# *How the Interaction of Domain and Situational Achievement Goals Influences Task Performance.*

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# How the Interaction of Domain and Situational Achievement Goals Influences Task Performance


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# Abstract

This thesis theoretically and empirically explores the application of achievement goal theory (AGT) for improving task performance. As one of most influential social-cognitive theories of achievement motivation, AGT has provided insight into the application of approach-based achievement goals by coaches and teachers to enhance performance. However, the question remains, which of the approach-based goals is the best? Using five empirical studies this thesis explores the consequences of the interaction between individuals' domain goals and situationally imposed mastery and performance-approach goals on facilitating task performance.

Study 1 (N = 15) piloted a methodology to examine the effects of the interaction between situational and domain goal congruency on sequence recall and goal valuation. Study 2 (N = 79) transitioned to the sport domain and considered the consequences of goal congruency for state anxiety, goal valuation, and reaction time performance. Study 3 (N = 129) embedded the methodological modifications noted in previous chapters and replicated an exploration of the facilitatory effects of congruent performance-approach goals identified in study 1. Study 4 (N = 81) then explored variations in the goal congruency relationship using a more complex physical task via the Speed, Time, Accuracy, Reaction, Response machine.

The thesis contributes to a limited literature that uses within-subjects designs to investigate achievement goals and task performance. It provides initial evidence to affirm the importance of domain goals, the differentiation between imposed and adopted situational goals, and the need to consider the integrative effects on task performance. It also provides data that challenges previous notions of the debilitating effects of performance goals. Overall, the thesis advocates both the need for consistent conceptualisation and operationalisation of achievement goals and the consideration of the interacting relationships of AGT components.

# Declaration

I confirm that none of the material presented in this thesis has been submitted elsewhere for any other qualification and is my own work unless referenced otherwise.

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# Chapter 1

## Introduction

"The drive for performance is fundamental to human nature" (Van Yperen et al., 2014)

Understanding why people behave in certain ways to achieve their goals has been a topic of fascination across contexts in both scientific and public discourse (Clancy et al., 2016). As of mid-2021, searching "motivation" in ScienceDirect returns 676,804 results, demonstrating a steady increase in published work over the last two decades: from 8,782 results in 2000 to 44,460 results in 2020. Additionally, to see the diverse applicability and interest in motivation, one need only look at the many domains in which motivational research is conducted, from educational (Ames, 1992; Dweck, 1986; Elliot, 1999; Nicholls, 1984; Senko, 2019) to occupational (Van Yperen & Orehek, 2013) to exercise, physical and competitive sport (Fernandez-Rio et al., 2014; Kavussanu et al., 2009; Mulvenna et al., 2020; Van Yperen, 2021). By pursuing the goal of understanding motivation, insights can be gained into why some people succeed and others may not in the same situation. However, the study of motivation has not always been simple.

To study a psychological construct, such as motivation, it is necessary to operationalise it. This is something which has proved problematic in the case of motivation. As Roberts et al. (2007, p.3) remarked "motivation is defined so broadly by some that it incorporates the whole field of psychology, so narrowly by others that it is almost useless as an organising construct". Robert et al.'s statement is supported by the generation of over 102 definitions even by the 1980's (Kleiginna & Kleiginna, 1981). The diversity of definitions affects the operationalisation of motivation in empirical investigation. For example, Vallerand and Thills (1933) note motivation, as a hypothetical construct, describes the breadth of initiation, direction, intensity and persistence of behaviour as the result of the influence of internal and external forces. This operationalisation is important to note for the context of this thesis, which will focus on the examination of internal and external forces that influence the intensity of task engagement and persistence in task performance through examination of performance outcomes. However, such investigation poses a critical question: what is the best way to generate and sustain motivation?

In a bid to answer this critical question, it is necessary to explore the theoretical construct of needs. The role of needs in motivated behaviour is complex and has been explored from a range of perspectives. These include need hierarchies for self-actualisation (e.g., Maslow, 1954), basic needs required for growth and development linked to psychological needs or drives (e.g., Self-Determination Theory, Deci & Ryan, 1985 or Drive-Reduction theory, Hull, 1943), acquired or learnt needs theory (e.g., affiliation, power, McClelland, 1961; McClelland & Boyatzis, 1982). This thesis, however, focuses specifically on the need for achievement (McClelland, 1961), which relates to an individual's motivation to engage in achievement related behaviours, otherwise referred to as achievement motivation (Harter & Connell, 1984). Achievement motivation differs from other forms of motivation because it is associated with tasks or situations where outcomes related to performance can be objectively measured in terms of success or failure (Wigfield et al., 2015). This differentiation makes achievement motivation particularly interesting to examine, both theoretically and empirically, when related to academia and sports as both contexts are driven by standards of performance and often defined by the success or failure of the participant.

Early research on achievement motivation adopted trait-based behavioural theories to explain individuals' motivation for task engagement (e.g., McClelland's [1961] need theory). However, motivation to achieve is not always explained by individuals' motivation alone. Team leaders are commonly expected to motivate team members, performance reviews and targets are given by supervisors to motivate students to achieve their academic potential, and sport coaches employ strategies to create environments to help motivate athletes (e.g., positive coach feedback has been linked to intrinsic motivation; Mouratidis et al., 2008). These external influences are considered by social-contextual theories. However, importantly, one-sided motivational responsibility (whether from the individual or from another person) has been linked to work-avoidance (e.g., King & McInerney, 2014) or other negative outcomes such as increases in drop-out (Sarrazin et al., 2002).

Moving away from one-sided motivational responsibility, social-cognitive theories (e.g., achievement goal theory [AGT]) became more popular in examining achievement motivation. By considering the social and personal aspects of motivation, social-cognitive theories provide the theoretical framework for empirical studies that examine factors such as motivational climate (determined by the coach, other participants or venue; a term coined by Ames, 1992), the role of a leader (whether that be a teacher or coach) and the impact of these factors on an individual through the use of instructions and environmental cues. Therefore, motivational constructs and models from social-cognitive theories (such as, AGT; Dweck, 1986, Elliot & Harackiewicz, 1996; Nicholls, 1984), which reflect a focus on the cognitive and affective processes underlying achievement behaviours (Pintrich & Schunk, 1996), may be considered more holistic for examining achievement motivation. Such theories allow examination of the reasons or purpose for task engagement not just the desired outcome and the criteria used to evaluate success as some goal setting theories. In other words, the reciprocal interaction between social-contextual and personal (trait-based) factors is at the core of a social-cognitive perspective's examination of human motivation (Dai et al., 1998). Such theories that consider how individuals can differentially interpret situational cues are known as interactionist theories, such as those championed by Dweck (1986) and Dweck and Leggett (1988).

Interactionist theories have been argued to represent a holistic view of achievement motivation and its many facets (Roberts et al., 2007). One prominent theory which examines achievement motivation, with elements of an interactionist perspective, is the social-cognitive AGT (Dweck, 1986; Elliot & Harackiewicz, 1996; Nicholls, 1984). Achievement goal theory has been one of the most prominent theories of motivation in educational and sport and exercise contexts for more than 30 years (Roberts et al., 2007; Senko et al., 2011). The theory encompasses both social and behavioural influences on achievement motivation considering innate dispositional motives (Elliot, 1999; Elliot & Church, 1997), context and contextual perceptions (e.g., motivational climate; Ames, 1992; Barkoukis et al., 2010) and their interaction as a cognitive process (Roberts, et al., 2007; Van Yperen, 2006). Furthermore, AGT can be used to examine past performance as well as predict immediate performance outcomes, making it useful in application for both evaluation and prediction.

Since its establishment, AGT has undergone considerable theoretical development. One of the most prominent developments was the work of Nicholls (1984) and Dweck (1986) on the achievement goal approach. Within this approach, achievement goals are considered the purpose of task engagement (Elliot, 1999; Maehr, 1989) varying as a function of how competence is defined: Two goals types were initially defined as performance and learning goals (Dweck 1986) or task, the self-referent development of ability, and ego, the normative-referent demonstration of ability, goals (Nicholls, 1984). These goals are posited to create a profile of how individuals interpret, experience and perform in achievement settings.

The appetitive, or approach, goal dichotomy was supported by an impressive overview of theoretical and empirical work, and parallels other areas of psychology (e.g., psychological processes such as emotion [Berridge, 2018], cognition and perception [Chaplin & Krawiec, 1979; Elliot & Church, 1997; Ludel, 1978]). Evidence supporting the goal dichotomy was used to lay the groundwork for Elliot to create an adapted framework (Elliot, 1999). The adapted framework, proposed by Elliot (1994) and Elliot and Harackiewicz (1996), integrated both the contemporary goal dichotomy (development and demonstration of competence represented by mastery and performance goals respectively) and classic approach/avoidance distinctions (achievement considered in terms attaining success or avoiding failure: McClelland et al., 1953). Over the years the expansion has included a hierarchical model of approach and avoidance motivation (trichotomous model; Elliot & Church, 1997), a 2x2 framework (Elliot & McGregor, 2001), a 3x2 model (Elliot et al., 2011), a 2x2 standpoints model (Korn & Elliot, 2016) and the consideration of the standards and standpoints model (Korn et al., 2019). The models created by Elliot and colleagues have been used to investigate motivation in conjunction with factors such as emotions (Adie et al., 2008; Putwain & Sander, 2016; Yeo et al., 2009), task performance (e.g., reaction time: DiMenichi & Tricomi, 2015), goal valuation (Gaudreau & Braaten, 2016; Paas et al., 2005) and anxiety (Stenling et al., 2014; Wang et al., 2004). The scope of Elliot's work provides a range of frameworks from which to further investigate achievement motivation, as is the aim of this thesis. As, according to Dweck and Elliot (1983, p.644), "achievement motivation consists of a varied and complex set of assumptions, assessments, predictions, inferences, values, standards and affective reactions that may be irrational, inaccurate, and contradictory", I propose it is important to examine how AGT can be used to clarify some of achievement motivation's complexities. The following literature review will do this by first examining the work of Elliot and colleagues. It will delve into the theoretical underpinnings of their interpretation of AGT and examine its relationship, development, limitations, and differences compared to the original work of Nicholls and Dweck. The review will also examine AGT in relation to factors that will be empirically investigated in subsequent chapters, including goal valuation, anxiety and performance.

## 1.1 Development of Achievement Goal Theory and Components

There have been numerous terms and definitions used to depict the constructs of achievement motivation throughout its history. Two key terms used by early theorists Dweck and Nicholls include goal orientation and achievement goal. Each term conceptualises a different component of the achievement goal approach, which has been examined and developed throughout the last two decades by a number of researchers. The following sections review traditional and contemporary theoretical approaches to create a framework for the empirical work within this thesis.

### *1.1.1 Goal Orientations and Dispositional Motivation*

The term goal orientation reflects individual differences in the preference for a specific, desired, end-state (Niemivirta et al., 2019; Pintrich et al., 2003). Goal orientations are viewed as an individual's tendencies or dispositions (e.g., Nicholls, 1989) and have been considered as the unconscious knowledge structures that do not need constant monitoring (Niemivirta et al., 2019). Nicholls et al. (1989) presented dispositional goal orientations as being represented by one's definition of what causes success. Reflecting one's dispositional motivation to achieve Nicholls described the two dispositional motivational goals (or goal orientations) as reflecting similar properties to task and ego state goals (goal constructs based on the distinction between differentiated and undifferentiated conceptions of competence or ability; Nicholls, 1984; 1989). For example, one could be ego-oriented or task-oriented, both referring to one's dispositional tendencies to achieve and evaluations of the causes of success in a given context. Dweck used the term goal orientation to refer to an individual's disposition to be performance or learning oriented (Dweck, 1986). However, the use of the term goal orientation to reference an individual's dispositional achievement motives was not adopted by all theorists [1].

In Elliot's theoretical framework, he referred to dispositional achievement and tendencies but did not use the term goal orientations to describe them (Elliot, 1999; Elliot & Church, 1997). Rather dispositional motivations were represented as both achievement motives and competence perceptions (Elliot, 1999). Achievement motives (e.g., fear of failure and need for achievement) were conceptualised as relatively stable affectively-based motivational dispositions (Atkinson, 1957; Elliot, 1999; McClelland, 1985) that were empirically related to, yet conceptually distinct from competence perceptions (Elliot, 1999; Elliot & Church, 1997). This conceptual distinction allowed competence perceptions and achievement motives to account for unique variance in achievement goal adoption (Elliot, 1999). Elliot and colleagues refer to dispositional tendencies and motives as antecedents, that are conceptually different to and distinct from achievement goals (Bipp & Van Dam, 2014; Elliot, 1999; Elliot, 2005; Elliot & Church, 1997).

### *1.1.2 Achievement Goals*

Following the positioning of Elliot's notion of achievement goals as being distinct from dispositional motivation, it is necessary to consider the properties of achievement goals themselves. Within the achievement goal approach tradition (Dweck, 1986; Nicholls, 1984),

[1] Examples of the different ways in which the term goal orientation (GO) has been used can be seen in Payne et al.'s (2007) meta-analytic examination of the goal orientation nomological net. Where a GO is used to reference an individual's trait or state preference in an achievement setting. For this thesis the term GO refers to dispositional (trait-based) achievement motivation. The use of the term GO to refer to state or trait achievement motivation as discussed in Payne et al.'s paper highlights that different construct interpretations and definitions within the achievement motivation literature are possible, despite researchers reading the same information. Other discussions on the definition and meaning of GO can be seen in Pintrich et al. (2003).

achievement goals were commonly defined as the purpose of task engagement (Maehr, 1989). Specifically, these were conceptualised as the cognitive-dynamic manifestations of competence that directionally guided behaviour toward an end result (Elliot, 1999; Elliot & Church, 1997; Elliot & Thrash, 2001). Achievement goals were posited to give an insight into the processes one used to achieve an aim. For example, the specific type of goal adopted was thought to create a framework for how individuals interpreted and experienced achievement settings.

Varying as a function of how competence is defined, two distinct types of goals emerged. To define these goals Dweck drew on research with children and findings regarding mastery and helpless responses to failure (Dweck, 1985; Elliott & Dweck, 1988). Conceptualising competence as being based on individual's implicit theories of intelligence (Dweck, 1986; Dweck & Leggett, 1988), the case was made for a performance-learning goal distinction (Dweck & Elliott, 1983; Dweck & Leggett, 1988): Whereby individuals were posited to pursue different goals even in the same situation. The second early achievement goal approach theorist, Nicholls, drew on his developmental work distinguishing differentiated and undifferentiated conceptions of ability to define competence-based achievement goals (Nicholls, 1984, 1989). Here the case was made for an ego-task goal distinction. Individuals were posited to be task-oriented or ego-oriented in their dispositional motivation or task-involved or ego-involved for task specific motivation.

Despite the differences in the theories used to define competence and form achievement goals it has been suggested that there are enough conceptual similarities to justify a convergence of achievement goals into a performance-mastery goal dichotomy (Ames & Archer, 1987; Elliot, 1999). This mastery-performance goal dichotomy became the dominant theoretical perspective in the contemporary achievement motivation literature (Elliot, 1999; Elliot & Church, 1997). In the initial goal dichotomy both achievement goals were construed as approach forms of motivation (Ames, 1992; Elliot et al., 2011; Nicholls et al., 1989. For further discussion see Elliot, 1999): where the individual strives for success. This represented a sharp contrast to the idea that individuals could, in fact, be oriented towards approaching success or avoiding failure because of their dispositional motives (Elliot & Church, 1997): ideas put forward by classical achievement motivational theorists (McClelland et al., 1953; Murray, 1938). These approach/avoidance tendencies were posited to reflect emotional, intuitive, interpretations of a situation or context; whether an emotion is ‘good’ (positive valence) or ‘bad’ (negative valence) (Colometti, 2005; Elliot & Covington, 2001; Lewin, 1951; Shuman et al., 2013). Perception of an achievement situation was thought to affect whether an individual saw positive, desirable possibilities, or negative undesirable possibilities to partaking in a task (Elliot, 1999; Elliot et al., 2011). Elliot and McGregor (2001) proposed that an individual’s perception of task stimuli as positive (i.e., encouraging, possible to complete, enticing) would stimulate approach tendencies, while negative perceptions (i.e., unachievable, too difficult, risk of failure) would foster avoidance tendencies (Erdem-Keklik & Keklik, 2013). Approach tendencies have been described as those focused on pursuing success in a task while avoidance tendencies were those focused on preventing any demonstration of failure (Elliot & Harackiewicz, 1996). These two achievement motives (one focused on avoiding failure and the other on attaining success), initially proposed by classical theorists such as McClelland and colleagues in the 1950’s (McClelland et al., 1953), were considered to contribute to approach and avoidance components of achievement goals.

### *1.1.3 Bifurcation of Achievement Goals: The Addition of Valence*

Examining empirical and theoretical considerations of traditional approach and avoidance motivation, Elliot and colleagues proposed achievement goal models that extended the mastery-performance dichotomy to include avoidance as well as approach motivation (Elliot, 1999; Elliot & Harackiewicz, 1996; Elliot & McGregor, 2001). This addition supports the connection of achievement goals to their dispositional antecedents which are grounded in approach and avoidance motivation (e.g., need for achievement and fear of failure). The relationship between achievement dispositions and achievement goals was further supported by Elliot and Church's (1997) hierarchical model in which achievement goals were described as cognitive mid-level constructs, representing an individual's abstract achievement motives (Deshon & Gillespie, 2005; Elliot & Thrash, 2001). Achievement goals were viewed as proximal to achievement behaviours and outcomes, acting as a concrete representation of the distal influencers of achievement outcomes, namely achievement dispositions (Dinger et al., 2013; Elliot & Church, 1997; Elliot & Thrash, 2001; Payne et al., 2007).

Within this model Elliot and Church detailed the trichotomous framework. This framework introduced separate performance-approach and performance-avoidance goals through bifurcation of the performance goal. For performance-approach goals, competence was defined by normative interpersonal standards, focused on out-performing others and achieving demonstration of normative competence (Elliot, 1999; Elliot & Church, 1997; Elliot & McGregor, 2001; Elliot & Murayama, 2008). For example, individuals with this goal would strive to beat others to win a race. This goal has been linked to achievement motivation (Bipp & Van Dam, 2014; Michou et al., 2013) and in some cases fear of failure (Elliot & Church, 1997; see Conroy & Elliot, 2004 for discussion on the links to fear or failure) achievement motives, particularly in cross-sectional investigations (e.g., in Baranik et al.'s, 2010, meta-analysis, the performance-approach goal was positively correlated with need for achievement). The goal being influenced by both positive and negative motivational dispositions (Roberts et al., 2007) is reflected in the performance-approach goal's positive valence (approach) and negative definitional (performance) elements (Yeo et al., 2009). The positive and negative dispositional influence is also reflected in the mixed findings surrounding the outcomes associated with performance-approach goal adoption (Elliot & Moller 2003; Midgley et al., 2001; Senko et al., 2011). In contrast the performance-avoidance goal construct defined competence by normative interpersonal standards but focused on a negative valence of competence: avoidance motivation (Elliot, 1999; Elliot & Church, 1997; Elliot & McGregor, 2001; Elliot & Murayama, 2008). For example, individuals with a performance-avoidance goal were posited to aim to avoid performing poorly compared to other people and be more concerned with not being the worst (Elliot, 1999; Elliot & Church, 1997). This goal has been linked to low competence perceptions and fear or failure achievement motives (Conroy & Elliot, 2004; Dinger et al., 2013; Elliot & Church, 1997). In particular, the strong association to fear of failure motives was not unexpected for the performance-avoidance goal as it derives from negative motivational dispositions in both definition and valence.

Along with the addition of avoidance motivation to the performance goal, Elliot and colleagues' classification of the achievement goal construct also offered a more precise definition of achievement goals. By removing the 'reason' aspect of purpose which included additional components beyond competence (Elliot, 2006)[2], achievement goals were more precisely grounded only in competence (Elliot et al., 2011). Using the Achievement Goal Questionnaire (AGQ: Elliot & Church, 1997), as 42% of studies examining the trichotomous model did (Liu et al., 2017), Elliot et al. (2006) examined goals in the trichotomous model and their effects when experimentally induced on basketball dribbling performance. The authors found basketball performance was significantly worse in the performance-avoidance, compared

[2]Traditionally goals were defined as the purpose for achievement. Semantically purpose included both reason for and aim of achievement. It was thought the reasons aspect of purpose included additional components motivating achievement goals beyond competence.

to the performance-approach, condition. The effects of different goals on task performance supported notions within early literature using the dichotomous model that inconsistent performance-based goal findings were, in fact, due to a lack of valence differentiation (Elliot, 1999; Elliot & Church, 1997; Lower et al., 2014; Senko et al., 2011). Specifically, it was found that the negative effects initially attributed to performance goals examined in the dichotomous framework were uniquely associated with the performance-avoidance goal (Elliot & Moller, 2003). This, along with the number of studies utilising the trichotomous framework, including: Agbuga and Xiang's (2008) study in secondary physical education; Simamora and Mutiarawati's (2021) study on old and new students' achievement goals and; Alhadabi and Karpinski's (2020) examination of university students, demonstrates the addition of valence to the achievement goal framework for performance goals continues to be supported.

However, that is not to say all researchers view the integration of valence as integral. Some have questioned the bifurcation as resulting in a precision-accuracy trade-off (Maehr & Zusho, 2009): The precision of defining achievement goals based on directionally (e.g., approach and avoidance) may lessen the accuracy with which consideration is given to other motivational influences (Maehr, 2001). Comparatively, other traditional achievement approach authors remained steadfast in their use of approach-based motivation (e.g., Nicholls, 1984: see Elliot (1999) for discussion). Others criticised the trichotomous model for its neglect of mastery-avoidance (Lower & Turner, 2016): A goal which Van Yperen (2006) found approximately a third of participants identified as their dominant achievement goal.

Before considering the mastery-avoidance goal, the mastery-approach goal (the traditional goal in earlier achievement motivation models) will be outlined. In the mastery-approach goal construct competence was defined by one's own attainment and the requirements of the task, focused on attaining task-based or intrapersonal competence (Elliot, 1999; Elliot & Murayama, 2008). For example, individuals with this goal would strive to develop and learn new skills aiming to better personal records. The goal subsumes two positive components (definitional mastery and a valenced approach). Linked to achievement motives, the mastery-approach goal has been correlated to need for achievement (e.g., $r = .49$; Baranik et al., 2010) and found to have no relationship with fear of failure (Conroy & Elliot, 2004; Elliot & McGregor, 2001; Roberts et al., 2007). The lack of relationship with fear of failure and competitiveness further aligns with theoretical proposals that the mastery-approach goal was fuelled by approach-related processes (Yeo et al., 2009). While the traditional positively valenced mastery goal created minimal debate in the literature, as the findings were generally consistent (unlike performance goals: Elliot, 1999), it was thought that separating the mastery goal into distinctive approach and avoidance constructs was necessary to account for and differentiate the broad-spectrum of competence-based achievement strivings (Elliot & McGregor, 2001; Pintrich, 2000).

