of appraisal (challenge vs. threat), $F(1, 116) = .40$, $p = .531$, $\eta^2_p = .00$, nor was there an interaction effect, $F(1, 116) = .57$, $p = .45$, $\eta^2_p = .01$, H1.

ANOVA indicated that perceptions of control significantly varied as a function of identity leadership (high vs. low), $F(1, 116) = 7.02$, $p = .009$, $\eta^2_p = .06$. Pairwise comparisons identified that perceived control was significantly greater in the high ($M = 4.1 \pm .68$) than the low identity leadership conditions ($M = 3.72 \pm .88$), $p = .009$. ANOVA identified that perceived control did not significantly vary as a function of appraisal (challenge vs. threat), $F(1, 116) = .1.08$, $p = .302$, $\eta^2_p = .01$, nor was there an interaction effect, $F(1, 116) = .12$, $p = .73$, $\eta^2_p = .00$, H1.

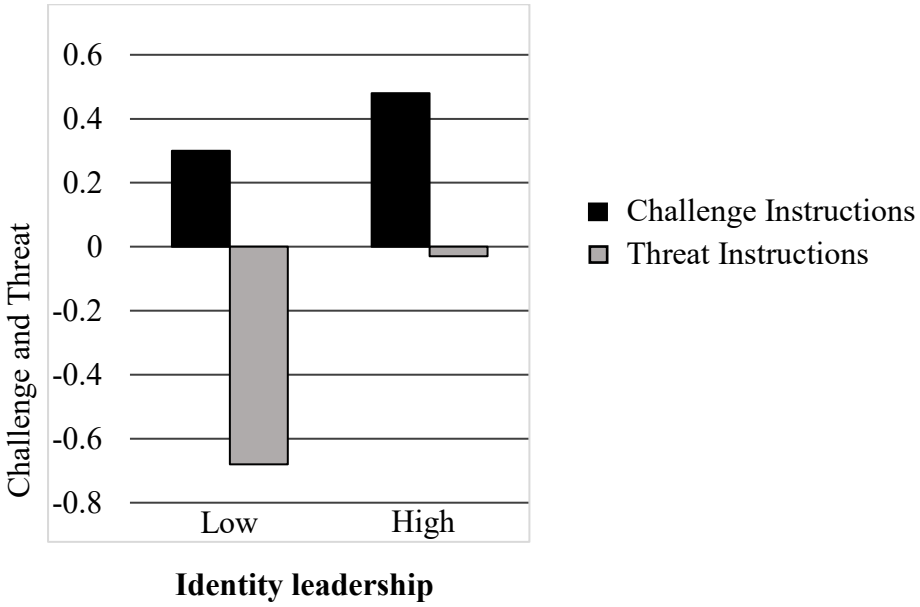
Achievement goals. MANOVA identified that there was a non-significant main effect of identity leadership (high vs. low) on MAp, MAv, Pap, and PAv, Wilks' $\Lambda = .93$, $F(4, 113) = 2.23$, $p = .070$, $\eta^2_p = .07$. That said, follow up comparisons identified that perceived MAp (high: $M = 6.05 \pm .93$; low: $M = 5.58 \pm .96$) and PAp (high: $M = 5.33 \pm 1.27$; low: $M = 4.78 \pm 1.43$) were significantly greater in the high than the low identity leadership conditions, $p \leq .029$. MANOVA identified a non-significant main effect of appraisal (challenge vs. threat) on MAp, MAv, PAp and PAv, Wilks' $\Lambda = .98$, F(4, 113) = .54, $p = .700$, $\eta^2_p = .02$. There was a non-significant interaction of identity leadership (high vs. low) and appraisal (challenge vs. threat) on MAp, MAv, PAp and PAv, Wilks' $\Lambda = .96$, F(4, 113) = 1.14, $p = .340$, $\eta^2_p = .04$, H1.

Social Support. MANOVA identified that perceived emotional, instrumental, and informational support from the leader significantly varied as a function of identity leadership (high vs. low), Wilks' $\Lambda = .62$, $F(3, 114) = 23.23$, $p < .001$, $\eta^2_p = .38$. Follow up comparisons indicated that perceived emotional (high: $M = 3.60 \pm .61$; low: $M = 2.68 \pm .92$), instrumental (high: $M = 3.37 \pm 1.20$; low: $M = 1.96 \pm 1.13$) and informational support (high: $M = 3.93 \pm 1.23$; low: $M = 2.23 \pm 1.20$) from the leader were significantly greater in the high than the low identity leadership conditions, $p < .001$. MANOVA identified that perceived emotional, instrumental and informational support from the leader significantly varied as a function of appraisal (challenge vs. threat), Wilks' $\Lambda = .91$, $F(3, 114) = 3.82$, $p = .01$, $\eta^2_p = .09$. Follow up comparisons indicated that perceived emotional (challenge: $M = 3.30 \pm .94$; threat: $M = 2.98 \pm .84$), instrumental (challenge: $M = 3.02 \pm 1.26$; threat: $M = 2.32 \pm 1.37$) and informational support (challenge: $M = 3.29 \pm 1.24$; threat: $M = 2.86 \pm 1.67$) from the leader were significantly greater in the challenge conditions than the threat conditions, $p \leq .05$. There was a non-significant interaction of identity leadership (high vs. low) and appraisal (challenge vs.

threat) on emotional, instrumental and informational support, Wilks' Λ = .97, $F(4, 113)$ = 1.25, p = .295, η^2_p = .03, H1.

CV reactivity. ANOVA indicated that challenge and threat index did not significantly vary as a function of identity leadership (high vs. low), $F(1, 116) = 1.78$, p = .185, η^2_p = .02. ANOVA indicated that challenge and threat index significantly varied as a function of appraisal (challenge vs. threat), $F(1, 116) = 5.78$, p = .018, η^2_p = .05. Follow up comparisons revealed that the challenge instructions (M = .39 ± 1.72) resulted in a significantly greater challenge CV response compared to the threat instructions (M = -.36 ± 1.69), p = .018. There was a non-significant interaction of identity leadership (high vs. low) and appraisal (challenge vs. threat) on CTI, Wilks' Λ = .97, $F(1, 116)$ = .571, p = .451, η^2_p = .01, H1 (see Figure 5.1).

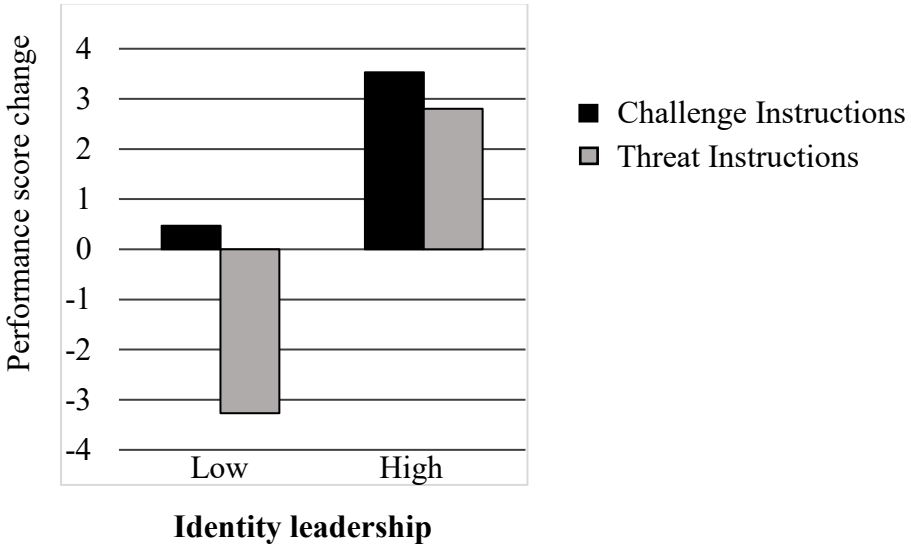
Figure 5.1. Challenge and threat index for the 2 (Identity leadership: Low vs High) X 2 (Appraisal: Challenge vs Threat) design.



Motor performance. ANOVA revealed that performance score varied according to identity leadership (high vs. low) from baseline to performance trial, $F(1, 116) = 10.40$, p = .002, η^2_p = .08. Follow up comparisons identified that the high identity leadership (M = 3.17 ± 7.66)

significantly improved in performance scores from baseline in comparison to the low conditions (M = -1.4 ± 7.96), p = .002. ANOVA identified that performance change did not significantly vary as a function of appraisal (challenge vs. threat), $F(1, 116) = 2.49$, p = .118, η^2_p = .02, nor was there an interaction effect, $F(1, 116) = 1.12$, p = .29, η^2_p = .01, H2 (see Figure 5.2).

Figure 5.2 Performance score change for the 2 (Identity leadership: Low vs High) X 2 (Instructions: Challenge vs Threat) design.



ANOVA revealed that change in performance intention between high and low identity leadership conditions from baseline to performance trial approached significance, $F(1, 116)$ = 3.33, p = .070, η^2_p = .03. Follow up comparisons identified that changes in performance intention from baseline in the high identity leadership condition (M = 5.83 ± 10.76) was (close to) significantly greater than the low condition (M = 2.47 ± 9.23), p = .07. ANOVA identified that change in performance intention did not significantly vary as a function of appraisal (challenge vs. threat), $F(1, 116) = .04$, p = .843, η^2_p = .00, nor was there an interaction effect, $F(1, 116) = .06$, p = .815, η^2_p = < .001, H2.

ANOVA revealed that performance time did not significantly vary according to identity leadership (high vs. low) from baseline to performance trial, $F(1, 116) = 1.85$, $p = .177$, $\eta^2_p = .02$. ANOVA revealed that performance time significantly varied according to appraisal (challenge vs. threat) from baseline to performance trial, $F(1, 116) = 4.33$, $p = .040$, $\eta^2_p = .04$. Follow up comparisons identified that the participants in the challenge conditions were significantly quicker in performance time from baseline ($M_{seconds}$= -.29 ± 2.93) in comparison to the threat condition ($M = .68 \pm 2.15$), $p = .040$. There was no significant interaction effect of identity leadership (high vs. low) and appraisal (challenge vs. threat), $F(1, 116) = .1.27$, $p = .261$, $\eta^2_p = .01$, H2. All means and standard deviations of all main analysis variables can be found in Table 5.1.

CTI was coded 1 (Challenged) and 0 (Threatened). From this, independent samples *t*-tests, irrespective of condition, revealed that those who were physiologically challenged (n = 56) reported greater perceived instrumental support (M = 2.96 vs 2.42, $p = .031$) and performed better after baseline than those who were physiologically threatened, M = -.48 vs 2.46, $p = .049$, $n = 63$. Accounting for all CV data across the two studies ($n = 280$), a further independent samples *t*-test revealed that those who were physiologically challenged ($n = 130$) performed better after baseline than those who were physiologically threatened, M = -.07 vs 2.54, $p = .026$, $n = 150$. A correlation matrix of all study variables can be found in Tables 4 and 5.

As with Study 3 it was identified whether thoughts may have changed during performance. Whether the participant got their first shot on the intended pole ($n = 38$) or missed the first intended pole ($n = 82$) was coded. Using the subsample of those who missed their first shot ($n = 82$), it was noted how many times the participant hit the remaining 9 intended targets (e.g., participant 64 scored 22, with 3 shots going on the poles). A three-way 2 (identity leadership: high vs low) X 2 (appraisal: challenge vs threat) X 2 (first shot:

success vs failure) ANCOVA was used for analysis, controlling for all appraisals (self-efficacy, perceived control, approach and avoidant focus and social support) and CV challenge and threat. It was identified that there was no main effect for identity leadership (high vs. low) or appraisal (challenge vs. threat) on target hit-rate, $p \geq .082$. However, there was a main effect of the first shot. It was found that those who missed their first shot hit significantly less poles in the following 9 throws ($M = 2.32 \pm 1.51$) than those who hit the target on the first shot ($M = 3.53 \pm 1.67$), $F(1, 117) = 4.86$, $p = .030$, $\eta^2_p = .05$. There were no interaction effects, $p \geq .188$. That said, it was found that irrespective of an individual's appraisal and physiology going into competition, if an individual missed the first shot, they were more likely to go ahead and continue to miss. These findings show that thoughts and feelings in the moment (iterative appraisals; Blascovich & Mendes, 2000) have implications for performance, irrespective of resource appraisal and physiological reactivity prior to performance.

Table 5.1 Means and standard deviations of all variables across the four conditions.

	Low identity leadership challenge	Low identity leadership threat	High identity leadership challenge	High identity leadership threat
Mastery Approach	5.47 ± .97	5.70 ± .95	6.20 ± .81	5.90 ± 1.03
Mastery Avoidance	4.10 ± 1.65	4.23 ± 1.43	3.80 ± 1.49	4.37 ± 1.71
Performance Approach	4.90 ± 1.21	4.67 ± 1.63	5.37 ± 1.35	5.30 ± 1.21
Performance Avoidance	4.63 ± 1.59	4.60 ± 1.54	4.53 ± 1.57	4.97 ± 1.81
Self-efficacy	3.28 ± .70	3.10 ± .81	3.68 ± .69	3.70 ± .69
Control	3.77 ± .86	3.67 ± .92	4.20 ± .71	4.00 ± .64
Emotional Support	2.83 ± 1.02	2.53 ± .79	3.75 ± .57	3.44 ± .62
Instrumental Support	2.30 ± 1.23	1.63 ± .92	3.73 ± .81	3.01 ± 1.42
Informational Support	2.60 ± 1.26	1.85 ± 1.03	3.98 ± .76	3.87 ± 1.59
Challenge-threat index	.30 ± 1.82	-.68 ± 1.50	.48 ± 1.64	-.03 ± 1.83
Performance score change	.47 ± 6.40	-3.27 ± 8.98	3.53 ± 8.25	2.80 ± 7.14
Performance intention change	2.87 ± 8.50	2.07 ± 10.04	5.80 ± 12.82	5.87 ± 8.45
Performance time change	-.87 ± 3.13	.63 ± 2.31	.29 ± 2.64	.73 ± 2.00

Table 5.2 Pearson's correlations coefficients (*r*) between the variables across high identity leadership conditions

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Prototypical	-	.48*	51*	.28	.35	.01	.25	.28	.13	.24	.09	-.07	-.03	.11	.02	-.06	.05	.11
2. Advancement	.92*	-	.50*	.25	.51*	.37**	.33	.21	-.30	.11	-.21	-.16	-.07	.17	-.10	-.17	-.04	.16
3. Entrepreneur	.85*	.88*	-	.57*	.47*	.08	.35	.17	.04	-.03	-.21	.16	.33	.55*	-.10	-.02	-.07	-.11
4. Impresario	.73*	.81*	.90*	-	.54*	.17	.18	.16	-.10	.05	-.17	.31	.27	.29	-.17	-.15	-.22	.05
5. Group Identification	.29	.35*	.43**	.45**	-	.52*	.36	.37**	-.19	.31	-.16	.01	-.13	.15	-.18	-.34	-.04	-.14
6. Self-efficacy	.32	.25	.41**	.45**	67*	-	.41**	.49*	-.21	.48*	-.13	.11	-.02	.24	.03	-.09	.19	.09
7. Control	.51*	.48*	.52*	.46**	.42**	.62*	-	.59*	-.38	.42**	-.01	.38**	.17	.45**	-.15	-.07	.14	.22
8. MAp	.46*	.45**	.54*	.48*	.51*	.64*	.57*	-	-.28	.66*	-.17	.24	-.00	.37**	.02	-.13	.09	.06
9. MAv	.18	.13	.13	-.06	.31	-.02	.22	.12	-	-.03	.52*	-.05	.14	-.22	-.06	.19	-.11	-.32
10. PAp	.07	.17	.29	.36	.49*	.34	27	.50*	.16	-	.17	.19	-.10	.16	.06	-.01	.02	.04
11. PAv	.31	.23	.19	.06	-.04	-.08	.09	.07	.49*	.08	-	.04	-.01	-.40*	.15	.30	.18	.11
12. Emotional	.23	.22	.26	.18	.35	.46**	.33	.41**	.11	.12	.17	-	.52*	.44*	.10	.04	-.12	-.28
13. Instrumental	.31	.26	.28	.18	.28	.24	.35	.26	.36	-.12	.26	.69*	-	.54*	-.25	-.01	-.14	-.22
14. Informational	.35	.33	.39**	.30	.22	.34	.41**	.24	.44**	.09	-.00	.33	.37**	-	-.10	.00	.08	-.18
15. CTI	.09	.14	.15	.26	.18	.03	.18	-.01	.04	-.07	-.21	-.14	.03	-.01	-	.53*	.52*	.02
16. Score	.40**	.23	.37**	.29	.14	.43**	.23	.45**	.15	.05	.10	.30	.36	.33	.00	-	.61*	.16
17. Intention	-.08	-.04	.17	.05	.01	.20	.20	.27	.11	.38**	.19	.13	-.08	.10	-.44*	.07	-	.17
18. Time	-.05	.02	.04	.08	.38**	.14	.03	.24	.37**	.15	.06	.17	.24	.19	.12	.21	.00	-

Note: High identity leadership-threat correlations are below the diagonal, and High identity leadership-challenge correlations are above the diagonal. $p \leq .05$**, $p < .01$*

Table 5.3 Pearson's correlations coefficients (*r*) between the variables across low identity leadership conditions

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Prototypical	-	.89*	.76*	59*	.60*	.11	-.09	.14	-.13	.04	.24	.31	.44**	.39**	-.19	-.03	.11	-.22
2. Advancement	.95*	-	.83*	.73*	.63*	.16	-.05	.15	-.22	.15	.07	.39**	.50*	.44**	-.05	.11	.22	-.25
3. Entrepreneur	.91*	.92*	-	.79*	.62*	.20	.11	.45**	-.02	.27	.09	.43**	.42**	.41**	-.09	.08	.26	-.17
4. Impresario	.80*	.81*	.94*	-	.65*	.01	.14	.27	-.06	.15	.08	.58*	.59*	.48*	-.09	.19	.28	-.26
5. Group Identification	.65*	.64*	.62*	.64*	-	.08	.05	.36	-.13	.22	-.05	.40**	.37**	.25	-.14	-.01	.17	-.07
6. Self-efficacy	.08	-.05	.04	.12	.22	-	.63*	.43**	-.28	.13	-.28	-.00	.01	.03	-.03	.15	-.20	.13
7. Control	.13	.06	.18	.17	.07	.46**	-	.47*	-.03	.20	-.29	.11	.01	.02	.11	.02	-.25	.04
8. MAp	.11	.03	.11	.10	-.03	.15	.43**	-	.36	.44**	.16	.19	.07	.17	.04	-.17	-.26	-.13
9. MAv	-.33	-.35	-.43	-.38	-.27	.04	-.28	.05	-	.63*	.44**	-.13	-.18	-.12	-.06	-.17	-.10	-.21
10. PAp	-.02	-.08	-.15	-.08	.07	.39**	-.15	.38**	.36	-	.09	.23	.21	.27	.42**	-.22	-.20	-.16
11. PAv	.13	.07	.02	.08	.15	.17	-.17	-.13	.54*	.37**	-	-.08	.06	-.04	-.21	-.38*	-.06	-.12
12. Emotional	.30	.24	.35	.39**	.13	.03	-.13	-.02	-.11	-.02	.11	-	.79*	.77*	.15	.16	.27	-.32
13. Instrumental	.78*	.71*	.77*	.79*	.70*	.23	.12	.01	-.27	.07	.21	.52*	-	.80*	.20	.05	.03	-.26
14. Informational	.63*	.59*	.72*	.80*	.62*	.18	.20	.02	-.35	.01	.10	.60*	.89*	-	.13	.08	-.06	-.37*
15. CTI	-.21	-.25	-.21	-.21	-.26	-.17	-.19	-.03	-.08	-.19	-.11	-.21	-.17	-.26	-	.04	-.09	.03
16. Score	-.33	-.30	-.34	-.29	-.13	.16	-.04	-.15	.15	.11	.02	-.33	-.29	-.15	.00	-	.21	.30
17. Intention	.12	.15	.18	.16	.25	-.24	-.09	-.14	-.11	-.12	.05	.06	.20	.23	-.14	-.10	-	-.12
18. Time	.02	-.07	.05	.14	.07	.41**	.23	.11	-.12	.24	.28	.09	.22	.28	-.02	.34	.12	-

Note: Low identity leadership-threat correlations are below the diagonal, and low identity leadership-challenge correlations are above the diagonal. $p \leq .05$**, $p < .01$*

5.4 Discussion

Study 4 showed mixed support for H1 and H2. The enactment of identity leadership principles (vs not) induced greater challenge-based appraisals (H1) and fine motor performance (H2). That said, it was challenge based instructions that positively influenced cardiovascular reactivity (H1), not identity leadership. In contrast to H1, the enactment of identity leadership did not exacerbate anticipated appraisals or cardiovascular reactivity. Rather, it was found that the enactment identity leadership induced greater resource appraisals in comparison to low identity leadership, irrespective of challenge and threat instruction (thesis aim 4). These findings suggest that the enactment of identity leadership principles buffer against the negative effect of ego-threat (see Turner et al, 2014), enhancing likelihood of adaptive appraisals. However, much like previous research (Turner et al., 2014), it was the challenge and threat instructions which predicted CV stress reactivity. Adding to this, inconsistent with H2, identity leadership instructions influenced motor performance, whilst challenge and threat instructions influenced performance time. Overall, it has not been identified that cardiovascular states (challenge or threat) become more pronounced when challenge and threat instructions are delivered by a leader who leads in-line with identity principles (vs. not). Additionally, it was found that neither identity leadership or challenge and threat-based instructions influenced iterative appraisals during performance.

This Chapter sought to examine whether the enactment of the four identity leadership principles and their interaction with challenge and threat appraisal instructions influenced followers' resource appraisals, CV reactivity, and motor performance on a pressurised motor task. In sum, self-report, CV, and motor performance measures indicated mixed support for hypotheses (thesis aim 4). In contrast to H1, there was no interaction effect where identity leadership did not exacerbate psychophysiological reactivity to stress. Instead, compared to low identity leadership, there was a main effect of leading in-line with the four principles on

resource appraisals (thesis aim 4). In addition, compared to threat instructions, challenge instructions led to greater challenge cardiovascular reactivity on approach to a motivated performance situation. In contrast to H2, identity leadership did not interact with challenge appraisal instructions in improving motor performance. Instead, compared to low identity leadership, leading in-line with the four principles positively influenced pressurised motor performance.

Overall, the findings identify that the enactment of identity leadership positively influences self-efficacy, perceived control, approach goals, and motor performance. Research by Slater and colleagues (2018) noted that identification with a leader serves to bolster resource appraisals and cognitive functioning. However, authors found limited results with regard to cardiovascular indices of challenge and threat. Specifically, Slater and colleagues (2018) found that low relational identification leads to a threat response, whilst greater identification does not necessary lead to a challenge response. Building on Slater and colleagues' (2018) findings, it was identified that the enactment of identity leadership induces a challenge state of appraisal, whilst low levels of enactment is conducive to a threat state of appraisal. Though this is the case, there was a main effect for challenge and threat instructions on CV states. Given the theoretical link between resource appraisals and CV states (Jones et al., 2009), it would be expected that challenge-based instructions would lead to challenge CV states.

Critically, Study 4's findings can be viewed in two clusters in that: (1) identity leadership influenced resource appraisals and performance on a pressurised task; and (2) challenge and threat instructions influenced participants' physiological reactivity to the task. Extending current knowledge, participants in the challenge condition were not more challenged as a result of being led by an individual high in identity leadership, nor did participants in the threat condition become more threatened as a result of high identity

leadership. Extending leadership (Haslam et al., 2011) and stress theory (Jones et al., 2009), appraisals of an event were influenced by identity leadership alone, with the enactment of the four principles (see Haslam et al., 2011; Steffens et al., 2014) proving adaptive for approach goals (both mastery and performance), self-efficacy, perceived control and perceived support. CV states (challenge and threat) were influenced by the challenge and threat instructions only, not influenced by identity leadership.

Again, like Study 3, iterative appraisals may have played a part in the results (Blascovich & Mendes, 2000). It may be possible that the appraisal – CV reactivity – performance relationship as outlined in the TCTSA is affected by reappraisal of the event (Jones et al., 2009; Turner et al., 2013). Participants completed their performance trial after the questionnaires and while time between elements was minimized, the short time is enough for reappraisal to occur (Turner et al., 2013). Therefore, it may not be the reported appraisal that is taken forth to performance in that thought both prior to, and during, performance can counteract threat, or revert challenge responses.

5.4.2 Theoretical implications

Study 4 findings have important implications for leadership and stress theory. Advancing the social identity approach to leadership (see Haslam et al 2011; Hogg, 2001), it was identified that the enactment of the identity leadership principles (regardless of challenge and threat instructions) had positive effects on follower self-efficacy, perceived control, approach valence and perceived support (aligned with a challenge appraisal) towards a motivated performance situation. Advancing identity leadership and challenge and threat theory, the enactment of the four identity leadership principles (irrespective of challenge and threat instructions) has implications for followers' psychological responses to stress. Speaking to the TCTSA (see Jones et al., 2009), based on study 4 alone, a leader's perceived enactment of identity leadership principles could now be considered an antecedent of

psychological stress reactivity. Indeed, social antecedents in this capacity are considered in the model, yet are vital in other approaches to stress (e.g., the social cure; Haslam et al., 2018). Holding true to social resources, like Study's 1, 2 and 3, like Study's 1, 2 and 3, it seems that individuals within our social environment (friends; memberships in clubs and organizations) attenuate stressful situations, as proposed nearly 40 years ago (Billings & Moos, 1981). Research has found that these social resources predict greater overall performances as a result of collective supportive climates (Peñalver et al., 2019), being products of leadership (Fransen et al., 2017; Zhu et al., 2015). That said, these findings, to some extent, align with the sociopsychobio proposition that social factors influence and shape psychological and biological parameters of group members (Haslam et al., 2019). The sociopsychobio model proposes that an appraisal of an event is shaped by a salient group-member (i.e., the leader) who then influences physiological stress reactivity (Haslam et al., 2019). Broadly, Study 4 adds weight to the position that the enactment of identity leadership is influential in individuals' psychological responses to stress, and their fine motor performance. Though this is the case, identity leadership, within this Chapter, did not lead to adaptive CV reactivity to competitive scenarios (relative to the other three conditions).

5.4.3 Practical implications

Previous links between identity leadership and stress related variables are largely under-researched (see Slater et al., 2018). The current findings from Study 4 show that identity-based leadership improves an individual's perceptions of efficacy, control, approach, and social support. Because leadership is an integral element that can define the extent of an environmental stressor (e.g., work-based), findings such as this can shape performance environments. Here, to shape the performance environment, the 3R's process (Haslam et al., 2011) may encourage positive (i.e., challenge) responses to stress (at least on a psychological level). Leaders should: (1) Reflect; (2) Represent; and (3) Realize to develop a shared sense

of collective identity in the attempt to positively influence resource appraisals of followers when approaching competitive situations. Going against findings in Study 3, identity leadership nor challenge and threat instructions (and consequential identification), statistically, influenced reappraisal of the competitive event. To this tune, individuals may not re-appraise an event as a challenge from what was a threat state as a result of the 3R's. Highlighting the inconsistencies between Study 3 and 4 with regards to iterative appraisals, it is clear that re-appraisal of a competitive event (as a result of identity leadership) warrants careful and well-designed research consideration.