Discussion of the nature of mastery-avoidance goals focuses on avoiding incompetence in relation to oneself or the task (Elliot, 1999; Elliot & McGregor, 2001). This goal differs from mastery-approach goals in terms of how competence is valenced, from the performance-avoidance goal in terms of how competence is defined, and the performance-approach goal in both the valence and definition of competence. Analysing the motive dispositions antecedent to mastery-avoidance further highlights the difference of mastery-avoidance from its positive mastery counterpart. For example, Elliot and McGregor (2001) found fear of failure to be a positive predictor of mastery-avoidance (also found in Elliot & Murayama, 2008). Such differences cemented the need to investigate this goal as a distinct construct (Baranik et al., 2010; Elliot & McGregor, 2001).

However, it has been noted that with the integration of the mastery-avoidance goal and subsequent development of achievement goal measures, findings were not always consistent. Some studies, conducted since the initial integration of the mastery-avoidance goal, found it not to be as strongly related to some variables as it was in early research. For example, Cury et al. (2006) found perceived competence to be negatively related to mastery-avoidance while Baranik et al. (2010) found a positive relationship. In some cases, the contrast in findings was thought to be associated with the development and use of different achievement goal measures. For example, dissecting early measures such as the AGQ (Elliot & McGregor, 2001) it was found the mastery-avoidance goal was portrayed with negative affectivity (Elliot & Murayama, 2008; Hulleman et al., 2010), prompting the creation of the Achievement Goal Questionnaire - Revised (AGQ-R: Elliot & Murayama, 2008). Therefore, comparing findings using the AGQ and AGQ-R may culminate in different goal related findings. Despite this, researchers still use the AGQ and compare findings to studies using other methodological tools (e.g., Alrakaf et al., 2014; Hall et al., 2015). The same issues have also been noted for performance-approach goals: Studies using the AGQ found higher performance-outcome correlations than studies using the Patterns of Adaptive Learning Scale (PALS: Midgley et al., 2000; Hulleman et al., 2010), suggesting terminological difference between measures can impact empirical findings. Terminological differences and their effect on research outcomes have also appeared in other ways, including theoretical representation of constructs. In their review, Hulleman et al. (2010) expressed how some achievement goal researchers failed to distinguish achievement goals from their achievement motive roots in their achievement measures. A distinction which Elliot and colleagues emphasised in their AGT frameworks (Bipp & Van Dam, 2014; Elliot, 1999; Elliot, 2005; Elliot & Church, 1997). For example, items were found to focus on general trait-like constructs as opposed to goal-relevant language. This argument emphasises terminological limitations within AGT, touched upon earlier in this thesis when discussing achievement goal labels. Collectively, these concerns highlight how different theoretical conceptions, represented by different methodological tools, have been used while claiming to represent the same construct. In fact, such tools contained components which represented varying underlying constructs (Hulleman et al., 2010; Mascret et al., 2015). This has led to a problematic situation whereby, it can be said, that some researchers use the same labels to refer to different constructs while others use different labels to refer to the same constructs. These have been referred to as the jingle ‘using the same label for different constructs’ (Thorndike, 1904) and jangle ‘using different labels for the same construct’ (Kelly, 1927) fallacies.

It was suggested that theorists who advocated for construct separation (e.g., division by valence or separation such as standards vs standpoints), risked positing two constructs when one would do (such as a precision-accuracy trade-off: Maehr, 2001), leading to a jangle fallacy. On the other hand, in support of the bifurcation of goals it was argued “researchers emphasising parsimony run the risk of collapsing together constructs that should be separated”, thus resulting in a jingle fallacy (Murayama et al., 2011, p.252). With a theory as vast as AGT, and one that continues to grow, the potential for such fallacies increases. Therefore, alignment of theoretical clarity and methodological operationalisation should be constantly considered by researchers and readers exploring work within these areas.

Continuing towards my own empirical investigations, it is necessary to continue the theoretical examination of achievement goals. Research has examined achievement motivation in not only the academic domain; where it has been the foundation of considerable exploration into the factors that influence, and the outcomes of, student goal adoption (Remedios et al., 2008), but also sport (Roberts et al., 2007) and work domains (Van Yperen & Orehek, 2013). Therefore, as I continue to explore the theoretical foundation of the thesis, examining research situated within the 2x2 achievement goal framework, it is important to consider the two levels of achievement goals: those at the contextual level and those at the task-specific or situational level.

## 1.2 Domain and Situational Achievement Goals

At the domain and situational levels the four achievement goals can have different relationships to one another. Achievement goals at the contextual level also have their own relationship to task-specific achievement goals. The relationship and properties of achievement goals at each level (contextual: domain goals and situational: task-specific goals) will be considered first.

### *1.2.1 Domain Achievement Goals: Theoretical Framework and Goal Relationships*

Emerging as a result of an individual's achievement motives, domain achievement goals are posited to represent concrete aims within a context (Han, 2016: Harackiewicz et al., 1998). By representing concrete aims, contextual goals have a degree of stability. In fact, domain goals are posited to be stable across tasks in the same domain (Xiang et al., 2011), having been shown to be resistant to change by task instructions or situational changes within a domain (Han, 2016). For example, Kaplan and Maehr (2007) showed domain goal stability in children in the academic domain between elementary and middle school, while Xiang et al. (2011) found USA children's physical education domain goals were stable from 5th to 6th grade. Kaplan and Midgely's (1999) longitudinal study also demonstrated goal stability across academic years. Similar results were found by Grant and Dweck (2003) Middleton et al. (2004) and Wolters et al. (1996), for students' goals towards mathematics.

However, the aforementioned studies supporting domain goal stability draw heavily on school children. Examining adult populations, a limited number of studies offer support of the notion of domain goal stability. This could be, in part, due to the lack of clear conceptualisation of domain goal investigation or because of the disadvantages in conducting longitudinal research with adults: Disadvantages including attrition with loss of follow-up and incomplete follow-up due to temporal demands of the study (Caruana et al., 2015). Nevertheless, some studies clearly conceptualise their investigation of domain goals and conduct somewhat successful longitudinal studies to examine goal stability. One such study was by Han (2016) who examined academic domain achievement goals of college psychology students. The results showed domain goals towards classroom quizzes were the same at the beginning and end of the semester, irrespective of instructions for specific quizzes. A study in the sport domain (Fernandez-Rio et al., 2014) examined domain goals of swimmers (aged 16+ years). Over the period of three weeks (the length of the study) swimmers' domain goals remained stable despite changes in training sessions. Although the longitudinal domain goal research spanning years in adults is sparse, support for goal stability and endurance at the contextual-level is evident. However, the stability within a domain does not mean domain goals cannot change between contexts. Van Yperen et al. (2011) showed 79% of their participants' contextual achievement goals changed between three different domains – work, sport and education. Further evidence of such changes was shown in a review by Van Yperen et al. (2015) who also noted differences in individuals' domain goals between work and sport contexts. The change between domains can be related to the different demands of each context as well as individual perceptions. An individual's perceptions relate back to the individual's achievement dispositions. Therefore, the influence of dispositional motivation on domain achievement goals should also be examined.

For domain general motivation (e.g., motivation generally for sport), or goals at the contextual level which do not require specific focus on a task, it can be suggested that achievement goals are orthogonal to one another (Roberts et al., 2007). This argument stems from Elliot's framing of achievement motives and competence perceptions as independent and distinct constructs (Elliot, 1999; Elliot & Church, 1997), each having their own influence on approach and avoidance motivation. This view differs from initial works in the achievement goal literature by Dweck and Nicholls, who proposed "competence perceptions and approach/avoidance tendencies were implicitly equated" (Elliot, 1999, p.175). High perceived competence was seen as equating to approach tendencies while low perceived competence was equated to avoidance tendencies. Thus, because high and low perceptions of competence were viewed as mutually exclusive (one could not perceive oneself as being both high and low in competence), so too were approach and avoidance tendencies. This relationship precluded, therefore, the possibility that an individual could simultaneously hold both approach and avoidance tendencies and as such be motivated or adopt approach and avoidance achievement goals. However, Elliot and Church's (1997) distinction of competence perceptions and achievement motives in their hierarchical model, suggests the two constructs can make independent, antecedent contributions to achievement goal adoption. For example, competence perceptions not only influence approach and avoidance goals but so too do achievement motives, (such as fear of failure and need to achieve), thereby contributing in their own way to the valence of goals (Elliot, 1999). This distinction creates an orthogonal relationship (Roberts et al., 2007) between the antecedents of domain achievement goals which, in turn, permits the simultaneous adoption of approach and avoidance goals.

Domain goal orthogonality is supported by findings from studies such as Gavaza et al. (2014). The results showed pharmacy students did not only score highly on one goal, but multiple achievement goals. The authors commented how their results, in line with previous research (e.g., Hastings et al., 2001), act as evidence to confirm that students' achievement goals (mastery and performance) can be adopted simultaneously. The orthogonality of goals has also been empirically shown by correlational research demonstrating domain goals are not related to one another or, at the very least, are only weakly correlated to one another (Šilić et al., 2016). Ommundsen and Roberts' (1996) factor correlation matrix revealed a low intercorrelation (r = .008) between performance and mastery goals which the authors noted was consistent with previous literature (e.g., Roberts et al., 1995; Roberts & Ommundsen, 1996) and confirmed the goals' orthogonality. Roberts et al. (1996), also confirmed, along with previous findings (Ames & Archer, 1988; Roberts & Treasure, 1995; Treasere & Roberts, 1994), the proposed orthogonality with a weak inter-correlation (r = .08) between mastery-based and performance-based subscales when examining retrospective achievement goals of competitive success in the sport domain. Finally, Ntoumanis and Biddle (1999) noted the same intercorrelation between performance-based and mastery-based goals and more recently Chain and Wang (2008) found weak correlations between mastery and performance-based goals.

Though orthogonality is shown by weak inter-correlations between achievement goals, the composition of goals in the 2x2 framework requires some exceptions for high inter-correlations to be considered. This is because the separation of goals allows for more overlap between the goal properties. Elliot and Murayama (2008), for example, found positive, moderate inter-correlations between the four achievement goals (r = .13 to .68), which according to Ning (2016b), still suggests the goals represent empirically distinct constructs but confirms the goals are not mutually exclusive. Strong correlations have been found between performance-approach and performance-avoidance goals ($r = .40$, $p = .01$: Hulleman et al., 2010). This relationship is posited to be the result of a shared commonality (Ning, 2016a; Yeo & Neal, 2008). In this case the goals' definitional component (performance: normative comparison), a theory supported by Dinger et al.'s (2013) who found a moderate positive association between the two performance goals ($r \approx .40$). On the other hand, weak correlations have been found between mastery-approach and performance-avoidance goals ($r = .01$, $p = .60$: Hulleman et al., 2010), goals that share no commonality: Mastery-approach subsumes two positive components (skill improvement and approaching success) while performance-avoidance subsumes two negative components. Therefore, this evidence suggests it is the goals' lack of similarity in definition or valence that leads to the low inter-correlations. The variation of goal interdependences further confirms achievement goals may be held simultaneously and pursued together to provide unique benefits for performance outcomes (Senko & Tropiano, 2016). For example, Dweck (1986) suggested it was possible for someone to aim to both improve their skill and perform well compared to others. Dinger et al. (2013) statistically demonstrates Dweck's theory for 2x2 achievement goals by demonstrating a positive correlation ($r \approx .20$) between mastery and performance-approach goals. Thus, indicating individuals may focus both on acquiring new skills as well as gaining positive judgements about their capabilities.

To determine how this multiple goal focus can affect consequences such as behavioural or performance outcomes, it is necessary to look at how domain achievement goals influence such factors. Domain achievement goals can directly influence behaviours and feelings for the achievement domain, as discussed in this section. However, domain achievement goals' primary, albeit indirect, influence on task-specific achievement behaviour (Elliot & Church, 1997), stems from their influence on situational achievement goals.

### *1.2.2 Situational Achievement Goals: Theoretical and Empirical Framework*

The difference between domain and situational achievement goals may not always be explicit in the literature. However, the difference has been alluded to in the operationalisation of achievement goals questionnaires (Pieper, 2003). For example, Ranellucci et al. (2015) investigated domain level achievement goals using a domain-general adaptation of the AGQ-R. For situational goal examination, questionnaires focus on engagement towards a specific impending task (Kaplan & Maehr, 2007). For example, questionnaires such as the Achievement Goal Questionnaire – Sport (AGQ-S) by Conroy et al. (2003) and traditionally the AGQ-R Elliot and Murayama (2008) (further examples include PALS by Midgley et al., 2000), can and have been used to examine goals at the situational level (Muis & Edwards, 2009; Nebel et al., 2017; Pekrun et al., 2014). The operationalisation of situational specific questionnaires therefore leans towards the theoretical differences of domain and situational achievement goals.

Compared to domain goals, which are related to the context in which tasks take place, situational goals are task-specific. They are related to specific results or outcomes an individual wants to achieve in a particular situation (Harackiewicz & Sansone, 1991; Pintrich et al., 2003). Goals characterised in this way are described as focusing on ones' evaluation and pursuit of competence (Fryer & Elliot, 2007) in such a way that the goal represents an individual's goal preferences towards an achievement task (Payne et al., 2007). Even though situational goals are still influenced by achievement dispositions, meaning multiple goals can be adopted because of achievement dispositions' orthogonality, a slightly different inter-goal relationship is considered. For goals at this level, the argument is made for singular goal adoption. This reflects the nature of selective processing (e.g., attentional focus), whereby individuals select information relevant to successfully completing the task at hand while suppressing other information (Johnston & Dark, 1986; Stevens & Bavelier, 2012; Treisman, 1964). Therefore, in task specific situations it is suggested that one goal is more strongly adopted, in order to complete the task at hand. For example, Scheltinga et al. (2015) used Van Yperen's (2006) Dominant Achievement Goal (DAG) method to examine task specific goal adoption. The DAG is a method designed to capture the "adoption of a specific achievement goal that is dominant in that setting" (Scheltinga et al., 2015, p.2). Scheltinga et al. (2015) found 88% of their sample had a dominant goal with the mastery-approach goal showing the greatest prevalence (51%).

The orthogonality of the goals in specific tasks then allows for goal switching to occur should the needs/requirements/demands of the task change (Fryer & Elliot, 2007). In other words, task based situational goals have a degree of variability (Han, 2016). The variability of situational goals has also been suggested by researchers such as Elliot (1999) and Fryer and Elliot (2007), who proposed situational goals represent a form of self-regulation. Defined as the ability to adapt or control behaviour to meet the variability, demands and suitability of a situation (Murayama et al., 2011), being self-regulatory suggests task-specific goals can be contemplated for revision and therefore have flexibility to change. For example, van de Pol and Kavussanu (2011; 2012) examined goals related to two different situations in the sports domain: training and competition. Between the two situations researchers found achievement goals differed. They argued this showed the variability of task-based goals, and their ability to adapt depending on the demands of the situation. Furthermore, Pekrun et al. (2014) also examined achievement goals in three different feedback situations: self-referential, normative or no feedback. Their results revealed that goals focused on competitive standards (performance-based goals) were more prominent in the normative feedback condition (performance condition) compared the other goals, whereas skills-based goals (mastery-based goals) were rated significantly higher in the self-referential feedback (mastery condition) condition. These results support the malleability of situational achievement goals. They demonstrate the goals' susceptibility to the direct or indirect influence of situational goal structures (Payne et al, 2007).

Situational goal structures are "conceptualised as competence-relevant environmental emphases" (Murayama & Elliot, 2009, p.432). Adjusting the environment of the task (as in van de Pol and Kavussanu's, 2012, study) or creating a specific atmosphere via teachers, coaches or parents (as in Pekrun et al.'s, 2014, study) are two components of a situational goal structure termed the motivational climate (Ames & Archer, 1988; Ames, 1992). The motivational climate is a psychological environment created which affects the motivation and situational atmosphere felt by a student or athlete (Ames, 1992; O'Rourke et al., 2014; Spray et al., 2006; Trenz & Zusho, 2011; Warburton, 2017). The third climate component is instruction condition or experimental manipulation of achievement goals (Paas et al., 2005; Van Yperen et al., 2011). Manipulating task-based goals involves inducing state goals over a short period of time for a specific task (Payne et al., 2007; Spray et al., 2006) by creating a difference in the delivery and focus on task instructions. For example, in their meta-analysis Van Yperen et al. (2015) detailed some of the key phrases used by the experimenters to induce achievement goals for a specific task. The phrases, seen in Table 1.1, are common in many achievement goal experiments and usually given within other experimental details.

**Table 1.1**

*Common Core Manipulation Phrases in Experimental Studies.*

| Manipulation | Mastery | Performance |
|---|---|---|
| Do better than before | ✓ | |
| Do better than others | | ✓ |
| Do well compared to others | | ✓ |
| Improve on past performances | ✓ | |
| Perform better than the majority of participants | | ✓ |
| Learn material | ✓ | |

The manipulation of goals can affect an individual's environmental perception. Environmental perception is a construct that can be influenced by any of the three components of motivational climate (Elliot et al., 2017): environment (competition, training, classroom) people, (e.g., teachers, coaches, other participants), or requirements of the situation (e.g., achievement manipulations; long-term achievement, short-term outcomes). It was noted that competitive environments elicited strong performance goal adoption (van de Pol & Kavussanu, 2011), that is the normative comparison within performance-based goals aligned with the normative comparison promoted by competition situations. There have also been studies that have linked perceived environmental competitiveness (not necessarily linked to a competition context) to performance-approach and avoidance-goals (see Elliot et al., 2017 for study examples including: Jones et al., 2017; Lochbaum et al., 2017; Midgley & Urdan, 2001; Murayama & Elliot, 2012; Papaioannou et al., 2008; Wolter, 2004).

However, when examining situational achievement goals within specific parameters (2x2 framework, goals defined in competence and situation-specific) Van Yperen et al. (2015) made some enlightening findings. The authors found 19 papers comprising 25 independent studies between 1999 and 2014 which adhered to their criteria of induced situational goals (e.g., situationally induced goals based on Elliot's of 2x2 framework and measuring performance on a particular task). When compared to the plethora of research that has been conducted under the umbrella of AGT (e.g., searching the terms achievement goal theory in ScienceDirect returns 91,595 results), the emergence of only 25 relevant studies suggests a sparsity of situational goal investigation. Furthermore, none of the studies highlighted in Van Yperen's meta-analysis used a within-subjects design to examine how individuals would respond to different goal conditions (something which should be considered to mitigate effects of individual differences). Ideally, for studies which would clearly examine performance or behavioural outcomes as a result of goal conditions, participants would be given the same task (for example, mathematics questions) on two different occasions (within sample design). On each occasion, the task would be presented with different instructional aims which would induce different situational goals. For example, at time one, the instructions oriented the participant to focus on being the best based on normative comparison, then at time two, emphasis is placed on achieving a personal best (self-referential) (nb. conditions would be counterbalanced in practice). Pre-task, participants' situational goals would be examined via a questionnaire, as has been done in previous studies (e.g., Korn & Elliot, 2016; Spray et al., 2006). The questionnaire would be used to determine if individuals' situational achievement goals changed between conditions. While Yeo et al. (2009) found 27 studies between 1998 and 2008 using the search term of key words 'goal orientation or achievement goals', none of these studies used a within-subjects repeated measures design where participants completed the experiment in both achievement goal conditions. To my knowledge, no further studies have been conducted, to date, which use a repeated measures design in such a way as detailed previously. This indicates that while there is evidence to support claims that individuals' situational goals can change to meet the needs of a situation, individual differences, stemming from domain goals may not be considered. Therefore, the relationship between achievement goals at the contextual (domain goals) and situational (task-specific goals) level should be considered when determining achievement goal adoption.

## 1.3 Factors of Achievement Goal Adoption: Goal Relationships

### *1.3.1 Antecedents to Achievement Goal Adoption*

There are many antecedents of achievement goal adoption. For example, previous task performance which Van Yperen and Renkema (2008) demonstrated influenced subsequent task goal adoption. In study 1, participants given positive feedback on their task performance adopted a performance-approach goal for a second task, unlike those who received negative feedback. The authors concluded that adoption of a dominant performance-approach goal for task two was positively related to the perception of good performance in task one. However, there are other antecedents to consider. Motivational climate, as a situational goal structure, has already been shown to directly influence situational goal adoption. Additionally, achievement dispositions have also been noted to influence situational achievement goals. Finally, domain achievement goals were noted to elicit their indirect influence on achievement behaviour through an influence on situational achievement goals (Elliot & Church 1997). However, the exact nature of the relationship of these factors has not yet been discussed here. These factors and their relationship with situational achievement goals and outcome behaviours have been represented in several theoretical approaches, outlined in turn below.

### *1.3.2 Interactionist Perspectives*

The interaction of dispositional and situational goals aligns with the work of Nicholls and in particular Dweck's interactionist approach (Dweck, 1986; Dweck & Leggett, 1988). This approach examines the influence of dispositional motivation and motivational climate on the adoption and variability of task-specific achievement goals and behavioural outcomes. Other authors advocating for an interactionist perspective include: Jagacinski et al. (2001) who examined the joint effect of dispositional and situational goals on the achievement goals individuals adopt; Treasure and Roberts (1995) who examined the effects of the interaction on children in physical education and; Papaioannou et al. (2004) who examined a compatibility hypothesis between dispositional orientation and motivational climates. These interaction theories, like Dweck and Leggett's (1988), proposed that the individual differences represented by one's dispositional orientation would influence the probability of that individual adopting a certain task-based goal or aim. Variables such as the motivational climate were proposed to act as moderators of dispositional orientations on task behaviours (Roberts et al., 2007). In turn, the interaction between situational and dispositional factors was also posited to predict performance (Jagacinski et al., 2001). Roberts et al. (1997) argued that the dispositional orientation would be dominant in an individual's task-based goal involvement if environmental cues were vague.

Other interactions are also evident within achievement goal literature. Elliot's work suggests two independent competence-based antecedent factors of dispositional motivation (motive dispositions including achievement motivation and fear or failure and competence perceptions); other intrapsychic and environmental antecedent variables are also noted in Elliot (1999). Elliot posits how the two independent antecedent factors are linked to/influence achievement goal adoption (whether that is domain or situational achievement goal adoption). This can be seen in discussions of the hierarchical model posited by Elliot and Church (1997) and the top-down influence of achievement dispositions on adopted goals. Though the relationship between dispositional motivation and achievement goals is important when considering achievement goal adoption, dispositional antecedents are not the core focus of this thesis. Instead, the dispositional and situational goal relationship is positioned to enlighten other construct interactions that will be considered. Specifically, one such interaction is between two levels of achievement goals: goals at the contextual and goals at the situational level.