5.4.4 Limitations and future research directions

The current research is not without its limitations. Although an integral part of the TCTSA, the leadership situations in both Study 3 and 4 hinge on an acute task and therefore only have implications for acute stressors. An extensive period of time was not given to the participants to accrue any long-term stressful reactions in the run up to the event. Given the temporally nature of leadership (Miller et al., 2020), there would be merit in identifying how identity leadership, namely the embodiment of the four principles, effect psychophysiological stress reactivity across an athletic season, using accessible, manoeuvrable equipment such as an ambulatory Finapres. Like Study 3, the leader was presented as a male (i.e., John). Perceptions of a leader can be influenced by their gender (Crites et al., 2015). To minimize this influence, the leader was presented using an audio to avoid implicit biases and perceptions (Willis & Todorov, 2006), being typical practice within challenge and threat research (Turner et al., 2014). The faces of the team were not shown for exact same reason (i.e., to avoid the influence of initial impressions; Willis & Todorov, 2006). Whilst the manipulations of identity leadership are explicit (high vs. low) and therefore challenge ecological validity, these manipulations aligned with typical research convention in assessing two polarized constructs (e.g., irrational vs rational leaders' speeches; Evans et al., 2018; high

vs. low relational identification; Slater et al., 2018; high vs low leader entrepreneurship; Stevens et al., 2018). Further, the manipulations aligned with the four theorized identity leadership principles (Haslam et al., 2011), eliciting group identification (i.e., manipulation check) without introducing potential confounds such as faces of other team members that could influence the results (i.e., initial impressions; Willis & Todorov, 2006). Finally, like Study 3, although lab-based and therefore lacking realism, the task mimicked a competitive scenario that requires a decision on how best to score points, enhancing likeness to a real-world scenario and important to induce participants' stress reactivity. This said, future researchers should look to measure real-life performance in natural pressurised environments.

5.4.5 Conclusion

This Chapter aimed to identify whether and to what extent identity leadership interacted with challenge and threat instructions to determine psychophysiological stress reactivity and motor performance. It was found that the enactment of identity leadership positively influences resource appraisals and motor performance. Those in a position to influence should endeavour to endorse follower group identification through the enactment of the four identity leadership principles, which in turn will enhance efficacy, perceived control, approach focus, perceived support and performance within stressful situations. In sum, leaders should be acutely aware of how they are perceived by their followers with regards to the identity leadership principles due to their implications for follower psychological responses to stress and performance under pressure.

CHAPTER 6: GENERAL DISCUSSION

6.1 Summary of Findings

The aims of this thesis were to examine the influence of identity leadership on follower psychophysiological reactivity to, and performance within competitive scenarios, extending both the social identity approach to leadership (Haslam et al., 2011) and stress theory (TCTSA; Jones et al., 2009; Meijen et al., 2020). The aims were based on two schools of thought that; (1) identity leadership may influence stress responses; and (2) resources appraisals and CV reactivity is associated with subsequent performance. Specifically, this thesis aimed to; (1) adopt a social identity perspective to analyse the mechanisms through which a leader affects an athlete's resource appraisals in a real-world sports setting (Chapter 2); (2) examine the mechanisms through which identity leadership influences resource appraisals and performance satisfaction across an athletic season (Chapter 3); (3) examine the influence of high identity leadership (vs. low identity leadership) on resource appraisals, physiological stress reactivity and consequent motor performance (Chapter 4); (4) and provide evidence for the effects of high identity leadership (vs. low identity leadership) on psychophysiological stress and performance under variable levels of challenge and threat appraisal manipulation (Chapter five).

Chapter two examined the relationships between identity leadership, identification, and resource appraisals. Results identified that appraisals can be predicted by identity leadership through both leader and group identification. Extending previous research, results note that the enactment of identity leadership increases emotional connections with the leader and the group, enhancing efficacy, perceived control, approach focus and support. This research identified the mechanisms through which identity leadership influences appraisals,

noting the integral role that leader and group level identification has on appraisal of imminent competitive events.

Chapter three examined the relationships between identity leadership, identification, resource appraisals and athletic performance over an athletic season. Results identified that an athlete's self-efficacy when approaching competition can be predicted by identity leadership through leader/relational identification. Extending previous research and Chapter 2, results evidence that the enactment of identity leadership increases emotional connections with the leader over time, enhancing athlete-efficacy. From this, it seems that over time, a dyadic connection is likely to influence appraisals rather than group identification. Further, social support predicted performance satisfaction at the end of the season, though identity leadership did not. This research identified the mechanisms through which identity leadership influences appraisals and performance, evidencing a) the integral role that leader identification has on athlete efficacy, and b) the integral role of social support for athletes' performance satisfaction.

Chapter four examined the influence of identity leadership and group identification on resource appraisals, CV reactivity and motor performance. Results identified intraindividual differences in self-efficacy, control, approach focus, social support, CV states and performance between high and low identity leadership conditions. These differences show that the acute enactment of identity leadership principles can influence both psychological and physiological stress reactivity, having implications for motor performance. While this is the case, identity leadership did not significantly influence performance intentions and performance time. With the design used (i.e., counterbalanced double-blind within participants experimental design), all found effects are likely to be as a result of the identity leadership manipulation, reducing extraneous influences. From the results, it is evidenced that identity leadership is integral in influencing psychological and physiological stress reactivity

to acute competitive scenarios. As such, identity leadership also bolstered acute motor performance.

Chapter five examined the influence of identity leadership, identification, and challenge and threat manipulation on resource appraisals, CV reactivity and motor performance. It was hypothesized that high levels of enacted identity leadership would exacerbate responses. By this, challenge instructions (i.e., instructions intentionally improving resource appraisals) alongside enacted identity leadership would bolster challenge responses (vs. low identity leadership). Equally, threat instructions (i.e., instructions intentionally reducing resource appraisals) alongside enacted identity leadership would bolster threat responses (vs. low identity leadership). Going against hypotheses, results identified that identity leadership instructions (vs not) improve an individual's appraisal of, and performance within stressful motor performance, regardless of the challenge and threat instructions. Simply, identity leadership did not exacerbate found effects, but weakened threat responses when threat instructions were delivered. Although this is the case, CV reactivity was found to be influenced by challenge and threat instructions, not identity leadership instructions. That said, all four Chapters to some degree have identified that identity leadership serves as a crucial part of the stress process and should be considered within future research.

In summary, this thesis has revealed that; psychological, physiological, motor and sport performance can be influenced by identity leadership in some capacity. Specifically, greater perceptions of identity leadership predict elevated resource appraisals, CV reactivity to, and motor and sport performance (Chapter 2, 3, 4 and 5). Within Chapter 2, the relationship between identity leadership and appraisals were found to be mediated by identification with a leader and therefore a group. Within Chapter 3, the enactment of the identity leadership principles significantly predicted self-efficacy over time through relational

identification. Further, social support predicted performance satisfaction. Extending identity leadership and stress theory, the thesis identified a difference between atemporal effects of identity leadership and temporal effects of identity leadership. By this, identity leadership cross-sectionally associated with resource appraisals through group level identification, and leader and group identification in serial. Atemporal research (Chapter 2) evidenced that the enactment of identity leadership positively associated with leader identification and thus group identification, in turn positively associating with resource appraisals. Similarly, the enactment of identity leadership positively associated with group identification, in turn positively associating with resource appraisals. However, over time, perceptions of identity leadership at the start of an athletic season predicted self-efficacy at the end of the season through leader identification (not group, or leader and group). As dyadic relationships improve as a result of perceptions of identity leadership, it is through a leader-follower level of identification that provides the foundation for improving an athlete's efficacy towards competition. In other words, the development of an emotional connection between a leader and follower serves to improve follower efficacy. In Chapter 3, social support also predicted performance satisfaction at the end of the season, supporting previous social support research (Rees & Hardy, 2004).

Regarding appraisals and CV reactivity manipulation through identity leadership, the thesis finds that reactivity is not a sole venture. By this, theory (Jones et al., 2009) posits that we appraise a situation based on our perceived ability to cope with the demands of a situation, and that our CV reactivity follows suits with this appraisal (challenge or threat). Yet, fruitful in this thesis, it is identified that reactions to, and performance within competitive scenarios are not just dictated by the self, but by the environment an individual is in. Given that identity leadership develops both dyadic and group level identification, it is this emotional connection that bolsters adaptive appraisal (Chapter 2), enhancing likelihood of

adaptive CV reactivity and motor performance (Chapter 4). This previously thought of lone venture should be considered a socially constructed phenomena that can be influenced by the environment in which an individual is in. By extension, this thesis also evidences that this emotional connection is pivotal in protecting against negative threat inducing scenarios. With previous research noting that resource appraisals can be manipulated through instruction (Turner et al., 2014), this thesis identifies that it is the individual that is giving these instructions that holds the key to the source of manipulation. Because participants held a greater emotional connection with the group as a result of identity leadership, the negative threatening manipulations bared no detrimental effect. In other words, if a participant identifies with group as a result of enacted identity leadership, threat-based terminology is not likely to have a detrimental effect on appraisal and performance. To this tune, based on the thesis as a whole, leaders should endeavour to develop a dyadic and team based emotional connections between leader and follower and follower and group in order to maximize adaptive psychophysiological stress responses, and performance potential. The following outlines the potential reasons for the current findings.

6.2 Explanation of Findings

The scope of research within identity leadership (Haslam et al., 2011) and challenge and threat theory (Jones et al., 2009) sits within the overarching theme of performance enhancement. It is common in research that identity leadership and challenge states have positive effects on performance parameters (Slater et al., 2018; Turner et al., 2014). Within identity leadership research it is posited that identity leadership influences the emotional connections within a group (leader and follower; follower and group), being the foundation for mobilization of efforts and performance (Slater et al., 2019; Stevens et al., 2019a). The mechanisms in which this identification mobilizes effort and performance had not been

investigated. To put it another way, it was unknown how identification (as a result of identity leadership) influences performance. The TCTSA (Jones et al., 2009) posits that individuals' appraisals of an impending scenario are predictive of CV reactivity, in turn influencing performance (see Turner et al., 2014), offering a potential mechanism through which identification influences performance. Specifically, in wake of an important event individuals appraise whether they are able to cope with the demand of the situation. Psychological resources must meet or exceed situational demands in order to cope with the competitive scenario. Those who perceive resources (self-efficacy, control, approach focus) that meet or exceed the situational demands are likely to be challenged, leading to an adaptive CV reactivity and performance. Evidently, the TCTSA identifies what antecedents influence performance, being theoretically informed for nearly 70 years (Jones et al., 2009; Lazarus et al., 1952). In collating both identity leadership theory (Haslam et al., 2011) and the TCTSA (Jones et al., 2009), it was possible to evidence the societal mechanisms that may influence these antecedents to motivated performance. As such, the current thesis evidences that psychophysiological reactivity can be manipulated through differing perceptions of a leader and the group an individual is a part of. Though the current thesis aimed to identify the psychophysiological implications of identity leadership, there seemed to be a difference in the extent to which identity leadership influenced psychological and physiological stress. Specifically, there was consistent evidence for psychological implications of identity leadership across Chapters, though the physiological implications were not as consistent. As such, the following explains these findings separately.

Psychological. Within the broad leadership literature, it is known that a leader can influence psychological variables in followers. Attentiveness (Zhu et al., 2016), trust (Giessner & van Knippenberg, 2008), respect, cooperation, perceptions of social support (Haslam et al., 2012), confidence (Fransen et al., 2016), intentional mobilization (Slater et al.,

2019), satisfaction and burnout (Van Dick et al., 2018) are variables that can be influenced by a leader. Stevens and colleagues (2019b) found that the enactment of identity leadership has a positive effect on sport and exercise attendance through group identification. Because a leader can influence a follower into internalizing a group as part of their self-concept, this becomes the basis for follower attitude and behaviour, mobilizing followers to engage with the group they identify with. It has also been found that a leader influences follower creativity through relational identification (Gu et al., 2015). Because of a leader's enacted behaviour's, a follower internalizes the meaning behind the dyadic relationship, making this part of their self-concept, mobilizing individuals towards thinking creatively. Common in leadership research, the social identity approach to leadership is conducive to greater identification (relational and group), which in turn has positive effects on a variety of psychological variables.

Because identity leadership has a positive influence on identification, in turn positively influencing psychological variables, this opens question into the mechanisms by which leaders influence psychological variables within competitive tasks. Combining leadership and stress theory, Slater and colleagues (2018) identified that relational identification with a leader positively influences appraisals of an upcoming event, leading to greater cognitive performance. Specifically, a leader of whom a follower has an emotional connection with is likely to positively influence follower efficacy, perceived control and approach focus. Within this research it was the dyadic relationship between the leader and follower that mobilized the follower to appraise the situation positively. Given that greater efficacy, control and approach focus is conducive to greater CV reactivity (challenge state) and performance (Jones et al., 2009; Turner et al 2014), it is fruitful to identify whether the enactment of identity leadership principles is conducive to a dyadic and group level relationship, in turn contributing to appraisals and performance.

The results of the thesis have identified that the mechanism through which identity leadership influences appraisals is through identification. Identity leadership positively influenced identification (both relational and group), and thus this identification influenced appraisals of an event. Though, the results of the thesis support Sluss and colleagues' (2012) propositions that relational identification serves as a prerequisite to group identification. Equally, the thesis opposes the position that relational identification with a leader can be inferred from a follower's group identification that unites follower and leader (Steffens et al., 2014). Atemporally, an emotional connection with the leader, and thus the group (as a result of identity leadership) fosters athlete efficacy, perceived control, approach focus and social support. An enhanced emotional connection with a group places emphasis on the collective, and that mobilized action is formulated through shared meaning and mutual understanding of goals. With all on the same page, being emotionally invested in one another, it is unsurprising that resource appraisals are affected. Indeed, it is hard to imagine that an individual who does not identify with a group, not being emotionally invested in the group's interests, will feel efficacious, perceive control over their actions and approach the competition positively. Though these results shed light on the positive effects of identity leadership on identification and appraisal, leadership is not a static, unchanging concept. Because sport is an ever-changing, emotionally charged environment, perceptions of leaders and a group can change within moments (i.e. arguments, getting to know one another). Leadership is inherently temporal, being determined over time. Speaking to this, collating identity leadership (Haslam et al., 2011) and TCTSA theory (Jones et al., 2009), it is the perceptions of identity leadership over time that has reciprocal effects on identification and appraisal. As previously evidenced, cross-sectionally, identity leadership was associated with self-efficacy, control, approach focus and social support through relational and thus group identification. Over time, this finding becomes less important. As perceptions of identity leadership change over time, it is

through relational identification that identity leadership improves resource appraisals. By this, perceptions of identity leadership over time reciprocally increase emotional connections with the leader. Because of this dyadic-connection, athletes then emotionally invest in the leader. As a result of this investment, increases in self-efficacy are likely. Being different to atemporal investigations, it is the connection with the leader over time that enables positive appraisals. In sum, when a leader represents, advances, creates and embeds a group, a dyadic emotional connection is likely to develop. Because of this emotional investment in the leader over time, athlete efficacy is bolstered when approaching competitive situations. This finding supports Meijen et al.'s (2020) propositions in that perceptions of support from a coach whom followers share an emotional connection with is likely to bolster positive appraisals of competitive situations.

However, alluded to in this thesis, iterative appraisals may have played a part within the findings (Blascovich & Mendes, 2000). Regarding the questionnaire-based research, it is possible that thoughts in the moments before competition could have changed, and thus influenced performance, explaining why limited variables predicted performance within Chapter 3. That said, questionnaires were given as close to competition as possible, replicating challenge and threat research (Turner et al., 2014), thus minimizing the influence of iterative appraisals. Regarding experimental data, it may be possible that the appraisal – CV reactivity – performance relationship is affected by reappraisal of the event. Even though the studies replicated previous challenge and threat research procedures (Turner et al., 2014), the gap between self-reported appraisal and actual performance was 3 minutes. As such, it may not be the reported appraisal that is taken forth to performance. By this, thoughts both prior and during performance can counteract threat, or revert challenge responses. In measuring this, in Study 3 it was found that those who missed their first performance shot (after baseline) in the low identity leadership condition continued to miss, whereas in the high

identity leadership condition, this was not the case. Because this was a counterbalanced within participants design, it can be argued that identity leadership positively influences iterative appraisals before as well as during performance (though inferred). To this end, those who perceive a greater emotional connection with both a leader and group may appraise, as well as re-appraise situations positively, focusing on efficacy beliefs and performance approach goals both before, and after adversity within competition.

Finally, though improbable, with Chapter 5 reporting a between participants research design, there is a chance that differences in self-report appraisal data between leadership conditions can be due to chance. That said, significant differences in appraisals between conditions in Chapter 4 (counterbalanced within participants design) were found, enhancing confidence that identity leadership influenced appraisal of an event. However, irrespective of leadership conditions, those who were physiologically challenged and performed better after baseline reported greater instrumental support and perceived control than those threatened and performed worse after baseline. To this end, although appraisals differ between identity leadership conditions, the causal link between appraisal, CV reactivity and performance is minimal, being a finding replicated in previous research (Turner et al., 2014).

Physiological. Alongside the psychological elements of stress, theory (Blascovich & Mendes, 2000) and research (Tomaka et al., 1997) draw on physiological indices of challenge and threat. These are hemodynamic CV markers that objectively identify whether an individual perceives a stressor as adaptive (i.e., challenge) or maladaptive (i.e., threat). Both markers are characterized by an increase in Sympathetic Adreno-Medullary (SAM) activity and catecholamine release (epinephrine and norepinephrine), elevating heart rate (HR; heart beats per minute [bpm]). What distinguishes the two responses is cardiac output (CO; litres of blood pumped from the heart per minute [l/min]), and total peripheral resistance (TPR; sum of the resistance of all peripheral vasculature in the systemic circulation [dyn.s.cm-5]). A

challenge response is indexed by increases in CO, and decreased TPR, encouraging efficient energy usage through increases in blood glucose, free fatty acids (fuel for the nervous system and muscles, respectively) and volume of blood flow to the brain and muscles (e.g., Dienstbier, 1989). Pituitary Adreno-Cortical (PAC) activity and the release of cortisol characterizes a threat state, further characterized by slight CO change and an increase or stabilization in TPR. PAC activity discards any positive effects of SAM activation, restricting efficient energy usage, limiting blood flow to the brain and muscles (e.g., Dienstbier, 1989).

Given these physiological differences between challenge and threat states, it is posited that decision making, cognitive functioning and gross motor skilled performance is affected (Jones et al., 2009; Turner et al., 2014; Slater et al., 2018). Within research it has been evidenced that cortisol responses (threat state) to stressful events are associated with performance impairments on tasks of attention, memory, decision making and clinical performance (Harvey et al., 2010). Though, in recent research this distinction in performance between physiological states is marginal. Turner and colleagues (2014) only saw marginal differences in performance between those challenged and threatened. Yet, Hase and colleagues' (2019) systematic review identified that the positive relationship between CV challenge states and performance is relatively stable across 38 studies. Although this is the case, knowledge on the physiological mechanisms that influence performance is unclear. Even though cortisol (threat) and catecholamines (challenge) are involved within the stress process, cortisol is unlikely to have been a major influence in the present research. Cortisol release can take up to 10 minutes (Mendes & Jamieson, 2011), where the participants in the experiments only had 3 minutes from condition to performance. The more likely contributor is PAC activity blunting SAM activation, preventing catecholamines from positively affecting performance (Seery, 2011). To add to the inconsistency, research also notes that muscular tension can contribute to challenge and threat states (Holmes & Wolff, 1952; Moore

et al., 2012; Wright & Kirby, 2003). It is posited that muscular tension restricts vasodilation of the peripheral vasculature system, contributing to a lack of blood flow to the brain and muscles, leading to a threat state (Moore et al., 2012; Wright & Kirby, 2003).

The mechanisms through which challenge and threat CV reactivity influence performance is uncertain. That said, this thesis evidences that leadership can influence this process. Recent evidence has pointed to the influence of a leader on CV responses and performance. Slater and colleagues (2018) identified that a low level of relational identification with a leader lends itself to a threat state in individuals, resulting in poor cognitive performance. Extending this, the current research has identified that the enactment of identity leadership can positively influence CV reactivity and gross motor performance. Even though the mechanisms through which physiological stress reactivity affects performance is unclear, and undescribed in this thesis, it is clear that societal factors such as leadership can influence challenge and threat CV responses and performance, whichever way that occurs. To elucidate, within the TCTSA it is posited that resource appraisals positively influence CV reactivity (a challenge state). Because Chapters 2 and 3 identified that identity leadership and consequent identification is conducive to adaptive appraisal, it was likely that the athletes in question had an adaptive CV response to the competitive situation. In testing this it was identified that the enactment of identity leadership positively influenced appraisal, CV reactivity and motor performance (Chapter 4). Specifically, the enactment of identity leadership increased identification, positively influencing resource appraisals, much like Chapter 2. To this end, these adaptive resource appraisals, as a result of a heightened emotional investment in the team, was conducive to an adaptive CV response and motor performance. When a leader represents, advances, creates and embeds a shared social identity (group identification), individuals are likely to be mobilized in acting for the collective, rather

than the self. To this end, again, the studies evidence that identity leadership positively influences appraisal, CV reactivity and performance.

6.2.1 Advancing Research on Challenge and Threat Manipulation

Previous research has endeavoured to manipulate CV reactivity through devaluing the importance of the upcoming task (e.g., Alter et al., 2010; Feinberg & Aiello, 2010; Tomaka et al., 1997). If an event is not perceived as important to an individual, a maladaptive appraisal is unlikely to occur. Though this may help, lacking perceived event importance is unlikely to represent a motivated real-life performance situation such as competitive or personally relevant events (e.g., cup final, job interview). Remaining aligned with the TCTSA, previous research has identified that instructions designed to influence resource appraisals have a direct effect on CV responses (Jones et al., 2009; Turner et al., 2014). Providing instructions that deplete resources were more likely to lead individuals to be threatened by the competitive situation. Conversely, those who received instructions that endorsed resource appraisals were more likely to be challenged by the scenario.

Echoing these findings, the present research identified the dyadic effects of both challenge and threat instructions and whether the person leading in line with the identity leadership principles interact to influence appraisals, CV reactivity and performance. To put it another way, it was identified whether it was the individual who was delivering the instructions, or the instructions themselves that influenced appraisal, CV reactivity and motor performance. It was found that challenge instructions, irrespective of the leader (enacting identity leadership or not), lead to challenge CV. Again, irrespective of the leader, threat instructions led to threat CV reactivity. To this end, the person that delivers the instructions does not have the ability to manipulate CV reactivity (at least in Chapter 5), only the instructions themselves (challenge or threat). It may have been so that the participants

focused or ruminated on these instructions, reducing the capacity to conceive of the identity-based language being said. Although this is plausible, identity leadership instructions influenced CV reactivity in Chapter 4. Overall, however, within Chapter 5, identity leadership positively influenced resource appraisals and performance, irrespective of challenge or threat instructions. With the contradictions between Chapters 4 and 5, these results speak to the disparity between appraisal and CV reactivity, being a common finding in TCTSA research (Turner et al., 2012; Turner et al., 2013). In light of this disparity, these findings elucidate potential mechanisms which influence appraisal, CV reactivity and motor performance.

6.2.2 The Social Cure Perspective

The thesis shows that social factors such as leadership can influence psychological and physiological reactions to stressful situations. It has been evidenced that maladaptive CV reactivity to stressors can have major implications for health (Kivimäki et al., 2012). To this tune, individuals' health, in both body and mind can be improved as a result of social factors. Meaningful group memberships that provide support are likely to bolster overall health (Jetten et al., 2017). Specifically, positive group memberships serve to make people stronger and healthier as a result of a sense of belonging, meaning, purpose and efficacy in life (Cruwys et al., 2014; Greenway et al., 2015; Jetten et al., 2015). Positive group memberships have the capacity to 'cure', positively impacting health and well-being (Haslam et al., 2009; Jetten et al., 2012). Equally, a lack of belonging with positive groups, and the associated social isolation that accompanies this has been found to majorly influence psychological and physical health, with individuals being likely to die far sooner than more social integrated counterparts (House et al., 1998). Here, a lack of social integration has been likened to having a comparable risk to health as smoking, obesity, physical inactivity, and high blood pressure (House et al., 1998). Reinforcing this, meta-analytical research (of over 300,000 participants)

found that the risk of mortality is reduced as a result of social integration and social support. Specifically, the effect of social integration and social support on lowering risk of mortality was greater than not smoking, low alcohol consumption, being physically active and not being exposed to air pollution (Holt-Lunstad et al., 2010). Evidently, an emotional connection to a positive social group can have profound effects, including that of lowering mortality. Even though positive group memberships have a significant effect on health and mortality, individuals tend to underestimate the impact of social factors on such variables (Haslam et al., 2018).

With this gross under-estimation (Haslam et al., 2018), the current Chapters present both psychological and physiological implications of social factors, namely leadership. As such, the thesis supports the position that social relationships and group memberships can have significant implications for both psychological and physiological health. Here though, the thesis evidences that a leader is in a pivotal position to influence psychophysiology, and as such health and well-being. When group members define the self as characteristic of an in-group (e.g., a sport team), seeing themselves as not just "I" but as one of "us", emotional connections are likely to develop (due to the behaviours of the leader). From this enhanced connection, self-efficacy, perceptions of control, approach focus, and adaptive physiological responses are likely to occur when the group faces a stressful event. Though it is unclear how positive group memberships influence psychophysiology in day to day interactions (i.e., aside from competition), given the influence of group memberships on mortality (Holt-Lunstad et al., 2010), it would be expected that positive group membership would positively influence both psychological and physiological health. In support of this, Frisch and colleagues (2014) evidenced that when a social group is perceived to be salient and perceives support from a group, this buffers against cortisol responses (i.e., negative stress response), positively influencing health. To this tune, it would be anticipated that a leader who represents,

advances, creates, and embeds a shared social identity is likely improve group members' psychological and physiological responses to stress, leading to healthier, longer lives (Holt-Lunstad et al., 2010). Given that this effect is inferred, future research would benefit from understanding the influence of identity leadership psychophysiological health and well-being over a prolonged period of time.

6.2.3 Important Considerations for Researchers

Measures and self-presentation. Whilst this research elucidated societal mechanisms that influence resource appraisals, CV reactivity and performance, the research fails to identify the mechanisms behind the appraisal – CV reactivity relationship. Specifically, it is unknown whether any particular psychological constructs influence CV reactivity more than others (i.e. efficacy, control, approach focus, social support). Though this research helps confirm that there is a link between appraisal and CV response, previous research has found the link between appraisal and CV reactivity to be weak (Turner et al., 2013). To this end, research is necessary in identifying the mechanisms that link the two constructs, if this link exists. Further, within the thesis the measures used, though validated, were edited slightly to fit the context of the research. Also, the AGQ (Conroy et al., 2003; Turner et al., 2012) was shortened to a single item per subscale for brevity. Though this may be conducive to information being missed, the scale in this capacity has been individually validated and used extensively in previous research (Adie et al., 2008; Conroy et al., 2003; Turner et al., 2014). Self-presentation may contribute to the way in which an individual articulates appraisals of an event (Blascovich & Mendes, 2000). By this, individuals may adopt a particular strategy to mask true appraisals of an event to make a good impression, either consciously or unconsciously (Paunonen & LeBel, 2012). By being motivated to achieve to satisfy their own needs (self-enhancement, ego maintenance), it may not be the way in which a leader led that contributed to appraisal, but a defence mechanism in

preserving ego or enhancing the self. Perceived appraisals of an event may be misrepresented, holding the potential to lead to unexpected CV reactivity and performance. Speaking to this effect, it has been found that, based on facial expression, those who are physiologically threatened can look more confident than those who were challenged by a given scenario (Weisbuch et al., 2009). To this end, there is a possibility that questionnaire and CV data within this thesis are misrepresented as masked thoughts and feelings on approach to, and performance within competitive situations. However, in light of the research findings, given the combination of designs (cross-sectional, longitudinal, within and between group), and the consistency in results, these phenomena are unlikely to have affected the results.

Unconscious appraisal processes. What may have affected the results within the thesis is non-conscious appraisals. It has been posited that individuals make non-conscious demand or resource appraisals, either in conjunction or separately, arriving at a challenge or threat response, without conscious awareness (Blascovich & Mendes, 2000). Unconscious appraisals of events have been recognised within stress-based research (Lovallo, 2005). Considering this position, self-report data is likely to hold flaws as a result of a lack of conscious awareness of true appraisals (e.g. Ellsworth & Scherer, 2003). In explaining this process, Le Doux (1998) identifies that appraisals can, though not exclusively, occur without areas of the brain responsible for conscious processing, being attributed to later stages within our evolution. Appraisals of an event can occur before our conscious awareness of a scenario. Taking an evolutionary perspective, individuals detect and appraise stimuli unconsciously, leading to physiological activity, being pivotal for our survival in previous years. Because modern life is not conducive to life and death scenarios, individuals have become accustomed to reacting in this way to non-life-threatening stimuli, such as exams and interviews. As a result, it is likely that this unconscious appraisal process occurs in wake of important

competitive events. Le Doux (1998) notes that the amygdala, key within the activation of the pituitary and adrenal glands, and therefore challenge and threat responses, doesn't require conscious awareness and control to create a response. In this event, examination of thoughts is impossible, and that which triggered the stress response is less likely to be our conscious appraisal. With these findings, and the research within this thesis, there is scope to suggest that non-conscious CV reactivity can be influenced by non-conscious appraisals of perceived leadership and identification. In other words, leadership and identification may play a role in non-conscious appraisals and CV reactivity in followers (Study 3).

Contrary to this presentation, the lack of conscious awareness of true appraisals (e.g. Ellsworth & Scherer, 2003) may also translate to potential unconscious biases held. Although no clear evidence can be presented to likelihood of psychophysiological stress being manipulated by unconscious biases, the reaction to the task may have manipulated by the gender of the leader, and their tone of voice. Relatedly, previous researchers have identified that neighbourhood identification can directly influence how we react to our surroundings (Fong et al., 2019). Hence, it is not inadmissible that the perceived accent portrayed by the leader could have influenced how participants reacted to the competition. Equally, it has been found that perceptions of a leader can be influenced by their gender (Crites et al., 2015). Though minimized in the present research (presented via audio; Willis & Todorov, 2006), gender neutral names may be an avenue to avoid the effects of implicit biases.

Athlete leadership. Though identity leadership played a part within the appraisal and CV reactivity process, either consciously or non-consciously, laudable dynamics within a group have not been accounted for within this thesis. Although much of the research has noted the integral position of the coach, tending to be the one responsible for making decisions (Chelladurai & Riemer, 1998), athlete leadership has not been considered. Athlete leaders are an integral part within the social system that can influence the functioning of the

group as a whole (Cotterill & Fransen, 2016; Fransen et al., 2016; Loughead et al., 2006). Athlete leadership has been defined as 'an athlete, occupying a formal or informal role within a team, who influences a group of team members to achieve a common goal' (Loughead & Hardy, 2006, p. 144). Researchers have identified that athlete leaders, though informal relative to the coach (Fransen et al., 2015a), positively contribute towards interpersonal connections within a team (Fransen et al., 2015b) and team effectiveness (Fransen et al., 2017). Within Paralympic sport, good quality athlete leaders motivate, support, communicate with their group effectively, and organize gatherings to maintain and improve team cohesion (Caron et al., 2016). Within an experimental setting, findings align with Caron and colleagues' (2016) research, identifying that athlete leadership can positively influence intrinsic motivation, competence satisfaction and objective sports performance (Fransen et al., 2018). To affirm this influence, an athlete that does not fulfil their leadership role is likely going to have a detrimental effect on team confidence and performance (Apitzsch, 2009; Fransen et al., 2015). This reciprocal relationship is unsurprising, as findings evidence that leadership is spread across a group, whether formally or informally (Fransen et al., 2014). Though not being the scope of this thesis, there is benefit in identifying whether both coaches and athlete leaders are able to influence appraisal and CV reactivity of peers within ecologically valid settings, taking a holistic perspective on the dynamics of a group in influencing stress.

In summary, many laudable influences such as measurement, self-presentation, unconscious processes and athlete leadership are possible areas that could have influenced the results of this thesis. Although this is the case, again, given the consistency in findings across studies, the validated measures used, the variation in research design, and inclusion of non-conscious processes within the research, it is unlikely that many of these factors influenced the results. Within Chapters 2 and 3, unconsidered in this thesis, there may be scope to

identify how leadership across a group can influence stress related variables and performance. However, given that research has noted the informal nature of athlete leadership (Fransen et al., 2015a), and that the coach is usually the individual who makes decisions (Chelladurai & Riemer, 1998), it can be argued that the coach is an important and influential member of a group that defines how a group functions. To this end, it is likely that the coach has the greatest influence on the team.

6.3 Implications for practice

Overall, this thesis holds implications for leadership development programmes in anticipating stress responses, and measurement and management of responses to stressful situations. It is evidenced that identity-based leadership significantly associates with resource appraisals through elevated identification (relational and group). Further, over an athletic season, perceived identity leadership at the start of a season positively influences self-efficacy at the end of the season through relational identification. Accompanying this, social support also predicted performance satisfaction at the end of the season. The thesis also identifies that the acute enactment of identity leadership positively influences resource appraisals, CV responses and skilled motor performance. The acute enactment of identity leadership buffered against the negative effects of threatening instructions, noting that it is the person who delivers the instructions that is influential, not the instructions themselves (at least for psychological appraisal and performance). Lastly, measuring iterative appraisals, identity leadership may serve as a mechanism in influencing positive re-appraisals of an event, both before and within competition.

Because the thesis identified that perceived identity leadership is influential over the course of a season and within imminent sports and motor performance, future developments can benefit from improving leadership quality in order to maximise chances of improving

both stress reactivity and performance. By creating a cohesive environment through identity leadership development, interventions such as the 3R's (Haslam et al., 2011) and the 4R's (Slater et al., 2016) may serve to positively influence stress reactivity. Because of the efficacy of the acute enactment of the identity leadership principles, short-term interventions on language used prior to competition/important events with coaches can be utilised in order to improve stress reactivity and performance. To put it another way, the results of the thesis allow us to anticipate how an individual is likely to react to a stressful situation (based on the environment), and therefore make changes to the environment to improve stress reactivity and performance.

From the thesis researchers can: (1) anticipate reactions to scenarios based on perceptions of leadership and the environment; and (2) predict performance based on appraisals of an event (i.e., social support). However, part of this 'reaction' is measured through questionnaires (i.e. resource appraisals). Given the mentioned inherent problems with self-report data (e.g. the influence of unconscious processes), there is an inherent fallibility in the measurement of stress reactivity. Although the thesis enables anticipation of likely stress reactions, the self-report measurement of said reaction warrants enhancement. That said, it can be argued that the use of identity leadership manipulations, self-report and CV markers allowed for accurate predictions of reactivity and performance, decreasing the likelihood of self-presentation issues (Blascovich & Mendes, 2000). Triangulating these measurements did prove effective, given the consistency of the results of the thesis. To this end, the results imply that stress reactivity and performance can be anticipated through perceived identity leadership and the environment the group is in. Because of this, leadership interventions, both short and long term, can have positive effects on psychophysiological stress reactivity and performance within a variety of domains.

Significant identity leadership development programmes have proven efficacious in their utility. Models such as ASPIRe (Haslam et al., 2003; Peters et al., 2013) and the 5R's (Haslam et al., 2017) have been used within a variety of contexts (Haslam et al., 2017; Mertens et al., 2020; Reynolds et al., 2014). The 5R's, an extension of the ASPIRe model, notes the importance of readying, reflecting, representing, realising and reporting (Haslam et al., 2017). Prior to the start of the leadership training workshops, leaders are taken through a *readying* session, noting the importance of the group and social identity processes for leadership (Haslam et al., 2011; Haslam et al., 2017). From this, all involved (leaders and followers) engage in identity mapping (Cruwys et al., 2016), noting how many (sub)groups followers are members of (within the institution), *reflecting* on the nature of that relationship. Leaders can then identify everyone's subjective representations of key relations that structure their behaviour (Peters et al., 2013). The next phase, *representing*, addresses the voice of subgroups in opening articulation of goals and aspirations associated with the shared identity, identifying obstacles of these goals, and strategies to overcome obstacles to attain group goals. *Realizing* then explains the importance of shared identity for well-being, aiming to develop strategies to achieve shared goals. With the results of the thesis, this workshop would also elucidate the influence of group identification on psychophysiology and performance, realizing the positive effects shared motives can have. The final workshop is *reporting*, noting the importance of leaders obtaining feedback on progress towards (sub)group goals, embedding the objectives and lessons, holding the potential for iterations to the programme if necessary. By applying this intervention in either a sport or organisational setting, a shared social identity is likely to develop. Given that a social identity is influential within the stress process, interventions such as this may aid in the improvement of appraisals, CV reactivity and performance within competitive situations.

Another implication is related to the training of athletes and employees. Within Chapters 4 and 5, like Turner and colleagues' (2013) research, applied pressure testing was utilized, much like that of a real-world scenario. This was achieved by stating that the performance will be recorded, that there will be a league table, in rank order, sent to all participants to view, and that a lot of effort is required to perform well. By using these instructions, this technique may help an individual desensitize from the perceived pressure of the situation if repeated (Wolpe, 1973). By this, if the participants were repeatedly exposed to these threatening instructions when within a performance situation, they would acclimatise to the experience, unconsciously increasing resource appraisals and decreasing demand (e.g. uncertainty), thus improving challenge reactivity. Along with this, identity leadership buffered against the negative effects of ego-threatening instructions (i.e. pressure) on appraisal and performance. The perception of a leader can positively influence reactivity to a scenario, irrespective of how threatening the instructions are. In combining desensitization techniques and identity leadership interventions in anticipation of an event to improve challenge states, the positive effects of acclimatization may increase. To this end, it would be unsurprising if a leader of whom a follower identifies with applies pressure, a positive response will occur. To put it another way, desensitisation is likely to be effective in improving stress reactivity if the pressure is applied by a leader that the individual identifies with. From these anticipatory interventions, post CV measurement reappraisals of a scenario may also be affected as a result of identification with a leader. Identity leadership influenced iterative appraisals (Study 3), evidencing that the greater the enactment of identity leadership came greater consistency in performance. By extension, identity leadership interventions prior to competitive performance, alongside desensitisation, can improve both psychophysiological reactivity to, and reappraisal within, competitive situations. Regarding this re-appraisal, within applied settings, a coach tends to deliver talks immediately prior to

competition to direct athletes towards goal attainment (Haslam et al., 2011). From the research within the thesis, it would be recommended that coaches should deliver instructions to include both resource appraisals (Turner et al., 2014), as well as emphasize prototypicality, advancement, entrepreneurship and impresarioship (Haslam et al., 2011). In doing this, a follower is likely to be challenged by a competitive situation (appraisal and CV), perform better, and re-appraise situations positively come adversity.

Another implication within the findings relates to the components of the TCTSA (Jones et al., 2009). Specifically, previous research has identified that by devaluing the importance of a task, a challenge state is likely (Tomaka et al., 1997). However, a non-important event is unlikely to represent the reality of competitive situations. That is, telling an athlete that a league winning game is not important, but then to tell them to try their best is contradictory and unrealistic. Rather than the importance being the key to manipulating challenge and threat states, it is posited as being an individual's perceived ability to cope with the competitive situation (resource appraisals; Jones et al., 2009; Turner et al., 2014). Otherwise put, by manipulating appraisals through instruction, this had a knock-on effect on CV states (Turner et al., 2014). Turner and colleagues (2014) evidenced that challenge-based instructions, bolstering appraisals, induced challenge CV reactivity. Conversely, threat-based instructions induced threat CV reactivity. Given this relationship, and that importance of an event was not influenced (between challenge and threat conditions), this opened scope into identifying whether the person delivering the instructions can influence appraisal and CV reactivity. Extending these findings, the current thesis notes that it is the perception of the person delivering the instructions that informs appraisal, CV, and performance (Study 3). When a leader enacts the identity leadership principles (vs. not), appraisal, CV reactivity and performance is influenced. This finding is consistent with Turner and colleagues' (2014) work in that there were no clear differences in perceived importance of the competitive event

between low and high identity leadership instructional conditions. Therefore, inducing challenge states is possible by influencing the perception of the individual delivering the instructions. However, to elucidate the manipulation of resource appraisals through instruction, Study 4 identified interesting results on what it is that influences appraisal, CV, and performance. Findings identified that when instructions intentionally reduce resource appraisals but are delivered by a leader who enacts the identity principles, an individual is likely to positively appraise the given situation, performing better as a result. Rather than negatively influencing appraisal (see Turner et al., 2014), identity leadership buffered against this effect. It was identified that the instructions that manipulated resource appraisals (challenge vs. threat) were the ones that influenced CV reactivity. Yet, it was identity leadership that influenced appraisal and performance. Though inconsistent with Study 3, the argument can be made that identity leadership can induce challenge states, as well as buffer against negative influences of threat instructions, without influencing perceived importance.

Summarizing practical implications of the findings from this thesis, it is possible to anticipate how an individual is going to approach, and perform within, a competitive situation as a result of identification. In enhancing social identity as a result of identity leadership, interventions such as the 5R's (Haslam et al., 2017), alongside techniques such as desensitisation (Wolpe, 1973) are likely to positively influence stress reactivity. Further, the enactment of identity leadership, and resultant identification, positively influences both appraisals and re-appraisals of situations, advancing both identity leadership (Haslam et al., 2011) and stress theory (2009). Ever expanding theory, identity leadership also serves as a barrier against the negative effect of threatening instructions. From the combined findings, coaches and managers would benefit from delivering speeches that include both resource appraisals (Turner et al., 2014) as well as the identity leadership principles (Haslam et al., 2011).

6.4 Limitations

Despite the strengths of this thesis, including the variety and robustness of research methods and analyses, there are a few limitations. There are opportunities for future research to incorporate variables not considered within this thesis. Although informal within the dynamics of a group (Fransen et al., 2015a), athlete leaders and their influence on the stress process was not considered within this research. Research would have to evidence the influence of the group, including all leaders (formal and informal), on appraisal, CV reactivity and performance. On this, it would need to be identified to what extent leaders of different roles influence this process, whether coaches, or team captains for example are more prominent in influencing appraisal, CV reactivity and performance. However, given that research notes the integral role of coaches in the dynamics of a group (Chelladurai & Riemer, 1998), this thesis provides an important contribution to the inner workings of how a leader can influence both a group, and the responses of a group.

Another factor not considered within this thesis the exact mechanisms that activates CV reactivity. Specifically, the exact link between appraisal, endocrine, neurology, and CV reactivity remains uncertain. Without empirical investigation into this link, it is uncertain how identity leadership influences appraisal, CV reactivity and performance. Speaking to this, a clear link between challenge and threat states and performance is still uncertain. That said, the thesis identified that identity leadership can influence CV states, re-appraisal and subsequent performance. By implication, because of the increases in blood to the brain and muscles in a challenge state, it may be so that the increased cognitive capacity and function allows for higher order thoughts in the moment, thus being able to reappraise adaptively. Put another way, the inhibited blood flow to the brain and muscles within a threat state, hindering cognitive function, may be the reason for a lack of ability to reappraise positively in the moment, being maladaptive for performance.

A further limitation is the artificial nature of Chapters 4 and 5. Although the motor task replicated a real-life motor performance situation (i.e. ultimate frisbee), the stress response was artificially developed through instruction. That said, much of the previous research within challenge and threat has used instruction to elicit a stress response (Slater et al., 2018; Turner et al., 2014). Further, the participants exhibited HR consistent with task engagement, showing that the research represented a motivated performance situation to participants (Blascovich et al., 2004). The leader was also presented as a male (i.e., John). Perceptions of a leader can be influenced by their gender (Crites et al., 2015). As well as this, faces of the leader and team was not shown. This was done to intentionally reduce the influence of implicit biases and perceptions of both the leader and the team (Willis & Todorov, 2006), which is typical practice within challenge and threat research (Turner et al., 2014). The identity leadership manipulations were also explicit (high vs. low) and therefore challenged ecological validity. Having said that, these manipulations aligned with typical research convention in assessing two polarized constructs (e.g., high vs. low relational identification; Slater et al., 2018), and aligned with the four theorized identity leadership principles (Haslam et al., 2011). Given that the manipulations elicited group identification (i.e., via the manipulation check) without introducing potential confounds such as faces of other team members (i.e., initial impressions; Willis & Todorov, 2006), the data can be interpreted without the influence of undue extraneous variables. Also, with utilising data from sports teams both cross-sectionally and longitudinally, it was identified that identity leadership influenced appraisal and performance within an ecologically valid setting. Critically, current findings of the thesis note the influence of identity leadership in both an ecologically valid setting as well as within an artificial environment, though this replicated a real-life performance scenario.

Another possible limitation is the use of self-report data. Given that challenge and threat CV responses do not need conscious awareness to occur (Le Doux, 1998), the conscious appraisal process is inherently fallible, potentially misrepresenting true appraisals of an event (e.g. Ellsworth & Scherer, 2003). Though unconscious appraisals may have influenced the results, it was identified that iterative appraisals, whether conscious or not, influenced skilled motor performance. By extension, there is potential that identity leadership influenced non-conscious appraisal processes. Further, given the Cronbach's alpha coefficients within the self-report data (i.e., self-efficacy) for Study 2 were poor, it begs to question the use of conscious appraisals as a measure of resources. Research will benefit from identifying whether identity leadership can influence unconscious appraisals of scenarios (e.g. Lovallo, 2005), and thus CV reactivity and performance. In addition, Study 4, although adequate power analyses were conducted, the study could have been statistically underpowered to identify significant differences in CV responses between identity leadership conditions, being inconsistent with Study 3 (Field, 2017). Therefore, investigation with larger samples could be conducted to address this limitation.

Overall, this thesis represents a significant step forward in the understanding of identity leadership, challenge and threat states, the manipulation of these states, and performance (sports and skilled motor). The results presented could be strengthened with mentioned limitations, especially so within the athlete leadership domain. More research is needed to detail the leadership dynamics of a full group, and how this as a whole can influence resource appraisals, challenge and threat states and performance. The current research provides a foundation for the notion that societal mechanisms such as leadership can influence stress reactivity and performance, being a basis for future research to build on.

6.5 Future Research Directions

The current research poses questions that could be answered with future research. Research query into identifying the mechanisms through which identification increases resource appraisals, cardiovascular reactivity and motor performance is necessary. By this, what is it about an emotional investment within a group that harnesses positive appraisal, CV reactivity and performance. Though it is understood that identity leadership can influence psychophysiological reactivity to stress, it is uncertain as to what other mechanisms identity leadership can influence. Though beyond the scope of this thesis, neurological assessment as well as blood and urine sampling will provide a holistic perspective on the overall influence of identity leadership. On the topic of measurement, though it was identified that psychological appraisals were in line with CV states, the best way to measure psychological states may yet be undiscovered. Noting the influence of unconscious appraisals on performance within this thesis, expansion is necessary to identify how to measure subliminal appraisal of events. In this thesis, a shot by shot analysis inferred the presence of iterative appraisals (Blascovich & Mendes, 2000). Though this identified that appraisals may change during competition, future research may want to apply systematic procedures to measure (re)appraisal. One such way is to measure CV data both prior to, and during a task. By measuring CV data shot by shot (e.g. on the ring toss task), momentary changes in CV can be seen. Taking the link between appraisal and CV as proposed by theory (Jones et al., 2009), seeing changes in CV shot by shot would show whether appraisals change in the moment. Adding weight to this argument, given that appraisals and CV reactivity can occur non-consciously (Le Doux, 1998), non-conscious assessment of appraisal seems a fruitful way forward.

Non-conscious appraisals may seem an important research avenue, and adding to previous testament, there are a few ways to minimize potential non-conscious biases and appraisals. By utilizing audio scripts with either male and female dialects (the participants'

choice), providing gender neutral names for such scripts, and presenting in a neutral tone, may reduce implicit biases that can influence reactivity (Crites et al., 2015; Fong et al., 2019; Willis & Todorov, 2006). Having said that, the research did identify changes in appraisal as a result of identity leadership, leading to expected CV reactivity and motor performance. Future research warrants qualitative investigation to detail the mechanisms through which emotional connections with a group and or a leader influence appraisal. By this, subjective accounts of the reason behind this increase in adaptive appraisal is necessary for well-being and performance excellence. Recent research has also evidenced the positive effects of challenge CV states on performance within real world performance situations (Dixon et al., 2019). With Study 1 and 2 finding that identity leadership influenced appraisal, it can only be inferred that identity leadership had a positive effect on CV reactivity (Jones et al., 2009). On this basis, future research may want to identify whether identity leadership influences appraisal, CV states and performance within ecologically valid settings. Further, the current research (Study 3) identified that those who were in the high identity leadership condition, yet were physiologically threatened and performed worse, reported lower levels of control than those who were physiologically challenged and performed better. Based on this finding, future research should investigate the importance of each of the resource appraisals in predicting CV reactivity. In this instance, manipulating control alone may serve as a prerequisite to CV responses and performance, which is a worthwhile avenue of investigation. Dixon and colleagues (2019) also used blunted CV responses (less than 2 HR_{bpm} change from baseline) within their research. This strategy warrants investigation into whether identity leadership improves both the likelihood of a challenge state and reduces chances of both a blunted and threat state. Within Study 4, no interactions between identity leadership (high vs. low) and challenge and threat instructions were found within psychological, physiological or performance parameters. This may have been due to the study

being underpowered (though unlikely). Given Study 3 utilized 80 participants twice, meaningful between-groups comparisons may not be possible with 30 participants in either condition (Study 4). Speaking to the relationship between instruction and dependent variables, the mechanisms behind the appraisal – CV relationship is uncertain.

Specifically, it is unknown what it is about self-efficacy, perceived control and approach focus that influences SAM activation, and suppresses PAC activation. From the current research it can be claimed that the appraisal-CV link is apparent, though what links them is not clear. Research may want to endeavour in delineating the mechanisms through which appraisal, conscious or not, influences physiological reactivity. This can be achieved through moment by moment CV measurement and ethnography on feelings during competitive performance. By noting when athletes feel confident (or not), may show when the participant is challenged (or threatened relative to baseline). Yet, factors including non-conscious appraisals (Le Doux, 1998) may prove influential and needs be accounted for. In noting the fallibility in CV measurement, future research should evidence when CV reactivity starts to influence performance (i.e. hysteresis; Fazey & Hardy, 1988). As projected in theory (Jones et al., 2009), an increase in TPR, alongside a stabilization or decrease in CO categorizes a threat state. At what point does an increase in TPR (e.g. $30_{dynes/cm\text{-}5}$), along with a stabilization in CO (l/min) influence performance. By this, an increase of $20_{dynes/cm\text{-}5}$, and a decrease of $.2_{l/min}$ may not be enough to negatively influence performance, where $30_{dynes/cm\text{-}5}$ and a decrease of $.3_{l/min}$ may be. Though this point of change is subjective and contextual, identifying a figure for this would be fruitful. Dixon and colleagues (2019) used HR ($< 2_{bpm}$) to determine a blunted response (no clear reaction to a stressor). By defining cut off points in HR, CO and TPR, challenge, threat and blunted CV indicators can be made clearer.

Another worthy avenue for research is within identity leadership interventions (5R's; Haslam et al., 2017). Longitudinal identity leadership interventions have proved influential

for mobilization of efforts within elite athletes (Slater & Barker, 2019). By utilizing pre-existing identity leadership development interventions, research could identify whether these interventions serve to positively influence follower appraisals, CV reactivity to, and performance within, competitive events. Further, shared identity content (i.e. the meanings behind social identification; Reicher, 1984; Turner, 1999) has also proven influential for follower mobilization of efforts (Slater et al., 2019). Research should endeavor to identify whether congruence in shared identity content (vs. non-shared) serves to influence follower appraisal, CV reactivity and performance. Only three studies have examined identity content in sport (Barker et al., 2014; Evans et al., 2013; Slater et al., 2019). The identity contents prevalent that athletes associate with are friendship and results identity content. When an athlete identifies with a group, the reason behind this identification tends to be a result of the sharedness of values, which are likely to be whether the team is results (i.e., drive to win), or friendship (i.e., aim for harmony) focused (Barker et al., 2014; Evans et al., 2013; Slater et al., 2019). Thus, the sharedness of identity content may serve as an antecedent to stress responses and performance, especially so given that shared identity content has been found to influence mobilization and performance in athletes (Slater et al., 2019). Though the scope of the thesis sits within coach-level leadership, athlete leadership is a worthwhile research consideration. By considering the influence of the whole group, including formal (i.e. coach) and informal (i.e. athlete, team captain) leaders, a holistic picture can be painted on the influence of the broader social group on psychological, physiological and performance parameters. Adding to this, it is uncertain whether identity leadership parameters can influence appraisals, CV, and performance within younger age groups. Without a validated measure of identity leadership within younger populations, a complete demographic of individuals is missed. Given that childhood sport is a significant context for identity leadership to develop, future research may want to; 1) develop a measure of identity

leadership within child populations, and 2) identify how identity leadership within a young population influences appraisal, CV reactivity and performance. Lastly, it is possible that, by using a transformational framework (Differentiated Transformational Leadership Inventory; Vella et al., 2012), similar results may have occurred. By this, there is significant cross over between identity leadership and transformational leadership regarding both a) principles, and b) positive outcomes. To this end, though a positive association between identity leadership and psychophysiology has been evidenced, future research may want to identify whether transformational leadership can serve a similar purpose. Without knowing this, it cannot be definitively evidenced that identity leadership is a separate construct that produces dissimilar results to transformational leadership. Overall, there is a broad scope of research opportunities that come from this thesis that will expand knowledge of social constructs, in particular leadership, as part of the stress process.