Similar to the interaction suggested by Dweck and Leggett (1988) and Elliot and Church (1997), where dispositional orientations act as moderators to task-based or domain goals, there are other goal-based antecedent factors that could influence task-based goal adoption. Payne et al. (2007) note that because situational goals are malleable, they are susceptible to the direct or indirect influence of situational goal structures and thus can be altered by goal influences. Thus far, evidence has shown environmental factors such as the climate, its perception, people within the situation, and demands of the task, can influence situational goals. Murayama and Elliot (2009) provide a number of analytical frameworks for the ways in which situational goals' susceptibility can be influenced through the relationships between personal achievement goals and goal structures on outcome variables. One potential relationship is reflected in the interaction effect model (Murayama & Elliot, 2009).

There are two possible interpretations of the interaction effect model relating to the components within this thesis. The first interpretation suggests personal goals in this model are likened to the adopted situational goals as described in this thesis because of their proximal link to achievement outcomes (Dinger et al., 2013; Elliot & Church, 1997; Elliot & Thrash, 2001; Payne et al., 2007). These are posited to be influenced by external goal structures (the goal structure component in the interaction model) such as those referenced in section 1.2.2, the components of motivational climate (e.g., classroom or sport training goal structures). The relationship of personal goals and goal structures in turn affects outcome variables, such as behaviour and performance. But, it is possible that other factors may influence how external goal structures (or external moderators e.g., components of motivational climate) are perceived (Roeser et al., 1996). For example, an individual's domain achievement goals. These predetermined contextual goals may act as an internal goal structure moderating the perception of external goal structures. Therefore, the goal structures in Murayama and Elliot's (2009) interaction model can refer to two types of goal structures: external (motivational climate) and internal (domain achievement goal). Thus, using the interaction model it is possible to examine the direct and indirect influences on outcome variables such as achievement behaviour or task performance. However, the authors note that the exact way adopted situational goals (personal goals) and goal structures interact to affect achievement-outcomes has received minimal empirical attention. This is particularly evident for examinations including internal goal structures (otherwise known as domain achievement goals). To my knowledge, the three studies noted in Murayama and Elliot (2009) as having investigated the interaction (Lau & Nie, 2008; Linnenbrink, 2005; Wolters, 2004), have mainly focused on the interaction of achievement goals and external goal structures. In 2019, Senko identified 9 additional published studies investigating similar relationships. But not all these studies identified the addition of internal goals structures (domain achievement goals), highlighting a lack of investigations where domain achievement goals are considered. This leads to a second possible interpretation of the interaction model.

In this second interpretation, personal goals could refer to domain achievement goals while goal structures remain as external moderators such as components of the motivational climate. This interpretation suggests that the goals an individual adopts (adopted situational goals) will only be an outcome variable, whereas in interpretation 1, the adopted situational goals could be included in the personal goal component and as an outcome variable (as the influence of goal structures, both internal and external has been found to influence goal adoption). The different placement of the adopted situational achievement goal component in this second interpretation arises because goal adoption is not as simple as was originally speculated (Darnon et al., 2009). In some cases, the situational achievement goals adopted were found to be a direct reflection of imposed situational goals stemming from the manipulation of external goal structures such as the components of motivational climate (creation of climate, environment and instruction conditions; Ames, 1992, Anderman & Midgley, 1997; Roeser et al., 1996; Urdan, 2004: found in Meece et al, 2006; Van Yperen et al., 2011). Such imposed goals and their effect on behavioural outcomes have been examined in a number of AGT studies (examples include: Cecchini-Estrada & Méndez-Giménez, 2017; Darnon et al., 2012; Jaakkola et al., 2016; Pintrich et al., 2003; Warburton, 2017). For example, Cumming et al. (2008) and Smoll et al. (2007) examined athletes' goals at two time points (pre-season and late season), comparing the influence of two coaching styles; 1) a style promoting self-comparison and skill mastery, 2) a style promoting normative comparison and competition. The studies found that athletes coached by style 1 (promotion of self-comparison) presented with situational achievement goals which reflected self-comparison and mastery, whereas athletes coached by style 2 (promotion of competition) presented with situational goals which reflected competition and normative comparison. These findings support the view that situational goals imposed by components of motivational climate are likely to be those the individual adopts for the task. However, Darnon et al. (2009) demonstrated this may not be the case in all circumstances. The academic-based study demonstrated that although teachers aimed to encourage mastery-approach goals (because of their theoretical link to better performance outcomes and students' well-being) students reported adopting performance-approach goals as they believed them to be better indicators of success. Therefore, while imposed goals may be found to strengthen personal goals (e.g., Lau & Nie, 2008; Murayama & Elliot, 2009), it must be considered that situational goal adoption may not always be a direct reflection of the imposed situational goal from the motivational climate. The ambiguity of the interpretation of the interaction effect model demonstrates how the relationship between domain goals and motivational climate-imposed goals and its effect on behavioural and performance outcomes should be considered carefully, particularly in relation to the position of the adopted situational goal within that relationship.

The position of the adopted situational goal variable is important because adopted situational goals are proximal influencers of achievement-related outcomes. Therefore how they are influenced can affect outcome variables (Dinger et al., 2013; Elliot & Church, 1997; Elliot & Thrash, 2001; Payne et al., 2007). That adopted goals can be influenced implies these goals are synonymous to the personal goal variable in the interaction effect model as suggested by interpretation 1. If adopted achievement goals are viewed as personal goals, then goal structures can be separated into internal (domain goals) and external (e.g., imposed achievement goals) components. The relationship between internal and external goal structures can have a significant impact on the consolidation of adopted achievement goals and consequently motor performance. This relationship is based on goal congruency.

### *1.3.3 Goal Congruency and Incongruency*

Previous investigations of goal congruency have largely focused on the congruency between external goal structures and adopted situational goals, external goal structures and dispositional goals, or a combination of the three (as shown through investigations using interactionist perspectives, Nicholls, 1989). Empirical investigations of the relationship between external goal structures and adopted situational goals have found that achievement goals perceived to be emphasised by external goal structures can be positively related to individuals' adopted situational achievement goals. For example, the stronger students perceived a mastery-oriented environment, the stronger their self-reported mastery goals whereas stronger performance-oriented motivational climates were positively related to performance-approach goal adoption in both students and athletes (Granero-Gallegos et al., 2017; Kaplan & Maehr, 1999; Roeser et al., 1996). Further examples of these relationships have been found by Darnon et al. (2012); Trenz and Zusho, (2011) and Warburton, (2017). These examples reflect a goal congruent relationship whereby external goal structures and adopted situational goals or dispositional goal orientations are harmonious. This alignment of goals increases goal cementation (the strengthening of achievement aims: Elliot et al., 2011) which has been shown to moderate levels of anxiety and goal valuation positively, when the goals are mastery oriented, and negatively when the goals are performance orientated (Granero-Gallegos et al., 2017). In contrast, goal incongruent relationships can have different outcome effects. For example, lower levels of goal consolidation may lead to reduced goal valuation and in turn lower investment of mental effort (Pass et al., 2005).

When adopted goals are incongruent with the imposed situational goal (or external goal structures) it is possible that the internal goal structure, or domain goal, has an influencing role in the perception of external goal structures (Roeser et al., 1996): In a similar way the interactionist perspective views the moderating effect of one's dispositional goal orientation. In other words, domain goals could moderate an individual's perception of the components of the motivational climate, in turn affecting the consolidation of situational goal adoption. For example, Darnon et al. (2009) demonstrated that despite teachers encouraging mastery-approach goal adoption, students adopted performance-approach goals because they believed them a better indicator of success in the context of university success. It could be argued performance-approach goals were the domain goals for these students. In that case the adopted goal reflected the individuals' domain goals; here, the adopted and domain goals were congruent but incongruent to the motivational climate. This suggests that when adopted situational goals and domain goals are congruent, such an alignment has the possibility to make tangible aims stronger and more precise (Han, 2016; Kaplan & Maehr, 2007). Such precision, in turn, increases goal strength and consequently moderates outcome variables because of the direct effect situational goals have on achievement-related behaviours (Dinger et al., 2013; Elliot & Church, 1997; Elliot & Thrash, 2001; Payne et al., 2007). The notion of domain goals strengthening and moderating situational goal adoption emphasises the importance of considering the influence of individual differences, beyond dispositional orientations, within an experimental context. However, there is limited research examining the influence of specifically defined and empirically tested internal (domain) goal structures. While one can infer the influence of domain goals on situational goal adoption, there is very limited empirical investigation into domain goals' relationship with external goal structures and the impact of their congruency on outcome variables. This limited research highlights, as Niemivirta et al. (2019) noted, researchers' ignorance of person-oriented approaches to achievement goal investigation.

Therefore, during the course of this thesis I propose to extend empirical research on the interaction effect model originally proposed by Murayama and Elliot (2009), focusing on the interaction between internal and external goal structures. To do this, I will use the first interpretation of the interaction effect model. In this interpretation there are both internal (domain achievement goals) and external (components of the motivational climates e.g., imposed situational goals) goal structures, which interact together and with an individual's personal goals (adopted situational goals) to affect achievement-relevant outcomes, including modification of one's personal goals. A visual representation of this model, adapted from Murayama and Elliot, 2009, can be seen in Figure 1.1.

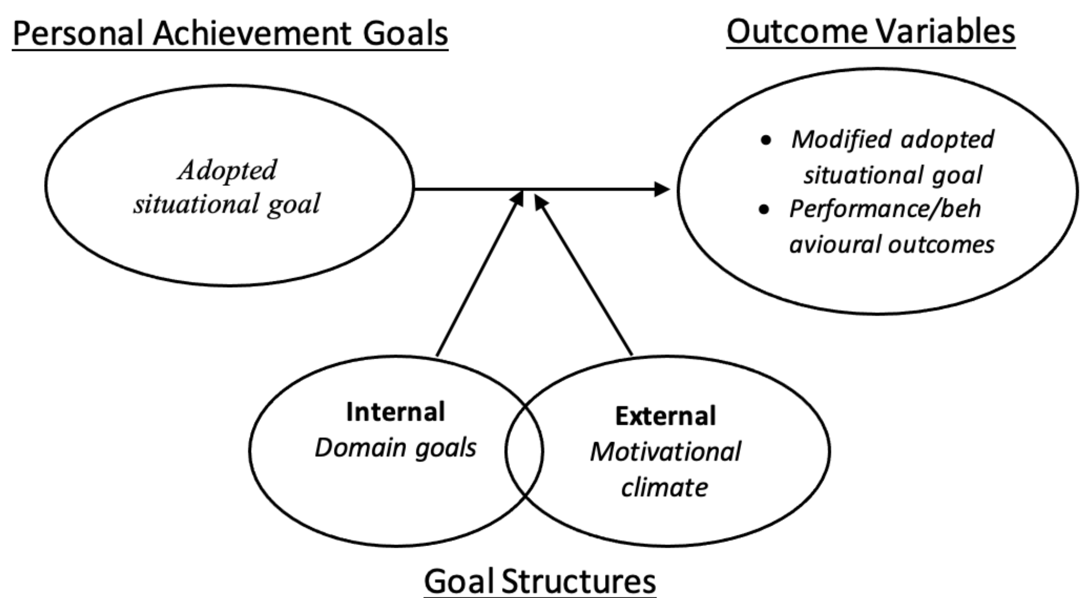



**Figure 1.1**

*A visual representation of the interaction of personal goals, outcome variables, and goal structures as interpreted from the interaction effect model depicted in Figure 1C by Murayama and Elliot (2009).*

The following section will provide an recap and outline of the other constructs and terms that will be used going forward in the experiments in this thesis.

### *1.3.4 Terminology and Constructs in my own Work*

The primary focus of this thesis will be the 2x2 achievement goal model (Elliot & McGregor, 2001). It was noted in section 1.1.3 with the bifurcation of achievement goals into the 2x2 framework that an additional conceptual shift occurred. That shift was related to the subcomponents of competence: the standards of, and standpoints on, competence.

The *standards* of competence refers to the focus of comparing competence to the task/self and others (master and performance goal respectively). The *standpoints* on competence refers to the focus on developing and demonstrating ones competence (mastery and performance goals respectively). Traditional achievement goals models (trichotomous and dichotomous) combined these two subcomponents in their definition of achievement goals (Elliot & Church, 1997). For example, mastery goals were defined as developing competence and acquiring task mastery and performance goals were defined as demonstrating competence and outperforming others (Ames, 1992; Dweck, 1986; Nicholls, 1984). With the bifurcation of the mastery goal in the 2x2 model, attention shifted to one subcomponent of the focus of competence – the standards of competence: evaluating one's competence with regards to task/self and others (Elliot, 1999; Korn & Elliot, 2016). Thus, excluding the examination of the standpoints on competence (demonstration vs. development), achievement goals were defined as approaching success or avoiding failure with respect to demands of the task/one's previous performance or with respect to others (mastery and performance goals respectively: Elliot & McGregor, 2001; Elliot & Murayama, 2008). This conceptual shift was also matched in the operationalisation of goals such as in the AGQ-R (Elliot & Murayama, 2008) and Van Yperen's (2006) dominant achievement goal (DAG) questionnaire. However, Korn and Elliot (2016) noted that the shift was not specifically stated in Elliot and McGregor's (2001) work or initially recognised by other researchers. As such there was a conceptual and, consequently, operational collapse of the subcomponents of competence within the literature. The operational collapse effects conceptual clarity within the literature, especially when comparing findings pertaining to consequences of achievement goal adoption. For validity and accuracy, it would be prudent to compare studies that use the same conceptualisation and subcomponents of competence, including questionnaires measures that are operationalised in the same way.

The subtlety of the initial conceptual shift highlighted the idea that the subcomponents of competence often co-occur in everyday life (Korn & Elliot, 2016). However, the distinction of the two subcomponents in the literature demonstrated they should also be considered separately (Elliot, 1999). In fact, Korn and Elliot (2016) argued that both the standards and standpoint subcomponents of the focus of competence were equally valid, central, and conceptually relevant to the conceptualisation of achievement goals. Therefore, the authors proposed the independent 2x2 standpoints model. It was proposed that considering both the standards and standpoint models in achievement goal investigations may provide a holistic representation of an individual's achievement goals but the models should ultimately be considered separately. Being relatively new, the independent standpoints model has limited empirical evidence in academic domain and, from my knowledge, even less exploring the implication of its achievement goals for performance in the sport domain. As such within the programme of research presented in this thesis achievement goals are considered in terms of the standards of competence. However, arguments have been made that the 2x2 standards model of achievement goals still confounds variables within the valence bifurcated mastery component (Elliot et al., 2011). The mastery component is defined as evaluating competence relative to the task and or self. That is, participants could compare themselves to their previous performance and or, the requirements of the task (e.g., learning the skills required for the task)

(Elliot & McGregor, 2001; Elliot & Murayama, 2008). To address this, Elliot et al. (2011) proposed the differentiation of the standard-based mastery goals into a further two independent subcomponents; task-referent and self-referent goals.

The separation of standard references of competence and the maintained crossing with valence components created the 3x2 model of achievement goals. Elliot et al. (2011) noted how when defined by standards, competence had three basic evaluative references: task, self and other. Performance goals remained defined against one standard, other-based, while mastery goals had in previous frameworks, been conceptualised as either task-based, self-based referents or simultaneously as both. The existing measures of mastery-based goals had also placed different emphasis on the two standards. For example, some researchers used measures which focused more on the task-based standards (Wang et al., 2007), others on self-based standards (Conroy et al., 2003), or a combination of both (Riou et al., 2012). This variation within the literature suggests work exploring mastery goals may have been measuring different constructs, thus making subsequent comparison between study findings difficult and unreliable (Lower & Turner, 2016). Elliot et al. (2011, p.633) noted how this differential use of mastery-goal conceptualisation raised “the question of whether the two standards are similar enough to belong in a single construct or are different enough to warrant separate goal constructs”. Elliot et al. (2011) therefore proposed their investigation of the 3x2 model which separated task and self as distinct constructs. The authors noted how their investigation demonstrated “structural validity and predictive utility of the 3x2 model under the most stringent of measurement conditions” (p.642). Therefore, the authors argued for future research to consider the integration of six achievement goals: 1) task-approach, 2) task-avoidance, 3) self-approach, 4) self-avoidance, 5) other-approach and 6) other-avoidance.

The goals in this framework were assessed by the 3x2 Achievement Goal Questionnaire

(3x2 AGQ, Elliot et al., 2011) in the academic domain and the 3x2 Achievement Goal Questionnaire – Sport (3x2 AGQ-S, Mascret et al., 2015) in the sport domain. There has been growing work examining achievement goals via the 3x2 framework in recent years. For example, in the academic domain the model has been used to examine classroom structures in secondary education (e.g., Méndez-Giménez et al., 2018), and university students' goals when working in teams (e.g., León-Del-Barco et al. 2019). It has also been used in the sport domain to examine the association between effort and mastery goals in Brazilain Jiu-Jitsu (e.g., Øvretveit et al., 2019) and has been adapted for use in other countries (eg., Turkey by Kadioğlu, & Uzuntİryakİ, 2019). However, the 3x2 model has still not been considered to fully cover the nature of achievement goals because it does not consider the standpoints on competence. There has been some debate that the 2x2 standpoint model, developed after the 3x2 standards model, backtracked achievement goal progression. However, this argument is negated by there being only two standpoints on competence. That being said, there is still limited research evaluating achievement goals' effects on behavioural outcomes that consider both standards of and standpoints on competence, especially with the 3x2 distinction. This supports the choice in this thesis to continue examining the 2x2 standards model of achievement goals as there is a greater breadth of research with which to compare findings. However, I acknowledge the importance of developments relating to the 3x2 model for future work, as considering the separation of task and self could be important when evaluating mastery-based findings.

Beyond the need to consider the standard and standpoint models and models including the task/self division, some researchers have suggested another component needs to be considered: The work-avoidance goal (Duda & Nicholls, 1992; King & McInerney, 2014; Niemivirta et al. 2019; Pieper, 2002). This goal has been found to be detrimental to motivation and performance (Archer, 1994; Nicholls et al., 1985). The inclusion of the work-avoidance goal has been advocated for when examining outcome performance (Pieper, 2003) because, as Harackeiwicz et al. (1997) found, work-avoidance negatively predicted university student's final grades. Advocates for the goal have also suggested work-avoidance is important to consider when trying to motivate students to achieve. For example, by understanding the foundations of the work-avoidance goal (e.g., stressful environments; Gavaza et al., 2014), researchers can develop effective interventions to optimally motivate work-avoidant students (Pieper, 2003). However, Elliot (1999) suggests work-avoidance should not be considered an achievement goal. Unlike other achievement goals, it is not competency-based. It in fact represents the absence of an achievement goal (Elliot, 1999; Elliot & Thrash, 2001). In support of the arguments made by Elliot work-avoidance will not be considered with the achievement goals in this thesis .

Therefore, in the present thesis domain and situational achievement goals will be investigated using the 2x2 standards model of competence. In doing so, this research will aim to address one continued discrepancy within the literature: What achievement goal relationships are most beneficial when considering behavioural and or physical performance outcomes? The literature has thus far come to mixed conclusions on the impact of achievement goals. The general consensus is that the approach-based goals are the most beneficial and facilitative for behavioural and performance outcomes (Van Yperen et al., 2015). However, the question remains, *how do imposed approach goals interact with domain goals to affect motor performance?* Throughout the next sections of this review the outcomes of approach-based goals will be examined in relation to key variables that can affect motor performance and which are impacted by internal (domain) and external (imposed situational) achievement goal structures and their interaction. Variables include situational goal adoption, the valuation assigned to achievement goals, and state anxiety.

## 1.4 Achievement Goals and Behavioural Outcomes: Empirical Investigations

The first key outcome variable that must be considered is the situational achievement goal an individual adopts in a given task. In section 1.3.2, it was highlighted that the adopted situational goal was initially thought to reflect the goals imposed through external goal structures (as found in Van Yperen et al., 2011). It was then explained that this relationship was more complex and in fact could be moderated by the interaction between external goal structures and internal goal structures such as domain achievement goals. Therefore, during the following sections one must keep in mind that the lack of differentiation between imposed and adopted achievement goals in the previous literature may be one factor which accounts for the differences between the theoretical propositions and experimental findings relating to approach-based goals. Approach goals have been viewed as the most adaptive goals for achievement compared to their maladaptive avoidance-based counterparts (Hulleman et al., 2010; Senko & Dawson, 2017; Van Yperen et al., 2014). Attitudes of approaching success associated with approach-based goals have been linked to higher levels of challenge seeking, persistence, attitudes of striving to better ones-self and high self-efficacy (Diseth, 2011; Elliot et al., 1999; Huang, 2011; Senko et al., 2013). Theoretically, mastery-approach goals were considered more adaptive than performance-approach goals (Hulleman & Senko, 2010; Midgley et al., 2001). Yet, data on performance-approach goals indicates that they are also positively related to several positive processes and outcomes (Elliot & Moller, 2003). The relation of achievement goals to outcome variables can depend on a number of things, including other variables. For example, task performance may not only be influenced directly by achievement goals but by other outcomes variables such as goal valuation (Ntoumanis., 2009) or anxiety (Roberts, 1986). Therefore, while examining achievement goal outcomes on task performance these other moderating variables will also be considered.

### *1.4.1 Valuing Achievement Goals*

The value an individual places on a task can be represented by the value an individual assigns to achieving their task goals and is referred to as goal valuation. As a construct, "goal valuation refers to how meaningful people perceive a task" (Brigandi et al., 2016, p.265). Eccles and Wigfield (1995) suggested goal valuation can be represented by factors such as interest and enjoyment while the amount of effort required to achieve a task can also have an impact on the value assigned to achieving a goal (Inzlicht et al., 2018). Like factors of effort, enjoyment, and interest, goal valuation can be moderated by personal goal structures (an individual's domain achievement goals), external goal structures (imposed situational goals) or an interaction of the two which can ultimately influence performance outcomes. The following section will delve into each of the moderating factors of goal valuation and how goal valuation consequently affects motor performance. However, it is first necessary to note some key terminological differences between types of valuation in achievement goal literature.

It is important that goal valuation is not confused with competence valuation. Competence valuation is the importance of being competent in a task rather than the value of achieving the task. For example, considering the environmental impact on competence valuation, Ntoumanis et al. (2009) suggested that a coach's motivational ethos in a sport environment can impact how important athletes view the demonstration or development of their competence or ability to be successful. Conversely for goal valuation, van de Pol and Kavussanu (2011) suggest the value given to achieving a goal based on the environment represents the meaningfulness of the psychological interpretation of a context. For example, according to Yeo et al. (2009), if the outcome of the task has meaning, imposed situational achievement goals are more influential as the goal holds greater value. This leads people to invest more effort and assign greater value to achieving their goals as "people work hard to achieve something of value" (Inzlicht et al., 2018). Deci and Ryan (1987) referred to this as a 'functional value'. This functional value can differ depending on environmental influences otherwise referred to in this thesis as external goal structures.

In training contexts, where learning is required, research suggests that coaches value and promote behaviours which facilitate skill development (Oliver et al., 2010); such as skill progression and acquisition (Côté et al., 2007) aligning with the values imposed by mastery-based climates. The promotion of this climate in training contexts in turn should influence the functional value athletes attribute to training (cf. Ames & Ames, 1984 for parallel in the academic context). In competition contexts, athletes' adoption of performance based goals was significantly higher than their adoption of mastery-based goals (van de Pol & Kavussanu, 2011). Researchers posited this was because the performance goal's definition of competence was based on normative comparison, and competition is promoted as a "formally regulated test of skills evaluated by normative criteria" (van de Pol & Kavussanu, 2011, p.178). Therefore, value is placed on performance goals by competition contexts, which in turn can moderate how the athlete values performance-based goals possibly resulting in stronger adoption. In comparison, the stronger adoption of mastery-based goals in a training context suggests that, where learning is required, functionally valued performance-approach goals may not be valued as highly by individuals as valued mastery-approach goals (van de Pol & Kavussanu, 2012).

Goal valuation has also been linked to effort. The value-effort relationship and its implication for task performance can differ depending on achievement goals. Mastery-approach goals predicted effort in training and practice contexts because of their foundation in self-improvement and alignment with the aims of training: a time for learning and honing skills (van de Pol & Kavussanu, 2012). In their systematic review, Biddle et al. (2003) reported a positive relationship between mastery goals and beliefs of effort. Øvretveit, et al. (2019), examining Brazilian Jiu-Jitsu athletes, found mastery-based goals were associated with an increase in training effort. The authors highlighted how their results were consistent with a mastery-effort relationship. In perceived performance climates, such as competition, some research has shown negative associations between performance-approach and effort (Biddle et al., 2003), whereas other work has shown stronger performance-approach goal adoption corresponded with more effort in competition contexts (van de Pol & Kavussanu, 2011). This is supported by research demonstrating the presence of a competitor, instigating a performance climate due to social comparison, was found to increase physical effort (Le Bouc & Pessiglione, 2013).

It is also necessary to consider the interaction effect on goal valuation (interaction between domain goals and external goal structures), as the way in which adopted goals are consolidated is speculated to alter the value placed on achieving (see for reviews: Biddle et al., 2003). When goals are congruent, goal valuation is posited to be greater and so is the learner's motivation to invest more mental effort to achieving their goals (Paas et al., 2005). The more cognitive effort devoted to schema construction, the greater the improvements in cognitive task performance (Kalyuga, 2011). Regulatory fit theory (Higgins, 2000) supports this notion of goal alignment and increasing value by suggesting that when someone believes there is a 'fit' of motivational orientation they will be more engaged (e.g., willing to put in more effort) and value the goal more (e.g., find it more important, Higgins, 2005). However, when goals are incongruent the effects on achievement behaviour are thought to be adverse. A reduction in the precision, as a result of the reduced cementation, of achievement aims has been posited to lead to a decrease in the value individuals associate with the situational goal. This could be because goals do not ‘fit’ or have conflicting aims. The weaker the assigned goal value the less the effort expenditure on a task, resulting in negative implications for performance as the goal is not seen to be as worthwhile (Paas et al., 2005).

However, increases in effort as a result of greater goal valuation do not necessarily translate to an improvement of task performance. Likewise, reduced valuation of goals and associated effort does not always directly correspond to negative performance outcomes. Essentially, the value-effort-outcome relationship may not be that straightforward and assumptions should be made cautiously. As Øvretveit et al. (2019) noted, winning is not intrinsically related to effort, just as performance is not always positively correlated with effort (Eysenck et al., 2007; Nebel et al., 2017; Seifriz et al., 1992). When considering the value-effort-performance relationship psychological mechanisms may also play a role. An example of this links to the congruency relationship between goals and the effect on goal valuation. When goals are incongruent, it can result in an internal conflict between the individual’s valuation of their, and the environment’s, standards of competence. This internal conflict has been posited to lead to an increase in anxiety (Eysenck, 1992). State anxiety has been found to impact performance in different ways (e.g., positively or negatively depending on the individual and or the environment). Therefore, goal valuation can not only directly, but also indirectly, affect performance outcomes through its effect on other performance related psychological mechanisms such as state anxiety.

### *1.4.2 Influence and Effects of State Anxiety*

State anxiety, as one concept of anxiety, "reflects the psychological and physiological transient reactions directly related to adverse situations in a specific moment" (Leal et al., 2017, p.148). State anxiety is often represented as cognitive anxiety and somatic anxiety specific to a situation. Cognitive anxiety centres around the conscious awareness of concerns or worries about one's performance and external stimuli (Morris et al., 1981; Ommundesen & Pedersen, 1999), whereas somatic anxiety refers to the "affective and physiological elements of the anxiety experience that develop directly from autonomic arousal" (Martens et al., 1990, p.6). Typically, anxiety arises due to a lack of confidence which can be attributed to feelings of incompetence or concerns about one's ability (Endler, 1997). Common symptoms include changes in cognition and behavioural variables (Craft et al., 2003). This, coupled with the concerns about competence, suggests anxiety may be modulated by achievement goals.

The relationship between anxiety and achievement goals was first examined by researchers such as Roberts (1986). Since then, research has examined the effects on anxiety of achievement goal adoption and implementation through contextual measures (e.g., Competitive State Anxiety Inventory -2 [CSAI-2], Martens et al., 1990, updated by Cox et al. 2003, to the more factorially valid CSAI-2 Revised). Positive relationships were found between performance-approach goals and cognitive anxiety (Darnon et al., 2012; Midgley et al., 2001 [as cited in Kaplan & Maehr, 2007]; Stenling et al., 2014). Prior to academic exams anxiety was positively related to performance goals (McGregor & Elliot, 2002), and in novice basketball players Mulvenna et al. (2020) found athletes pursuing performance-approach goals experienced the higher state anxiety throughout their performance. A positive relationship between goals and anxiety has often been viewed as undesirable because high levels of somatic and cognitive anxiety (worry, nervousness, high arousal, butterflies) were initially thought to be detrimental to performance (Hardy, 1997). An example of an anxiety related performance detriment includes choking (eg., Wang et al., 2004): A negative implication associated with high cognitive anxiety. However, positive relationships were not always the case. Negative relationships have been found between mastery-approach and cognitive anxiety (Stan & Oprea, 2014) and in some cases mastery-approach goals have been found to lessen cognitive anxiety (Li, 2013; Morris & Kavussanu, 2008). For example, Mulvenna et al. (2020) found pursuit of a mastery-approach based goal resulted in lower state anxiety. Alternative relationships have even been found for performance-approach goals and anxiety. From their literature review Elliot and Moller (2003) summarised, based on 41 studies, that performance-approach goals clearly had null relationships to test anxiety. In some cases, the manipulation of achievement goals in a PE basketball dribbling task has even revealed no statistical difference between mastery-approach and performance-approach goals on state anxiety (Cury et al., 2003). The literature has shown achievement goals can modulate state anxiety. But based on the interaction model of achievement goals, which suggests personal achievement goals and goal structures can affect outcomes variables, are there other factors that could affect state anxiety?

Stenling et al. (2014) suggested that individual differences, such as gender and implicit beliefs of ability, can affect anxiety. Other research has suggested that personal goals and factors such as internal goal structures or domain goals, could also affect anxiety. For example, when examining domain goals, Ranellucci et al. (2015) found individuals endorsing mastery-approach goals had lower levels of predicted anxiety. This supports Roberts et al. (2007) who suggested individuals with mastery dominance would be less likely to experience anxiety because their competency is not threatened. In other studies, performance dominant individuals have been argued to be more predisposed to interpreting feelings of pressure as anxiety, as they have been found to have heightened levels of trait anxiety (Ommundsen & Pedersen, 1999). Spielberger et al. (1970) suggested, through a unidimensional approach, that individuals with heightened trait anxiety would be predisposed to demonstrating an increase in state anxiety in situations deemed threatening to their valuation of competence (success referenced by others). According to Eysenck (1992), anxiety occurs as a result of threat. The threat is based on an individual's self-esteem driven subjective evaluation of a situation. For example, Leal et al. (2017) found a positive correlation between levels of trait anxiety and state anxiety during interpersonal threat situations (in this case a video-monitored stroop test, VMST). It has also been found that in competition situations individuals with performance dominant goals were more susceptible to the increased levels of anxiety found in this context than their mastery dominant counterparts (Ommundsen & Pedersen, 1999). These examples indicate situational climates, as well as an individual's predetermined goals, including domain goals, may impact levels of anxiety.

Despite Dasinger (2018) reporting that no study had used a 2x2 framework to assess perceptions of motivational climate as they relate to anxiety, situations used in previous anxiety research can, in many important ways, be paralleled to mastery or performance climates. For example, the interpersonal situations in Leal et al. (2017) can be considered a performance-based climate as such situations promote comparison between individuals. Mesagno et al. (2012) found somatic anxiety in basketball players was significantly higher in the high-pressure phase. High-pressure phases can also be likened to performance-based climates, which Dasinger (2018) found were significantly related to state anxiety. In performance-based climates, success is related to outperforming others. In such situations the uncertainty about the probability of achieving success defined by normative comparison can lead to heightened levels of anxiety (Eisenbarth & Petlichkoff, 2012). In contrast mastery climates have been proposed to minimise feelings of anxiety (Smith et al., 2007).

Based on findings that only mastery-approach climates significantly predicted state anxiety, Dasinger (2018) concluded promotion of a mastery-approach climate would likely reduce student experiences of anxiety. Ommudsen and Pedersen's (1999) interpretation of their findings supports Dasigner's (2018) conclusion. The authors proposed the non-significant relationship between performance dominant individuals and high levels of state anxiety found in their study may have been due to the athletes' perception of a mastery-based motivational climate. On the other hand, goal incongruency (performance dominant individuals in a mastery climate) may lead to an internal conflict surrounding individuals' valuations of their standards of competence, which could increase anxiety (Eysenck, 1992). However, this adverse effect of goal incongruency may only be for mastery dominant participants (who focus on skill and self-improvement) in performance climates, due to their success depending on others (Eisenbarth & Petlichkoff, 2012). For the performance dominant group in Ommudsen and Pedersen's study, the threat of incongruent goals may have facilitated performance as a way to minimise aversive state anxiety (Eynseck et al., 2007). Therefore, not only could perceptions of motivational climate effect anxiety, but interpretations of anxiety could differentially effect performance.

In the sport literature, anxiety's effects on performance have been discussed by multiple theorists. One theory, Kahneman (1973), posits anxiety leads to an uptake in arousal of which there is an optimal point for facilitating performance. If arousal increases further performance can be negatively affected. This is similar to the inverted-U hypothesis (Yerkes & Dodson, 1908) often applied in sport. This posits a curvilinear relationship between physiological arousal and performance (Craft et al., 2003; Landers, 1980; Martens et al., 1990). Other theories such as the zones of optimal functioning theory (Hanin, 1980), posit there is an optimum “zone” where the relationship between the level of anxiety and peak performance is unique to individuals. While the catastrophe model (Fazey & Hardy, 1988) describes the relationship between levels (high and low) of cognitive and somatic anxiety and the point of performance decline and recovery. These theories suggest context subjective cognition and arousal, and even individuality, play a key role in explaining how anxiety affects performance. These theories also suggest that anxiety may not always be detrimental to performance. In fact, it may be the interpretation of anxiety related symptoms (e.g., physical manifestations: somatic anxiety) and thoughts (e.g., mental manifestations: cognitive anxiety) that determine the effects, positive or negative, of heightened levels of anxiety on performance (Geukes et al., 2012). For example, increases in anxiety could affect performance differently depending on an athlete’s experience and coping mechanisms (Hagan et al., 2017).

It has been proposed that experience and regulation mediate the relationship between performance-approach goals and achievement outcomes (Edwards, 2014; Hagan et al., 2017). Wang et al. (2004) suggested that, for high trait anxiety level individuals, such as those with a performance dominant achievement goals, performance may be better under pressure/in anxiety inducing situations. They posited this because performance dominant individuals are accustomed to performing with a higher level of baseline anxiousness due to their high ’normal’ level of anxiety (Ommudsen & Pedersen, 1999). Like performance dominant individuals, elite athletes are experienced in performing in situations with increased anxiety and pressure. They have been found to implement coping mechanisms, so anxiety does not debilitate their performance (Hagan et al., 2017; Mahoney & Avener, 1977). The processing efficiency theory (PET, Eynseck & Calvo, 1992) suggests, due to increased anxiety, mechanisms of worry can increase motivation in order to reduce negative feelings that arise in stressful situations. The reduction in worry is complimented by promoting the use of additional, auxiliary processing resources and enhancing effort (Eynseck et al., 2007). In some cases, cognitive anxiety in the form of worry may arise from the negative interpretation of somatic anxiety symptoms (Hall & Kerr, 1997). In other cases, somatic symptoms of anxiety such as increased heart rate, butterflies or other autonomic arousals may be interpreted as excitement (a positive reappraisal of symptoms of high arousal and therefore anxiety; Brooks, 2014). Excitement a facilitator of task performance, rather than a negative performance debilitating emotion (Brooks, 2014; Jones et al., 1994; Ommundsen & Pedersen, 1999), supports early notions that somatic anxiety may have less of a negative influence on performance than cognitive anxiety (Martens et al., 1990). Dewar et al. (2013) found that the performance goal condition was related to higher levels of pre-competitive excitement. In competitive swimmers, cognitive and somatic symptoms were reported as facilitative if associated with positive expectations of achievement (Jones & Hanton, 1996). This evidence demonstrates that achievement goals can modulate state anxiety and in turn influence task performance. As in the swimmers, anxiety elicited by the performance condition facilitated their competition performance when interpreted as excitement. This suggests achievement goals can indirectly affect task performance through variables such as state anxiety. However, the direct effects of achievement goals for task performance are less clear.

### *1.4.3 Achievement Goals and Academic and Sport Performance*

Van Yperen et al.'s (2015) meta-analysis comparing experimental studies inducing situational goals concluded pursuit of mastery-approach goals led to better performance than pursuit of performance-approach goals. However, on examination of the type of tasks they concluded there was no statistical difference between mastery-approach and performance-approach goals in terms of physical task performance. In contrast, some research has found mastery and performance-approach goals to be equally beneficial for performance attainment (e.g., Elliot et al. 2006, 2005, Study 1a and 1b; Mouratidis et al., 2018; Senko et al., 2011). These results add to the controversy surrounding which approach-goal is more beneficial to impose or adopt for performance outcomes. A controversy arising, in part, because there are less experimental studies examining performance outcomes associated with achievement goals than correlational studies (Kavussanu et al. 2009). Given this, work relating to the outcomes of both mastery- and performance-approach goals will now be briefly considered.

Theorists initially predicted inducement of mastery goals would lead to task performance benefits (Kanfer & Ackerman, 1989; Yeo et al., 2009) as mastery-approach goals were theorised to align most closely with desirable outcomes (Jackson et al., 2010). However experimental research may inform slightly different conclusions. Empirical examination has primarily been conducted in the education domain (e.g., Litalien et al., 2017) though investigation is increasing in physical education and sport related settings (e.g., Adie et al., 2008; Adie et al., 2010; Conroy et al., 2006). Generally field research results were mixed. In educational settings, mastery goals were seen to be the more adaptive, resulting in higher performance outcomes (Pintrich, 2000). This was because of their association with higher levels of intrinsic motivation (Elliot & Harackiewicz, 1996), deep learning strategies (Murayama & Elliot, 2009; Moller & Elliot, 2006; Senko et al., 2013) and focus on improvement, which have been linked to long-term educational benefits (Senko et al., 2013). For example, Alrakaf et al.(2014) found only mastery-approach goals significantly impacted academic grade in their investigation of pharmacy students. Mastery-approach goals' association with positive outcomes is further supported by Van Yperen et al.'s (2015) meta-analysis on experimental research. Using imposed achievement goal studies, Van Yperen and colleagues concluded mastery-approach goals did have a stronger effect on performance outcomes compared to other goals, including performance-approach goals. One example of a study included in their analysis was that by Kavussanu et al. (2009) who concluded mastery-approach condition participants practised for longer on a golf-putting task than their performance-approach condition equivalents. Practice is an important variable that links to performance outcomes such as skill mastery or triumph in competitions. Kavussanu et al.'s (2009) demonstration of the positive influence of mastery-approach goals on practice, measured by time invested in practicing golf putting, supports the notion that mastery-approach goals can not only directly, but indirectly, affect positive performance outcomes.

However, while mastery-approach goals are hypothesised to be highly adaptive and result in a number of positive outcomes, evidence relating to academic performance has been mixed. Some empirical evidence from correlational research has identified null relationships between mastery-approach goals and objective task outcomes (e.g., exam grades, test scores, physical performance; Cury et al., 2006; Elliot & McGregor, 2001; Payne et al., 2007; Senko & Harackiewicz, 2005). Yeo et al. (2009) noted that research often finds null relationship between mastery-approach goals and task performance. Phan (2010) noted a notable consistency in the lack of statistically significant associations between mastery-approach goals and academic achievement. As such it remains unclear whether mastery-approach goals would only be conducive in certain circumstances such as verbal tasks, tasks with anticipated comparative feedback (Anseel et al., 2011; Chen & Mathieu, 2008) or tasks that require cognitive learning (Anseel et al., 2011).

From their dispositional underpinning, performance-approach goals were originally posited to promote behaviours leading to high performance (Elliot & Church, 1997). However, performance-based goals were initially thought to be associated with maladaptive outcomes for both behaviour and performance (Benita et al., 2014; Elliot & Harackiewicz, 1996; Lachman, 2014) because of theoretical links to the definitional performance component. For example, because performance-based goals lead to the use of shallow learning strategies (Senko et al., 2011), this may result in decreased levels of intrinsic motivation (Elliot & Murayama, 2008) and poorer academic performance. On the other hand, performance-approach goals have been suggested by a profusion of research to be the only achievement goal to positively, consistently predict performance (Barron & Harackiewicz, 2003; Elliot et al., 1999; Harackiewicz et al. 2002; Hulleman et al., 2010; Wolters, 2004), including sports performance (e.g., dart throwing: Ntoumanis et al., 2009). In correlational research among college students, performance-approach goals consistently demonstrated positive relationships to exam outcomes and final grade. Van Yperen and Renkema (2008) argued this correlation to be around $r = .20$, enough for achievement goal researchers to begin to consider performance-approach goals as an empirically supported determinant of performance (for a review, see Harackiewicz et al., 2002). In sport settings performance-approach goals have also been found to be as adaptive for learning new motor-based skills (Meira & Fairbrother, 2018) and beneficial in competition contexts (van de Pol & Kavussanu, 2012). The benefits of performance-based environments have been noted since before the development of achievement goal theory (Van Yperen, 2021): In the 1890s Norman Triplett observed racing cyclists' performance was faster in competitive contexts (i.e., a performance climate) than when they raced against the clock alone (arguably a mastery-based condition).

Positive identifications of performance-approach goals have also been found in individual-level studies (Elliot et al., 2006; Stoeber et al., 2009). Stoeber et al. (2009) for example demonstrated, in a regression analyses, that high performance-approach goals (along with other components of a goal profile) predicted an individual's triathlon race performance.

They concluded their results demonstrated performance-approach goals and personal standards of perfectionism predicted performance in both training and competition. In two studies, Senko et al. (2013) found that performance-approach goals were facilitative of high achievement in a high challenge condition, particularly if participants believed the task to be complex. Positive effects have also been found for team sports where performance-approach goals were related to performance outcomes and changes in performance during the season (Van Mierlo & Van Hooft, 2020).

However, that is not to say performance-approach goals have not been associated with negative outcomes related (in some cases) to learning strategies (Delavar et al., 2011). For example, in education settings performance-approach goals eliciting the use of surface-learning strategies (Senko et al., 2011) can be seen as a detriment to academic attainment or long-term goals. Benita et al. (2017) argued their results supported previous studies where performance-based goals were superior for eliciting better task performance in tasks which were short-term. In other studies performance-approach goals have been unrelated to academic performance (Midgley et al., 2001); unless perceived in the motivational climate. For example, in the academic domain, implementing competition-based games in a classroom was shown to improve course performance (Burguillo, 2010). This suggests any competition-based influence in an environment can promote a performance motivational climate and thus the associated performance goal benefits. It also suggests the negative relationships associated with performance-approach goals may be related to the goals the individual adopts rather than those perceived. That is, just because a motivational climate is perceived does not mean it is adopted as an individual's task goal. Only if the individual adopts a performance-approach goal in specific tasks, may behaviours and performance be affected negatively. Regardless, Yeo et al. (2009) proposed that the negative or aversive elements of the performance-approach goal are expected to be outweighed by the positive benefits associated with approach-related process as a result of the approach element of the goal.

Overall, the comparison of the two approach goals demonstrates a number of positive findings for each. Mastery-approach goals were theoretically thought to elicit positive performance outcomes, however empirical investigations demonstrated mixed support. Performance-approach goals have been theoretically associated with some negative outcomes. However, the positive empirical findings are believed, in part, to arise because the performance-approach goal incorporates a positive (approaching success) component which outweighs rather than complements the negative component under specific circumstances (Yeo et al., 2009), such as competitions or physical learning. Nevertheless, Van Yperen et al. (2014) concluded that when aiming to enhance performance outcomes, achievement goal interventions (e.g., in the classroom or sports environment) should focus on promoting mastery-approach goals. The authors list several reasons for this conclusion, including the idea that mastery-approach goals are considered the ideal type of competence regulation and that they promote prosocial behaviour (for further discussion see Van Yperen et al., 2014). However, it cannot be ignored that at times researchers found situational performance-approach goals to be positively associated with performance, more reliably and robustly than the mastery-approach goals (Barron & Harackiewicz, 2003; Elliot et al., 1999; Harackiewicz et al. 2002; Hulleman et al., 2010; Senko et al., 2013; Wolters, 2004).