6.6 Conclusion

This thesis provides a novel contribution to both identity leadership and challenge and threat literature. For the first time, this thesis identifies that identity leadership positively influences resource appraisals through leader and therefore group level identification. In particular, the enactment of identity leadership was found to positively influence self-efficacy, control, approach focus, avoidant focus, and social support through improving group members' emotional connection with a leader, in turn improving emotional connections with the team. This thesis also shows that identity leadership positively influences resource appraisals across a season through relational identification. Over time, the enactment of identity leadership fosters emotional connections between a leader and follower, in turn improving self-efficacy. Atemporally, perceptions of identity leadership improves follower emotional connection to the leader, and therefore with a group. However, over time

identity leadership helps foster dyadic relationships, which in turn improve appraisals of an event. Additionally, perceived social support over time positively associated with performance satisfaction across an athletic season. Introducing hemodynamic CV markers, this thesis identified that the enactment of identity leadership positively influenced resource appraisals, cardiovascular challenge states and motor performance. This thesis also identified that identity leadership buffers against threat inducing instructions, being adaptive for appraisal and performance. By utilizing a variety of research designs (i.e., cross-sectional, longitudinal, within groups experiment, between groups experiment), both within ecological and contextually valid environments, researchers can be confident in the results of these studies. Overall, the research offers practitioners scope to promote identity leadership (via development programmes) in improving follower appraisal, CV reactivity and performance within competitive events. Simply, by improving perceived identity leadership within a group, there is likely to be an enhancement in performance through improvements in resource appraisals and CV reactivity. This thesis also found that identity leadership may serve as an important role in influencing non-conscious appraisals of events, being an avenue for future research. Another key direction for future research is to identify the influence of the wider social group (e.g. athlete leaders) in influencing appraisal, CV reactivity and motor performance. In summary, this thesis has made an original and significant contribution to the understanding of how societal mechanisms can influence stress and performance, noting the integral position of a leader in contributing to this process. With this influence being congruent across psychological, physiological and performance parameters, the influence of a leader can be considered a significant contributor towards the human stress process.

6.7 The PhD Journey

Having concluded the PhD, here I have dedicated a section on my PhD journey reflecting on some of the lessons learned in actioning just a feat.

Start from the beginning. One of the first things I did at the start of my PhD was read some seminal work in leadership and stress. Having read that, I then read slightly newer work. I repeated this process until I got to the studies I conducted. These, to me, progressed like a story, adding complexity as literature progressed. It was easy to get bogged down in all the detail of the research conducted, but this is when I made my second realization.

Mulling things over. There was no way I was going to be able to incorporate all perspectives I read about. This is when I sat back and thought, 'what's the best next step?'. In the realms of identity leadership and stress, there had been little to no empirical investigation to combine these constructs in sport. My task was to identify the best way to understand these associations. It took a while to get to a stage where I was happy with a plan to understand the associations between the two largely disconnected constructs, and this is okay. The point here was to take some time to make sure there is a clear rationale for the study, and to know the take home message. However, once I got to the stage of data collection for my first Study, its then a matter of getting the data. I hadn't conducted this type of research before, with this many participants, how was I going to do it? This is where the next lesson comes in.

Self-discipline. Throughout the data collection process I quickly learned that there isn't many people that want to fill in surveys, or take part in experiments. I am lucky enough to have a significant network of sports contacts that were able to support my research. However, when reaching out to those I did not know, my luck ran out. I had to keep on pushing for data collection from all that I could. This same discipline can be said for the write up of the thesis. A diary for when you will dedicate time to write is key, or at least it was for me. I work better when I have a large amount of time to write, I struggle with short bursts of time. Because I

know how I operate, it made it clear how I was going to finish this in a timely manner. So, after all this, I've been super disciplined, I've read what I needed to, I've taken time to reflect, I've collected loads of data, and I've dedicated enough writing time, a perfect, timely PhD right? Wrong.

Be ready to be questioned. I went to an international conference, ready and prepared to present my findings to some of the most well-known academics in the field. After presenting, I got questioned on my approach, analysis, and take-home message. My responses were less than ideal in my opinion. Though after taking on board some of the points made at the conference, it helped develop a better all-round thesis. The point here then is to, if possible, speak to people about the work you've done. The questions you get asked may help.

In hindsight, a PhD would be best accomplished, in my opinion, if you; a) read all that you can on the topic, b) take your time and speak to people about your intentions, and c) commit to the PhD knowing that this is something that will take a long time to complete.

Thank you.

REFERENCES

Abbott, A. (2001). *Chaos of disciplines*. Chicago: The University of Chicago Press.

Adachi, P., & Willoughby, T. (2015). Interpreting effect sizes when controlling for stability effects in longitudinal autoregressive models: Implications for psychological science. *European Journal of Developmental Psychology*, *12*(1), 116-128. https://doi.org/10.1080/17405629.2014.963549

Adie, J. W., Duda, J. L., & Ntoumanis, N. (2008). Achievement goals, competition appraisals, and the psychological and emotional welfare of sport participants. *Journal of Sport and Exercise Psychology*, *30*(3), 302-322. https://doi.org/10.1123/jsep.30.3.302

Adie, J. W., & Jowett, S. (2010). Meta-perceptions of the coach–athlete relationship, achievement goals, and intrinsic motivation among sport participants. *Journal of Applied Social Psychology*, *40*(11), 2750-2773.

Adarves-Yorno, I., Postmes, T., & Haslam, S. A. (2006). Social identity and the recognition of creativity in groups. *British Journal of Social Psychology, 45,* 479-497.

Ali, H., & Chowdhury, M. F. (2015). Positivism in understanding the contemporary social world: A critical discussion. *Journal of Studies in Social Sciences*, *11*(2), 215-232.

Aliyu, A. A., Bello, M. U., Kasim, R., & Martin, D. (2014). Positivist and non-positivist paradigm in social science research: Conflicting paradigms or perfect partners. *Journal of Management and Sustainability*, *4*, 79-95.

Allred, K. D., & Smith, T. W. (1989). The hardy personality: Cognitive and physiological responses to evaluative threat. *Journal of Personality and Social Psychology, 56*, (2), 257-266. doi:10.1037/0022-3514.56.2

Alter, A. L., Aronson, J., Darley, J. M., Rodriguez, C., & Ruble, D. N. (2010). Rising to the threat: Reducing stereotype threat by reframing the threat as a challenge. *Journal of Experimental Social Psychology, 46*, (1), 166-171. doi:10.1016/j.jesp.2009.09.01

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of educational psychology*, *80*(3), 260.

Antonakis, J., & Day, D. V. (Eds.). (2017). *The nature of leadership*. Sage publications.

Apitzsch, E. (2009). A case study of a collapsing handball team. In S. Jern & J. Näslund (Eds.), *Dynamics within and outside the lab* (pp. 35–52). Linköping: LiU-Tryck.

Arnold, R., Edwards, T., & Rees, T. (2018). Organizational stressors, social support, and implications for subjective performance in high-level sport. *Psychology of Sport and Exercise*, *39*, 204-212.

Averill, J. R. (1973). Personal control over aversive stimuli and its relationship to stress. *Psychological Bulletin, 80*, 286-303.

Balkundi, P., & Kilduff, M. (2006). The ties that lead: A social network approach to leadership. *The leadership quarterly*, *17*(4), 419-439.

Bandura, A. (2006). Guide for constructing self-efficacy scales. *Self-efficacy beliefs of adolescents*, *5*(1), 307-337.

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of social and clinical psychology*, *4*(3), 359-373.

Barker, J. B., Evans, A. L., Coffee, P., Slater, M. J., & McCarthy, P. J. (2014). Consulting on tour: A dual-phase personal-disclosure mutual-sharing intervention and group functioning in elite youth cricket. *The Sport Psychologist*, *28*(2), 186-197.

Barreto, N. B., & Hogg, M. A. (2018). Influence and leadership in small groups: Impact of group prototypicality, social status, and task competence. *Journal of Theoretical Social Psychology*, *2*(1), 26-33.

Bass, B. M. (1985). *Leadership and performance beyond expectations.* New York: Free Press.

Bass, B. M. (2008). *The Bass handbook of leadership: Theory, research, & managerial applications* (4th ed.). New York, NY: Free Press.

Bass, B. M. (1990). From transactional to transformational leadership: Learning to share the vision. *Organizational dynamics*, *18*(3), 19-31.

Bass, B. M. (1985). Leadership: Good, better, best. *Organizational Dynamics*, *13*(3), 26–40. https://doi.org/10.1016/0090-2616(85)90028-2

Bass, B. M., & Avolio, B. J. (1990). Developing transformational leadership: 1992 and beyond. *Journal of European industrial training*, *14*(5). https://doi.org/10.1108/03090599010135122

Beard, G. (1869). Neurasthenia, or nervous exhaustion. *The Boston Medical and Surgical Journal*, *80*, 217-221.

Behnke, M., & Kaczmarek, L. D. (2018). Successful performance and cardiovascular markers of challenge and threat: A meta-analysis. *International Journal of Psychophysiology*, *130*, 73-79.

Bennis, W. G., & Thomas, R. J. (2002). Crucibles of leadership. *Harvard business review*, *80*, 39-45.

Berry, W. D., Feldman, S., & Stanley Feldman, D. (1985). *Multiple regression in practice* (No. 50). Sage.

Biddle, S. J. H., Hanrahan, S. J., & Sellars, C. N. (2001). *Attributions: Past, present, and future*. In R. N. Singer, H. A. Hausenblas, & C. M. Janelle (Eds.), Handbook of sport psychology (pp. 444_471). Chichester: Wiley.

Biddle, S. J.H., Wang, C. K.J., Kavussanu, M. and Spray, C. M. (2003). Correlates of achievement goal orientations in physical activity: A systematic review of research. *European Journal of Sport Science*, *3*, 1–20.

Billings, A. G., & Moos, R. H. (1981). The role of coping responses and social resources in attenuating the stress of life events. *Journal of Behavioral Medicine*, *4*(2), 139-157. https://doi.org/10.1007/BF00844267

Blascovich, J., & Katkin, E. S. (1993). *Cardiovascular reactivity to psychological stress and disease.* Washington, DC: American Psychological Association

Blascovich, J., & Mendes, W. B. (2000). Challenge and threat appraisals: The role of affective cues. *Feeling and Thinking: The Role of Affect in Social Cognition*. Studies in Emotion and Social Interaction, Second Series. https://doi.org/10.4324/9780203888148.ch25

Blascovich, J., Mendes, W. B., Tomaka, J., Salomon, K., & Seery, M. (2003). The robust nature of the biopsychosocial model challenge and threat: A reply to Wright and Kirby. *Personality and Social Psychology Review*, *7*(3), 234-243.

Blascovich, J., Mendes, W. B., Vanman, E., & Dickerson, S. (2011). *Social Psychophysiology for Social and Personality Psychology*. London: Sage.

Blascovich, J., Seery, M. D., Mugridge, C. A., Norris, R. K., & Weisbuch, M. (2004). Predicting athletic performance from cardiovascular indexes of challenge and threat. *Journal of Experimental Social Psychology, 40*, 683-688.

Blascovich, J., & Tomaka, J. (1996). The Biopsychosocial Model of Arousal Regulation. *Advances in Experimental Social Psychology*, *28*, 1–51. https://doi.org/10.1016/S0065-2601(08)60235-X

Boen, F., Vanbeselaere, N., Pandelaere, M., Schutters, K., & Rowe, P. (2008). When your team is not really your team anymore: Identification with a merged basketball club. *Journal of Applied Sport Psychology, 20*(2), 165-183. doi.org/10.1080/10413200701805711.

Bono, J. E., & Judge, T. A. (2004). Personality and transformational and transactional leadership: a meta-analysis. *Journal of applied psychology*, *89*(5), 901-910.

Borgatta, E. F., Bales, R. F., & Couch, A. S. (1954). Some Findings Relevant to the Great Man Theory of Leadership. *American Sociological Review, 19*(6), 755–759. https://doi.org/10.2307/2087923

Bracha, H. S., Ralston, T. C., Matsukawa, J. M., Williams, A. E., & Bracha, A. S. (2004). Does "fight or flight" need updating? *Psychosomatics*, *45*, (5), 448-449.

Branscombe, N. R., Ellemers, N., Spears, R., & Doosje, B. (1999). The context and content of social identity threat. In N. Ellemers, R. Spears, & B. Doosje (Eds.), *Social identity: Context, commitment, content*, (pp. 35-58). Oxford: Blackwell.

Brewer, B. W., van Raalte, J., & Linder, D. E. (1993). Athletic identity: Hercules' muscles or Achilles heel? *International Journal of Sport Psychology, 24,* 237-254.

Bryant, A. (2012). *Social research methods* (4th ed.). Oxford: Oxford University Press.

Brimmell, J., Parker, J., Wilson, M. R., Vine, S. J., & Moore, L. J. (2019). Challenge and threat states, performance, and attentional control during a pressurized soccer penalty task. *Sport, Exercise, and Performance Psychology*, *8*(1), 63-79.

Brockner, J., Wiesenfeld, B. M., Reed, T., Grover, S., & Martin, C. (1993). Interactive effect of job content and context on the reactions of layoff survivors. *Journal of personality and social psychology*, *64*(2), 187-197.

Burns, J. M. (1978). *Leadership.* New York: Harper & Row.

Bynum, W. F. (1993). Nosology. In Bynum. W. F., & Porter, R. (Eds). *Companion Encyclopaedia of the History of Medicine* (pp. 335-358). London: Routledge.

Calmeiro, L., Tenenbaum, G., & Eccles, D. W. (2014). Managing pressure: patterns of appraisals and coping strategies of non-elite and elite athletes during competition. *Journal of Sports Sciences*, *32*(19), 1813-1820. https://doi.org/10.1080/02640414.2014.922692

Cannon, W. B. (1915). *Bodily changes in pain, hunger, fear and rage: An account of recent researches into the function of emotional excitement*. Appleton: Century-Crofts. 186

Cannon, W. B. (1929a). *Bodily changes in pain, hunger, fear, and rage*. New York: Appleton-Century-Crofts.

Cannon, W. B. (1929b). Organization for physiological homeostasis. *Physiological reviews*, *9*(3), 399-431.

Cannon, W. B. (1939). The wisdom of the body (2nd edition.). New York: W. W. Norton.

Caron, J. G., Bloom, G. A., Loughead, T. M., & Hoffmann, M. D. (2016). Paralympic Athlete Leaders' Perceptions of Leadership and Cohesion. *Journal of Sport Behavior, 39*(3), 219-238.

Carruthers, M. (1981). Field studies: Emotion and beta-blockade. In M. J. Christie & P. G. Mellett (Eds.), *Foundations of psychosomatics* (pp. 223–241). Chichester, England: Wiley.

Cartwright, D., & Zander, A. (1960). Leadership and group performance: Introduction. In D. Cartwright & A. Zander (Eds.), *Group dynamics: Research and theory* (2nd ed., pp. 487-510). New York: Harper & Row.

Cavanaugh, M. A., Boswell, W. R., Roehling, M. V., & Boudreau, J. W. (2000). An empirical examination of self-reported work stress among U.S. managers. *The Journal of Applied Psychology, 85,* 65–74.

Cerasoli, C. P., Nicklin, J. M., & Ford, M. T. (2014). Intrinsic motivation and extrinsic incentives jointly predict performance: A 40-year meta-analysis. *Psychological Bulletin*, *140*(4), 980–1008. https://doi.org/10.1037/a0035661

Chadha, N. J., Turner, M. J., & Slater, M. J. (2019). Investigating irrational beliefs, cognitive appraisals, challenge and threat, and affective states in golfers approaching competitive situations. *Frontiers in Psychology, 10.* https://doi.org/10.3389/fpsyg.2019.02295

Charness, G., Gneezy, U., & Kuhn, M. A. (2012). Experimental methods: Between-subject and within-subject design. *Journal of Economic Behavior & Organization*, *81*(1), 1-8. https://doi.org/10.1016/j.jebo.2011.08.009

Chelladurai, P. (1993). Leadership. In R.N. Singer, M. Murphy, & L.K. Tennant (Eds.). *Handbook of research on sport psychology* (pp. 647-671). New York: Macmillian.

Chelladurai, P., & Riemer, H. A. (1998). Measurement of leadership in sport. *Advances in sport and exercise psychology measurement*, 227-253.

Chemers, M. (2014). *An integrative theory of leadership*. Psychology Press.

Chou, C. P., Bentler, P. M., & Satorra, A. (1991). Scaled test statistics and robust standard errors for non-normal data in covariance structure analysis: a Monte Carlo study. *British Journal of Mathematical and Statistical Psychology*, *44*(2), 347-357. https://doi.org/10.1111/j.2044-8317.1991.tb00966.x

Cicero, L., Pierro, A., & van Knippenberg, D. (2007). Leader group prototypicality and job satisfaction: The moderating role of job stress and team identification. *Group Dynamics: Theory, Research, and Practice*, *11*(3), 165-175.

Cohen, S., Gotlieb, B. H., & Underwood, L. G. (2000). Social Relationships and Health. *Social Support Measurement and Intervention: A Guide for Health and Social Scientists*. https://doi.org/10.1016/0277-9536(92)90365-W

Conger, J. A. (2011). Charismatic leadership. In A. Bryman, D. Collinson, K. Grint, B. Jackson & M. Uhl-Bien (Eds.), *The SAGE handbook of leadership* (pp. 86-102). Thousand Oaks, CA: Sage.

Conroy, D. E., Elliot, A. J., & Hofer, S. M. (2003). A 2× 2 achievement goals questionnaire for sport: Evidence for factorial invariance, temporal stability, and external validity. *Journal of sport and Exercise psychology*, *25*(4), 456-476.

Costa, P. T., & McCrae, R. R. (1992). Four ways five factors are basic. *Personality and individual differences*,*13*(6), 653-665.

Cotterill, S. T., & Fransen, K. (2016). Athlete leadership in sport teams: Current understanding and future directions. *International Review of Sport and Exercise Psychology*, *9*(1), 116-133.

Cox, T. (1978). *Stress*. MacMillan, London.

Crawford, E. R., LePine, J.A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *The Journal of Applied Psychology, 95*, 834–848.

Cregan, C., Bartram, T., & Stanton, P. (2009). Union organizing as a mobilizing strategy: The impact of social identity and transformational leadership on the collectivism of union members. *British Journal of Industrial Relations, 47* (4), 701-722. doi: 10.1111/j.1467-8543.2009.00733.x

Crites, S. N., Dickson, K. E., & Lorenz, A. (2015). Nurturing gender stereotypes in the face of experience: A study of leader gender, leadership style, and satisfaction. *Journal of Organizational Culture, Communications and Conflict*, *19*(1), 1-23.

Crust, L., & Azadi, K. (2009). Leadership preferences of mentally tough athletes. *Personality and Individual Differences, 47*, 326-330.

Cruwys, T., Haslam, S. A., Dingle, G. A., Haslam, C., & Jetten, J. (2014). Depression and social identity: An integrative review. *Personality and Social Psychology Review*, *18*(3), 215-238. https://doi.org/10.1177/1088868314523839

Cruwys, T., Steffens, N. K., Haslam, S. A., Haslam, C., Jetten, J., & Dingle, G. A. (2016). Social Identity Mapping: A procedure for visual representation and assessment of subjective multiple group memberships. *British Journal of Social Psychology*, *55*(4), 613-642.

Currie, G., & Lockett, A. (2007). A critique of transformational leadership: Moral, professional and contingent dimensions of leadership within public services

organizations. *Human Relations*, *60*(2), 341–370. https://doi.org/10.1177/0018726707075884

Cutrona, C. E., & Russell, D. W. (1990). Type of social support and specific stress: Toward a theory of optimal matching. In B. R.Sarason, I. G. Sarason, & G. R. Pierce, (Eds.), *Social support: An Interactional View* (pp. 319–361). England: Wiley. https://doi.org/10.1177/009365092019002002

De Cremer, D., & van Vugt, M. (1999). Social identification effects in social dilemmas: A transformation of motives. *European Journal of Social Psychology, 29* (7), 871-893.

De Vries, M. K., & Engellau, E. (2010). A clinical approach to the dynamics of leadership and executive transformation. *Handbook of leadership theory and practice*, 183-222.

Denson, T. F., Spanovic, M., & Miller, N. (2009). Cognitive appraisals and emotions predict cortisol and immune responses: A meta-analysis of acute laboratory social stressors and emotion inductions. *Psychological Bulletin, 135*, 823-853.

Dickerson, S. S., & Kemeny, M. E. (2004). Acute stressors and cortisol responses: A theoretical integration and synthesis of laboratory research. *Psychological Bulletin, 130*, 355-391

Dienstbier, R. A. (1989). Arousal and physiological toughness: Implications for mental and physical health. *Psychological Review, 96*, 84-100.

Dienstbier, R. A. (1992). Mutual impacts of toughening on crises and losses. Faculty Publications: Department of Psychology, University of Nebraska-Lincoln.

Dinh, J. E., Lord, R. G., Gardner, W. L., Meuser, J. D., Liden, R. C., & Hu, J. (2014). Leadership theory and research in the new millennium: Current theoretical trends and changing perspectives. *The Leadership Quarterly, 25*, 36-62.

Dixon, M., & Turner, M. J. (2018). Stress appraisals of UK soccer academy coaches: An interpretative phenomenological analysis. *Qualitative Research in Sport, Exercise and Health*, *10*, 620-634.

Dixon, M., Turner, M. J., & Gillman, J. (2017). Examining the relationships between challenge and threat cognitive appraisals and coaching behaviours in football coaches. *Journal of sports sciences*, *35*(24), 2446-2452.

Doublet, S. (2000). *The Stress Myth*. Chesterfield, MO: Science & Humanities Press.

Duda, J. L., & Hall, H. (2001). Achievement goal theory in sport. In R. N. Singer, H. A. Hausenblas, & C. M. Janelle (Eds.), *Handbook of Sport Psychology* (pp. 290-318). New York, NY: John Wiley.

Duda, J. L., & Nicholls, J. G. (1992). Dimensions of achievement motivation in schoolwork and sport. *Journal of educational psychology*, *84*, 290-299.

Dweck, C. (1986). Motivational processes affecting learning. *American Psychologist, 41,* 1040-1048.

Dweck, C., & Bempechat, J. (1983). *Children's theories of intelligence: Consequences from learning.* In S. Paris, G. Olsen, & H. Stevenson (Eds.), Learning and motivation in the classroom (pp. 239-256). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Elliot, A., J. (1999) Approach and avoidance motivation and achievement goals*, Educational Psychologist, 34*, 169-189.

Elliot, A. J., & Harackiewicz, J. M. (1994). Goal setting, achievement orientation, and intrinsic motivation: A mediational analysis. *Journal of personality and social psychology*, *66*, 968-980.

Elliot, A. J., Murayama, K., & Pekrun, R. (2011). A 3× 2 achievement goal model. *Journal of Educational Psychology*, *103*(3), 632-648.

Ellis, A. (1957). Rational psychotherapy and individual psychology. *Journal of Individual Psychology*, *13*, 38-44.

Ellsworth, P. C., & Scherer, K. R. (2003). Appraisal processes in emotion. In R. J. Davidson, H. Goldsmith, & K. R. Scherer (Eds.), *Handbook of affective sciences*. New York and Oxford: Oxford University Press.

Euler, U. V., & Lishajko, F. (1961). Improved technique for the fluorimetric estimation of catecholamines. *Acta Physiologica Scandinavica*, *51*(4), 348-356.

Evans, A. L., Slater, M. J., & Edwards, M. (2021). The effects of embedding social identities on perceived leadership outcomes and the intentional mobilization of group members. *Psychology of Sport and Exercise*, *53*, 101879.

Evans, A. L., Turner, M. J., Pickering, R., & Powditch, R. (2018). The effects of rational and irrational coach team talks on the cognitive appraisal and achievement goal orientation of varsity football athletes. *International Journal of Sports Science & Coaching*, *13*(3), 431-438. https://doi.org/10.1177/1747954118771183

Fazey, J. A., & Hardy, L. (1988). The inverted-U hypothesis: A catastrophe for sport psychology. *British Association of Sports Sciences Monograph 1*. Leeds: The National Coaching Foundation.

Feeney, B. C., & Collins, N. L. (2014). A theoretical perspective on the importance of social connections for thriving. In M. Mikulincer & P. R. Shaver (Eds.), *The Herzliya series on personality and social psychology. Mechanisms of social connection: From brain to group* (pp. 291-314). Washington, DC, US: American Psychological Association. http://dx.doi.org/10.1037/14250-017

Feinberg, J. M., & Aiello, J. R. (2010). The effect of challenge and threat appraisals under evaluative presence. *Journal of Applied Social Psychology, 40*, (8), 2071-2104. doi:10.1111/j.1559-1816.2010.00651.x

Fiedler, F. E. (1967). A theory of leadership effectiveness. New York: McGraw-Hill

Fiedler, F. E. (1993). The leadership situation and the black box in contingency theories. In M. M. Chemers & R. Ayman (Eds.), *Leadership, theory, and research: Perspectives and directions* (pp. 1-28). New York: Academic Press.

Field, A. (2017). *Discovering statistics using IBM SPSS Statistics (5th edition)*. London: SAGE Publications Ltd.

Fitzhugh, W. W., Rossabi, M., & Honeychurch, W. (Eds.). (2009). *Genghis Khan and the Mongol empire*. Genghis Khan Exhibits.

Fletcher, D., & Arnold, R. (2011). A qualitative study of performance leadership and management in elite sport. *Journal of Applied Sport Psychology, 23,* 223-242

Frankenhaeuser, M. (1981). Coping with job stress: A psychobiological approach. Working life. In B. Gardell & G. Johansson (Eds.), *A social science contribution to work reform* (pp. 213-233). New York: John Wiley.

Frankenhaeuser, M., Mellis, I., Rissler, A., Björkvall, C., & Pátkai, P. (1968). Catecholamine excretion as related to cognitive and emotional reaction patterns. *Psychosomatic Medicine*, *30*(1), 109-120.

Fransen, K., Boen, F., Vansteenkiste, M., Mertens, N., & Vande Broek, G. (2018). The power of competence support: The impact of coaches and athlete leaders on intrinsic motivation and performance. *Scandinavian journal of medicine & science in sports*, *28*(2), 725-745.

Fransen, K., Haslam, S. A., Mallett, C. J., Steffens, N. K., Peters, K., & Boen, F. (2017). Is perceived athlete leadership quality related to team effectiveness? A comparison of three professional sports teams. *Journal of science and medicine in sport*, *20*(8), 800-806.

Fransen, K., Haslam, S. A., Steffens, N. K., Vanbeselaere, N., De Cuyper, B., & Boen, F. (2015). Believing in "us": Exploring leaders' capacity to enhance team confidence and performance by building a sense of shared social identity. *Journal of experimental psychology: applied*, *21*(1), 89-100.

Fransen, K., Steffens, N. K., Haslam, S. A., Vanbeselaere, N., Vande Broek, G., & Boen, F. (2016). We will be champions: Leaders' confidence in 'us' inspires team members' team confidence and performance. *Scandinavian Journal of Medicine & Science in Sports*, *26*(12), 1455-1469. https://doi.org/10.1111/sms.12603

Fransen, K., Van Puyenbroeck, S., Loughead, T. M., Vanbeselaere, N., De Cuyper, B., Broek, G. V., & Boen, F. (2015a). The art of athlete leadership: Identifying high-quality athlete leadership at the individual and team level through social network analysis. *Journal of Sport and Exercise Psychology*, *37*(3), 274-290.

Fransen, K., Van Puyenbroeck, S., Loughead, T. M., Vanbeselaere, N., De Cuyper, B., Broek, G. V., & Boen, F. (2015b). Who takes the lead? Social network analysis as a pioneering tool to investigate shared leadership within sports teams. *Social networks*, *43*, 28-38.

Freeman, P., Coffee, P., Moll, T., Rees, T., & Sammy, N. (2014). The ARSQ: The Athletes' Received Support Questionnaire. *Journal of Sport and Exercise Psychology*, *36*(2), 189–202. https://doi.org/10.1123/jsep.2013-0080

Freeman, N. E., Shaw, J. L., & Snyder, J. C. (1936). The Peripheral blood flow in surgical shock: The Reduction in Circulation through the Hand Resulting from Pain, Fear, Cold, and Asphyxia, with Quantitative Measurements of the Volume Flow of Blood in Clinical Cases of Surgical Shock. *The Journal of Clinical Investigation*, *15*(6), 651-664.

Freeman, P., & Rees, T. (2010). Perceived social support from team-mates: Direct and stress-buffering effects on self-confidence. European Journal of Sport Science, 10(1), 59–67. https://doi.org/10.1080/17461390903049998

Freeman, P., & Rees, T. (2008). The effects of perceived and received support on objective performance outcome. *European Journal of Sport Science*, *8*(6), 359–368. https://doi.org/10.1080/17461390802261439

Freeman, P., Rees, T., & Hardy, L. (2009). An intervention to increase social support and improve performance. *Journal of Applied Sport Psychology*, *21*(2), 186–200. https://doi.org/10.1080/10413200902785829

French, J. R. P., & Raven, B. H. (1959). The bases of social power. In D. Cartwright (Ed.), *Studies in social power* (pp. 150-167). Ann Arbor: University of Michigan Press.

Frisch, J. U., Häusser, J. A., van Dick, R., & Mojzisch, A. (2014). Making support work: The interplay between social support and social identity. *Journal of Experimental Social Psychology*, *55*, 154-161. https://doi.org/10.1016/j.jesp.2014.06.009

Gerstner, C. R., & Day, D. V. (1997). Meta-Analytic review of leader–member exchange theory: Correlates and construct issues. *Journal of applied psychology*, *82*(6), 827–844.

Giessner, S. R., & Van Knippenberg, D. (2008). "License to fail": Goal definition, leader group prototypicality, and perceptions of leadership effectiveness after leader failure. *Organizational Behaviour and Human Decision Processes*, *105*, 14-35.

Giessner, S. R., van Knippenberg, D., & Sleebos, E. (2009). License to fail? How leader group prototypicality moderates the effects of leader performance on perceptions of leadership effectiveness. *The Leadership Quarterly, 20*(3), 434-451

Glynn, M. A., & DeJordy, R. (2010). Leadership through an organizational behavior lens: A look at the last half-century of research. In N. Nohria, & R. Khurana (Eds.),

Handbook of leadership and practice (pp. 119-158). Boston, MA: Harvard Business Press.

Goethals, G. R., & Allison, S. T. (2014). Kings and charisma, Lincoln and leadership: An evolutionary perspective. In *Conceptions of leadership* (pp. 111-124). Palgrave Macmillan, New York.

Gould, D., Collins, K., Lauer, L., & Chung, Y. (2007). Coaching life skills through football: A study of award winning high school coaches. *Journal of applied sport psychology*, *19*(1), 16-37.

Goldman, S. L., Kraemer, D. T., & Salovey, P. (1996). Beliefs about mood moderate the relationship of stress to illness and symptom reporting. *Journal of Psychosomatic Research*, *41*(2), 115–128. https://doi.org/10.1016/0022-3999(96)00119-5

González-Morales, M. G., & Neves, P. (2015). When stressors make you work: Mechanisms linking challenge stressors to performance. *Work & Stress*, *29*(3), 213-229.

Graen, G. B., & Uhl-Bien, M. (1995). Relationship-based approach to leadership: Development of leader-member exchange (LMX) theory of leadership over 25 years: Applying a multi-level multi-domain perspective. *The leadership quarterly*, *6*(2), 219-247.

Greenaway, K. H., Haslam, S. A., Cruwys, T., Branscombe, N. R., Ysseldyk, R., & Heldreth, C. (2015). From "we" to "me": Group identification enhances perceived personal control with consequences for health and well-being. *Journal of personality and social psychology*, *109*(1), 53–74. https://doi.org/10.1037/pspi0000019

Greenwald, A. G. (1976). Within-subjects designs: To use or not to use?. *Psychological Bulletin*, *83*(2), 314 –320. https://doi.org/10.1037/0033-2909.83.2.314

Gu, Q., Tang, T. L. P., & Jiang, W. (2015). Does moral leadership enhance employee creativity? Employee identification with leader and leader–member exchange (LMX) in the Chinese context. *Journal of Business Ethics*, *126*(3), 513-529.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1995). Multivariate data analysis New York. *NY: Macmillan*.

Harvey, A., Nathens, A. B., Bandiera, G., & LeBlanc, V. R. (2010). Threat and challenge: cognitive appraisal and stress responses in simulated trauma resuscitations. *Medical education*, *44*(6), 587-594.

Hase, A., O'Brien, J., Moore, L. J., & Freeman, P. (2019). The relationship between challenge and threat states and performance: A systematic review. *Sport, Exercise, and Performance Psychology, 8*(2), 123-144. http://dx.doi.org/10.1037/spy0000132

Haslam, S. A. (2004). *Psychology in organizations: The social identity approach*. (2nd ed.). Thousand Oaks, CA: Sage Publications.

Haslam, S. A., Eggins, R. A., & Reynolds, K. J. (2003). The ASPIRe model: Actualizing social and personal identity resources to enhance organizational outcomes. *Journal of occupational and organizational psychology*, *76*(1), 83-113.

Haslam, S. A., Jetten, J., Postmes, T., & Haslam, C. (Eds.). (2009). Social Identity, Health and Well-being. Special issue of *Applied Psychology: An International Review, 58,* 1-192.

Haslam, S. A., McMahon, C., Cruwys, T., Haslam, C., Jetten, J., & Steffens, N. K. (2018). Social cure, what social cure? The propensity to underestimate the importance of social factors for health. *Social Science & Medicine*, *198*, 14-21. https://doi.org/10.1016/j.socscimed.2017.12.020

Haslam, S. A., & Reicher, S. D. (2007). Identity entrepreneurship and the consequences of identity failure: The dynamics of leadership in the BBC prison study. *Social Psychology Quarterly, 70*(2), 125-147.

Haslam, S. A., & Reicher, S. D. (2016). Rethinking the psychology of leadership: from personal identity to social identity. *Daedalus*, *145*(3), 21-34.

Haslam, S. A., Reicher, S. D., & Platow, M. J. (2011). *The new psychology of leadership: Identity, influence and power.* Hove: Psychology Press.

Haslam, S. A., Steffens, N. K., Peters, K., Boyce, R. A., Mallett, C. J., & Fransen, K. (2017). A social identity approach to leadership development. *Journal of Personnel Psychology*, *16*, 113-124.

Hays, R. D., Reise, S., & Calderón, J. L. (2012). How much is lost in using single items?. *Journal of General Internal Medicine*, *27*(11), 1402-1403. doi:10.1007/s11606-012-2182-6

Hemenover, S. H., & Dienstbier, R. A. (1996). The effects of an appraisal manipulation: Affect, intrusive cognitions, and performance for two cognitive tasks. *Motivation and Emotion, 20*, 319-340.

Hersey, P., & Blanchard, K. H. (1969). Life cycle theory of leadership. *Training & Development Journal, 23*(5), 26-34.

Hersey, P., & Blanchard, K. H. (1979). Life cycle theory of leadership. *Training & Development Journal, 33*(6), 94.

Hersey, P., & Blanchard, K. H. (1996). Great ideas revisited: Revisiting the life-cycle theory of leadership. *Training & Development Journal, 50*(1), 42-47.

Hogg, M. A. (2001). A social identity theory of leadership. *Personality and social psychology review*, *5*(3), 184-200.

Hogg, M. A., & van Knippenberg, D. (2003). *Social Identity and Leadership Processes in Groups.* In M. P. Zanna (Ed.), *Advances in experimental social psychology, Vol. 35* (p. 1–52). Elsevier Academic Press. https://doi.org/10.1016/S0065-2601(03)01001-3

Holmes, T. H., & Wolff, H. G. (1952). Life situations, emotions, and backache. *Psychosomatic Medicine, 14*, 18-33.

Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: a meta-analytic review. *PLoS medicine*, *7*(7), e1000316. https://doi.org/10.1371/journal.pmed.1000316

Hooke, R (1705). *The posthumous works of Robert Hooke*. Waller, Richard.

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science*, *241*(4865), 540-545. DOI: 10.1126/science.3399889

House, R. J., & Shamir, B. (1993). Toward the integration of transformational, charismatic, and visionary theories. In M. M. Chemers & R. Ayman (Eds.), *Leadership theory and*

research: Perspectives and directions (pp. 81-107). San Diego, CA, US: Academic Press.

Howell, J. M., & Shamir, B. (2005). The role of followers in the charismatic leadership process: Relationships and their consequences. *Academy of management review*, *30*(1), 96-112.

Howard, A., & Scott, R. (1965). A proposed framework for the analysis of stress in the human organism. *Behavioral Science*, *10*, 141-160

Isoard-Gautheur, S., Trouilloud, D., Gustafsson, H., & Guillet-Descas, E. (2016). Associations between the perceived quality of the coach–athlete relationship and athlete burnout: An examination of the mediating role of achievement goals. *Psychology of Sport and Exercise*, *22*, 210-217.

Jetten, J., Branscombe, N. R., Haslam, S. A., Haslam, C., Cruwys, T., Jones, J. M., ... & Thai, A. (2015). Having a lot of a good thing: Multiple important group memberships as a source of self-esteem. PloS one, 10(5), e0124609. https://doi.org/10.1371/journal.pone.0124609

Jetten, J., Haslam, S. A., Cruwys, T., Greenaway, K. H., Haslam, C., & Steffens, N. K. (2017). Advancing the social identity approach to health and well-being: Progressing the social cure research agenda. *European Journal of Social Psychology*, *47*(7), 789-802. https://doi.org/10.1002/ejsp.2333

Jetten, J., Haslam, C., & Haslam, S. A. (Eds) (2012). *The social cure: Identity, health and well-being*. New York, NY: Psychology Press.

Jones, G. (1995). More than just a game: Research developments and issues in competitive anxiety in sport. *British Journal of Psychology*, *86*(4), 449–478. https://doi.org/10.1111/j.2044-8295.1995.tb02565.x

Jones, M., Meijen, C., McCarthy, P. J., & Sheffield, D. (2009). A theory of challenge and threat states in Athletes. *International Review of Sport and Exercise Psychology*, *2*(2), 161–180. https://doi.org/10.1080/17509840902829331

Jowett, S. (2007). Interdependence Analysis and the 3+1Cs in the Coach-Athlete Relationship. In S. Jowett & D. Lavallee (Eds.), *Social Psychology in Sport* (pp. 15-27). Champaign, IL, US: Human Kinetics.

Jowett, S. (2008). Moderator and mediator effects of the association between the quality of the coach-athlete relationship and athletes' physical self-concept. *International Journal of Coaching Science*, *2*(1), 1-20.

Jowett, S. (2005). The coach-athlete partnership. *The Psychologist*, *18*(7), 412-415.

Jowett, S. (2001). *The psychology of interpersonal relationships in sport: the coach-athlete relationship* (Doctoral dissertation, University of Exeter).

Jowett, S., & Meek, G. A. (2000). The coach-athlete relationship in married couples: An exploratory content analysis. *The Sport Psychologist*, *14*(2), 157-175.

Jowett, S., & Nezlek, J. (2012). Relationship interdependence and satisfaction with important outcomes in coach–athlete dyads. *Journal of Social and Personal Relationships*, *29*(3), 287-301.

Jowett, S. and Shanmugam, V. (2016). Relational coaching in sport: Its psychological underpinnings and practical effectiveness. In: Schinke, R.J., McGannon, K.R. and Smith, B. (eds). *Routledge International Handbook of Sport Psychology*. (pp. 471-484). Abingdon, Oxon: Routledge.

Judge, T. A., Bono, J. E., Ilies, R., & Gerhardt, M. W. (2002). Personality and leadership: a qualitative and quantitative review. *Journal of applied psychology*, *87*(4), 765-780.

Judge, T. A., Colbert, A. E., & Ilies, R. (2004). Intelligence and leadership: a quantitative review and test of theoretical propositions. *Journal of Applied Psychology*, *89*(3), 542-552.

Kavussanu, M., White, S. A., Jowett, S., & England, S. (2011). Elite and non-elite male footballers differ in goal orientation and perceptions of parental climate. *International Journal of Sport and Exercise Psychology*, *9*, 284-290.

Kemeny, M. E. (2003). The psychobiology of stress. *Current Directions in Psychological Science, 12*, (4), 124-129.

Keren, G. (2014). Between-or within-subjects design: A methodological dilemma. *A Handbook for Data Analysis in the Behaviorial Sciences*, *1*, 257-272.

Kivimäki, M., Nyberg, S. T., Batty, G. D., Fransson, E. I., Heikkilä, K., Alfredsson, L., ... & Clays, E. (2012). Job strain as a risk factor for coronary heart disease: a collaborative

meta-analysis of individual participant data. *The Lancet*, *380*(9852), 1491-1497. https://doi.org/10.1016/S0140-6736(12)60994-5

Knowles, E. (Ed.). (2016). *Little Oxford dictionary of proverbs*. Oxford University Press.

Kodish, S. (2006). The paradoxes of leadership: The contribution of Aristotle. *Leadership*, *2*(4), 451-468.

Kolditz, T. (2007). In Extremis Leaders: Can you and your team lead in crises?. *Leadership Excellence*, *24*(10), 18.

Krog, J., Folkow, B., Fox, R. H., & Andersen, K. L. (1960). Hand circulation in the cold of Lapps and North Norwegian fishermen. *Journal of Applied Physiology*, *15*(4), 654-658. https://doi.org/10.1152/jappl.1960.15.4.654

Kubicek, W. G., Karnegis, J. N., Patterson, R. P., Witsoe, D. A., & Mattson, R. H. (1966). Development and evaluation of an impedance cardiac output system. *Aerospace Medical*, *37*(12), 1208-1212.

Lafrenière, M. A. K., Jowett, S., Vallerand, R. J., Donahue, E. G., & Lorimer, R. (2008). Passion in sport: On the quality of the coach–athlete relationship. *Journal of Sport and Exercise Psychology*, *30*(5), 541-560.

Larsson, J., & Vinberg, S. (2010). Leadership behaviour in successful organisations: Universal or situation-dependent? *Total Quality Management & Business Excellence, 21*(3), 317-334. doi:10.1080/14783360903561779

Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York: McGrawHill.

Lazarus, R. S., & Alfert, E. (1964). Short-circuiting of threat by experimentally altering cognitive appraisal. *The Journal of Abnormal and Social Psychology, 69*(2), 195-205. http://dx.doi.org/10.1037/h0044635

Lazarus, R. S., Deese, J., & Osler, S. F. (1952). The effects of psychological stress upon performance. *Psychological Bulletin*, *49*, 293-317.

Lazarus, R. S., & Eriksen, C. W. (1952). Effects of failure stress upon skilled performance. *Journal of Experimental Psychology*. *43*, 100-105.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer publishing company.

LeDoux, J. (1998). *The emotional brain*. London: Phoenix.

LePine, J. A., Podsakoff, N. P., & LePine, M. A. (2005). A meta-analytic test of the challenge stress-hindrance stressor framework: An explanation for inconsistent relationships among stressors and performances. *Academy of Management Journal, 48*, 764–775.

LePine, M. A., Zhang, Y., Crawford, E. R., & Rich, B. L. (2016). Turning their pain to gain: Charismatic leader influence on follower stress appraisal and job performance. *Academy of Management Journal*, *59*(3), 1036-1059.

Levin, K. A. (2006). Study design III: Cross-sectional studies. *Evidence-based dentistry*, *7*(1), 24-25.

Levy, A. R., Nicholls, A. R., & Polman, R. C. J. (2011). Pre-competitive confidence, coping, and subjective performance in sport. *Scandinavian journal of medicine & science in sports, 21*(5), 721-729.

Lochbaum, M., & Gottardy, J. (2015). A meta-analytic review of the approach-avoidance achievement goals and performance relationships in the sport psychology literature. *Journal of Sport and Health Science*, *4*(2), 164-173.

Loughead, T. M., & Hardy, J. (2006). Team cohesion: From theory to research to team building. *Literature reviews in sport psychology*, 257-287.

Loughead, T. M., Hardy, J., & Eys, M. A. (2006). The nature of athlete leadership. *Journal of Sport Behavior*, *29*(2), 142-158.

Lovallo, W. R. (2005). *Stress & health: Biological and psychological interactions* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Lundberg, U., & Frankenhaeuser, M. (1980). Pituitary-adrenal and sympathetic-adrenal correlates of distress and effort. *Journal of Psychosomatic Research*, *24*(3-4), 125-130.

Lyons, J. B., & Schneider, T. R. (2009). The effects of leadership style on stress outcomes. *The Leadership Quarterly*, *20*, 737-748.

Maddux, J. E. (1995). Self-efficacy theory: An introduction. In J.E. Maddux (Ed.) *Self-efficacy, adaptation, and adjustment: Theory, research, and application* (pp. 333). New York: Plenum Press.

Man, J. (2009). *The leadership secrets of Genghis Khan*. Random House.

Mann, R. D. (1959). A review of the relationship between personality and performance in small groups. *Psychological Bulletin, 56,* 241-270.

Marx, J. (2006). *Rosen's emergency medicine: Concepts and clinical practice*. Mosby: Elsevier.

Meijen, C., Turner, M., Jones, M., Sheffield, D., & McCarthy, P. (2020). A theory of challenge and threat states in athletes: A revised conceptualisation. *Frontiers in Psychology*. https://doi.org/10.3389/fpsyg.2020.00126

Mendes, W. B., & Jamieson, J. P. (2011). Embodiment of stereotype threat: Physiological underpinnings of performance decrements. In M. Inzlicht & T. Schmader (Eds.), Stereotype threat: Theory, process, & application. New York: Oxford.

Mendes, W. B., Reis, H. T., Seery, M. D., & Blascovich, J. (2003). Cardiovascular correlates of emotional expression and suppression: Do content and gender context matter?. *Journal of Personality and Social Psychology*, *84*(4), 771-792. http://dx.doi.org/10.1037/0022-3514.84.4.771

Mertens, N., Boen, F., Steffens, N. K., Cotterill, S. T., Haslam, S. A., & Fransen, K. (2020). Leading together towards a stronger 'us': An experimental test of the effectiveness of the 5R Shared Leadership Program (5RS) in basketball teams. *Journal of Science and Medicine in Sport. 23*, 770-775. https://doi.org/10.1016/j.jsams.2020.01.010

Moore, L. J., Vine, S. J., Wilson, M. R., & Freeman, P. (2014). Examining the antecedents of challenge and threat states: The influence of perceived required effort and support availability. *International Journal of Psychophysiology*, *93*(2), 267–273. https://doi.org/10.1016/j.ijpsycho.2014.05.009

Moore, L. J., Vine, S. J., Wilson, M. R., & Freeman, P. (2012). The effect of challenge and threat states on performance: An examination of potential mechanisms. *Psychophysiology*, *49*(10), 1417-1425.

Moore, L. J., Wilson, M. R., Vine, S. J., Coussens, A. H., & Freeman, P. (2013). Champ or chump?: Challenge and threat states during pressurized competition. *Journal of Sport and Exercise Psychology*, *35*(6), 551-562.

Mullen, B. A., Salas, E., & Driskell, J. E. (1989). Salience, motivation, and artifact as contributors to the relation between participation rate and leadership. *Journal of Experimental Social Psychology, 25*, 545-559.

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91*, 328-346.

Nicholls, J. G. (1989). *The competitive ethos and democratic education*. Harvard University Press.

Nicholls, A. R., Earle, K., Earle, F., & Madigan, D. J. (2017). Perceptions of the Coach–Athlete Relationship Predict the Attainment of Mastery Achievement Goals Six Months Later: A Two-Wave Longitudinal Study among FA Premier League Academy Soccer Players. *Frontiers in psychology*, *8*, 684-692.

Nicholls, A. R., Levy, A. R., Jones, L., Meir, R., Radcliffe, J. N., & Perry, J. L. (2016). Committed relationships and enhanced threat levels: perceptions of coach behavior, the coach–athlete relationship, stress appraisals, and coping among athletes. *International Journal of Sports Science & Coaching*, *11*(1), 16-26. https://doi.org/10.1177/1747954115624825

Nicholls, A. R., Polman, R. C., & Levy, A. R. (2012). A path analysis of stress appraisals, emotions, coping, and performance satisfaction among athletes. *Psychology of sport and exercise*, *13*(3), 263-270.

Nicholls, A. R., Polman, R., & Levy, A. R. (2010). Coping self-efficacy, pre-competitive anxiety, and subjective performance among athletes. *European journal of sport science, 10*(2), 97-102.

Northouse, P. G. (2010). *Leadership* (5th ed.). Thousand Oaks, CA: Sage.

Northouse, P. G. (2015). *Leadership: Theory and practice*. Sage publications.

Ober, J. (1989). *Mass and elite in democratic Athens: Rhetoric, ideology, and the power of the people*. Princeton, NJ: Princeton University Press.

Obrist, P. A. (1981). *Cardiovascular psychophysiology: A perspective.* New York: Plenum.

Paunonen, S. V. & LeBel, E. P. (2012). Socially desirable responding and its elusive effects on the validity of personality assessments. *Journal of Personality and Social Psychology, 103,* (1), 158-175.

Peñalver, J., Salanova, M., Martínez, I. M., & Schaufeli, W. B. (2019). Happy-productive groups: How positive affect links to performance through social resources. *The Journal of Positive Psychology*, *14*(3), 377-392. https://doi.org/10.1080/17439760.2017.1402076

Perry, R., Hladkyj, S., Pekrun, R., & Pelletier, S. (2001). Academic Control and Action Control in the Achievement of College Students: A Longitudinal Field Study. *Journal of educational psychology*, *93*(4), 776–789. https://doi.org/10.1037//OO22-0663.93.4.776

Peters, K. O., & Haslam, S. A. (2008). *The leadership secrets of leadership secrets: A quantitative and qualitative exploration of the lessons that are drawn from the lives of "great" leaders*. Unpublished manuscript, University of Exeter

Peters, K., Haslam, S. A., Ryan, M. K., & Fonseca, M. (2013). Working with subgroup identities to build organizational identification and support for organizational strategy: A test of the ASPIRe model. *Group & Organization Management*, *38*(1), 128-144.

Piaget, J. (1950). *The psychology of intelligence* (M. Piercy & D. Berlyne, Trans.). London: Routledge & Kegan Paul.

Pillai, R., Schriesheim, C. A., & Williams, E. S. (1999). Fairness perceptions and trust as mediators for transformational and transactional leadership: A two-sample study. *Journal of management*, *25*(6), 897-933.

Plato. (1993). *The republic*. Oxford: Oxford University Press. (Original work 380 BC)

Platow, M. J., Haslam, S. A., Both, A., Chew, I., Cuddon, M., Goharpey, N., ... & Grace, D. M. (2005). "It's not funny if they're laughing": Self-categorization, social influence, and responses to canned laughter. *Journal of Experimental Social Psychology*, *41*(5), 542-550.

Platow, M. J., Nolan, M. A., & Anderson, D. (2003). *Intergroup identity management in a context of strong norms of fairness: Responding to in-group favouritism during the Sydney 2000 Olympics*. Unpublished manuscript, The Australian National University.

Polefrone, J. M., & Manuck, S. B. (1987). *Gender differences in cardiovascular and neuroendocrine response to stressors.* In R. C. Barnett, L. Biener, & G. K. Baruch (Eds.), *Gender and stress* (p. 13–38). Free Press.

Postmes, T., & Spears, R. (1998). Deindividuation and antinormative behaviour: A metaanalysis. *Psychological Bulletin, 123*, 238-259.

Poucher, Z. A., Tamminen, K. A., & Kerr, G. (2018). Providing social support to female Olympic athletes. *Journal of Sport and Exercise Psychology*, *40*(4), 217-228.

Rahim, M., & Buntzman, G. F. (1989). Supervisory power basis, styles of handling conflict with subordinates, and subordinate compliance and satisfaction. *Journal of Psychology: Interdisciplinary and Applied, 123*(2), 195-210

Reb, J., Chaturvedi, S., Narayanan, J., & Kudesia, R. S. (2019). Leader mindfulness and employee performance: A sequential mediation model of LMX quality, interpersonal justice, and employee stress. *Journal of Business Ethics*, *160*(3), 745-763.

Rees, T., & Freeman, P. (2007). The effects of perceived and received support on self-confidence. *Journal of Sports Sciences*, *25*(9), 1057–1065. https://doi.org/10.1080/02640410600982279

Rees, T., & Freeman, P. (2010). Social support and performance in a golf-putting experiment. *The Sport Psychologist*, *24*(3), 333-348.

Rees, T., & Hardy, L. (2004). Matching social support with stressors: Effects on factors underlying performance in tennis. *Psychology of Sport and Exercise*, *5*(3), 319–337. https://doi.org/10.1016/S1469-0292(03)00018-9

Rees, T., Haslam, S. A., Coffee, P., & Lavallee, D. (2015). A social identity approach to sport psychology: Principles, practice, and prospects. *Sports medicine*, *45*(8), 1083-1096.

Reicher, S. D. (1984). The St Pauls' riots: An explanation of the limits of crowd action in terms of a social identity model. *European Journal of Social Psychology, 14,* 1-21.

Reicher, S., & Haslam, S. A. (2006). Rethinking the psychology of tyranny: The BBC prison study. *British Journal of Social Psychology*, *45*(1), 1-40.

Reicher, S. D., Haslam, S. A., & Hopkins, N. (2005). Social identity and the dynamics of leadership: Leaders and followers as collaborative agents in the transformation of social reality. *The Leadership Quarterly*, *16*, 547-568

Reicher, S., & Hopkins, N. (1996a). Seeking influence through characterizing self-categories: An analysis of anti-abortionist rhetoric. *British Journal of Social Psychology*, *35*(2), 297-311.

Reicher, S. D., & Hopkins, N. (2001). *Self and nation.* London: Sage.

Reicher, S., & Hopkins, N. (1996b). Self-category constructions in political rhetoric; an analysis of Thatcher's and Kinnock's speeches concerning the British miners' strike (1984–5). *European journal of social psychology*, *26*(3), 353-371.