The circumstances in which performance-approach goals may be more effective at enhancing performance could be related to the ultimate evaluation of the performance. For example, mastery-approach goals focus on intrapersonal standards of self-reference to judge performance improvement (Elliot et al., 2011). Thus, while a mastery-approach goal may be beneficial for personal performance improvement it does not necessarily lead to improvements at an interpersonal level as it does not prioritise external evaluation to validate performance (Cury et al., 2006). That is, while individuals with mastery-approach goals may demonstrate personal performance improvement, when that improvement is compared to other individuals, the performance benefits may not be as obvious.

There are two alternative explanations for the mixed empirical findings for the performance approach-based goal which could change researchers' views on which goal is most beneficial. These alternatives stem from the clarity of achievement goal conceptualisations. The first alternative is that earlier studies used measures which confounded the approach and avoidance attributes of performance and mastery goals. Research that explicitly differentiated the goals by using the 2x2 model and appropriately aligned questionnaire measures has more consistently demonstrated positive relationships between performance-approach goal adoption and performance outcomes (Hullemen et al., 2010; Mouratidis et al., 2018). The second alternative is that studies combined the standard and standpoint definitions of competence, defining mastery-approach goals as the desire to develop competence based on task/self and performance-approach goals as the desire to demonstrate competence compared to others (Mouratidis et al., 2018). In Hulleman et al.'s (2010) meta-analysis examining over 100 studies it was noted that performance-approach goals focused on the standpoints of competence (demonstrating competence) had negative links to achievement outcomes. In contrast, performance-approach goals focused on the standards of competence (referencing competence compared to others) linked positively to achievement outcomes. This confirms that experimental studies manipulating situational approach-based goals, strictly defined by standards of competence, have demonstrated performance-approach goals to be a more consistent positive predictor of performance outcomes than mastery-approach goals (see Elliot et al., 2005; Senko et al., 2011).

While goals have their own relationships with achievement, some perspectives argue that a combination of the goals can be the most beneficial: the person-centred multiple-goal perspective for example (Barron & Harackiewicz 2001). The multiple-goal perspective is a person-centred approach to achievement motivation that asserts a combination of mastery and performance-approach goal orientations can be beneficial in achievement settings (Barron & Harackiewicz 2001). Research findings have supported the beneficial relationship of the two achievement goals. Mouratidis et al. (2018) noted how their findings aligned with those of Senko et al. (2011), where, when examined by academic grade, mastery-approach and performance-approach goals were both conducive to performance. As both goals facilitated performance it could be argued they would do so more beneficially when adopted together. Nevertheless, the question remains, which approach-based goal is the most beneficial for task performance? This question includes the effects the goals have on behavioural outcomes such as goal valuation and state anxiety which have been shown to act as behavioural moderates of physical performance. It has been suggested that not only the way in which the goals are manipulated but how they are conceptualised and operationalised could affect their impact on outcome variables. Therefore, the next section of this review will examine the methodology used in the literature to examine the effects of achievement goals, including the interaction effects posited earlier in this thesis, to inform my own empirical investigation to answer the research question how do imposed approach goals interact with domain goals to affect motor performance?

## 1.5 Methodology in the Literature

The dominant methodologies that have been used to assess achievement goals are between-subject designs. Participants are allocated to independent conditions, for example as in Elliot et al.'s (2006) study where participants were assigned one of three goal conditions. Participants' performance was then assessed in each condition. Conclusions were drawn based on which goal elicited better basketball dribbling. However, methods such as this do not allow researchers to determine whether there are individual differences in the effects of imposed situational goals. Therefore, previous studies using between-subjects measures (of which there are a great deal, e.g., see meta-analysis by Van Yperen et al., 2015) are not accounting for the potentially confounding influence of individual differences. These individual differences can include internal goal structures such as domain achievement goals. Using a between-subjects design also means results need to be interpreted cautiously as a large majority of achievement goal experiments examining two goal conditions fail to include a control, no goal group (e.g., Anseel et al., 2011; Elliot et al., 2005). This means changes in outcome variables between goal conditions could be attributed to goal facilitation in one condition, or debilitation in another (Senko et al., 2013). This limitation may be avoided through the use of a within-subjects design and consideration of individual differences such as over-arching domain goals.

Domain achievement goals have been described as occurring in an orthogonal relationship whereby goals can be simultaneously adopted. A reflection of this is the multiple goal perspective. In this perspective mastery-approach and performance-approach goals are not mutually exclusive. Goals are proposed to be simultaneously adopted where goals with a shared dimension (either in valence or definition) often occur together (Barron & Harackiewicz, 2001; Pintrich, 2000). Within this simultaneous adoption one goal is posited to be more dominant with the continued influence of other achievement goals (Van Yperen, 2006). In this thesis, however, situational goals are posited to be adopted for task specific situations where, even with an orthogonal relationship, one goal is adopted more strongly at one time to suit the demands of the task. The orthogonal relationship allows for effective goal switching should the demands of the task change. There have been a range of previously published methods of differentiating the orientation and relationship of domain achievement goals as described in this thesis. These included mean and median split (used by authors such as: Da Costa, 2015; Pintrich, 2000) and more recently Van Yperen's (2006) DAG analysis. Niemivirta et al. (2019) provide an extensive (though not exhaustive) list of studies using methods such as median split and cluster analysis.

Median split analysis is a commonly used method to determine achievement goal categorisation while cluster analyses focus on achievement goal profiles (Abd-El-Fatta, 2018). There are drawbacks to both methods. Traditional median split analyses, as Niemivirta et al. (2019) suggests, are not fully person-centred. Median or mean split analysis as a method of categorising individuals domain goals reflects the median or mean at the sample-level (Fryer & Elliot, 1997). So, when the sample changes, so too would the median or mean and consequently the way in which individuals are categorised (Pastor et al., 2007). This does not reflect the nature of domain achievement goals which are posited to reflect individual differences in achievement goals towards a domain (Han, 2016: Harackiewicz et al., 1998). Therefore, a tool to represent the orthogonality of domain goal adoption would need to consider categorisation at the individual-level. The use of such a tool would reflect domain goal adoption categorisation consistently between studies even when using different samples.

Cluster analysis, used by over half of the studies examined in Niemivirta et al.'s (2019) review, is arguably more sophisticated. It considers variation of achievement goals at the individual level before grouping together those with similar profiles (Abd-El-Fatta, 2018). However, because of problems determining the number of clusters, the method is prone to its own biases (Pastor et al., 2007). For example, Pastor et al. (2007) note how rather than relying on statistics researchers use their own judgement to determine cluster solutions. This may result in biases due to a lack of rigorous guidelines for the clustering process. Furthermore, comparison between studies can be difficult because of the variety of variables used to indicate clusters. Therefore, cluster analysis also may not be a suitable method by which to investigate domain achievement goal profiles for the purpose of consistently and reliably grouping participants across studies with different samples and variables of interest. It also may not be suitable for use as a method to investigate the interaction of domain and imposed goals and the effect on motor performance. Therefore, consideration will be given to which methodology to use to examine domain achievements goals as defined in this thesis.

The operationalisation of achievement goals is also an important factor to consider when trying to determine which approach-based goal is most beneficial. Hulleman et al. (2010) noted that measures which coded items with reference to different components of competence (e.g., task vs self or demonstration compared to a normative focus on competence) generated different results. Examining performance-approach goals, it was found scales having a majority of normatively referenced items (e.g., doing better than others) demonstrated positive correlations with performance outcomes (e.g., Hulleman et al., 2010, r^= .14). For example, in Elliot and McGregor (2001) or Grant and Dweck (2003) and studies using the AGQ or AGQ-R (Elliot & McGregor, 2001; Elliot & Murayama, 2008). Conversely, scales which more heavily emphasised appearance and evaluative items (e.g., demonstrating ability) had a negative relationship (r^ =.14). For example, Smith (2005) and Midgley et al. (1998) and studies using the PALS questionnaire (Midgley et al., 2000). However, Wirthwein and

Steinmayr (2020) have demonstrated that, as well as normative performance-approach goals, appearance performance-approach goals also have a positive relationship with educational outcomes. Collectively these results demonstrate the necessity of defining and operationalising achievement goals and using measures which correspond to the theoretical conceptualisation of a construct.

With this in mind it is also necessary to consider how studies have differentiated the types of achievement goals (domain and situational) from goal orientations. Many studies use the terms achievement goals and goal orientations indiscriminately (see Elliot, 1999), though the two are distinctly different (see Hulleman et al., 2010; Niemvirita et al., 2019). Thus, like with domain and situational achievement goals, it can be extremely difficult to categorise studies into those that focus on achievement goals and those which focus on goal orientations (dispositional tendencies antecedent to achievement goals). Therefore, not only is there a need for clarity when defining and measuring which type of achievement goal is being investigated but there is also a need for consistency in the operationalisation and interpretation of achievement goals as a construct distinct from dispositional goal orientations.

As broached upon when discussing achievement goals, the plethora of AGT research has led to the use of different labels for the same constructs and the same labels for different constructs otherwise known as jingle and jangle fallacies. The occurrence of these fallacies, especially in the operationalisation of achievement goals, has aided in the generation of inconsistent empirical findings. This has hindered the progression of AGT's understanding of achievement motivation, specifically in regards to performance outcomes. I intend to address some of these methodological inconsistencies, clearly defining the theoretical conceptualisation of achievement goals in the empirical chapters to follow, while investigating the interaction between imposed approach goals and domain goals and its affect on motor performance. Within this investigation, I will use a mixed model design where individuals are grouped as between-subjects based on their domain achievement goals and tested by within-subject measures for the imposed situational goal effects on task performance. I also intend to use operational measures which adhere to the chosen conceptualisation of achievement goals, the 2x2 achievement goals on the standards of competence. This would include the AGQ-R (Elliot & Murayama, 2008) or AGQ-S (Conroy et al., 2003) adapted to reflect contextual or task-specific use.

## 1.6 Summary of Key Concepts, Hypothesis and Empirical Investigations

Examination of the literature has illuminated a lack of empirical investigation into domain (internal goal structures) and situational achievement goals (external goal structures) conceptually defined in standards of competence, and the consequences of their relationship for motor performance. A methodological overview revealed: i) a shortage of within-subject studies whereby each individual partook in all achievement goal conditions, and ii) few studies exploring potential effects of individual differences (internal goal structures), in the form of dominant domain achievement goals, in their investigation of situational achievement goals. To address these gaps in the literature this thesis empirically examined the congruence interaction between dominant domain, and situational imposed and adopted achievement goals, including their effects on and moderation of motor performance. This examination was in a bid answer a key research question: *How do imposed approach goals interact with domain goals to affect motor performance?* To this end, four empirical studies were conducted:

Chapter 2, Study 1: A pilot study that examined the interaction between domain and situational achievement goals and the consequences of the congruency of that relationship. The study also trialled and evaluated several methodological processes. These included: participant selection, design of task instructions, task apparatus, task and questionnaire implementation and variability, use of a grouping tool, examination of imposed versus adopted achievement goals and the feasibility of a within-between subject design. It was hypothesised that memory task performance and goal valuation would be better in goal congruent conditions.

Chapter 3a, Study 2: This chapter examined the congruency relationship found in the previous study using a reaction-time based task while attempting to address the methodological concerns raised. Additionally, the study examined the of influence state anxiety in modulating task performance. Goal congruency was expected to improve task performance, increase goal valuation and decrease state anxiety.

Chapter 3b, Study 3: This chapter aimed to embed the additional methodological modifications suggested at the end of the previous chapter. It aimed to determine if null results could be attributed to reduced sensitivity in the dependent variable and aimed to improve task instructions, so they aligned more with their achievement goal conceptualisations. The goal congruency hypothesis remained the same as in previous chapters. For situational goal adoption, based on previous findings, it was hypothesised that goal adoption would reflect the dominant domain goal of the sample.

Chapter 4, Study 4: This chapter replicated and extended Chapter 3b and Chapter 2's findings by investigating the relationship between domain dominant and situational goal congruency, examining the consequences for reaction time (RT) performance, state anxiety and goal valuation. The study explored the possible influence of additional congruency-based relationships (other than domain and imposed situational goal congruency) which were alluded to influence performance in previous chapters. The replication aimed to examine task performance in a more physically demanding task. Based on motor skill acquisition studies and Chapter 3b's findings, it was hypothesised that RT would be better in the performance-approach condition than in the mastery-approach condition.

# Chapter 2

## Achievement Goals and Memory Recall: Exploring the Relationship Between Domain and Situational Achievement Goals

### 2.1 Introduction

The first step to becoming successful in any endeavour, particularly in academia, is learning (National Research Council., 2000). In order to learn, individuals can utilise an array of strategies such as rote learning (e.g., surface learning) and learning with understanding (e.g., deep learning: Beattie et al. 1997), both of which include aspects of memorising and the ability to recall information. However, in order to effectively utilise such cognitive learning strategies for successful performance, for example in academic tests, people first need to be motivated (Bereby-Meyer & Kaplan, 2005, Garcia & Pintrich, 1994; Paas et al. 2005). One factor which directly impacts the motivation required for a successful performance in such situations are the situational achievement goals individuals adopt (Payne et al., 2007) (c.f. achievement goals theory (AGT): Elliot, 1999).

A large majority of research on situational achievement goals and task performance, conducted using the prominent motivational framework AGT, has focused on correlational investigations (Van Yperen et al., 2015: see, Hulleman et al., 2010; Van Yperen et al., 2014 for meta-analyses). However, if we were to understand "the causal relationship between [situational] achievement goals and performance attainment", AGT could be used to delve into the "development of effective achievement goal-based interventions" for ways to improve learning and consequently performance (Van Yperen et al., 2015, p.166). Within the search to understand the process of this causal relationship there are a number of questions to consider. How situational goals are adopted (e.g., “reasons” [see Elliot & Thrash, 2001], what moderates them (e.g., antecedents such as instructional conditions [Paas et al., 2005], perceived environmental processes [Elliot, 1999; Elliot & Thrash, 2001], motivational climates [Ames 1992] and the overarching-domain achievement goals) and how they influence task performance are all important questions. Answering them, and in doing so developing understanding of the importance and effect of motivational influences, may help personalise learning and better motivate individuals.

Despite some experimental studies exploring the implications of manipulating achievement goals for task performance (Barron & Harackiewicz, 2001; Van Yperen, 2003, Utman, 1997) and well-being (e.g., Adie et al., 2008; 2010), there are comparatively few which experimentally examine inducing situational achievement goals based on Elliot’s 2x2 achievement goal framework. In fact, in their meta-analysis, Van Yperen et al., (2015) found 19 studies: A large majority of which examined inducing approach-based goals but none of which examined the moderating influence of other goal structures such as individuals’ domain achievement goal (Murayama & Elliot, 2009).

To address the limited amount of literature examining the effect of, or the relationship between, domain and situational achievement goals on task performance, the present study comprised two stages. First, a theoretical evaluation of approach-based situational achievement goals and their implications for task-specific motor performance. Second an empirical investigation, conducted as a methodological pilot, examining the influence of domain achievement goals when imposing approach-based situational goals on task performance. This latter element included exploration of the effect on situational goal adoption. There were three research aims based on these stages: i) investigate the effects of situationally induced approach-based instruction conditions on situational goal adoption, ii) investigate the interaction between domain and situational achievement goals for task performance, iii) evaluate the methodology used in this investigation and its suitability for a larger-scale study. To place these aims in context, this chapter first presents an overview of situational achievement goals within AGT, including their moderating antecedents and distinction from domain achievement goals.

### *2.1.1 Achievement Goal Theory and Situational Achievement Goals*

Achievement goal theory (AGT) posits there are four achievement goals stemming from the 2x2 standards of competence framework. Conceptualised as cognitive representations of competence-based possibilities that directionally guide behaviour toward an end result (Elliot, 1999; Elliot & Thrash, 2001) achievement goals give an insight into the processes one uses to achieve an aim. This is done by combining the definitional and valence dimensions of competence (Elliot & McGregor, 2001). Mastery-avoidance (MAv: striving to avoid self or task failure) and performance-avoidance (PAv: striving to avoid performing worse than others), and the main focus of this investigation, mastery-approach (MAp: approaching success by striving for self or task improvement), and performance-approach (PAp: approaching success by striving for improvement compared to others: Elliot, 1999; Elliot & Church, 1997; Elliot & McGregor, 2001; Elliot & Murayama, 2008; Senko & Tropiano, 2016).

Achievement goals can be examined for task-specific situations (e.g., an upcoming test) or as over-arching goals for a particular domain (general goals for academic endeavours). This is evident in the modifications of achievement goal questionnaires such as the AGQ-R: situation specific (e.g., “aims for psychology exam”; Elliot & McGregor, 2001) or domain-specific (e.g., “aims for academic course”; Finney et al., 2004). As such, it could be possible to compare an individual's domain achievement goals and situational achievement goals to assess if the situational goals are influenced by the goals adopted for the domain. This also leads to the comparison of the properties of domain and situational achievement goals. Related to a specific task, situational goals have been posited to be preferred one at a time. In other words, individuals 'adopt' one achievement goal over the others (Scheltinga et al., 2015; Van Yperen, 2006), in order to focus on the task at hand and maximise success (Payne et al., 2007). Situational goals have been described as relating to results or outcomes an individual wants to achieve in a particular situation (Harackiewicz & Sansone, 1991; Pintrich et al., 2003). For example, while domain goals reflect the global aims for a student's degree course, such as passing, getting a 2:1 or getting a job, situational goals are the goals that focus the individual on specific elements of the course, such as a module exam or pieces of coursework. By providing specific, tangible aims for achievement for an impending task (Han, 2016; Kaplan & Maehr, 2007), situational goals "represent a form of self-regulation" where goals can be contemplated for revision should the aim of the task change (Fryer & Elliot, 2007, p.701). As such, this ability for regulation indicates aims have the ability to be revised, and as such, suggests goals are not concrete (Cury et al., 2006; Elliot et al., 2011) indicating situational variability (Han, 2016). The variability of situational goal adoption, and therefore the consequences for behaviour and performance outcomes, can be influenced by a number of factors (Roberts et al., 2007). Mostly notably are the situational goal structures, "conceptualised as competence-relevant environmental emphases" (Murayama & Elliot, 2009, p.432) which can be seen through the motivational climate (Ames, 1992).

### *2.1.2 Influencing Factors of Situational Goal Variability*

The motivational climate is a psychological environment created which affects the motivation and situational atmosphere felt by a student or athlete (Ames, 1992; O'Rourke et al., 2014; Spray et al., 2006; Trenz & Zusho, 2011; Warburton, 2017). The climate, as a goal structure, can be divided into three components: i) the creation of the climate by teacher, coaches or parents (Ames, 1992), ii) the type of environment such as competition/exam or practise/revisions (van de Pol & Kavussanu, 2011), and iii) instruction conditions such as specific motivational instructions or imposed goals (Paas et al., 2005; Van Yperen et al., 2011).

Teachers and coaches can create a motivational climate by the ways in which success is encouraged, competence is defined or their demeanour towards the activity and students (Ames, 1992; Kaplan et al., 2002 in Meece et al., 2006; Darnon et al., 2012). The type of environment is the setting or situation in which the task takes place (e.g., classroom, examination, training, practise or competition: Barron & Harackiewicz, 2003; Conroy et al., 2008; van de Pol & Kavussanu, 2012). In the sport domain researchers such as van der Pol and Kavussanu (2011) found that in competition environments performance-based goals were more commonly adopted whereas in practice or training environments mastery-based goals were more common. Parallels can be drawn between the education and sports domain: competitions seen as exams, and training environments similar to a classroom environment. Using this parallel, similar results for achievement goal adoption can also be seen. Barron and Harackiewicz (2003) noted performance goals were more suited to classes with multiple-choice exams whereas mastery goals were better matched to classes emphasising student participation.

Inducing a climate by manipulating and inducing specific goals, over a short period of time for a specific task is often referred to as imposing or the imposed situational goal

(Payne et al., 2007). This is usually done through the use of task instructions (see Van Yperen et al., 2015 for different task instruction manipulations). For example, it has been consistently demonstrated that mastery-based climates are positively related to MAp goals while performance-based climates are positively related to PAp goal adoption in both students and athletes (e.g., Darnon et al., 2012; Trenz & Zusho, 2011; Warburton, 2017). However, research has been less consistent in findings when examining situational goal adoption and performance outcomes.

### *2.1.3 Consequences of Situational Goals*

A plethora of correlational research examining situational goal adoption and performance outcomes has consistently noted the positive associations of approach-based goals (MAp or PAp) and negative associations of avoidance-based goals (MAv or PAv) with performance. However, the research has led to a number of unexpected findings on the strengths of MAp and PAp goal benefits. Particularly surprising are the controversial findings related to MAp goals. Theorists initially predicted inducement of mastery goals would lead to task performance benefits (Kanfer & Ackerman, 1989; Yeo et al., 2009). This was supported in Van Yperen et al.'s (2015) meta-analysis on experimental research using imposed achievement goals which found that MAp goals did have a stronger effect on performance outcomes compared to other goals, including PAp goals. However, some empirical evidence from correlational research has identified null relationships between MAp goals and objective task outcomes (e.g., exam grades, test scores, physical tasks; Cury et al., 2006; Elliot & McGregor, 2001; Payne et al., 2007; Senko & Harackiewicz, 2005). Yeo et al. (2009) argued the difference between theoretical and empirical findings could be due to the MAp goals focusing on intrapersonal standards of self-reference to judge performance improvement (Elliot et al., 2011). Thus, while a MAp goal may be beneficial for personal performance improvement it does not necessarily lead to improvements when compared at an interpersonal level as it does not prioritise external evaluation to validate performance (Cury et al., 2006). This argument suggests that the difference between experimental findings may be due to the use of moderating variables and inter- vs. intra-level comparisons.

Performance-approach goal research has a similar history. It was thought that PAp goals would hinder performance due to the adoption superficial learning strategies (Elliot & Harackiewicz, 1996) and in some experimental findings this was indeed the case. Yet some experimental researchers (e.g., Senko & Harackiewicz, 2005 Study 1; Senko et al., 2013) found situational PAp goals to be positively associated with academic performance, at times, more reliably than MAp goals (Elliot et al., 1999; Harackiewicz et al., 2002). The positive empirical findings are believed, in part, to arise because the PAp goal incorporates positive (approaching success) and negative (normative comparison) components which can outweigh rather than complement one another under different circumstances (Yeo et al., 2009).

Nevertheless, it remains unclear whether MAp goals would be conducive in certain circumstances (Mouratidis et al., 2018). Circumstances such as verbal tasks or anticipated feedback (Anseel et al., 2011), as demonstrated in Van Yperen et al.'s (2015) meta-analysis, due the rarity of experimental literature testing the influence of clearly defined situational approach-based goals (Da Costa, 2015; Murayama et al., 2012; Van Yperen et al., 2015). It is also important to note that there are discrepancies between theoretical assumptions and experimental findings surrounding situational goal adaption. Experimentally, situational goal adoption was often recorded and consequently in some cases then assumed to be the direct reflection of the imposed situational goal (Ames, 1992, Anderman & Midgley, 1997; Roeser et al., 1996; Urdan, 2004 (found in Meece et al), Van Yperen et al., 2011). But this assumption did not reflect the theoretical consensus of situational goal adoption given by interactionist perspectives (e.g., those by Dweck & Leggett, 1988; Jagacinski et al., 2001; Nicholls, 1984; Papaioannou et al., 2004; Treasure & Roberts, 1995) which suggest situational goal adoption is influenced by the interaction between domain and imposed goals. Despite not receiving adequate empirical investigation, there are studies whose findings support the theoretical assumption. Darnon et al. (2009), for example, showed that although teachers aimed to encourage MAp goals because of their theoretical link to better performance outcomes and students' well-being, students reported adopting PAp goals as they believed them to be better indicators of success. These experimental outcomes support the theoretical assumptions by indicating the imposed goals were not the only thing influencing student performance. The adoption of one's personal goal over the one that is imposed suggests individuals have an internal mechanism influencing their situational interpretation and consequent situational goal adoption. One such mechanism is speculated to be the domain achievement goal (Payne et al., 2007).

### *2.1.4 Integration Effects on Situational Achievement Goals*

Previously the influence of situational goal structures (e.g., classroom structures such as motivational climate) as external moderators was discussed. But, it is possible that certain factors may influence how these external moderators are perceived (Roeser et al., 1996). For example, an individual's existing domain goals could act as an internal moderator to motivational perceptions and thus situational goal adoption. In other words, rather than an individual adopting the goals they are given through motivational climate influences such as instruction conditions, it is possible the individual may adopt a situational goal based on their existing over-arching domain goals (e.g., their achievement goals for sport or academia) as seen in Darnon et al., 2009, and discussed in Chapter 1. As such situational achievement goals may be congruent, aligning with one's domain goal, or incongruent, differing from one's domain goal.

Using the interaction model from Murayama and Elliot (2009), which focuses on the joint influence of personal achievement goals and goal structures (which could be interpreted as external situational factors or internal domain achievement goals), it is reasonable to suggest that how situational goals are consolidated affects outcome variables. For example, when situational goals and domain goals are congruent, such an alignment has the possibility to make tangible aims stronger and more precise for achievement behaviour due to the increase in goal strength. Consolidation of situational goals in this way is speculated to alter the value placed on achieving. The greater the goal valuation, the greater the learner's motivation to invest more mental effort to achieving their goals (Paas et al., 2005). The more cognitive effort devoted to schema construction, the greater the improvements in cognitive task performance (Kalyuga, 2011). However, when goals are incongruent the effects on achievement behaviour are thought to be more adverse. A reduction in the precision, as a result of the reduced cementation, of achievement aims has been posited to lead to a decrease in the value individuals associate with the situational goal. The weaker the assigned goal value the less effort the expenditure on a task, as the goal is not seen to be as worthwhile (Paas et al., 2005), resulting in negative implications for performance. With this in mind it is posited that the congruency of situational and domain goals can differentially affect task performance. Specifically, congruent situational achievement goals should, theoretically, result in better task performance than incongruent goals. As such, previous studies using between-subject designs to investigate the different outcomes between two situational goal adoptions were not taking into account a person-oriented approach to their achievement goal investigation (Niemivirta et al., 2019). They did not consider the individual's domain achievement goal and the influence it could have on situational goal pursuit and consequently performance outcomes (Van Yperen et al., 2014).

### *2.1.5 A Person-Oriented Approach to Domain Achievement Goal Investigation*

It was noted in Chapter 1 that consideration would need to be given to the methodology used to examine domain achievement goals. A method was needed that would consider categorisation at the individual rather than sample level and represent the orthogonality of domain goal adoption. Traditionally, studies investigating achievement goals have used median spit or cluster analysis. However both methods have their limitations (e.g., variability of sample median between studies or biases due to lack of rigorous guidelines for the clustering process, see Chapter 1, p.58-59). For the purpose of this study a method was needed which allowed the classification of individuals based on their domain goals to create between-subjects groups which could be used to investigate the effect of domain goal and climate (imposed goal) congruency on task performance. It was thought one way to do this was to determine the relative difference between goals. In other words to determine an individual's dominant domain achievement goal (DDAG). If participants had no difference between their goals then they would receive score of zero. By taking this value as the median it ensures there is consistency across studies as this value would not shift if the sample changed, allowing direct comparison of the groups generated by the DDAG between studies.

The vision for the DDAG was to use it as a tool to dichotomously group participants in a simple way in order to focus on the key aspect of relativity: a factor important to determining goal congruency. For example, even if goal differences were small (e.g., a difference of 1) or scores on the questionnaire were low for both goals (e.g., 1 or 2) there would still a relative difference between the degree to which each goal motivated the individual. Therefore, there would be a relative difference in the way in which the individual was motivated by a congruent climate. Categorising participants this way allows hypotheses to be generated concerning under which climate a person would perform better because of goal congruency. The difference between the scores allows the relative strength of mastery and performance motivation to be considered independently from the absolute strength of the score. The absolute strength of mastery and performance motivation would be more important if the DDAG was designed to generate a goal profile, but that is not the purpose of the DDAG.

### *2.1.6 Current Research*

To summarise, the congruency of domain dominant goals and imposed goals, and its relationship with task performance, has limited experimental exploration using within-persons designs under Elliot's 2x2 achievement goal theory framework. Addressing this lack of investigation could help determine how imposed approach-based goals interact with domain goals (e.g., under which circumstances and for which individuals) to affect motor performance. Therefore, I used the current study as a pilot study to trial and evaluate the methodological processes of participant selection, DDAG classification, design of task instructions, task apparatus, task and questionnaire implementation, variability and feasibility of a within-between persons study examining the effects of imposed approach-based situational achievement goals. The study also examined if the relationship between the DDAG component and imposed situational goals influenced task performance.

The aim of this study was therefore two-fold. First to examine the experimental feasibility of a new within-subjects design. Second, to investigate three research questions.

First (Hypothesis 1), the experiment focused on the effects situationally imposed approach-based goals have on implicit situational goal adoption (via a situationally adapted version of the AGQ-R; Elliot & Murayama, 2008). This line of investigation generated an exploratory hypothesis in which I predicted that situational achievement goal scores would differ between dominance groups for each task condition. For example, in the mastery condition, mastery dominant individuals' highest situational achievement goal score may be for the MAp goal, but this may not be the case in for those with a performance dominant disposition in this condition. In the performance condition, performance dominant individuals' highest score may be for the PAp goal but this may not be the same for mastery dominant individuals in this condition.

Second (Hypothesis 2), the effects of task instruction on goal valuation (via the novel STVSQ; Philyaw, 2020). Here, due to the exploratory nature of this chapter, I tentatively predicted imposed goals would be more valued when they aligned with individuals' dominant domain goal.

Finally (Hypothesis 3), the main aim of this study was to examine the effects of domain-congruency and incongruency with situationally-induced goals on task-performance, examined via a memory recall task. Here, I hypothesised that task performance would be better when an imposed situational goal was congruent with participants' DDAG, than when it was incongruent because of the increase in goal strength.

Due to the limited use of within-persons designs in the achievement goal field, this experiment was additionally designed to inform, a priori, adequate sample sizes for subsequent thesis studies exploring the interaction between domain orientation and imposed situational goal.

## 2.2 Method

### *2.2.1 Sampling Method*

The study received ethical approval from a Departmental Research Ethics Committee[1]. Participants were university students, systematically selected for recruitment in two stages. In stage one participants were recruited, via opportunistic sampling from the student population and to be included had to be second year or above of undergraduate study or a postgraduate student (see Appendix A and B for consent forms and information sheets). Participants were asked to complete the Achievement Goal Questionnaire – Revised with a domain general focus in order to calculate their DDAG (see Appendix C). In stage two and for inclusion in the present study participants were then selected from those recruited in stage one under two selection criteria. First, students in the study had to have consented to being contacted for follow up (Consent form in Appendix A). Second, based on Tukey's calculation of outliers (Tukey, 1977), participants needed a domain score at least 1.5 standard deviations (SD) from the sample mean. The participant recruitment email for stage two can be seen in Appendix D. As this study was an exploratory experiment trialing the procedure, and determining if there are any effects related to goal congruency, it was thought that selecting participants with the most extreme differences in dominance scores would be most suitable to represent participants with a marked discernible dominance.

[1]REF: 16/29 - The effects on cognitive task performance, of the relationship between dispositional goal orientation and motivational instructions

### *2.2.1.1 Sample Response*

The sample response has been broken down into two stages. Stage 1: 165 students initially submitted a questionnaire response, but after exclusion criteria (*n* = 3 for repeat submission and *n* = 4 for incomplete questionnaires) the final sample consisted of 157 students (*n* = 125 female) with a mean age of 20.41 years (*SD* = 2.15; range = 18-31 years). Further descriptive statistics of this sample can be seen in Appendix E. Stage 2: 40 participants, who met the selection criteria from the initial 157 students in stage 1 were contacted. Eighteen participants responded; *n* = 10 mastery dominant, *n* = 8 performance dominant. All respondents completed the study. Participants' mean age was 21.3 years (*SD* = 3.67, range 19 – 31 years). Psychology students were awarded with participant credit for their participation.

### *2.2.2 Materials*

*Achievement Goal Questionnaire - Revised*

Situational achievement goals in each condition were measured using the 12-item AGQ-R (Elliot & Murayama, 2008) with a situational stem (Appendix F). Each of the 2x2 achievement goals corresponded to three items. All questions were adapted to indicate the specific learning task: MAp (*"aim to completely master the sequence presented in this task"*), MAv (*"aim is to avoid learning less than I possibly could"*), PAp (*"aim is to perform well relative to other students"*), PAv (*"aim is to avoid doing worse than other students*"). Participants responded to all items on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*).

Prior to completing the questionnaire students were asked to think about the aims they had been given for upcoming task: *"Please give a response that best suits your aims for the memory-task, based on the task aims you have received"*. Previous works have shown the structural validity and predictive utility of the AGQ-R to be strong, being empirically and conceptually sound for use in the academic domain (Elliot & Murayama, 2008).

*Subjective Task Value in Sport Questionnaire*

Students were also asked to complete the 9-item STVSQ (see Appendix G: Philyaw, 2020) which reflected aspects of goal valuation. To ensure focus on the present task questions were re-worded to remove reference to sport activities. The questionnaire examined participants' explicit adopted achievement goal via the open-ended statement *"What is your goal for this activity?*". Responses were coded to reflect mastery or performance goal adoption. The remaining 8 questions, which examined goal valuation, were used to determine if participants valued their goals differently depending on the instruction condition and or dominance group. Responses to all controlled items were on a scale of 1 ("*not at all*") to 7 (*"extremely"*). The questionnaire has shown good reliability and structural validity in previous tests (e.g., in Philyaw, 2020).

*Task Aims*

Two approach-based task aims were presented to each participant. The task aims were modelled from Elliot's (1999) 2x2 framework directing participants toward achievement in a manner representing the achievement goals' theoretical conceptualisation. To try and ensure implicit goal adoption the task instructions were made as similar as possible with key word changes. For example, the MAp task aim focused on positive outcomes based on a self-and task-referenced standard (Van Yperen et al., 2015):

*"For this task, your aim is to concentrate on taking the least number of trials necessary for*

*you to achieve 3 consecutive error free performances. Your aim is to complete the task as fast as you possibly can. The number of trials taken, and your final time will be generated once you have completed the 3 consecutive error free performances."*

The PAp task aim focused on positive outcomes based on a normative standard (Van Yperen et al., 2015):

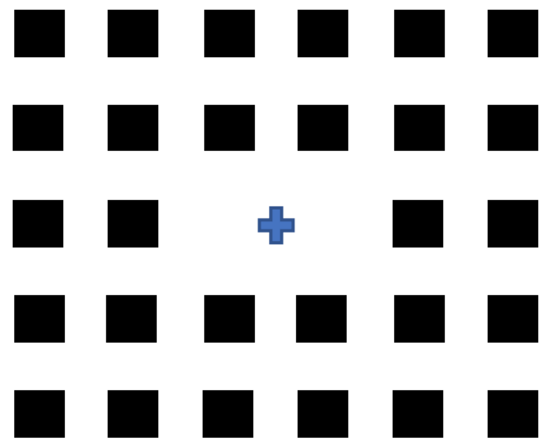
*"For this task, your aim is to be able to perform the 3 consecutive error free sequences, faster than other participants, by taking the least number of trials. Your average time for the task, used to rank you against other participants, will be given once you have completed 3 error free sequences. The number of trials taken for you to complete the 3 sequences will also be taken into consideration when ranking your scores."*

### *2.2.3 Memory Task*

From a 24-block array with a central fixation point, shown in Figure 2.1, two nine-box sequences (for mastery and performance instructions) of equal difficulty were created. A sequence of 9 boxes was chosen as it is well known that short-term memory can hold no more than 7 +/-2 items (Miller, 1956). Two sequences were used to avoid memory recall effects in the second experimental session and ensure differences in task performance were the result of task instruction. Sequence patterns, from first to last point, included a total of 5-line crossings and 3 boxes from the right, centre and left thirds, two of which were corner boxes. Each box in a sequence was illuminated blue for 75 milliseconds (ms) with 0ms between the next box illumination.

**Figure 2.1**

*24 Block-Array Presented to Participants for Memory Sequences.*



Upon completion the screen displayed the statement "*when you are ready press anywhere on the screen to begin recall*" at the fixation point. Once pressed the screen would display blank array and participants could begin recalling the sequence; each box would illuminate to show a registered press. After the 9th box press participants would receive feedback. During feedback, the selected boxes were illuminated within the array: correct presses (selected in the correct place in the sequence) illuminated green and incorrect presses red. Feedback was presented based on the last press of a box. For example, if a box was selected once (in its correct place in the sequence) and then later selected incorrectly, the box would appear red during feedback (participants were warned of this during the practise trial). After every sequence recall, participants received feedback and were showed the trial sequence before their next recall attempt. To complete the task, the correct sequence had to be consecutively recalled three times. Three variables were recorded: i) the time taken (milliseconds, converted to seconds for analysis) from the blank array to the 9th box press, ii) number of incorrect presses (errors) and iii) total trial number to task completion (minimum 3). The time taken to complete each trial, including the three consecutive error free trials, was summed together and averaged by the number of trials to be used in the data analysis and labelled *recall time*.

Before the start of each trial, an example sequence was given. This sequence sequentially presented blocks 1 through 9. As with the experimental trials, to complete the task participants had to accurately recall the sequence three times in a row. Participants received feedback as they would in the experimental trials and were told they could purposefully make errors during this practise in order to understand the negative feedback.

### *2.2.4 Apparatus*

A 14” Lenovo yoga (510-14ISK) 2in1 touch screen laptop: Intel ® Pentium ® CPU 4405SU® 2.10GHz 64-bit operating system, x64-based processor, Windows 10 Home with 1920 x1080 screen resolution was used for the experiment. The laptop was rotated 360 degrees placed flat on the desk as a touch screen tablet, for the memory task. This task was coded in Embarcadero C++ Builder, using Direct X and data was automatically saved to Microsoft Excel.

### *2.2.5 Procedure*

In stage one, a retrospective version of the questionnaire was completed online, with informed consent, at the beginning of the academic year to determine students’ DDAG (consent form and participant information Appendix A and B). A link was distributed via email and social media pages. At a later date, students who met the inclusion criteria for stage 2 of the study were contacted via email and asked if they wished to take part in a second stage of the study. Participants who responded were allocated a time slot to complete the second part of the experiment. Upon arrival students were given participant information sheets detailing the procedure of the experiment (Appendix H) and then presented with task instructions (Appendix H). They were taken through the practise trial and any questions regarding feedback were answered. Participants were then presented with their first task aim (aims and corresponding sequences were counterbalanced between participants) and asked to complete the two questionnaires, the AGQ-R and STVSQ, before completing the memory trial. All questionnaires were completed securely online and downloaded onto an external hard drive. One week later, participants were returned to complete the second memory trial with the alternate aim. The session was conducted in the same manner as the first. When three error free sequences had been completed, participants were debriefed (debrief statement in Appendix H) and thanked for their time.

### *2.2.6 Analysis*

Data analysis including outlier removal was completed using IBM SPSS 27. The threshold for statistical significance was set with an alpha of .05. For multiple tests Bonferroni corrections were used and the reported *p* values were corrected. Participants' DDAG scores were calculated and participants with scores 1.5 SDs from the sample mean or a score of zero were selected. A manipulation check was conducted via the first statement of the STVSQ. Implicit situational goal adoption, determined by the situational AGQ-R, was analysed three ways. First, a doubly multivariate analysis was used to determine differences in goal scores between conditions. Second, a one-way MANOVA was used to determine differences in subscales scores between dominance groups. Finally, a within-subjects repeated measures ANOVA was used to investigate differences in subscale scores in each instruction conditions. Goal valuation (STVSQ) and task performance (recall time) were analysed using a 2 (dominance) x 2 (instruction) ANOVA, followed by post hoc analyses (Bonferroni corrected paired sampled t-tests) for main effects.

## 2.3 Results

### *2.3.1 Data Analysis*

The AGQ-R showed acceptable internal reliability to examine domain dominance ($\alpha >$ .64) and acceptable reliability in each instruction condition ($\alpha >$.628, except Mastery MAv $\alpha$ >.514). The internal reliability of the STVQS was acceptable ($\alpha >$.639).

#### *2.3.1.1 Generation of the DDAG*

To examine domain dominant goals N = 157 raw AGQ-R subscale scores were used. The subscale scores were combined based on their definitional component. This generated a performance domain score (PDS, *M* = 19.17, *SD* = 3.49) including PAp and PAv, and a mastery domain score (MDS, *M* = 23.58, *SD* = 3.35) including MAp and MAv. Cronbach's alphas for the combined scores were acceptable: $\alpha$ = .700 and $\alpha$ = .832 respectively. Thus, indicating the six subscales sufficiently represented their definitional-based groups.

PDS and MDS scores were used to determine individuals' DDAG scores using the following formula:

*Performance Dominance = (Performance domain score – Mastery Domain Score)*

The formula generated scores on a continuum from 13 to -14, (M = .96, SD = 4.83). The histogram in Appendix E shows the distribution of DDAG scores assessed via Shapiro-Wilks (*p* = .052) suggesting a normal distribution supported by acceptable levels of skewness = -.294 (SE = .194) and kurtosis = .644 (SE = .385). Positive scores represented those with a Performance Dominant (PD) orientation (*n* = 84; *M* = 4.42, *SD* = 2.95) and negative scores represented those with a Mastery Dominant (MD) orientation, (*n* = 55; *M* = -4.00, *SD* = 3.16) scores of zero represented those with an Equal Dominant (ED) orientation (n = 18). A total of 89% of participants had a dominant achievement goal. The dominance categories were assigned on the premise that an individual's MDS and PDS's were significantly different.

To check the validity of the processing method to determine goal dominance, a paired samples *t*-test was conducted between the MDSs and the PDSs for the three dominance groups. For the PD group results confirmed significant differences, $t(83) = -13.72$, $p < .001$, where PDS (*M* = 23.58, *SD* = 3.35) was significantly higher than MDS (*M* = 19.17, *SD* = 3.49). For the MD group results also confirmed significant differences, $t(54) = 9.38$, $p < .001$, where MDS (*M* = 22.29, *SD* = 3.54) was significantly higher than PDS (*M* = 18.29, *SD* = 3.45). As expected, there were no differences for the ED group (MDS: *M* = 20.65, *SD* = 5.58, PDS: *M* = 20.65, *SD* = 20.65).

Having established that the dominance categories were valid it was necessary to also confirm that the groups created by the DDAG could be used as independent and distinct groups. Further paired samples *t*-tests conducted between participants' MDS and PDS scores showed that both dominance groups were significantly different from one another $t(138) = -2.502$, $p$=.014. where PDS scores (*M* = 21.49) were higher than MDS scores (M = 20.40). Finally, to determine if the mastery and performance groups could be used as between-subject grouping factor, an independent *t*-test was conducted; $t(137) = -15.985$, $p <.001$. This confirmed that the groups created by the DDAG scores could be used to group participants into two distinct groups.

### *2.3.1.2 Pilot Study Data*

The minimum extreme DDAG scores were calculated using Tukey's calculation of outliers (Tukey, 1977). Scores above or below 1.5SDs were selected to participate in the pilot study. This resulted in 20 mastery dominant individuals, 20 performance dominant individuals and 20 participants with equal dominance (a DDAG score of zero). It was decided that equal dominance would be used as an additional exclusion criteria as these participants showed no difference in their goal preference and the pilot study did not include a control group. By using a within-subject design, participants acted as their own control group. In total N = 40 participants (n = 20 for each dominance group) were contacted and invited to participate (Appendix D). Eighteen participants responded and were included in the initial analysis. The variable *Score Difference* was created to identify any outliers:

*Score difference = performance condition time - mastery condition time*

Three outliers, based on scores exceeding 1.5x interquartile range as per SPSS calculations, were identified and subsequently removed from further analysis ($n$ = 15: $n$ = 10 mastery dominant, $n$ = 5 performance dominant). The means and SD for each dependent variable in the main analyse in each instruction condition can be seen in the correlation matrix Table 2.1. The matrix also shows the correlation between each dependent variable and updated internal reliability of each subscale. The table shows improved internal reliability for the Mastery MAv subscale ($\alpha$ = .748). In line with the hypothesis the correlation table shows significant positive relationships between MAp and PAp situational goals and task performance in the mastery and performance conditions.