Reynolds, K. J., Subasic, E., Lee, E., & Tindall, K. (2014). Does education really transform us? The impact of school based social processes on the person. In K. J. Reynolds & N. R. Branscombe (Eds.), *The psychology of change: Life contexts, experiences, and identities*. Hove, UK: Psychology Press.

Rhind, D. J., & Jowett, S. (2010). Initial evidence for the criterion-related and structural validity of the long versions of the Coach–Athlete Relationship Questionnaire. *European Journal of Sport Science*, *10*(6), 359-370.

Sagar, S. S., Busch, B. K., & Jowett, S. (2010). Success and failure, fear of failure, and coping responses of adolescent academy football players. *Journal of Applied Sport Psychology*, *22*(2), 213-230.

Sarachek, B. (1968). Greek concepts of leadership. *Academy of management journal*, *11*(1), 39-48.

Schatzman, L., & Strauss, A. L. (1973). *Field research: Strategies for a natural sociology*. Prentice Hall.

Schinke, R. J., Mellalieu, S., Ntoumanis, N., Kavussanu, M., Standage, M., Strauss, B., & Papaioannou, A. (2020). Getting published: Suggestions and strategies from editors of sport and exercise psychology journals. *Journal of Applied Sport Psychology*, 1-14. https://doi.org/10.1080/10413200.2020.1741725

Schlotz, W., Hammerfald, K., Ehlert, U., & Gaab, J. (2011). Individual differences in the cortisol response to stress in young healthy men: Testing the roles of perceived stress

reactivity and threat appraisal using multiphase latent growth curve modelling. *Biological Psychology, 87*, 257-264

Schmitt, M., & Dörfel, M. (1999). Procedural injustice at work, justice sensitivity, job satisfaction and psychosomatic well-being. *European Journal of Social Psychology*, *29*(4), 443-453.

Schoemann, A. M., Boulton, A. J., & Short, S. D. (2017). Determining power and sample size for simple and complex mediation models. *Social Psychological and Personality Science*, *8*(4), 379-386. https://doi.org/10.1177/1948550617715068

Schyns, B., & Schilling, J. (2013). How bad are the effects of bad leaders? A meta-analysis of destructive leadership and its outcomes. *The Leadership Quarterly, 24*, 138–158.

Schwarzer, R., & Schulz, U. (2013). Berlin social support scales (BSSS). Measurement instrument database for the social science.

Seery, M. D. (2011). Challenge or threat? Cardiovascular indexes of resilience and vulnerability to potential stress in humans. Neuroscience & Biobehavioral Reviews, 35, 1603-1610. http://dx.doi.org/10.1016/j.neubiorev.2011.03.003.

Seery, M. D., West, T. V., Weisbuch, M., & Blascovich, J. (2008). The effects of negative reflection for defensive pessimists: Dissipation or harnessing of threat?. *Personality and Individual Differences*, *45*(6), 515-520. https://doi.org/10.1016/j.paid.2008.06.004

Selye, H. (1976). *The stress of life* (rev. edn.). New York: McGraw-Hill.

Selye, H. (1979). *The stress of my life: A scientist's memoirs*. New York: Nostrand Reinhold.

Sherwood, A., Allen, M., Fahrenberg, J., Kelsey, R., Lovallo, W., & van Dooren, L. (1990). Methodological guidelines for impedance cardiography. *Psychophysiology, 27*, 1-23.

Sherwood, A., & Turner, J. R. (1993). Postural stability of hemodynamic responses during mental challenge. *Psychophysiology*, *30*(3), 237-244. https://doi.org/10.1111/j.1469-8986.1993.tb03349.x

Shin, J., Heath, R. L., & Lee, J. (2011). A contingency explanation of public relations practitioner leadership styles: Situation and culture. *Journal of Public Relations Research, 23*(2), 167-190. doi:10.1080/1062726X.2010.505121

Silverthorne, C., & Wang, T. H. (2001). Situational leadership style as a predictor of success and productivity among Taiwanese business organizations. *The Journal of Psychology*, *135*(4), 399-412.

Simon, B., & Oakes, P. (2006). Beyond dependence: An identity approach to social power and domination. *Human Relations, 59,* 105-139. doi: 10.1177/0018726706062760.

Skinner, E.A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology, 71,* 549-570.

Skinner, N., & Brewer, N. (2004). Adaptive Approaches to Competition: Challenge Appraisals and Positive Emotion. *Journal of Sport & Exercise Psychology*, *26*(2), 283–305. https://doi.org/10.1207/S15374424JCCP3203_02

Skinner, N., & Brewer, N. (2002). The dynamics of threat and challenge appraisals prior to stressful achievement events. *Journal of personality and social psychology*, *83*(3), 678-692.

Slater, M. J., & Barker, J. B. (2018). Doing social identity leadership: Exploring the efficacy of an identity leadership intervention on perceived leadership and mobilization in elite disability soccer. *Journal of Applied Sport Psychology*, 1-22. https://doi.org/10.1080/10413200.2017.1410255

Slater, M. J., Coffee, P., Barker, J. B., & Evans, A. L. (2014). Promoting shared meanings in group memberships: A social identity approach to leadership in sport. *Reflective Practice*, *15*(5), 672-685.

Slater, M. J., Evans, A. L., & Barker, J. B. (2013). Using social identities to motivate athletes towards peak performance at the London 2012 Olympic Games: Reflecting for Rio 2016. *Reflective practice*, *14*(5), 672-679.

Slater, M. J., Evans, A. L., & Turner, M. J. (2016). Implementing a social identity approach for effective change management. *Journal of Change Management*, *16*(1), 18-37. https://doi.org/10.1080/14697017.2015.1103774

Slater, M. J., Turner, M. J., Evans, A. L., & Jones, M. V. (2018). Capturing hearts and minds: The influence of relational identification with the leader on followers' mobilization and cardiovascular reactivity. *Leadership Quarterly*. https://doi.org/10.1016/j.leaqua.2017.08.003

Sluss, D. M., & Ashforth, B. E. (2007). Relational identity and identification: Defining ourselves through work relationships. *Academy of Management Review*, *32*(1), 9-32. https://doi.org/10.5465/amr.2007.23463672

Sluss, D. M., Ployhart, R. E., Cobb, M. G., & Ashforth, B. E. (2012). Generalizing newcomers' relational and organizational identifications: Processes and prototypicality. *Academy of Management Journal*, *55*(4), 949-975. https://doi.org/10.5465/amj.2010.0420

Smith, H. J., & Tyler, T. R. (1997). Choosing the right pond: The impact of group membership on self-esteem and group-oriented behavior. *Journal of experimental social psychology*, *33*(2), 146-170.

Steffens, N. K., Haslam, S. A., & Reicher, S. D. (2014b). Up close and personal: Evidence that shared social identity is a basis for the 'special' relationship that binds followers to leaders. *The Leadership Quarterly*, *25*(2), 296-313. https://doi.org/10.1016/j.leaqua.2013.08.008

Steffens, N. K., Haslam, S. A., Reicher, S. D., Platow, M. J., Fransen, K., Yang, J., … Boen, F. (2014a). Leadership as social identity management: Introducing the Identity Leadership Inventory (ILI) to assess and validate a four-dimensional model. *Leadership Quarterly*, *25*(5), 1001–1024. https://doi.org/10.1016/j.leaqua.2014.05.002

Steffens, N. K., Yang, J., Jetten, J., Haslam, S. A., & Lipponen, J. (2018). The unfolding impact of leader identity entrepreneurship on burnout, work engagement, and turnover intentions. *Journal of Occupational Health Psychology, 23*(3), 373-387. http://dx.doi.org/10.1037/ocp0000090

Stevens, M., Rees, T., Coffee, P., Haslam, S. A., Steffens, N. K., & Polman, R. (2018). Leaders promote attendance in sport and exercise sessions by fostering social identity. *Scandinavian journal of medicine & science in sports*, *28*(9), 2100-2108.

Stevens, M., Rees, T., Coffee, P., Steffens, N. K., Haslam, S. A., & Polman, R. (2020). Leading us to be active: A two-wave test of relationships between identity leadership, group identification, and attendance. *Sport, Exercise, and Performance Psychology*, *9*(1), 128–142. https://doi.org/10.1037/spy0000164

Stevens, M., Rees, T., & Polman, R. (2019b). Social identification, exercise participation, and positive exercise experiences: Evidence from parkrun. *Journal of sports sciences*, *37*(2), 221-228.

Stevens, M., Rees, T., Steffens, N. K., Haslam, S. A., Coffee, P., & Polman, R. (2019a). Leaders' creation of shared identity impacts group members' effort and performance: Evidence from an exercise task. *PloS one*, *14*(7), e0218984.

Stogdill, R. M. (1974). *Handbook of leadership: A survey of theory and research*. Free Press.

Stogdill, R. M. (1948). Personal factors associated with leadership: A survey of the literature. *Journal of Personality, 25*, 31-71.

Stoney, C. M., Davis, M. C., & Matthews, K. A. (1987). Sex differences in physiological responses to stress and in coronary heart disease: a causal link?. *Psychophysiology*, *24*(2), 127-131. https://doi.org/10.1111/j.14698986.1987.tb00264.x

Stordeur, S., D'hoore, W., & Vandenberghe, C. (2001). Leadership, organizational stress, and emotional exhaustion among hospital nursing staff. *Journal of advanced nursing, 35,* 533-542.

Subašić, E., Reynolds, K. J., Turner, J. C., Veenstra, K. E., & Haslam, S. A. (2011). Leadership, power and the use of surveillance: Implications of shared social identity for leaders' capacity to influence. *The Leadership Quarterly, 22,* 170-181.

Summers, J., Miller, K., & Ford, S. (1991). Attentional style and basketball performance. *Journal of Sport and Exercise Psychology*, *8*, 239–253. https://doi.org/10.2466/PMS.73.7.1025-1026

Sund-Levander, M., Forsberg C., & Wahren L. K. (2002). Normal oral, rectal, tympanic and axillary body temperature in adult men and women: A systematic literature review. *Scandinavian Journal of Caring Sciences*, *16*, 122-128.

Swann, C., Moran, A., & Piggott, D. (2015). Defining elite athletes: Issues in the study of expert performance in sport psychology. *Psychology of Sport and Exercise*, *16*, 3-14.

Tajfel, H. (1972). Social categorisation. English manuscript of "La categorisation sociale". In S. Moscovici (Ed.), *Introduction à la Psychologie Sociale* (Vol. 1, pp. 272-302). Paris: Larosse.

Tajfel, H., & Turner, J. (1979). An integrative theory of intergroup conflict. In *The Social Psychology of Intergroup Relations* (pp. 33–47). https://doi.org/10.1016/S0065-2601(05)37005-5

Thelwell, R. C., Wagstaff, C. R., Chapman, M. T., & Kenttä, G. (2017). Examining coaches' perceptions of how their stress influences the coach–athlete relationship. *Journal of Sports Sciences*, *35*(19), 1928-1939.

Tomaka, J., Blascovich, J., Kelsey, R. M., & Leitten, C. L. (1993). Subjective, physiological, and behavioral effects of threat and challenge appraisal. *Journal of personality and social psychology*, *65*(2), 248-260.

Tomaka, J., Blascovich, J., Kibler, J., & Ernst, J. M. (1997). Cognitive and physiological antecedents of threat and challenge appraisal. *Journal of personality and social psychology*, *73*(1), 63-72.

Turner, J. C. (2005). Explaining the nature of power: A three-process theory. *European Journal of Social Psychology*. https://doi.org/10.1002/ejsp.244

Turner, J. C. (1975). Social comparison and social identity: Some prospects for intergroup behaviour. *European journal of social psychology*, *5*(1), 1-34.

Turner, J. C. (1991). *Social influence*. Milton Keynes: Open University Press.

Turner, J. C. (1999). Some current issues in research on social identity and self-categorization theories. In N. Ellemers, R. Spears, and B. Doosje (Eds.), *Social identity: Context, commitment, content.* (pp. 6-34). Oxford, UK: Blackwell Publishers.

Turner, M. J., Aspin, G., Didymus, F. F., Mack, R., Olusoga, P., Wood, A. G., & Bennett, R. (2020). One Case, Four Approaches: The Application of Psychotherapeutic Approaches in Sport Psychology. *The Sport Psychologist*, *34*(1), 71-83. https://doi.org/10.1123/tsp.2019-0079

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S., & Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorisation theory*. Oxford: Basil Blackwell.

Turner, M. J., Jones, M. V., Sheffield, D., Barker, J. B., & Coffee, P. (2014). Manipulating cardiovascular indices of challenge and threat using resource appraisals. *International Journal of Psychophysiology*, *94*(1), 9-18.

Turner, M. J., Jones, M. V., Sheffield, D., & Cross, S. L. (2012). Cardiovascular indices of challenge and threat states predict competitive performance. *International Journal of Psychophysiology*, *86*(1), 48-57. https://doi.org/10.1016/j.ijpsycho.2012.08.004

Tyler, T. R., & Blader, S. L., (2000). *Cooperation in groups: Procedural justice, social identity, and behavioral engagement*. Philadelphia, PA: Psychology Press.

Tyler, T. R., & Blader, S. L. (2003). The group engagement model: Procedural justice, social identity, and cooperative behavior. *Personality and social psychology review*, *7*(4), 349-361.

Tyler, T. R., Rasinski, K. A., & McGraw, K. M. (1985). The Influence of Perceived Injustice on the Endorsement of Political Leaders 1. *Journal of Applied Social Psychology*, *15*(8), 700-725.

Ursin, H., Baade, E., & Levine, S. (1978). *Activation, coping, and psychosomatics. Psychobiology of stress: A study of coping men.* New York: Academic Press.

Van Deusen, E. H. (1869). Observations on a form of nervous prostration,(neurasthenia,) culminating in insanity. *American Journal of Psychiatry*, *25*, 445-461.

Van Dick, R., Lemoine, J. E., Steffens, N. K., Kerschreiter, R., Akfirat, S. A., Avanzi, L., ... & González, R. (2018). Identity leadership going global: Validation of the Identity Leadership Inventory across 20 countries. *Journal of Occupational and Organizational Psychology*, *91*(4), 697-728.

Van Knippenberg, D. (2011). Embodying who we are: Leader group prototypicality and leadership effectiveness. *The Leadership Quarterly, 22,* 1078-1091.

Van Knippenberg, D. (2000). Work motivation and performance: A social identity perspective. *Applied psychology*, *49*(3), 357-371.

Van Knippenberg, B., & Van Knippenberg, D. (2005). Leader Self-Sacrifice and Leadership Effectiveness: The Moderating Role of Leader Prototypicality. *Journal of Applied Psychology, 90*(1), 25-37.

Vecchio, R. P. (1987). Situational leadership theory: An examination of a prescriptive theory. *Journal of Applied Psychology, 72*(3), 444-451.

Vella, S. A., Oades, L. G., & Crowe, T. P. (2012). Validation of the differentiated transformational leadership inventory as a measure of coach leadership in youth soccer. *The sport psychologist*, *26*(2), 207-223.

Vine, S. J., Moore, L. J., & Wilson, M. R. (2014). Quiet eye training: The acquisition, refinement and resilient performance of targeting skills. *European Journal of Sport Science*, *14*, 235-242.

Wakefield, J. R., Bowe, M., Kellezi, B., Butcher, A., & Groeger, J. A. (2020). Longitudinal associations between family identification, loneliness, depression, and sleep quality. *British Journal of Health Psychology*, *25*(1), 1-16. https://doi.org/10.1111/bjhp.12391

Wann, D. L., Hunter, J. L., Ryan, J. A., & Wright, L. A. (2001). The relationship between team identification and willingness of sport fans to consider illegally assisting their team. *Social Behavior and Personality, 29,* 531-536.

Weber, M. (1946). The sociology of charismatic authority. In H. H. Gerth & C. W. Milles (Trans. & Eds.), *Max Weber: Essays in sociology* (pp. 245-252). New York: Oxford University Press.

Weber, M. (1947). *The theory of social and economic organization* (A. M. Henderson & T. Parsons, Trans. & Eds.). New York: Oxford University Press.

Weinberg, R., Fowler, C., Jackson, A., Bagnall, J., & Bruya, L. (1991). Effect of goal difficulty on motor performance: A replication across tasks and subjects. *Journal of Sport and Exercise Psychology*, *13*, 160-173.

Weisbuch, M., Seery, M. D., Ambady, N., & Blascovich, J. (2009). On the correspondence between physiological and nonverbal responses: Nonverbal behavior accompanying challenge and threat. *Journal of Nonverbal Behavior, 33*, 141-148

Wheelock, A. M. (2011). *" Passion is Catching": Emotional Contagion and Affective Action in Select Works by Shakespeare* (Doctoral dissertation).

White, S. A., Kavussanu, M., Tank, K. M., & Wingate, J. M. (2004). Perceived parental beliefs about the causes of success in sport: relationship to athletes' achievement goals and personal beliefs. *Scandinavian Journal of Medicine & Science in Sports*, *14*, 57-66.

White, C., Slater, M., Turner, M., & Barker, J. (2020). More positive group memberships and social identification are associated with greater resilience in Royal Air Force (RAF) personnel. *British Journal of Social Psychology*. https://doi.org/10.1111/bjso.12385

Williams, R. B. (1986) Patterns of reactivity and stress. In K. A. Matthews, S. M. Weiss, T. Detre, T. M. Dembroski, B. Falker, S. B. Manuck & R. B. Williams, Jr. (Eds.), *Handbook of stress, reactivity, and cardiovascular disease* (pp. 109-125). New York: Wiley.

Willis, J., & Todorov, A. (2006). First impressions: Making up your mind after a 100-ms exposure to a face. *Psychological science*, *17*(7), 592-598. https://doi.org/10.1111/j.1467-9280.2006.01750.x

Wit, A., & Wilke, H. (1988). Subordinates' endorsement of an allocating leader in a commons dilemma: An equity theoretical approach. *Journal of Economic Psychology*, *9*(2), 151-168.

Wolff, H. G. (1950). Life situations, emotions and bodily disease. In M. L. Reymert (Ed.), *Feelings and emotions* (pp. 284–335). New York, NY: McGraw-Hill.

Wolff, H. G. (1953). Stress and disease. American lecture series: The Bannerstone division of American lectures in physiology. Vol 166, (pp. 148-151). Springfield, IL, US: Charles C Thomas Publisher, xix, 199 pp. doi: 10.1037/11785-004

Wolpe, J. (1973). *The practice of behavior therapy*. New York: Pergamon Press.

Woodman, T., & Hardy, L. (2003). The relative impact of cognitive anxiety and self-confidence upon sport performance: a meta-analysis. *Journal of Sports Sciences*, *21*(6), 443–457. https://doi.org/10.1080/0264041031000101809

Wright, R. A., & Kirby, L. D. (2003). Cardiovascular correlates of challenge and threat appraisals: A critical examination of the biopsychosocial analysis. *Personality and Social Psychology Review, 7*, 216-233.

Yang, S. X., & Jowett, S. (2016). Understanding and enhancing coach–athlete relationships through the 3+ 1Cs model. *The Psychology of Sports Coaching: Research and Practice*, 54-67.

Zapf, D., Dormann, C., & Frese, M. (1996). Longitudinal studies in organizational stress research: a review of the literature with reference to methodological issues. *Journal of occupational health psychology*, *1*(2), 145-169.

Zhao, X., Lynch Jr, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of consumer research*, *37*(2), 197-206. https://doi.org/10.1086/651257

Zhu, W., He, H., Trevino, L. K., Chao, M. M., & Wang, W. (2015). Ethical leadership and follower voice and performance: The role of follower identifications and entity morality beliefs. *The Leadership Quarterly*, *22*, 702-718. http://dx.doi.org/10.1016/j.leaqua.2015.01.004

Zhu, W., Treviño, L. K., & Zheng, X. (2016). Ethical leaders and their followers: The transmission of moral identity and moral attentiveness. *Business Ethics Quarterly*, *26*(1), 95-115.

GLOSSARY OF KEY TERMINOLOGY

This glossary includes terminology that are referred to throughout the current thesis. These terms are derived from leadership, and challenge and threat based literature, that is contextualised to suit the context of the current thesis.

Challenge state: An adaptive response to a stressful situation, scenario or competition.

Control: How much control is available in a given performance context.

Demands: What an athlete faces prior to a competition (i.e. Effort, uncertainty and danger to esteem)

Entrepreneurship: A leader who applies meaning to the group that they are a member of through applying group values, beliefs and priorities.

Impresario of Identity: The leader who knows the true nature of the group, who organises projects to make a vision a reality, in building a future to sustain the construction of group identity.

In-group: A group that an individual has a social identity with in a particular context.

In-group champions: A leader who acts and stands up for the group they are a member of.

Out-group: A group that an individual does not have a social identity with in a particular context.

Prototypicality: A determinant of self-categorisation and is the extent to which a leader is representative of their group.

Resource Appraisals: What an athlete may or may not possess when approaching competition (i.e. Self-efficacy, control and an approach valence)

Self-categorisation: A category that an individual perceives themselves to be a member of.

Self-efficacy: A situation specific belief that an action can be successfully completed

Social identity: The extent of belonging an individual feels to their group.

Social identity approach: A framework for understanding attitudes, behaviours, and behavioural outcomes through the principles of self-categorisation theory and social identity theory.

Social identity approach to leadership: A framework for leaders to enhance social identification with a group

Social identity theory: The theory that attitudes, behaviours, and behavioural outcomes can be explained by the extent of an individual's social identity with their group.

Social Support: Receiving comfort, perceptions of security, advice, and instrumental assistance from significant others

Threat state: A maladaptive response to a stressful situation or scenario.

APPENDICES

Appendix 1: Recruitment information and questionnaires completed in Chapter 2 *In the form of a Qualtrics survey*

Recruitment information:

Information Sheet and consent form

The study you are about to consider taking part in is part of a PhD sport psychology research project.

Procedure:
Immediately before a competitive match, you will be asked to provide your name, date of birth, sex, number of siblings, type of sport you play, the name of your sports team, the name of your leader (e.g. coach), and the level of performance that you play at. After this you will be asked to fill in 7 questionnaires, taking around 20/25 minutes. You will have the opportunity to ask any questions before completion.

Risks:
You will not be exposed to any physical risk, and the topics that are being investigating are not of a sensitive nature.

Anonymity:
Although you will be providing information about yourself, the information collected will be strictly confidential. You will be issued a participant number to maintain anonymity in subsequent analyses. Your name, or any identifying information will not be included in any reports.

Voluntary participation:
Your participation in this research is completely voluntary, and you may withdraw from the research at any time during, and up to two weeks after completion of the second timepoint. You do not need to provide a reason for withdrawal.

Data Storage:

Paper based, and electronic data via an external hard drive, will be stored securely in a locked filing cabinet in the research office on site at Staffordshire university (Brindley Building). Records will be kept secure for 5 years (extending to 10 years if published in a peer reviewed journal).

Ethics:

Ethical approval for this research has been obtained from Staffordshire University Faculty of Health Sciences Research Ethics Committee.

Please feel free to ask any questions that you may have regarding your participation in the study, at any time.

Contact:

If you have any further queries regarding the study after your participation please contact Anthony Miller on Anthony.miller@research.staffs.ac.uk (phone: 01782 294 866). Alternatively, you can speak to my supervisor, Dr Matthew Slater on M.Slater@staffs.ac.uk (phone: 01782 294498), or write to us at Staffordshire University, Department of Sport and Exercise, School of Life Sciences and Education, Brindley Building, Leek Road, Stoke-on-Trent, ST4 2DF.

Consent form

Please read through the following statements and acknowledge your understanding of each, by placing a tick in the brackets.

I have read and understand the information provided regarding the nature of the study ( )

I am aware of the what my participation will involve ( )

I understand that my participation is voluntary and I can withdraw from the study at any time (up to three days after completion) without providing a reason ( )

My anonymity will be respected at all times ( )

I am of at least 18 years of age and able to take part in this research ( )

All of my questions about my participation in the study have been answered satisfactorily ( )

I have read and understood the above, and give my consent to participate:

Signature: _____ Date: _____

Questionnaires:

Demographics:

Date of birth (dd/mm/yy): _____

Sex (M/F/Other): _____ Number of siblings: _____ Age:_____

Type of team sport (football/rugby/cricket etc): _____

Year's experience in your sport: _____ Nationality: _____

Level of current performance (please circle either 1, 2, 3 or 4):

1 e.g. Regional level, represent university, semi-professional

2 e.g. Involved in talent development, second/reserve team professional

3 e.g. National level, first team professional

4 e.g. International level, currently representing the nation, participated in globally recognised competition

Instructions: Please judge to what extent the leader engages in the various behaviors and activities listed by selecting the corresponding number using the following scale.

1 Disagree strongly	**2** Disagree	**3** Disagree a little	**4** Neutral	**5** Agree a little	**6** Agree	**7** Agree strongly

1. The coach embodies what the team stands for	1	2	3	4	5	6	7
2. The coach is representative of the team	1	2	3	4	5	6	7
3. The coach is a model member of the team	1	2	3	4	5	6	7
4. The coach exemplifies what it means to be a member of the team	1	2	3	4	5	6	7

5. The coach promotes the interests of the members of the team	1	2	3	4	5	6	7
6. The coach acts as a champion for the team	1	2	3	4	5	6	7
7. The coach stands up for the team	1	2	3	4	5	6	7
8. When the coach acts, he or she has the team's interests at heart	1	2	3	4	5	6	7
9. The coach makes people feel as if they are part of the same group	1	2	3	4	5	6	7
10. The coach creates a sense of cohesion within the team	1	2	3	4	5	6	7
11. The coach develops an understanding of what it means to be a member of the team	1	2	3	4	5	6	7
12. The coach shapes members' perceptions of the team's values and ideals	1	2	3	4	5	6	7
13. The coach devises activities that bring the team together	1	2	3	4	5	6	7
14. The coach arranges events that help the team function effectively	1	2	3	4	5	6	7
15. The coach creates structures that are useful for the team	1	2	3	4	5	6	7

Instructions: The following questions refer to how strongly you identify with ***your coach and your team.*** Please circle your response to each item from 1 (do not agree at all) to 7 (completely agree):

1. I feel a strong connection with the coach	1	2	3	4	5	6	7
2. I identify strongly with the coach	1	2	3	4	5	6	7
3. I feel no connection with the coach	1	2	3	4	5	6	7
4. I feel a strong connection with the team	1	2	3	4	5	6	7
5. I identify strongly with the team	1	2	3	4	5	6	7
6. I feel no connection with the team	1	2	3	4	5	6	7

In the next fixture…

… how important is it for you to perform well? (please circle)

Not at all	a little	moderately	quite a bit	very much so
1	2	3	4	5

...to what extent do you feel confident that you can perform well?

Not at all	a little	moderately	quite a bit	completely

1	2	3	4	5

...to what extent do you feel confident that you fulfil your potential?

Not at all	a little	moderately	quite a bit	completely
1	2	3	4	5

To what extent do you agree with the following statement:

The more effort I put into the following fixture, the better I will do?