**Table 2.1**

*Correlations and Descriptive Statistics for Study Variables*

| | | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Mastery Dominance | 32.85 | 6.52 | | | | | | | | | | | | | | | | | | |
| 2 | Performance Domaince | 28.82 | 7.26 | .355** | | | | | | | | | | | | | | | | | |
| 3 | TP Mastery IC | 113.81 | 7.70 | .011 | .051 | | | | | | | | | | | | | | | | |
| 4 | TP Performance IC | 114.47 | 7.46 | .029 | .077 | .837** | | | | | | | | | | | | | | | |
| 5 | Mastery IC situational MAp | 5.90 | 1.03 | .499** | .164 | .160 | .137 | (.867) | | | | | | | | | | | | | |
| 6 | Mastery IC situational MAv | 5.01 | 1.32 | .494** | .128 | .182 | .216 | .458** | (.724) | | | | | | | | | | | | |
| 7 | Mastery IC situational PAp | 4.60 | 1.20 | .321** | .455** | .119 | .194 | .377** | .338** | (.649) | | | | | | | | | | | |
| 8 | Mastery IC situational PAv | 4.47 | 1.13 | .315** | .475** | .059 | .213 | .355* | .453** | .701** | (.574) | | | | | | | | | | |
| 9 | Performance IC situational MAp | 5.86 | 0.87 | .553** | .310** | .134 | .139 | .731** | .391** | .250* | .254* | (.812) | | | | | | | | | |
| 10 | Performance IC situational MAv | 4.99 | 1.23 | .562** | .239** | .133 | .176 | .295** | .630** | .255* | .322** | .403** | (.471) | | | | | | | | |
| 11 | Performance IC situational PAp | 5.07 | 0.95 | .199 | .386** | .297** | .349** | .107 | .165 | .291* | .293** | .304** | .299** | (.594) | | | | | | | |
| 12 | Performance IC situational PAv | 4.92 | 1.06 | .275* | .416** | .141 | .126 | .014 | .316** | .141 | .310** | .230* | .536** | .529** | (.324) | | | | | | |
| 13 | Mastery IC cognitive anxiety | 18.56 | 6.18 | .132 | -.002 | .365** | .326** | .293** | .442** | .255* | .199 | .205 | .334** | .372** | .333** | (.788) | | | | | |
| 14 | Performance IC cognitive anxiety | 19.49 | 6.55 | .275* | .106 | .299** | .235* | .254* | .454** | .287* | .261* | .295** | .423** | .473** | .430** | .761** | (.823) | | | | |
| 15 | Mastery IC somatic anxiety | 15.48 | 6.28 | .004 | .116 | .383** | .307** | .133 | .159 | .108 | .009 | .125 | .049 | .190 | .118 | .446** | .437** | (.895) | | | |
| 16 | Performance IC somatic anxiety | 14.99 | 5.98 | .188 | .094 | .205 | .123 | .000 | .118 | .166 | .091 | .100 | .084 | .188 | .122 | .359** | .552** | .682** | (.911) | | |
| 17 | Mastery IC value | 4.85 | .92 | .397** | .265* | .282* | .362** | .538** | .385** | .311** | .207 | .580** | .385** | .280* | .286** | .425** | .418** | .306** | .163 | (.882) | |
| 18 | Performance IC value | 4.85 | .97 | .412** | .252* | .112 | .180 | .323** | .330** | .239* | .226* | .615** | .514** | .453** | .319** | .4720** | .476** | .173 | .166 | .655** | (.889) |

*Note:* N = 79; IC = Instruction Condition; TP = Task Performance;
** Correlation is significant at the p < .01 level (2-tailed); * Correlation is significant at the p < .05 level (2-tailed);
Cronbach's alphas are shown in the diagonal.

Further descriptive statistics for each instruction condition measure and each measure differentiated by dominance group can be seen in Table 2.2. The table shows faster mean reaction time for each dominance group in the congruent task condition.

**Table 2.2**

*Descriptive Statistics for Study Variables Separated by Dominance Group*

| Instruction Condition | Questionnaire Subscale | Mastery Dominance | | Performance Dominance | |
|---|---|---|---|---|---|
| | | M | SD | M | SD |
| | | Situation Goal Involvement | | | |
| Mastery | MAp | 3.43 | .75 | 3.27 | .49 |
| | MAv | 3.30 | .89 | 2.87 | .69 |
| | PAp | 3.53 | 1.30 | 4.47 | .56 |
| | PAv | 3.33 | 1.08 | 4.33 | .97 |
| Performance | MAp | 3.47 | .67 | 3.60 | .72 |
| | MAv | 3.36 | .88 | 2.80 | .77 |
| | PAp | 4.30 | .91 | 4.27 | .55 |
| | PAv | 3.60 | 1.26 | 4.47 | .51 |
| | | Subjective Task Value in Sport | | | |
| Mastery | Value | 4.98 | .83 | 5.08 | .67 |
| Performance | Value | 4.99 | .90 | 4.83 | .62 |
| | | Game Score | | | |
| Mastery (sec) | - | 86.74 | 51.04 | 86.31 | 16.25 |
| Performance (Sec) | - | 98.47 | 50.45 | 75.82 | 17.82 |

*Note: N = 15, n = 10 mastery and n = 5 performance dominant participants. All outliers removed*

### 2.3.2 *Manipulation Check*

Exploratory analysis of the STVSQ's first statement, as the manipulation check for the imposed situational goals, demonstrated eight participants reported a mastery goal in the mastery condition and six reported a performance goal in the performance condition.

### *2.3.3 Hypothesis 1: Situational Goal Adoption*

Using a doubly multivariate analysis the effect of conditions instructions, on individuals' situational achievement goal adoption, were examined. Multivariate analysis showed no significant differences in achievement goals across instruction conditions: $F(4, 11) = 1.354$, $p = .314$, Wilk's A = .671, $\eta^2 p = .329$. However, on a cursory examination, pairwise comparison using Bonferroni corrected *t*-tests revealed a marginally non-significant difference ($p = .052$) where PAp goals were higher in the performance ($M = 4.27$) condition compared to the mastery condition ($M = 3.84$).

The effect of dominance on situational goal adoption in each instruction condition was examined by a MANOVA. Multivariate, between subjects, tests showed no significant differences in achievement goal scores based on dominance group: $F(8, 6) = 1.289$, $p = .389$, Wilks A = .389, $\eta^2 p = .632$.

Within subjects repeated measures ANOVAs for each instruction, with Greenhouse-Geisser correction due to sphericity violations, identified no significant differences between subscales in the mastery instruction condition, $F(1.346, 18.842) = 1.938$, $p = .179$, $\eta^2 p = .122$. Significant differences were found in the performance condition: $F(1.928, 26.992) = 6.244$, $p = .006$, $\eta^2 p = .308$. Pairwise comparisons using Bonferroni corrected *t*-tests in the performance condition showed that PAp goal ($M = 4.27$) scores were significantly higher than MAp ($M = 3.51$, $p = .048$) and MAv ($M = 3.18$, $p = .007$) goal scores, but not significantly different from PAv goal scores ($M = 3.89 p = .752$), this can be seen in the correlation matrix Table 2.1. The results suggest participants adopted a PAp goal in the performance condition above other goals but no differences in goal adoption were evident in the mastery condition. There were no significant differences in goal adoption across conditions and contrary to the hypothesis, dominance had no significant impact on goal adoption.

### 2.3.4 Hypothesis 2: Goal Valuation

A mixed model repeated measures 2 (dominance: mastery and performance) x 2 (instruction: mastery x performance) ANOVA showed no significant main effects (instruction: $F(1, 13) = 1.381$, $p = .261$, $\eta^2 p = .096$ or dominance: $F(1, 13) = .003$, $p = .954$, $\eta^2 p < .001$) or interaction effect, $F(1, 13) = 1.381$, $p = .261$, $\eta^2 p = .096$, despite a moderate effect size. This suggests goal valuation did not significantly differ between task conditions or between dominance groups.

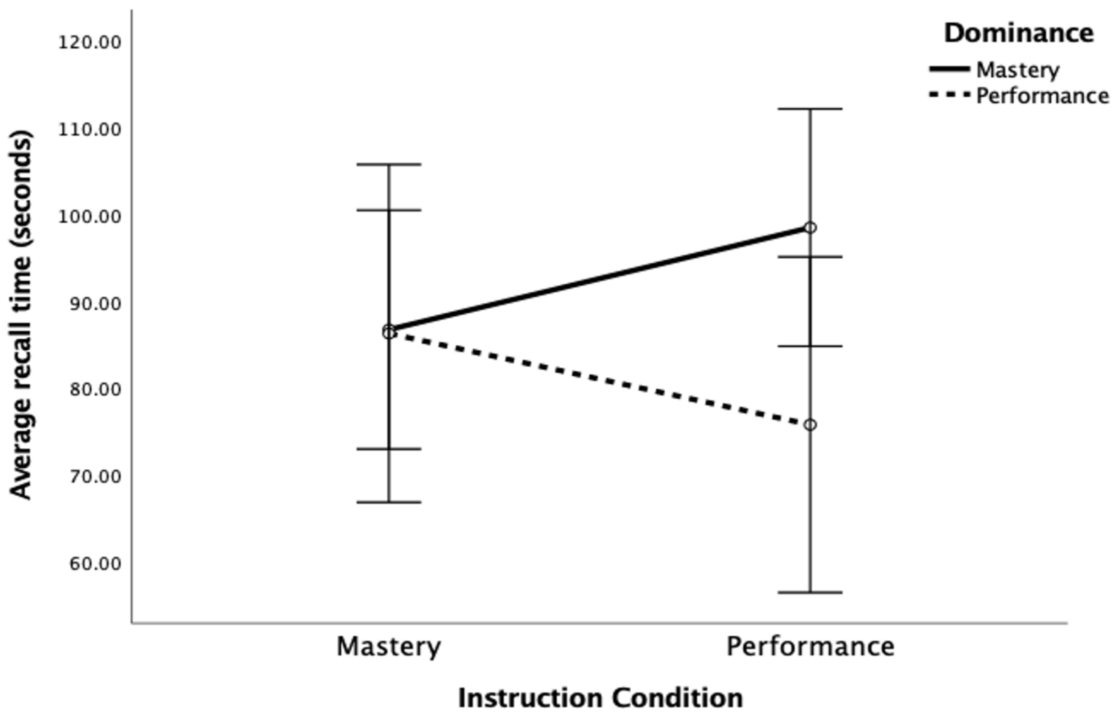
### 2.3.5 Hypothesis 3: Recall Time

To analyse the difference between recall time (average recall time across all trials) a mixed-model (within-subjects: task instruction and between-subjects: dominance), repeated measures, 2 (mastery vs performance) x 2 (mastery dominant vs performance dominant) ANOVA was used. Both the main effect of dominance ($F(1, 13) = 0.245$, $p = .629$, $\eta^2 p = .340$) and the within-subjects effect of instruction ($F(1, 13) = .021$, $p = .887$, $\eta^2 p = .002$) were non-significant. The interaction between dominance and task instruction was significant: $F(1, 13) = 6.703$, $p = .022$, $\eta^2 p = .340$ with a large effect size. Figure 2.2 shows the interaction effect and demonstrates a noticeable difference between dominance groups in the performance instruction condition.

Post hoc paired samples *t*-test revealed, the mastery dominant group participants were faster in the mastery instruction condition ($M = 86.74$ seconds) than in the performance instruction condition ($M = 98.47$ seconds), although this difference did not reach statistical significance ($t(9) = 2.001$, $p = .076$, $d = .231$). For the performance dominant group, recall was significantly faster in the performance instruction condition ($M = 75.82$ seconds) than in the mastery instruction condition ($M = 86.31$ seconds), $t(4) = -4.814$, $p = .009$, $d = .615$, with a large effect size. For the performance dominant group, task instruction had a positive effect on reaction time, where reaction time was faster in the congruent instruction condition.

**Figure 2.2**

*ANOVA Interaction for Recall Time in Each Instruction Condition by Dominance Group. Error bars: +/- 1 S.E.*




## 2.4 Discussion

This study, as a methodological pilot for a within-between experimental design, empirically examined the effects of congruency between situational and domain achievement goals and the effects on task performance. Examining the notion that imposed situational goals may not be the goals an individual adopts in the task-specific situation, the study also explored the moderating effects domain goals may have over other goal structures (e.g., motivational climate instruction conditions) for situational goal adoption. As this is a pilot study, the discussion will offer a tentative interpretation of the results: It would be premature to draw any strong conclusions about any of the effects revealed, especially those pertaining to domain-situational goal congruency effects on performance, in part due to the relatively small sample. The results relating to the two main hypotheses are discussed in depth.

### *2.4.1 Situational Goal Adoption*

Implicit goal adoption was examined through a situational version of the AGQ-R, to investigate assumptions that individuals' adopted situational achievement goals may differ to those that are imposed as suggested by the first hypothesis. It was proposed that situational goal adoption in each condition would differ for each dominance group. For example, mastery dominant participants would adopt a MAp goal over other situational goals in the mastery condition and performance dominant individuals would adopt PAp goals in the performance instruction condition. The results of the AGQ-R, examining implicit goal adoption, showed there were no differences between domain dominance groups. The results did show, however, that participants significantly adopted a PAp goal in the performance condition compared to other goals. The strength of the PAp goal adoption in the performance condition is further supported by it only marginally missing significance in its score difference between its counterpart in the mastery condition. We would have expected to see the same result for the MAp goal in the mastery condition to show that individuals adopted the goals that were imposed. As the results showed no discernible differences for this goal, the current findings appear to challenge findings of previous empirical research which assumed goals imposed through motivational climate moderators, such as instruction conditions, were the goals individuals adopted (Van Yperen et al., 2011). Within the current study there are a number of possible explanations for such findings. First, the instructional task aims of the MAp condition, unlike the PAp aims, were not strong enough to manipulate students' implicit achievement goal adoption. This could be due to the aims not representing the characteristics of a MAp goal clearly or in a way appropriate for students to adopt the intended goal. Alternatively, the task itself may not have presented students with what they deemed an option to adopt the mastery aims suggested. In the academic domain mastery goals have been adopted for tasks requiring development, where long-term goals can be supported, enabling students to "better themselves" (Korn & Elliot, 2016). However, the design of the current study aligned more with PAp goal adoption in that it was over a short time period where beating others to demonstrate competence was more desirable (Benita et al., 2017).

The hypothesis that situational achievement goal adoption is influenced by an individual's domain achievement goals cannot be confirmed by the empirical findings. Nevertheless, it can be argued the empirical findings suggest, as in Ntoumanis et al. (2009), that adopted achievement goals are relatively equivalent across conditions and therefore experimental researchers should remain cautious in assuming the imposed achievement goal is adopted by the participant.

### *2.4.2 Task Performance*

The final hypothesis posited task performance would be better when task instructions were congruent with students' dominant domain achievement goal. A significant interaction indicated significant differences in task performance in congruent conditions. This indicates situational and dominant domain goal congruency can lead to improved behavioural outcomes, in this case, faster recall time. However, it must be noted this effect was only seen with significance for performance dominant individuals in the performance goal condition as the results was marginally non-significant in mastery condition. Consequently, it could be suggested that while the performance condition elicited better recall time for the performance dominant individuals, the mastery condition was neither facilitative nor debilitative for mastery dominant individual's recall time. Some experimental research has shown MAp goal conditions lead to better performance outcomes than PAp goal conditions (Van Yperen et al., 2015). However, challenging this perspective is research that demonstrates PAp goals are more constant predictors of performance outcomes than MAp goals and the results of the current experiment. The present findings support the facilitative effects of performance goals for novel motor-based tasks that involve learning (see also Kavussanu et al., 2009; Meira & Fairbrother, 2018). They extend research by suggesting that PAp goals may be more favourable and advantageous to those with performance-based domain goals. Nevertheless, the results do not overlook the importance and value of MAp goals, which previous research has shown have benefits in terms of effort, intrinsic enjoyment, information recall, learning strategies and persistence (Elliot & Dweck, 1988; Elliot & McGregor, 2001; Grant & Dweck, 2003), or the negative outcomes found to be associated with PAp goals ((e.g., increases in anxiety or low levels of interest, Linnenbrink, 2005; Midgley et al., 2001). The findings suggest that the facilitiative effects of PAp goals should receive enhanced attention in future research along with the prospect that, while they may not hinder self-referent standards of encouragement, they also may not improve a mastery dominant student's performance. In this early stage of research examining the interaction between domain and situational goals, this pilot study demonstrates that consideration of an individual's DDAG may help educators better understand the contexts within which individuals will become "motivationally and behaviourally active participants in their own learning process" (Zimmerman, 1989, p.329), thus helping to fostering self-regulated learners which is one of the ultimate aims of higher education (Richardson et al., 2012).

Importantly, what must be remembered here is that conclusions were based on the interaction between the imposed goals and individuals' domain goals. Earlier in the discussion it was noted that students' situational goal adoption was not necessarily that of the imposed goal. Examining the results of situational goal adoption, PAp goal adoption was strongest in the performance condition which could play an interesting roll in the reaction time finding seen here, especially as MAp goal adoption was not strongest in the MAp condition. However, as there were no dominance effects in the situational adoption analyses, the suggestion that goal adoption played a role in influencing task performance may be premature. The data can, however, be interpreted to suggest that the results support the notion that congruent domain and situationally imposed goals create a stronger cementation of the individual's achievement aims (Elliot et al., 2011), thus create a stronger drive to achieve. For example, when a participant has a dominant domain goal to achieve via normative standards, imposing task aims, through motivational climate structures as depicted in the interaction effect model (Murayama & Elliot 2009) which encourage normative competition, will strengthen the domain goal creating a stronger drive for achievement (Scheltinga et al., 2017). This stronger drive has arguably been empirically evidenced by the performance improvements in the performance congruent condition.

It was argued in the introduction that the strengthening of goals would improve task performance because of an increase in the value placed on achieving those goals. However, no significant differences in goal valuation were found which suggests that task performance was not influenced by the value placed on goals. The lack of significant findings gives cause to re-evaluate the initial proposal: Consolidation of situational goals through DDAG congruency would improve performance because greater goal valuation would lead the individual to devote more cognitive effort to achieving their goals (Paas et al., 2005). As evidence that goal valuation changed was not found, it cannot be said task performance was a result of the moderating effects of goal valuation nor that goal consolidation affected cognitive effort. While this could indicate the need to revise the initial hypothesis on the influence of valuing goals, it could also be the result of other moderating factors that need to be addressed. The next section will consider some methodological limitations and whether they may be responsible for the null effect.

### *2.4.3 Methodological Considerations and Limitations: Evaluating the Pilot Study*

The experiment has, as hoped, allowed the trial of methodological processes of using a new grouping tool, participant selection, design of task instructions, task apparatus, task and questionnaire implementation, variability and feasibility of a within-between person's study. Having examined the empirical results, I now evaluate the processes used in the experiment to consider its feasibility, and in particular offer an insight as to how some of the methodological weaknesses could have impacted statistical findings.

#### *2.4.3.1 The Use of the DDAG*

The DDAG used zero as the median by which to categorise participants into two groups. This method reflected a division of participants at the individual rather than the sample level allowing a more accurate comparison between the present and future studies than common median split analyses. Additionally the division of participants into two groups was sufficiently manageable for the pilot study compared to groups created by median split or cluster analyses methods in other studies (e.g., see Shih, 2005 whose median split analyses generated eight groups for only three achievement goals). Furthermore, the dichotomisation of the 2x2 AGQ-R was deemed reliable based on Cronbach alpha for use in the present study; based on these strengths the DDAG will continue to be used in future studies in this thesis. However, there are limitations to the DDAG that must be considered at this point.

While I remain committed to the idea that there is no method which captures the orthogonality of domain-achievement goals and represents that orthogonality in a single value, it is important to note the DDAG has some important limitations that must be considered. The DDAG collapses across the valence components of the 2x2 framework, arguably limiting its ability to capture the variability of achievement goal profiles due it is dichotomisation of the 2x2 framework. While valence is not ignored, as the valence-based subscales are summed together to determine the overall score based on the goals' definitional component (mastery and performance), the DDAG scores do not allow distinctions between approach or avoidance-based scores to be represented in later analysis. Furthermore, previous studies investigating the use of the AGQ-R in a two factor model have shown it to have a weak model fit (Elliot & Murayama, 2008). However, to support that representing the 2x2 framework as two definitional-based groups was reliable, for the purpose of this study, the internal reliability was examined and deemed acceptable ($\alpha < 700$). That is not to say the dichotomisation would not pose limitations when considering the interpretability and application of findings pertaining to the facilitative effects of performance goals. For example, such an approach may not enable use to answer whether performance-approach or performance-avoidance individuals perform better in the performance condition?

Along a similar line a further point to consider is whether it is appropriate for individuals with varying strengths of goals (e.g., those that score high on both subscales, or low on both subscales) to be grouped together in one category. For example, individuals that score high (e.g., 6/7 = "very like me") and those that score low (e.g., 2/3 = "not very like me") on both mastery and performance-based subscales are grouped together in the one category. The difference in their scores is +1 (if the highest score is the performance score), and so both high and low scoring individuals are grouped together. This method of grouping would be problematic if the DDAG was to be used to establish the absolute strength of an individual's mastery or performance dominance. However, DDAG scores symbolise the difference between the mastery and performance dominance scores, not the strength of the goals themselves. Whether high or low, the difference between the two dominance groups is still 1 which is recognised by the DDAG. As such, for the purpose of the classification into between-subjects groups, based on the overall difference between the two dominance groups, the DDAG serves its intended purpose. The dichotomisation of the 2x2 framework, including the collapse of valence and grouping of individuals with different strengths of goals must be considered when delimiting the conclusions of the remainder of the studies within the thesis. This issue is discussed in depth in Chapter 5 when the limitations of the DDAG can be disentangled from the limitations that are associated with the other methodological flaws found in the present pilot study. The other limitations of this methodological pilot and their consequences on results will now be discussed.

#### *2.4.3.2 Procedural Considerations*

First, sample collection. The between-subjects groups were based on the sample collected in stage one. This allowed use of participants with greater differences in the strength of their mastery or performance domain scores. However, participants were recalled for this second study. They had to attend two sessions a week apart which resulted in a significant degree of participant drop-out. In order to avoid inadequate sample sizes in future studies, a methodological adaptation would be to collect all participant information: consent, DDAG information, both task instruction performances and questionnaire responses, in one longer session. This would reduce the number of sessions participants would need to attend. Another consideration is the task apparatus and task itself: recall time. Recall time in this study did not include the length of time between the end of the sequence presentation and the participant indicating they were ready for the trial to begin. Through observation, this time was used differently by each participant: Some used the time to map out the sequence, while others instantly began recalling their sequence. Examining this length of time could have revealed differences in the use of “practice” time and provided an insight into learning strategies. For example, in the performance goal condition shorter “practice” time may have shown that participants were driven to prioritise speed in order to be faster than others thus resulting in a speed-accuracy trade-off (Heitz, 2014). However, as analysis of the number of errors did not support this interpretation (see Appendix I), it would be interesting to consider the informative nature of this in future studies. It may help draw conclusions in determining how imposed climates differentially affect learning strategies, in turn improving the real-world implications of the findings.