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1	2	3	4	5

Instructions: The following statements represent **types of goals** that you may or may not have **regarding the upcoming fixture**. For each item, circle from 1 (strongly disagree) to 7 (strongly agree) to indicate your level of agreement with the statement.

1. It is important to me to perform as well as I possibly can	1	2	3	4	5	6	7
2. I worry that I may not perform as well as I possibly can	1	2	3	4	5	6	7
3. It is important to me to do well compared to others	1	2	3	4	5	6	7
4. I just want to avoid performing worse than others	1	2	3	4	5	6	7

Instructions: The following questions refer to the **support** you **receive within your sport**. For each item, circle from 1 (not at all) to 7 (extremely so) to indicate your level of agreement with the statement.

In the build up to the upcoming fixture, to what extent has someone …

1. Cheered you up	1	2	3	4	5	6	7
2. Listened to you	1	2	3	4	5	6	7
3. Showed concern for you	1	2	3	4	5	6	7
4. Made you feel that they would always be there for you	1	2	3	4	5	6	7
5. Comforted you	1	2	3	4	5	6	7
6. Encouraged you	1	2	3	4	5	6	7
7. Emphasized your abilities	1	2	3	4	5	6	7
8. Told you, you can do it	1	2	3	4	5	6	7
9. Reinforced the positives	1	2	3	4	5	6	7
10. Boosted your confidence	1	2	3	4	5	6	7
11. Given you advice about performing in competitive situations	1	2	3	4	5	6	7
12. Given you tactical advice	1	2	3	4	5	6	7
13. Offered you ideas and suggest actions	1	2	3	4	5	6	7
14. Helped you put things in perspective	1	2	3	4	5	6	7
15. Helped you decide what to do	1	2	3	4	5	6	7
16. Given you advice about what to do	1	2	3	4	5	6	7
17. Helped plan your training	1	2	3	4	5	6	7
18. Helped with transport to training and competition/matches	1	2	3	4	5	6	7
19. Done things for you at training and competitions/matches	1	2	3	4	5	6	7
20. Helped set sessions in training	1	2	3	4	5	6	7
21. Helped you with tasks	1	2	3	4	5	6	7
22. Helped manage your training sessions	1	2	3	4	5	6	7

Appendix 2: Ethical approval letter for Chapter 2

STAFFORDSHIRE UNIVERSITY

Health Sciences

PROPORTIONATE REVIEW APPROVAL FEEDBACK

Researcher name:	**Anthony Miller**
Title of Study:	**The role of Social Identity leadership in psychophysiological responses to stress**
Status of approval:	Approved

Thank you for addressing the committee's comments. Your research proposal has now been approved by the Ethics Panel and you may commence the implementation phase of your study. You should note that any divergence from the approved procedures and research method will invalidate any insurance and liability cover from the University. You should, therefore, notify the Panel of any significant divergence from this approved proposal.

When your study is complete, please send the ethics committee an end of study report. A template can be found on the ethics BlackBoard site.

Signed: Dr Roozbeh Naemi **Date: 13.02.2018**

Chair of the Health Sciences Ethics Panel

Appendix 3: Recruitment information and questionnaires completed in Chapter 3

Information Sheet and consent form

The study you are about to consider taking part in is part of a PhD sport psychology research project.

Procedure:
Immediately before a competitive match, you will be asked to provide your name, date of birth, sex, number of siblings, type of sport you play, the name of your sports team, the name of your leader (e.g. coach), and the level of performance that you play at. After this you will be asked to fill in 8 questionnaires, taking around 20/25 minutes. Immediately after the match/fixture, you will then be asked to rate your performance out of 10. You will have the opportunity to ask any questions before completion. This process will be completed, at the start, and the end of the season.

Risks:
You will not be exposed to any physical risk, and the topics that are being investigating are not of a sensitive nature.

Anonymity:
Although you will be providing information about yourself, the information collected will be strictly confidential. You will be issued a participant number to maintain anonymity in subsequent analyses. Your name, or any identifying information will not be included in any reports.

Voluntary participation:
Your participation in this research is completely voluntary, and you may withdraw from the research at any time during, and up to two weeks after completion of the second timepoint. You do not need to provide a reason for withdrawal.

Data Storage:

Paper based, and electronic data via an external hard drive, will be stored securely in a locked filing cabinet in the research office on site at Staffordshire university (Brindley Building). Records will be kept secure for 5 years (extending to 10 years if published in a peer reviewed journal).

Ethics:

Ethical approval for this research has been obtained from Staffordshire University Faculty of Health Sciences Research Ethics Committee.

Please feel free to ask any questions that you may have regarding your participation in the study, at any time.

Contact:

If you have any further queries regarding the study after your participation please contact Anthony Miller on Anthony.miller@research.staffs.ac.uk (phone: 01782 294 866). Alternatively, you can speak to my supervisor, Dr Matthew Slater on M.Slater@staffs.ac.uk (phone: 01782 294498), or write to us at Staffordshire University, Department of Sport and Exercise, School of Life Sciences and Education, Brindley Building, Leek Road, Stoke-on-Trent, ST4 2DF.

Consent form

Please read through the following statements and acknowledge your understanding of each, by placing a tick in the brackets.

I have read and understand the information provided regarding the nature of the study ( )

I am aware of the what my participation will involve ( )

I understand that my participation is voluntary and I can withdraw from the study at any time (up to three days after completion) without providing a reason ( )

My anonymity will be respected at all times ( )

I am of at least 18 years of age and able to take part in this research ( )

All of my questions about my participation in the study have been answered satisfactorily ( )

I have read and understood the above, and give my consent to participate:

Signature: _____ Date: _____

Demographics:

Date of birth (dd/mm/yy): _____

Sex (M/F/Other): _____ Number of siblings: _____ Age:_____

Type of team sport (football/rugby/cricket etc): _____

Year's experience in your sport: _____ Nationality: _____

Level of current performance (please circle either 1, 2, 3 or 4):

1 e.g. Regional level, represent university, semi-professional

2 e.g. Involved in talent development, second/reserve team professional

3 e.g. National level, first team professional

4 e.g. International level, currently representing the nation, participated in globally recognised competition

Instructions: Please judge to what extent the leader engages in the various behaviors and activities listed by selecting the corresponding number using the following scale.

1 Disagree strongly	**2** Disagree	**3** Disagree a little	**4** Neutral	**5** Agree a little	**6** Agree	**7** Agree strongly

1. The coach embodies what the team stands for	1	2	3	4	5	6	7
2. The coach is representative of the team	1	2	3	4	5	6	7
3. The coach is a model member of the team	1	2	3	4	5	6	7
4. The coach exemplifies what it means to be a member of the team	1	2	3	4	5	6	7
5. The coach promotes the interests of the members of the team	1	2	3	4	5	6	7
6. The coach acts as a champion for the team	1	2	3	4	5	6	7

7. The coach stands up for the team	1	2	3	4	5	6	7
8. When the coach acts, he or she has the team's interests at heart	1	2	3	4	5	6	7
9. The coach makes people feel as if they are part of the same group	1	2	3	4	5	6	7
10. The coach creates a sense of cohesion within the team	1	2	3	4	5	6	7
11. The coach develops an understanding of what it means to be a member of the team	1	2	3	4	5	6	7
12. The coach shapes members' perceptions of the team's values and ideals	1	2	3	4	5	6	7
13. The coach devises activities that bring the team together	1	2	3	4	5	6	7
14. The coach arranges events that help the team function effectively	1	2	3	4	5	6	7
15. The coach creates structures that are useful for the team	1	2	3	4	5	6	7

Instructions: The following questions refer to how strongly you identify with ***your coach and your team.*** Please circle your response to each item from 1 (do not agree at all) to 7 (completely agree):

1. I feel a strong connection with the coach	1	2	3	4	5	6	7
2. I identify strongly with the coach	1	2	3	4	5	6	7
3. I feel no connection with the coach	1	2	3	4	5	6	7
4. I feel a strong connection with the team	1	2	3	4	5	6	7
5. I identify strongly with the team	1	2	3	4	5	6	7
6. I feel no connection with the team	1	2	3	4	5	6	7

In the next fixture…

… how important is it for you to perform well? (please circle)

Not at all	a little	moderately	quite a bit	very much so
1	2	3	4	5

...to what extent do you feel confident that you can perform well?

Not at all	a little	moderately	quite a bit	completely
1	2	3	4	5

...to what extent do you feel confident that you fulfil your potential?

Not at all	a little	moderately	quite a bit	completely
1	2	3	4	5

To what extent do you agree with the following statement:

The more effort I put into the following fixture, the better I will do?

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1	2	3	4	5

Instructions: The following statements represent **types of goals** that you may or may not have **regarding the upcoming fixture**. For each item, circle from 1 (strongly disagree) to 7 (strongly agree) to indicate your level of agreement with the statement.

1. It is important to me to perform as well as I possibly can	1	2	3	4	5	6	7
2. I worry that I may not perform as well as I possibly can	1	2	3	4	5	6	7
3. It is important to me to do well compared to others	1	2	3	4	5	6	7
4. I just want to avoid performing worse than others	1	2	3	4	5	6	7

Instructions: The following questions refer to the **support** you **receive within your sport**. For each item, circle from 1 (not at all) to 7 (extremely so) to indicate your level of agreement with the statement.

In the build up to the upcoming fixture, to what extent has someone …

1. Cheered you up	1	2	3	4	5	6	7
2. Listened to you	1	2	3	4	5	6	7
3. Showed concern for you	1	2	3	4	5	6	7
4. Made you feel that they would always be there for you	1	2	3	4	5	6	7
5. Comforted you	1	2	3	4	5	6	7
6. Encouraged you	1	2	3	4	5	6	7
7. Emphasized your abilities	1	2	3	4	5	6	7
8. Told you, you can do it	1	2	3	4	5	6	7
9. Reinforced the positives	1	2	3	4	5	6	7
10. Boosted your confidence	1	2	3	4	5	6	7
11. Given you advice about performing in competitive situations	1	2	3	4	5	6	7
12. Given you tactical advice	1	2	3	4	5	6	7
13. Offered you ideas and suggest actions	1	2	3	4	5	6	7
14. Helped you put things in perspective	1	2	3	4	5	6	7
15. Helped you decide what to do	1	2	3	4	5	6	7
16. Given you advice about what to do	1	2	3	4	5	6	7
17. Helped plan your training	1	2	3	4	5	6	7
18. Helped with transport to training and competition/matches	1	2	3	4	5	6	7
19. Done things for you at training and competitions/matches	1	2	3	4	5	6	7
20. Helped set sessions in training	1	2	3	4	5	6	7
21. Helped you with tasks	1	2	3	4	5	6	7
22. Helped manage your training sessions	1	2	3	4	5	6	7

Match reflection: Player

Date of birth: _____ No of siblings: _____

Please indicate how satisfied you are with your performance in the match you have just participated in? (please circle)

Totally Dissatisfied Totally Satisfied

1 2 3 4 5 6 7 8 9 10

_____

Appendix 4: Ethical Approval Letter for Chapter 3

STAFFORDSHIRE UNIVERSITY

Health Sciences

PROPORTIONATE REVIEW APPROVAL FEEDBACK

Researcher name:	**Anthony Miller**
Title of Study:	**The role of Social Identity leadership in psychophysiological responses to stress**
Status of approval:	Approved

Thank you for addressing the committee's comments. Your research proposal has now been approved by the Ethics Panel and you may commence the implementation phase of your study. You should note that any divergence from the approved procedures and research method will invalidate any insurance and liability cover from the University. You should, therefore, notify the Panel of any significant divergence from this approved proposal.

When your study is complete, please send the ethics committee an end of study report. A template can be found on the ethics BlackBoard site.

Signed: Dr Roozbeh Naemi **Date: 13.02.2018**

Chair of the Health Sciences Ethics Panel

Appendix 5: Recruitment information and questionnaires completed in Chapter 4

Recruitment information:

Information Sheet and consent form

Manipulating Challenge and Threat states through Social Identity Leadership

The study you are about to consider taking part in is part of a PhD sport psychology research project.

Procedure:
You will be asked to commit to two 30-minute sessions, one week apart. At first instance, you will be asked to complete a consent form, please read this carefully. You will be asked to sit and physiological equipment will be placed on you. This equipment comprises a finger and arm cuff, typical of a blood pressure monitor within a hospital. After setting this up, you will perform 4 minutes of seated ring toss trials after the researcher has informed you of the correct technique. A relaxation script will then play whilst you wear headphones. Then, you will listen to instructions of an upcoming ring toss task. Once played, the researcher will ask you to fill out 5 questionnaires. After this, you will be asked to take part in another seated ring toss in front of a camera (10 throws). The footage from the recording will be subject to analysis. You will have the opportunity to ask any questions before completion. You will then be asked to return for a second time, a week later, to repeat this process.

Risks:
There are no major risks involved in your participation. Some people find wearing the finger and arm cuff to be uncomfortable, but this is unlikely to occur. If you do feel discomfort you can inform the researcher and they will stop testing. In addition, given that we are researching stress and throwing performance, answering questions on these may cause emotional distress and anxiety in some individuals. Also, due to the nature of the questions, participation may affect (either adversely or favourably) performance in some individuals. There is a slight risk of injury as a result of throwing the plastic ring. A first aider is on site at all times in the event of an injury. Further, your participation in this study has no relevance to the module outcome and neither the results nor participation will be shared with the module lead or will be used in any sort of way to affect any of your study related aspects.

Anonymity:
Although you will be providing information about yourself, the information collected will be strictly confidential. You will be issued a participant number to maintain anonymity in subsequent analyses. Your name, or any identifying information will not be included in any reports, or published articles.

Voluntary participation:

Your participation in this research is completely voluntary, and you may withdraw from the research at any time during, and up to completion of data collection (28/06/2019). You do not need to provide a reason for withdrawal.

Data Storage and protection:

Paper based, and electronic data via an external hard drive, will be stored securely in a locked filing cabinet in the research office on site at Staffordshire university (Brindley Building). Records will be kept secure for 5 years (extending to 10 years if published in a peer reviewed journal).

The data controller for this project will be Staffordshire University. The University will process your personal data for the purpose of the research outlined above. The legal basis for processing your personal data for research purposes under the data protection law is a 'task in the public interest' You can provide your consent for the use of your personal data in this study by completing the consent form that has been provided to you. You have the right to access information held about you. Your right of access can be exercised in accordance with the General Data Protection Regulation. You also have other rights including rights of correction, erasure, objection, and data portability. Questions, comments and requests about your personal data can also be sent to the Staffordshire University Data Protection Officer. If you wish to lodge a complaint with the Information Commissioner's Office, please visit www.ico.org.uk.

Ethics:

Ethical approval for this research has been obtained from Staffordshire University School of Life Sciences Research Ethics Committee.

Please feel free to ask any questions that you may have regarding your participation in the study, at any time.

Contact:

If you have any further queries regarding the study after your participation please contact Anthony Miller on Anthony.miller@research.staffs.ac.uk (phone: 01782 294 866). Alternatively, you can speak to my supervisor, Dr Matthew Slater on M.Slater@staffs.ac.uk (phone: 01782 294498), or write to us at Staffordshire University, Department of Sport and Exercise, School of Life Sciences and Education, Brindley Building, Leek Road, Stoke-on-Trent, ST4 2DF.

If for any reason support is needed as a result of participating in this research, the following contacts are available;

Counselling - Student Enabling Centre
Cadman Courtyard (Cadman Building)
College Road
Stoke on Trent
Staffs
ST4 2DE

t: +44 (0)1782 294976

Mind – North Staffs
83 Marsh Street North
Hanley, Stoke-on-Trent
ST1 5HN

t: 01782 262100

e: counselling@staffs.ac.uk

Consent form

Title of project: Manipulating Challenge and Threat states through Social Identity Leadership

Researcher: Anthony James Miller

Please read through the following statements and acknowledge your understanding of each, by placing a tick in the appropriate box

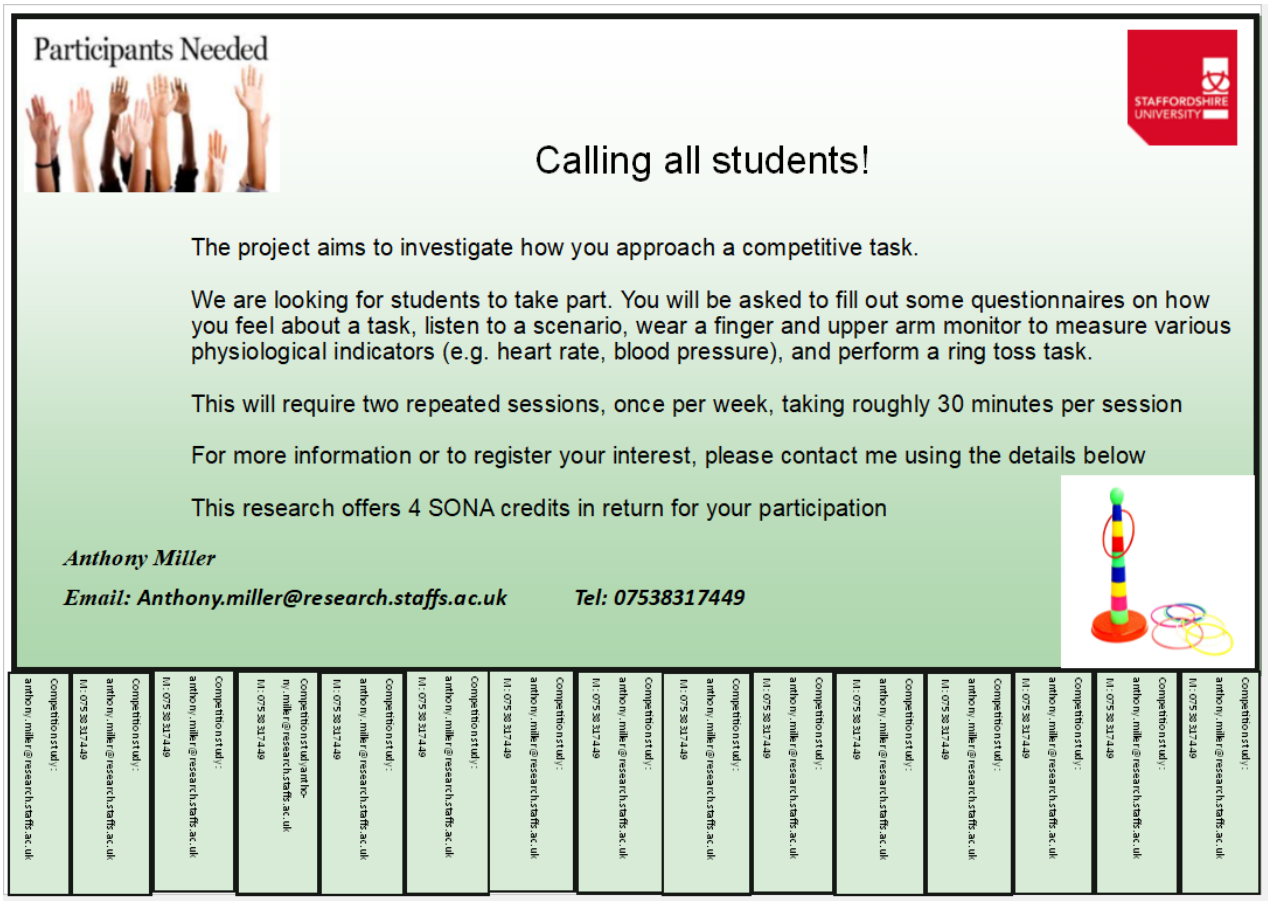
I have read and understand the information provided regarding the nature of the study	Yes ☐	No ☐
I am aware of the what my participation will involve	Yes ☐	No ☐
I understand that my participation is voluntary and I can withdraw from the study at any time (two weeks after completion of data collection; 28/06/2019) without providing a reason	Yes ☐	No ☐
My anonymity will be respected at all times	Yes ☐	No ☐
I am of at least 18 years of age and able to take part in this research	Yes ☐	No ☐
All of my questions about my participation in the study have been answered satisfactorily	Yes ☐	No ☐
I understand that the information provided may be used for research papers, conferences and teaching, but I will not be identifiable individually	Yes ☐	No ☐
All data will be sorted safely on a password protected computer (electronic data), or locked away securely (hard copies of data) for 10 years before being destroyed	Yes ☐	No ☐
I hereby give consent to take part in this study	Yes ☐	No ☐

I have read and understood the above, and give my consent to participate:

Participant signature: _____ Date: _____

Researcher signature: _____ Date: _____

Poster for recruitment:



Questionnaires:

Demographics:

Date of birth (dd/mm/yy): _____

Sex (M/F/Other): _____ Number of siblings: _____ Age:___

Course you are enrolled on: _____

Level of study: _____ (e.g. First year undergraduate is level 4)

Instructions: Please judge to what extent John engages in the various behaviors and activities listed by selecting the corresponding number using the following scale.

1 Disagree strongly	**2** Disagree	**3** Disagree a little	**4** Neutral	**5** Agree a little	**6** Agree	**7** Agree strongly

1. John embodies what the team stands for	1	2	3	4	5	6	7
2. John is representative of the team	1	2	3	4	5	6	7
3. John is a model member of the team	1	2	3	4	5	6	7
4. John exemplifies what it means to be a member of the team	1	2	3	4	5	6	7
5. John promotes the interests of the members of the team	1	2	3	4	5	6	7
6. John acts as a champion for the team	1	2	3	4	5	6	7
7. John stands up for the team	1	2	3	4	5	6	7
8. When John acts, he has the team's interests at heart	1	2	3	4	5	6	7
9. John makes people feel as if they are part of the same group	1	2	3	4	5	6	7
10. John creates a sense of cohesion within the team	1	2	3	4	5	6	7
11. John develops an understanding of what it means to be a member of the team	1	2	3	4	5	6	7
12. John shapes members' perceptions of the teams values and ideals	1	2	3	4	5	6	7
13. John devises activities that bring the team together	1	2	3	4	5	6	7
14. John arranges events that help the team function effectively	1	2	3	4	5	6	7
15. John creates structures that are useful for the team	1	2	3	4	5	6	7

Instructions: The following questions refer to how strongly you identify with ***John*** and ***your team***. Please circle your response to each item from 1 (not at all) to 7 (very true):

1. I feel a strong connection with the leader	1	2	3	4	5	6	7
2. I identify strongly with the leader	1	2	3	4	5	6	7
3. I feel no connection with the leader	1	2	3	4	5	6	7
4. I feel a strong connection with my team	1	2	3	4	5	6	7
5. I identify strongly with my team	1	2	3	4	5	6	7
6. I feel no connection with my team	1	2	3	4	5	6	7

In the following ring toss task…

… how important is it for you to perform well? (please circle)

Not at all	a little	moderately	quite a bit	very much so
1	2	3	4	5

...to what extent do you feel confident that you can perform well?

Not at all	a little	moderately	quite a bit	completely
1	2	3	4	5

...to what extent do you feel confident that you fulfil your potential?

Not at all	a little	moderately	quite a bit	completely
1	2	3	4	5

To what extent do you agree with the following statement:

The more effort I put into the task, the better I will do?

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1	2	3	4	5

Instructions: The following statements represent **types of goals** that you may or may not have **regarding the upcoming throwing task.** For each item, circle from 1 (strongly disagree) to 7 (strongly agree) to indicate your level of agreement with the statement.

1. It is important to me to perform as well as I possibly can	1	2	3	4	5	6	7
2. I worry that I may not perform as well as I possibly can	1	2	3	4	5	6	7
3. It is important to me to do well compared to others	1	2	3	4	5	6	7
4. I just want to avoid performing worse than others	1	2	3	4	5	6	7

1. John showed me that he loves and accepts me	1	2	3	4	5	6	7
2. John comforted me when I was feeling bad	1	2	3	4	5	6	7
3. John left me alone	1	2	3	4	5	6	7
4. John did not show much empathy for my situation	1	2	3	4	5	6	7
5. John criticized me	1	2	3	4	5	6	7
6. John made me feel valued and important	1	2	3	4	5	6	7
7. John expressed concern about my condition	1	2	3	4	5	6	7
8. John assured me that I can rely completely on him	1	2	3	4	5	6	7
9. John encouraged me not to give up	1	2	3	4	5	6	7
10. John was there when I needed him	1	2	3	4	5	6	7
11. John took care of many things for me	1	2	3	4	5	6	7
12. John took care of things I could not manage on my own	1	2	3	4	5	6	7
13. John helped me find something positive in my situation	1	2	3	4	5	6	7
14. John suggested activities that might distract me	1	2	3	4	5	6	7

Instructions: Please indicate the frequency with which you received each type of support by ***John*** in the build up to the following throwing task. Please tick one of the following response options per question. For each item, circle from 1 (not at all) to 7 (completely) to indicate your level of agreement with the statement.

In as many words as you like, please identify what you think this study was about?

_____
_____
_____
_____

I hereby agree to not share any details of the study with anybody else:

Participant Signature: _____

Participant Debrief

Thank you for taking part in this study. The purpose of this study was to identify whether John, the leader, had any effect on your approach to the competitive throwing task. We hypothesized that exposure to positive leadership behaviours was likely to positively influence your approach to the task. Further, we hypothesized that exposure to positive leadership behaviours will improve ring toss performance as a result.

To confirm, no league table will be generated with scores from the throwing task, nor will there be an email to inform all participants of said scores. The camera was recording during the throwing task and will be used in the analysis. However, your footage will not be seen by anyone other than the research and supervisory team (below) and will be securely stored on an encrypted hard drive. The scores in the throwing task will be anonymised and used purely for research purposes. Only the researcher will have access to this information.

For more detailed explanations, or if you wish to know the results of the study, please contact the researcher using the contact details below.

Your details will be kept confidential at all times, and complete anonymity will be maintained. Raw data will be kept in a locked cabinet, which will only be accessible to the researcher and supervisors. Raw data will be destroyed after five years. In the case of the data being used for academic publication, materials may be kept until ten years have passed from the date of publication.

If you wish to withdraw your data you need to contact the researcher using the contact details below and quote your date of birth and number of siblings. No other information is required and you will not be asked to provide a reason.

If for any reason support is needed as a result of participating in this research, the following contacts are available;

Counselling - Student Enabling Centre
Cadman Courtyard (Cadman Building)
e: counselling@staffs.ac.uk
t: +44 (0)1782 294976

Mind – North Staffs
83 Marsh Street North
t: 01782 262100

Researcher's contact details:

Anthony Miller

Ashley 2 Mezzanine

Leek Road,

Stoke-on-Trent,

Staffordshire,

ST4 2DF

Email: Anthony.miller@research.staffs.ac.uk

Phone: 01782 294866

Supervisor Contact details:

Dr Matthew Slater

Email: M.Slater@staffs.ac.uk

Phone: 01782 294498

Appendix 6: Ethical Approval Letter for Chapter 4

STAFFORDSHIRE UNIVERSITY

Life Sciences and Education

ETHICAL APPROVAL FEEDBACK

Researcher name:	Anthony Miller
Title of Study:	Social Identity Leadership and Challenge and Threat states: Predicting mathematic ability (Manipulating Challenge and Threat states through Social Identity Leadership)
Award Pathway:	**PhD**
Status of approval:	**Amendment approved**

Thank you for your correspondence requesting approval of a minor amendment to your previously approved application which are highlighted in your letter to me dated 01.11.2018.

Your amended application is approved. We wish you well with your research.

Action now needed:

Your amendment has now been approved by the Health Sciences Ethics Panel.

You should note that any divergence from the approved procedures and research method will invalidate any insurance and liability cover from the University. You should, therefore, notify the Panel in writing of any significant divergence from this approved proposal.

You should arrange to meet with your supervisor for support during the process of completing your study and writing your dissertation.

When your study is complete, please send the ethics committee an end of study report. A template can be found on the ethics BlackBoard site

Signed: Dr Roozbeh Naemi **Date: 02.11.2018**

Ethics Coordinator
School of Life Sciences and Education

Appendix 7: Instructions for Chapter 4

Relaxation script:

...make yourself comfortable...and gently allow your eyelids to close...and as you sit there...with your eyes comfortably closed...I want you to think of something pleasant...maybe a peaceful...tranquil scene...and I want you to let all the muscles of your body to go quite limp and slack...first...the muscles of your feet and ankles...let them relax...let them go...limp and slack...now...the muscles of your calves...let them go...limp and slack...allow them to relax...now the muscles of your thighs...let them relax...let them go...limp and slack allow them to relax...and already...you can feel a feeling of heaviness in your legs...your legs are beginning to feel as heavy as lead...let your legs go...as heavy as lead...let them relax completely...and as you do so...you are becoming drowsier and drowsier...you feel completely at peace...your mind calm and contended...you are really enjoying this very pleasant...drowsy feeling...and now...that feeling of relaxation is spreading upwards over the whole of your body...let your stomach muscles relax...let them go...limp and slack...now...the muscles of your chest...your body...and your back...let them go limp and slack...allow them to relax...and you can feel a feeling of heaviness in your body...as though your body is feeling just as heavy as lead...as if it is wanting to sink down...deeper and deeper into the chair...just let your body go...heavy as lead...let it sink comfortably into the chair...and as it does so...you are feeling drowsier and drowsier...just let yourself relax...more and more completely...you are feeling warm and comfortable...completely at peace...and that pleasant feeling of relaxation...is now spreading to your neck...your shoulders...and your arms...let your neck muscles relax...let them go...limp and slack...now the muscles of your shoulders...let them go limp and slack...allow them to relax...now the muscles of your arms...let them relax...let them go limp and slack...and you can feel a feeling of heaviness in your arms...as if your arms are becoming just as heavy as lead...just let your arms go...heavy as lead...let them relax completely...and as you sit there...all the way deep down...and comfortable in the chair...breathing freely and easily… in a few moments you will listen to an audio clip instructing you of the next task, you may open your eyes…

Audio instructions: High social identity leadership instructions:

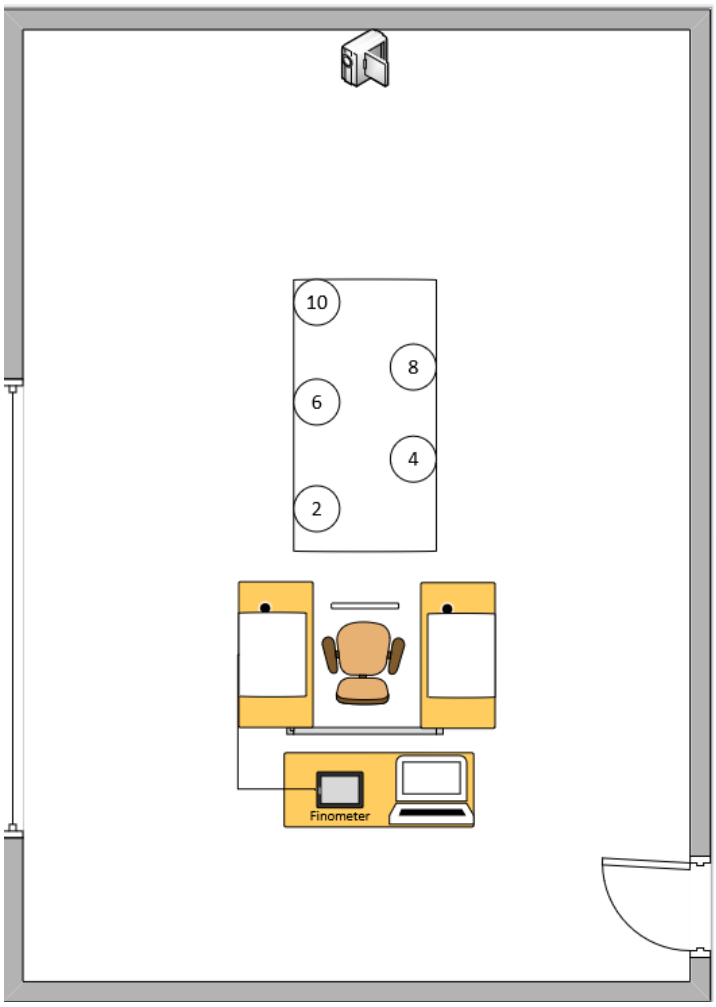
Hello. My name is John. In a few moments you will complete a ring toss throwing task as part of a team. You will sit 1 metre away from the targets and must throw the ring onto the targets 10 times. The further away the target, the higher you will score. The maximum you can score is 100 points. The task will be video recorded and will be done in-front of the researcher. Your scores on the task, along with everyone else's scores, will generate a league table from best performers to worst performers, and this will be emailed to all participants at the conclusion of the study. Because everyone will see your scores it is important for you to do well in this difficult throwing task. You must try very hard to do well on this task. I will be your leader for this task, and you are in my team. I will represent the qualities that define our team and what it means to be a member of our team. I know what makes this team special and distinct from other teams. I will be an exemplary and model member of our team. I will promote the interests of our team, standing up for our team's interests. I'll champion these ambitions we have that are key to our team as a whole. I will bring us together as a team. We will all feel part of the same group, knowing our core values, norms, and ideals. To achieve our goals, I will create structures that will allow us all to achieve success as a team. We will achieve, and we will show other teams that we matter. Please keep as still as you can for 2-minutes while you think about the upcoming ring toss task, and we collect some cardiovascular data.

Audio instructions: Low social identity leadership:

Hello. My name is John. In a few moments you will complete a ring toss throwing task as part of a team. You will sit 1 metre away from the targets and must throw the ring onto the targets 10 times. The further away the target, the higher you will score. The maximum you can score is 100 points. The task will be video recorded and will be done in-front of the researcher. Your scores on the task, along with everyone else's scores, will generate a league table from best performers to worst performers, and this will be emailed to all participants at the conclusion of the study. Because everyone will see your scores it is important for you to do well in this difficult throwing task. You must try very hard to do well on this task. I will be your leader for this task, and you are in my team. Even though I lead our team, I do not represent or know the qualities that define our team nor what it means to be a member

of this team. I do not know what makes this team special and distinct from other teams. As such, I will not be able to be an exemplary and model member of our team. Because of this, I will not promote the interests of the team, nor will I be able to stand up for the team's interests. I will not be able to champion the team's ambitions. I will not be able to bring us together as a team. We may not feel part of the same group, as I don't know your core values, norms, and ideals. I will not be able to create structures that will allow us all to achieve success. Please keep as still as you can for 2-minutes while you think about the upcoming ring toss task, and we collect some cardiovascular data.

Appendix 8: Experimental set up for Chapters 4 and 5



Appendix 9: Recruitment information and questionnaires completed in Chapter 5

Recruitment information:

Information Sheet and consent form

Manipulating challenge and threat appraisals: The effect of social identity leadership on stress reactivity and throwing performance.

The study you are about to consider taking part in is part of a PhD sport psychology research project.

Procedure:

You will be asked to commit to a single 30-minute session. At first instance, you will be asked to complete a consent form, please read this carefully. You will be asked to sit and physiological equipment will be placed on you. This equipment comprises a finger and arm cuff, typical of a blood pressure monitor within a hospital. After setting this up, you will perform 4 minutes of seated ring toss trials after the researcher has informed you of the correct technique. A relaxation script will then play whilst you wear headphones. Then, you will listen to instructions of an upcoming ring toss task. Once played, the researcher will ask you to fill out 5 questionnaires. After this, you will be asked to take part in another seated ring toss in front of a camera (10 throws). The footage from the recording will be subject to analysis. You will have the opportunity to ask any questions before completion.

Risks:

There are no major risks involved in your participation. Some people find wearing the finger and arm cuff to be uncomfortable, but this is unlikely to occur. If you do feel discomfort you can inform the researcher and they will stop testing. In addition, given that we are researching stress and throwing performance, answering questions on these may cause emotional distress and anxiety in some individuals. Also, due to the nature of the questions, participation may affect (either adversely or favourably) performance in some individuals. There is a slight risk of injury as a result of throwing the plastic ring. A first aider is on site at all times in the event of an injury. Further, your participation in this study has no relevance to the module outcome and neither the results nor participation will be shared with the module lead or will be used in any sort of way to affect any of your study related aspects.

Anonymity:

Although you will be providing information about yourself, the information collected will be strictly confidential. You will be issued a participant number to maintain anonymity in subsequent analyses. Your name, or any identifying information will not be included in any reports, or published articles.

Voluntary participation:

Your participation in this research is completely voluntary, and you may withdraw from the research at any time during, and up to completion of data collection (28/06/2019). You do not need to provide a reason for withdrawal.

Data Storage and protection:

Paper based, and electronic data via an external hard drive, will be stored securely in a locked filing cabinet in the research office on site at Staffordshire university (Ashley 2 Building). Records will be kept secure for 5 years (extending to 10 years if published in a peer reviewed journal).

The data controller for this project will be Staffordshire University. The University will process your personal data for the purpose of the research outlined above. The legal basis for processing your personal data for research purposes under the data protection law is a 'task in the public interest' You can provide your consent for the use of your personal data in this study by completing the consent form that has been provided to you. You have the right to access information held about you. Your right of access can be exercised in accordance with the General Data Protection Regulation. You also have other rights including rights of correction, erasure, objection, and data portability. Questions, comments and requests about your personal data can also be sent to the Staffordshire University Data Protection Officer. If you wish to lodge a complaint with the Information Commissioner's Office, please visit www.ico.org.uk. Personal data shall be processed lawfully, fairly and in a transparent manner, collected only for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes. Data will be adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed. All data will be accurate and kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the personal data are processed. Data will be processed in a manner that ensures appropriate security of the personal data, including protection against unauthorised or unlawful processing and against accidental loss, destruction or damage, using appropriate technical or organisational measures.

Ethics:

Ethical approval for this research has been obtained from Staffordshire University School of Life Sciences Research Ethics Committee.

Please feel free to ask any questions that you may have regarding your participation in the study, at any time.

Contact:

If you have any further queries regarding the study after your participation please contact Anthony Miller on Anthony.miller@research.staffs.ac.uk (phone: 01782 294 866). Alternatively, you can speak to my supervisor, Dr Matthew Slater on M.Slater@staffs.ac.uk (phone: 01782 294498), or write to us at Staffordshire University, Department of Sport and Exercise, School of Life Sciences and Education, Brindley Building, Leek Road, Stoke-on-Trent, ST4 2DF.

If for any reason support is needed as a result of participating in this research, the following contacts are available;

Counselling - Student Enabling Centre
Cadman Courtyard (Cadman Building)
College Road
Stoke on Trent
Staffs
ST4 2DE

Mind – North Staffs
83 Marsh Street North
Hanley, Stoke-on-Trent
ST1 5HN

t: +44 (0)1782 294976 t: 01782 262100
e: counselling@staffs.ac.uk

Consent form

Title of project: Manipulating challenge and threat appraisals: The effect of social identity leadership on stress reactivity and throwing performance.

Researcher: Anthony James Miller

Please read through the following statements and acknowledge your understanding of each, by placing a tick in the appropriate box

I have read and understand the information provided regarding the nature of the study	Yes ☐	No ☐
I am aware of the what my participation will involve	Yes ☐	No ☐
I understand that my participation is voluntary and I can withdraw from the study at any time (two weeks after completion of data collection; 28/06/2019) without providing a reason	Yes ☐	No ☐
My anonymity will be respected at all times	Yes ☐	No ☐
I am of at least 18 years of age and able to take part in this research	Yes ☐	No ☐
All of my questions about my participation in the study have been answered satisfactorily	Yes ☐	No ☐
I understand that the information provided may be used for research papers, conferences and teaching, but I will not be identifiable individually	Yes ☐	No ☐
All data will be sorted safely on a password protected computer (electronic data), or locked away securely (hard copies of data) for 10 years before being destroyed	Yes ☐	No ☐
I hereby give consent to take part in this study	Yes ☐	No ☐

I have read and understood the above, and give my consent to participate:

Participant signature: _____ Date: _____

Researcher signature: _____ Date: _____

Demographics:

Date of birth (dd/mm/yy): _____

Sex (M/F/Other): _____ Number of siblings: _____ Age:___

Course you are enrolled on: _____

Level of study: _____ (e.g. First year undergraduate is level 4)

Instructions: Please judge to what extent John engages in the various behaviors and activities listed by selecting the corresponding number using the following scale.

1 Disagree strongly	**2** Disagree	**3** Disagree a little	**4** Neutral	**5** Agree a little	**6** Agree	**7** Agree strongly

1. John embodies what the team stands for	1	2	3	4	5	6	7
2. John is representative of the team	1	2	3	4	5	6	7
3. John is a model member of the team	1	2	3	4	5	6	7
4. John exemplifies what it means to be a member of the team	1	2	3	4	5	6	7
5. John promotes the interests of the members of the team	1	2	3	4	5	6	7
6. John acts as a champion for the team	1	2	3	4	5	6	7
7. John stands up for the team	1	2	3	4	5	6	7
8. When John acts, he has the team's interests at heart	1	2	3	4	5	6	7
9. John makes people feel as if they are part of the same group	1	2	3	4	5	6	7
10. John creates a sense of cohesion within the team	1	2	3	4	5	6	7
11. John develops an understanding of what it means to be a member of the team	1	2	3	4	5	6	7
12. John shapes members' perceptions of the teams values and ideals	1	2	3	4	5	6	7
13. John devises activities that bring the team together	1	2	3	4	5	6	7
14. John arranges events that help the team function effectively	1	2	3	4	5	6	7
15. John creates structures that are useful for the team	1	2	3	4	5	6	7

Instructions: The following questions refer to how strongly you identify with ***John*** and ***your team***. Please circle your response to each item from 1 (not at all) to 7 (very true):

1. I feel a strong connection with the leader	1	2	3	4	5	6	7
2. I identify strongly with the leader	1	2	3	4	5	6	7
3. I feel no connection with the leader	1	2	3	4	5	6	7
4. I feel a strong connection with my team	1	2	3	4	5	6	7

5. I identify strongly with my team	1	2	3	4	5	6	7
6. I feel no connection with my team	1	2	3	4	5	6	7

In the following ring toss task…

… how important is it for you to perform well? (please circle)

Not at all	a little	moderately	quite a bit	very much so
1	2	3	4	5

...to what extent do you feel confident that you can perform well?

Not at all	a little	moderately	quite a bit	completely
1	2	3	4	5

...to what extent do you feel confident that you fulfil your potential?

Not at all	a little	moderately	quite a bit	completely
1	2	3	4	5

To what extent do you agree with the following statement:

The more effort I put into the task, the better I will do?

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
1	2	3	4	5

Instructions: The following statements represent **types of goals** that you may or may not have **regarding the upcoming throwing task.** For each item, circle from 1 (strongly disagree) to 7 (strongly agree) to indicate your level of agreement with the statement.

1. It is important to me to perform as well as I possibly can	1	2	3	4	5	6	7
2. I worry that I may not perform as well as I possibly can	1	2	3	4	5	6	7
3. It is important to me to do well compared to others	1	2	3	4	5	6	7
4. I just want to avoid performing worse than others	1	2	3	4	5	6	7

Instructions: Please indicate the frequency with which you received each type of support by ***John*** in the build up to the following throwing task. Please tick one of the following response options per question. For each item, circle from 1 (not at all) to 7 (completely) to indicate your level of agreement with the statement.

1. John showed me that he loves and accepts me	1	2	3	4	5	6	7
2. John comforted me when I was feeling bad	1	2	3	4	5	6	7
3. John left me alone	1	2	3	4	5	6	7
4. John did not show much empathy for my situation	1	2	3	4	5	6	7
5. John criticized me	1	2	3	4	5	6	7
6. John made me feel valued and important	1	2	3	4	5	6	7
7. John expressed concern about my condition	1	2	3	4	5	6	7
8. John assured me that I can rely completely on him	1	2	3	4	5	6	7
9. John encouraged me not to give up	1	2	3	4	5	6	7
10. John was there when I needed him	1	2	3	4	5	6	7
11. John took care of many things for me	1	2	3	4	5	6	7
12. John took care of things I could not manage on my own	1	2	3	4	5	6	7
13. John helped me find something positive in my situation	1	2	3	4	5	6	7
14. John suggested activities that might distract me	1	2	3	4	5	6	7

In as many words as you like, please identify what you think this study was about?

_____
_____
_____
_____

I hereby agree to not share any details of the study with anybody else:

Participant Signature: _____

Participant Debrief

Thank you for taking part in this study. The purpose of this study was to identify whether John, the leader, had any effect on your approach to the competitive throwing task. We hypothesized that exposure to positive leadership behaviours was likely to positively influence your approach to the task. Further, we hypothesized that exposure to positive leadership behaviours will improve ring toss performance as a result. We further hypothesized that the ego strengthening and weakening instructions will influence your approach to, and performance on, the throwing task.

To confirm, no league table will be generated with scores from the throwing task, nor will there be an email to inform all participants of said scores. The camera was recording during the throwing task and will be used in the analysis. However, your footage will not be seen by anyone other than the research and supervisory team (below) and will be securely stored on an encrypted hard drive. The scores in the throwing task will be anonymised and used purely for research purposes. Only the researcher will have access to this information. For more detailed explanations, or if you wish to know the results of the study, please contact the researcher using the contact details below.

Your details will be kept confidential at all times, and complete anonymity will be maintained. Raw data will be kept in a locked cabinet, which will only be accessible to the researcher and supervisors. Raw data will be destroyed after five years. In the case of the data being used for academic publication, materials may be kept until ten years have passed from the date of publication.

If you wish to withdraw your data you need to contact the researcher using the contact details below and quote your date of birth and number of siblings. No other information is required and you will not be asked to provide a reason.

If for any reason support is needed as a result of participating in this research, the following contacts are available;

Counselling - Student Enabling Centre
Cadman Courtyard (Cadman Building)
e: counselling@staffs.ac.uk
t: +44 (0)1782 294976

Mind – North Staffs
83 Marsh Street North
t: 01782 262100

Researcher's contact details:

Anthony Miller

Ashley 2 Mezzanine

Leek Road,

Stoke-on-Trent,

Staffordshire,

ST4 2DF

Email: Anthony.miller@research.staffs.ac.uk

Phone: 01782 294866

Supervisor Contact details:

Dr Matthew Slater

Email: M.Slater@staffs.ac.uk

Phone: 01782 294498

Appendix 10: Instructions for Chapter 5

Relaxation script:

...make yourself comfortable...and gently allow your eyelids to close...and as you sit there...with your eyes comfortably closed...I want you to think of something pleasant...maybe a peaceful...tranquil scene...and I want you to let all the muscles of your body to go quite limp and slack...first...the muscles of your feet and ankles...let them relax...let them go...limp and slack...now...the muscles of your calves...let them go...limp and slack...allow them to relax...now the muscles of your thighs...let them relax...let them go...limp and slack allow them to relax...and already...you can feel a feeling of heaviness in your legs...your legs are beginning to feel as heavy as lead...let your legs go...as heavy as lead...let them relax completely...and as you do so...you are becoming drowsier and drowsier...you feel completely at peace...your mind calm and contended...you are really enjoying this very pleasant...drowsy feeling...and now...that feeling of relaxation is spreading upwards over the whole of your body...let your stomach muscles relax...let them go...limp and slack...now...the muscles of your chest...your body...and your back...let them go limp and slack...allow them to relax...and you can feel a feeling of heaviness in your body...as though your body is feeling just as heavy as lead...as if it is wanting to sink down...deeper and deeper into the chair...just let your body go...heavy as lead...let it sink comfortably into the chair...and as it does so...you are feeling drowsier and drowsier...just let yourself relax...more and more completely...you are feeling warm and comfortable...completely at peace...and that pleasant feeling of relaxation...is now spreading to your neck...your shoulders...and your arms...let your neck muscles relax...let them go...limp and slack...now the muscles of your shoulders...let them go limp and slack...allow them to relax...now the muscles of your arms...let them relax...let them go limp and slack...and you can feel a feeling of heaviness in your arms...as if your arms are becoming just as heavy as lead...just let your arms go...heavy as lead...let them relax

completely...and as you sit there...all the way deep down...and comfortable in the chair...breathing freely and easily...

… in a few moments you will listen to an audio clip instructing you of the next task, you may open your eyes…

Audio instructions:

High social identity leadership challenge instructions

Hello. My name is John. In a few moments you will complete a ring toss throwing task as part of a team. Whilst seated facing the targets in front of you, you must throw the ring onto the targets 10 times. The further away the target, the higher you will score. The maximum you can score is 100 points. You will have performed similar actions in the past. Because of this experience, you can feel confident that you will score highly. We would like you to try your upmost to score as highly as possible. The equipment is set up to allow you to complete the task without complications. The task will be video recorded and will be done in-front of the researcher. Your scores on the task, along with everyone else's scores, will generate a league table from best performers to worst performers, and this will be emailed to all participants at the conclusion of the study. Because everyone will see your scores it is important for you to do well in this difficult throwing task. You must try very hard to do well on this task. I will be your leader for this task, and you are in my team. I will represent the qualities that define our team and what it means to be a member of our team. I know what makes this team special and distinct from other teams. I will be an exemplary and model member of our team. I will promote the interests of our team, standing up for our team's interests. I'll champion these ambitions we have that are key to our team as a whole. I will bring us together as a team. We will all feel part of the same group, knowing our core values,

norms, and ideals. To achieve our goals, I will create structures that will allow us all to achieve success as a team. We will achieve, and we will show other teams that we matter. Please keep as still as you can for 2-minutes while you think about the upcoming ring toss task, and we collect some cardiovascular data.

High social identity leadership threat instructions

Hello. My name is John. In a few moments you will complete a ring toss throwing task as part of a team. Whilst seated facing the targets in front of you, you must throw the ring onto the targets 10 times. The further away the target, the higher you will score. The maximum you can score is 100 points. However, it is unlikely that you will have done a task like this before, so you obviously can't be sure that you will perform well, so do try to avoid missing the poles. Also, complications are likely, as unavoidable nerves can majorly influence your throw. The task will be video recorded and will be done in-front of the researcher. Your scores on the task, along with everyone else's scores, will generate a league table from best performers to worst performers, and this will be emailed to all participants at the conclusion of the study. Because everyone will see your scores it is important for you to do well in this difficult throwing task. You must try very hard to do well on this task. I will be your leader for this task, and you are in my team. I will represent the qualities that define our team and what it means to be a member of our team. I know what makes this team special and distinct from other teams. I will be an exemplary and model member of our team. I will promote the interests of our team, standing up for our team's interests. I'll champion these ambitions we have that are key to our team as a whole. I will bring us together as a team. We will all feel part of the same group, knowing our core values, norms, and ideals. To achieve our goals, I will create structures that will allow us all to achieve success as a team. We will achieve, and we will show other teams that we matter. Please keep as still as you can for 2-minutes while you think about the upcoming ring toss task, and we collect some cardiovascular data.

Low social identity leadership challenge instructions

Hello. My name is John. In a few moments you will complete a ring toss throwing task as part of a team. Whilst seated facing the targets in front of you, you must throw the ring onto the targets 10 times. The further away the target, the higher you will score. The maximum you can score is 100 points. You will have performed similar actions in the past. Because of this experience, you can feel confident that you will score highly. We would like you to try your upmost to score as highly as possible. The equipment is set up to allow you to complete the task without complications. The task will be video recorded and will be done in-front of the researcher. Your scores on the task, along with everyone else's scores, will generate a league table from best performers to worst performers, and this will be emailed to all participants at the conclusion of the study. Because everyone will see your scores it is important for you to do well in this difficult throwing task. You must try very hard to do well on this task. I will be your leader for this task, and you are in my team. I do not represent the qualities that define our team and what it means to be a member of our team. I do not know what makes this team special and distinct from other teams. I will not be an exemplary and model member of our team. I will not promote the interests of our team, nor will I stand up for our team's interests. I will not champion these ambitions we have that are key to our team as a whole. I will not bring us together as a team. We may not feel part of the same group, as I don't know your core values, norms, and ideals. I will not create structures that will allow us all to achieve success. Please keep as still as you can for 2-minutes while you think about the upcoming ring toss task, and we collect some cardiovascular data.

Low social identity leadership threat instructions

Hello. My name is John. In a few moments you will complete a ring toss throwing task as part of a team. Whilst seated facing the targets in front of you, you must throw the ring onto

the targets 10 times. The further away the target, the higher you will score. The maximum you can score is 100 points. However, it is unlikely that you will have done a task like this before, so you obviously can't be sure that you will perform well, so do try to avoid missing the poles. Also, complications are likely, as unavoidable nerves can majorly influence your throw. The task will be video recorded and will be done in-front of the researcher. Your scores on the task, along with everyone else's scores, will generate a league table from best performers to worst performers, and this will be emailed to all participants at the conclusion of the study. Because everyone will see your scores it is important for you to do well in this difficult throwing task. You must try very hard to do well on this task. I will be your leader for this task, and you are in my team. Even though I lead our team, I do not represent or know the qualities that define our team nor what it means to be a member of this team. I do not know what makes this team special and distinct from other teams. As such, I will not be able to be an exemplary and model member of our team. Because of this, I will not promote the interests of the team, nor will I be able to stand up for the team's interests. I will not be able to champion the team's ambitions. I will not be able to bring us together as a team. We may not feel part of the same group, as I don't know your core values, norms, and ideals. I will not be able to create structures that will allow us all to achieve success. Please keep as still as you can for 2-minutes while you think about the upcoming ring toss task, and we collect some cardiovascular data.

Appendix 11: Ethical Approval Letter for Chapter 5

Life Sciences and Education

ETHICAL APPROVAL FEEDBACK

Researcher name:	Anthony James Miller
Title of Study:	Manipulating challenge and threat appraisals: The effect of social identity leadership on stress reactivity and throwing performance.
Status of approval:	Approved

Thank you for addressing the committee's comments. Your research proposal has now been approved by the Ethics Panel and you may commence the implementation phase of your study. You should note that any divergence from the approved procedures and research method will invalidate any insurance and liability cover from the University. You should, therefore, notify the Panel of any significant divergence from this approved proposal.

You should arrange to meet with your supervisor for support during the process of completing your study and writing your dissertation.

When your study is complete, please send the ethics committee an end of study report. A template can be found on the ethics BlackBoard site.

Signed: Dr Roozbeh Naemi **Date: 19.02.2019**

Ethics Coordinator
School of Life Sciences and Education