Importantly, I also wish to offer a discussion on the manipulation of achievement goals illuminating some of the other limitations of the study which will need to be addressed in preceding experiments. The first statement of the STVSQ was used as a manipulation check to examine students’ explicit understanding of the achievement goals they had been given. Over half of the students in the mastery condition explicitly reported having mastery-based goal as their aim for the task. However, in the performance goal condition less than half of the students reported having a performance-based aim. Consequently, it can be said students did not successfully recall the goals they were given. Compared to other studies who use similar methods of goal recall to determine goal adoption, such as Van Yperen et al. (2011) whose 84% correct goal recall was interpreted as successful goal adoption, it could be concluded the students in this study did not adopt the imposed goals. However, it is important to note the current study did not use a closed-ended, multiple choice question, specifically asking participants for goal recall. Therefore, the results cannot be directly compared against studies determining situational goal adoption based on evidence gathered from direct recall. Allowing participants to report their personal goal adoption could arguably be a better representation of situational goal adoption because it shows comprehension and personalisation of the aims. It is also necessary to examine the possibility that low levels of successful manipulation were due to terminological differences between the *task aims* and STVSQ statement which asked participants to recall the *goal* they were given. Achievement goals are viewed conceptually as cognitive representations of competence-based directional guides to behaviour that provide an insight into the processes one uses to achieve an aim (Elliot, 1999; Elliot & Thrash, 2001). Therefore, while the terms *aim* and *goal* may be used interchangeably by some AGT researchers it is not to say experimental participants would make this connection. As such, future studies would need to be consistent in their use of terminology throughout all components of the study. For example, using the term **goal** in task instructions and all questionnaires.

The implication of the terminology in the task instructions also brings us back to post hoc analyses of the domain-instruction interaction for reaction time performance. It may be possible that the mastery condition interaction did not reach statistical significance because, unlike the task aims in the performance condition, the mastery condition did not elicit a strong mastery representation. The task aim focused on error free performances, least number of trials, as fast as you possibly can, and a focus on the time/outcome. The task instructions were designed to be as similar as possible to remove any confounding effect of instruction length or complexity. On reflection, while the instructions for this condition focused on intra-personal performance; asking the participant to focus on themselves rather than others (a PAp goal focus), it is evident that by omitting phrases such as "further develop your" or "better your" (e.g., task instructions from MAp goals in experiments such as Senko & Harackiewicz, 2005) the essence of an MAp goal was not captured (e.g., better previous performance, learning etc, Elliot, 1999): ultimately making it an incompatible instruction. Future studies would need to address this and, while ensuring the PAp and MAp task instructions has some semblance to one another, effectively capture the nature of the goal in question. The final point to discuss is the use of the within-subject design and the absence of a control group. There are studies examining approach and avoidance distinctions that have used control/no goal groups (e.g., Bereby-Meyer & Kaplan, 2005; Darnon et al., 2007; Van Yperen, 2003; Van Yperen et al., 2009). However, as in this study, there are a number of studies examining imposed situational goals that have not used control groups (e.g., Anseel et al., 2011; Elliot et al., 2005; Elliot et al., 2006; Kavusannu et al., 2009; Ntoumanis et al., 2009; Senko et al., 2013), supporting the use of no control group in the present study. Additionally, these studies did not use within-subject design, where participants can serve as their own control, as in the present study. The aforementioned studies also support the use of the 2x2 AGT model for investigating the effect of approach goals. Therefore, succeeding studies will continue to use a within-between design with no control group, the effects of which will be revisited in overall discussion chapter of the thesis.

### *2.4.4 Conclusion*

As noted earlier in the discussion, a tentative interpretation of the results found in this methodological pilot was offered. With a relatively small sample and methodological adjustments it would be premature to draw any strong conclusions about the effects of domain-situational goal congruency on task performance. However, the study did pique interest into the empirical effects that can result from domain and situational goal congruency, particularly the potential task performance benefits of performance goal congruency. Furthermore, the study illuminates the importance of defining the differences between imposed and adopted situational goals, as one leading to the other is not a fait accompli. Given the demonstrated feasibility of the experimental design, and in order to strength the claims made based on these findings, a follow-up experiment was conducted. The sample size for this follow-up study was based on *a priori* power analysis on the moderate effect size of the interaction between dominance and instruction on goal valuation ($\eta_p^2$ = .096) obtained from the present study because this was the smallest effect of interest.

# Chapter 3a

Domain Profiles and Situational Goals: Examining the Effects of Achievement Goals on Reaction Time

## 3a.1 Introduction

Chapter 2 explored the effect of imposed goals on adopted goals, goal valuation and task performance, piloting a within-between persons design. It was observed that the performance instructions appeared to enhance performance for the performance dominant group but not performance for the mastery dominant group. However, the sample was small and the groups unbalanced, among other limitations, so it is necessary to conduct a further experiment to attempt to replicate these effects for motor performance. The previous study is also expanded to explore the effects of the imposed goals on anxiety.

Athlete performance can be influenced by a number of key factors such as strength, agility, endurance, flexibility, balance and coordination (Tamer, 2000). High standards of performance are often dependent on the application and building of these components of physical fitness (for a full list of components see Caspersen et al., 1985), the development of which differs depending on the demands of the sport (Atan & Akyol, 2014). Performance can also be affected by reaction time (RT) which is considered a skill-related component of physical fitness (Caspersen et al., 1985). Reaction time is defined as the elapse of time between receiving an immediate and unexpected stimulus and responding to it (Atan & Akyol, 2014; Reigal et al., 2019). Some researchers have concluded that improving RTs can help optimise sport performance, for example by improving decision making (which way to take a ball against a defender in football) or reactions to auditory cues (runners getting off the starting blocks sooner) (Malhotra et al., 2015). Specifically, it is not that RT improves overall performance, but that improved RT helps ensure performance is at its best (Jackson, 2017, PDHPE), a primary interest in the sport domain. Changes in RT, including its improvement, have been found to be influenced by reaction conditions (simple/complex/response: Luce, 1986; Welford, 1980), amongst other person-centred variables (Baayen & Milin, 2010; Konsinski, 2013) such as fitness, age, gender, practise (Çolakoğlu et al., 1993) and fatigue (Fontani et al., 2006; Sanders, 1998; Welford, 1980). But what about motivation?

In terms of motivation, evidence has shown RT can be modulated by the use of extrinsic motivators such as rewards. Experiments in non-human primates have demonstrated faster RTs in response to reward (from Mir et al., 2011) and several studies have found that rewarded objects and spatial locations elicit faster saccadic RTs (Dunne et al., 2015; Milstein & Dorris, 2007; Takikawa et al., 2002; Wang et al,, 2013). Performance improvement by the influence of extrinsic motivation has been attributed, under certain conditions, to increases in effort exertion. For example, in simple tasks when the possibility for intrinsic motivators is limited (Weibel et al., 2010), and when individuals can easily and objectively monitor their performance outcomes (Kuvaas, 2018). As such, RTs have been shown to be sensitive to the effort a participant is willing to exert on a task. If RTs can be altered by levels of effort exertion which are in turn modulated by external motivational factors, (e.g., extrinsic monetary reward) RTs should also be sensitive to other external motivational influences such as imposed achievement goals: a component of motivational climate.

One prominent theory examining the motivational influence of imposed achievement goals on factors such as effort and task performance is achievement goal theory (AGT) (Nicholls, 1984; Elliot, 1999). This theory has:

*helped understand the meaning that athletes attach to achievement, and how this meaning influences their goals and their behaviours, such as time spent in an activity, effort exerted, persistence (Fernandez-Rio et al., 2014, p. 265) as well as physical performance (Stenling et al., 2014) and well-being (Adie et al., 2010).*

Achievement motivation defined by AGT, posits that outcome variables, such as an individual's task performance (and situational goal adoption as discussed in Chapter 2), can be influenced by both intrinsic (internal) and extrinsic (external) factors (Murayama & Elliot, 2009). Intrinsic factors, or internal goal structures, include personal goals such an individual's goals for the domain in which a specific task takes place (Payne et al., 2007) while extrinsic factors, or external goal structures, nod towards environmental-based components such as factors of motivational climate (Ames, 1992). A key component of motivational climate are instruction conditions (Paas et al., 2005; Van Yperen et al., 2011) which are often given in the form of situationally imposed achievement goals (Payne et al., 2007). Within the sport domain, situationally imposed goals have been shown to modulate performance of motor skills in tasks such as golf putting, basketball and swimming (Elliot et al., 2006; Fernandez-Rio, et al., 2014; Spray et al., 2006; Smith et al., 2009). YYet, the impact of internal domain goals is not necessarily considered (Murayama & Elliot, 2009). In the same way situational goal adoption in empirical research should consider the impact of domain goals, to reflect the theoretical consensus from interactionist perspectives (e.g., Ames, 1992; Dweck & Leggett, 1988; Jagacinski et al., 2001; Nicholls, 1984), the impact of domain goals should be considered for motor skill task performance. However, there is limited empirical investigation into the relationship of domain and imposed situational achievement goals and the impact on motor skills (Van Yperen et al., 2014; Philyaw, 2020), specifically RT.

### *3a.1.1 Physical Performance and Achievement Goals*

The 2x2 achievement goal framework (mastery-approach (MAp), mastery-avoidance (MAv), performance-approach (PAp) and performance-avoidance (PAv) goals: Elliot & McGregor, 2001) is one of the most prominent models used in determining achievement goals' links to performance. Researchers have argued that imposed approach-based situational goals are the best goals to promote high levels of performance (Van Yperen et al., 2015). This is due to the positive relationships found between MAp and PAp goals and attributes that have coincided with higher levels of performance (Conroy et al., 2006): Relationships not found for avoidance-based goals, which have been shown to undermine task performance (Elliot et al., 2005).

However, which approach-based goal is most beneficial for motor performance is still debated. For example, benefits of the MAp goal have been found in the academic literature when learning is required (Anseel et al., 2011). But, Meira and Fairthbrother (2018) found individuals performed better in the performance- compared to the mastery-goal condition when a motor-skill based task (in this case balance) required learning. This finding suggests performance goals may be more beneficial when a task requires physical, as opposed to, cognitive learning. Direct investigations on physical task performance, such as fast action skills, have also yielded mixed results: not just for performance outcomes but levels of task interest and satisfaction (Benita et al., 2017; Gaudreau & Braaten, 2016; Van Yperen et al., 2014). In some cases, MAp and PAp goals were found to be equally beneficial for performance in tasks such as basketball dribbling (e.g., Elliot et al., 2006), dart-throwing (Ntoumanis et al., 2009) and golf putting (Kavussanu et al., 2009). In other cases, such as triathlons or other tasks involving a time pressure, PAp goals were found to be more beneficial for performance (e.g., Stoeber et al., 2009) whereas in tasks without a time pressure MAp goals were found to be more beneficial (Van Yperen et al., 2015).

Despite the investigations into AGT and motor-skill performance including time sensitive tasks, there appears to be limited research which examines the motivational influence of achievement goals on RT (Goudas, 1999). There is also a scarcity of investigations into the effect of the relationship between domain and situational achievement goals on motor performance. Arguably, this indicates the need for investigation into how imposed situational approach-based goals interact with domain goals to affect RT performance, especially considering which interaction of goals (congruent vs incongruent) is most beneficial for performance. Conducting such research will allow consideration of other factors, whose ability to be moderated by imposed achievement goals, may differentially play a role in influencing performance and behavioural outcomes.

#### *3a.1.2 Influencers of Behavioural Outcomes Moderated by Achievement Goals.*

One factor, moderated by achievement goals, which has an effect on behavioural outcomes is goal valuation: The value an individual assigns and the effort given to achieving a goal (Gaudreau & Braaten, 2016). For example, the value an individual assigns to a goal reflects the amount of importance placed on that goal. The higher the value, the more effort placed on the task and therefore the likelihood of more positive the performance outcomes, such as higher intrinsic motivation, effort and overall task performance. How task goals are valued is speculated to be affected by the context in which the task takes places and the value the context gives a goal. Here, the context is also referred to as an environmental goal structure, another component of motivational climate (Ames, 1992). The value given to a goal, in this sense, represents the meaningfulness of the psychological interpretation of a context (van de

Pol & Kavussanu, 2011), something Deci and Ryan (1987) referred to as 'functional value'. van de Pol and Kavussanu (2012) found that in different contexts athletes value MAp and PAp goals differently. Mastery-approach goals predicted effort in training and practise contexts because of their foundation in self-improvement and alignment with the aims of training: a time for learning and honing skills.

Conversely, PAp goals were shown to be valued more in competition contexts (van de Pol & Kavussanu, 2011) because their definitions of competence are based on normative comparison, and competition contexts promote this as the aim is to beat others. Stronger PAp goal adoption also corresponded with more effort in competition contexts providing additional performance benefits (van de Pol & Kavussanu, 2011). These findings suggest that functionally valued PAp goals in training contexts, where learning is required, may not be valued as highly by individuals as valued MAp goals. So if motor-skill learning, as in Meira and Fairbrother (2018), was found to be better in PAp goal conditions but in a training context, what other factors influenced this outcome? This alludes to other factors that both influence and are influenced by the interpretation of task context, such as the psychological moderators of task value, state anxiety and arousal.

### *3a.1.3 Psychological Moderators of Performance and Achievement Goals*

According to Eysenck (1992), anxiety occurs as a result of threat. The threat is based on an individual's self-esteem driven subjective evaluation of a situation. State anxiety, as one concept of anxiety, "reflects the psychological and physiological transient reactions directly related to adverse situations in a specific moment" (Leal et al., 2017, p.148), of which arousal, is an inherent element (Sharma, 2014). These definitions posit that anxiety can alter as a result of task context. However, there are ongoing debates within psychological and sport-based literature generating a range of mechanistic theories on how context-based anxiety can affect performance. One theory, Kahneman (1973), posits anxiety leads to an uptake in arousal of which there is an optimal point for facilitating performance. If arousal increases further performance can be negatively affected. This is similar to the inverted-U hypothesis (Yerkes & Dodson, 1908) often applied in sport. Other theories such as the zones of optimal functioning theory (Hanin, 1980), posit there is an optimum “zone” where the relationship between the level of anxiety and peak performance is unique to individuals, while the catastrophe model (Fazey & Hardy, 1988) describes the relationship between levels of state anxiety (high and low) and the point of performance decline and recovery. These theories suggest context subjective cognition and arousal, and even individuality, play a key role in explaining how anxiety affects performance. Such factors lead back to the influence of achievement goals.

It was suggested earlier that goal pursuit, or achievement goal adoption, can vary as a function of the interaction between external goal structures (e.g., context and imposed task instructions) and internal goal structures (domain achievement goals). If goal adoption can vary as a consequence of context (e.g., state-based anxiety), but is also unique to each individual, is it not then possible that anxiety can also vary as a function of that same interaction. For example, it has been found that in competition situations (context, an extrinsic goal structure) individuals with a performance dominant domain goal were more susceptible to the increase in the levels of anxiety found in this context than their mastery dominant counterparts (Ommundsen & Pedersen, 1999). Leal et al. (2017) found a positive correlation between levels of trait anxiety (personal levels) and state anxiety (levels in a specific situational) during interpersonal threat situations (in this case a video-monitored stroop test, VMST). A unidimensional approach as posited by Spielberger, et al. (1970) suggested individuals with heightened trait anxiety, such as performance dominant individuals (Ommundsen & Pedersen, 1999), would be predisposed to demonstrating an increase in state anxiety in situations deemed threatening to their valuation of competence (success referenced by others). For example interpersonal VMST or competition contexts. This is supported by Jaakkola, et al. (2015) who found it was the dispositional external referents of competence that led to increased feelings of pressure resulting in the higher levels of anxiety.

Further supporting the idea that anxiety can also vary as a function of domain goals and imposed situational goals is the notion that higher levels of anxiety induced by contextual factors may not always debilitate performance because of athletes' experience and coping mechanisms (Hagan et al., 2017). For example, Wang et al. (2004) suggest that, for high trait anxiety level individuals, such as those with performance domain dominant achievement goals, performance may be better under pressure/in anxiety inducing situations because they are accustomed to performing with a higher level of baseline anxiousness due to their high *normal* level of anxiety. The processing efficiency theory (PET, Eynseck & Calvo, 1992), suggests mechanisms of worry can increase motivation in order to reduce negative feelings that arise in stressful situations due to increased anxiety. The reduction in worry is done by promoting the use of additional, auxiliary processing resources and enhanced effort (Eynseck et al., 2007), also affected by levels of goal valuation. However, in the same way there is limited research exploring the interaction effect of domain and imposed goals on RT, there is also limited research directly exploring the effects of the same interaction on other variables affecting task performance such as, goal valuation and level of anxiety.

#### *3a.1.4 Current Research*

To summarise, the effect of achievement goals on RT has received minimal investigation, especially using a within-subject experimental design: that is, testing whether RT differs between individuals depending on the imposed task goal. Furthering this, the achievement goals individuals adopt has received limited empirical investigation despite theoretical research detailing them as the product of a domain domain and imposed goal interaction. It is known that goal valuation and state anxiety can be affected by achievement goals and have a moderating effect on motor performance. However the interaction of domain and imposed achievement goals on these variables and their effect on RT have not been discussed. Therefore, the present chapter will use a mixed-model design to examine the interaction of domain dominant (between-subject factor) and imposed approach-based situational achievement goals (within-subjects factor), of the 2x2 standards AGT model, and the effect of this interaction on situational goal adoption, state anxiety, goal valuation, and ultimately RT task performance. To measure RT performance a time-based computerised visuomotor search task, which does not require specific levels of prerequisite knowledge or skill, will be used. In line with previous research and pilot studies in Chapter 2 the following hypotheses are made:

*Hypothesis 1*: For situational goal adoption, the strongest adopted goal will reflect the dominant domain goal of the sample. This is based on findings in Chapter 2. A PAp goal was adopted in the performance condition but this was also the dominant goal of the sample. Additionally, in Van Yperen (2006), 40% of participants adopted a dominant MAp goal and this was also the highest goal adopted (across all groups) in examination of situational goal adoption."

*Hypothesis 2*: A three-part hypothesis was formed relating to congruency between the domain dominant achievement goal and imposed goal. Part one: When goals are congruent, situationally imposed goals will be more valued because the goals are consistent with the person's beliefs about what constitutes being competent in the situation and are therefore more worthy of pursuit. Despite investigations into goal valuation yielding null results in the previous chapter this variable remained of interest for two reasons. First because of positive associations found in previous literature and second because of the possibility that the null results were due to some of the methodological limitations highlighted in the previous chapter. Part two: Participants given a situational goal congruent to their domain dominant goal will report lower levels of pre-task anxiety than their incongruent counterparts (e.g., mastery dominant participants will have lower state anxiety scores then performance dominant participants in the mastery-approach condition). This is because congruent conditions minimise feelings of threat (Eynseck, 1992) to individuals' standards of competence. Part three: Based on the previous chapter, it is predicted that congruent conditions will result in better task performance compared to incongruent conditions. For example, performance dominant individuals will have better reaction times in the PAp goal condition than in the MAp goal condition.

## 3a.2 Method

### *3a.2.1 Participants*

An *a priori* power analysis using G*power 3.1 was used to determine the sample size for a repeated measures within-between interaction *F* test. Using the effect size specification as an SPSS option, and a direct measure of partial eta squared ( $\eta_p^2$ = .096) from the previous experiment's (Chapter 2) significant interaction between dominance and task instruction for goal valuation with power of .80 and .05 alpha, a minimum sample size of N = 38 was indicated.

The study received ethical approval from a Departmental Research Ethics Committee [1]. A total of 86 participants including students from Durham University were recruited through

[1] Ref: PSYCH-2018-10-21T19:29:46-dhzp44

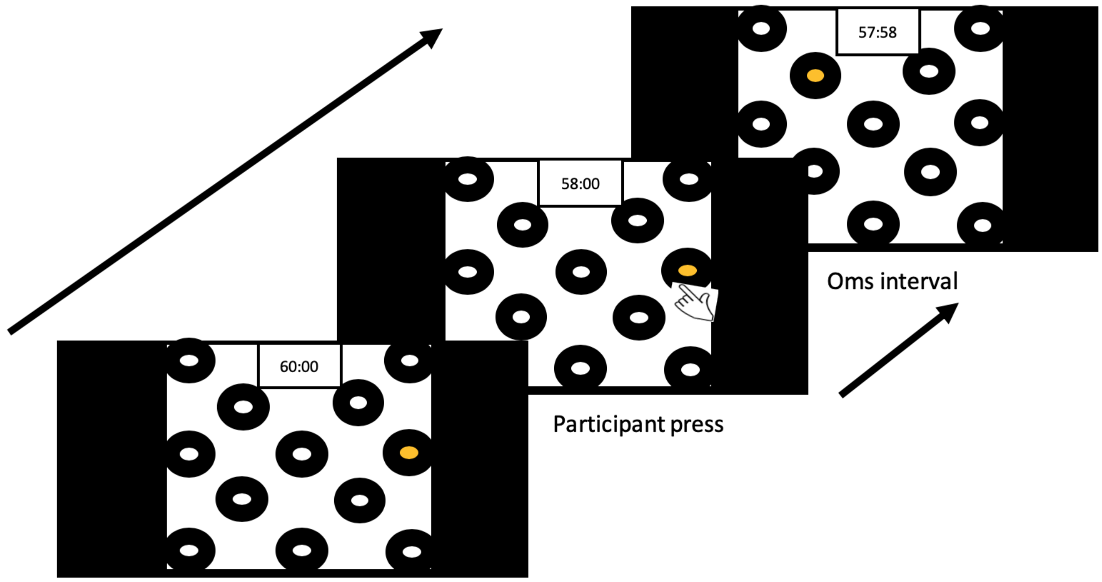
online advertisement and sports clubs (advertisement can be seen in Appendix J). The mean age was 23.2 years (standard deviation *SD* = 8.873) and 63% of were female. Durham University students were credited with 40 minutes participant credit for completing the study.

### *3a.2.2 Apparatus and Stimuli*

A 14” Lenova yoga (510-14ISK) 2-in-1 touch screen laptop, Intel ® Pentium ® CPU 4405SU® 2.10GHz 64-bit operating system, x64-based processor, windows 10 Home with 1920 x 1080 screen resolution was used. The laptop was rotated 145 degrees and stood with the screen facing participants for the task. An adult colouring book was also used as a break task. Coloured pencil crayons were provided. A BATAK style RT task was used as simple RT (Luce, 1986; Welford, 1980) test on the computer, coded in Embarcadero C++ Builder, using Direct X and automatically saved to Microsoft Excel. During the task participants had 60 seconds to press as many lights as possible. Twelve, 2mm thick black outlined, 26mm diameter circles, (180 x 180 pixels with a 10 pixel outline) were equally spaced in an array, in a 167mm by 167mm rectangle (1040 x 1040 pixels), in the middle of the screen as shown in Figure 3a.1. A countdown timer was placed at the top of the screen. One circle at a time would illuminate yellow and dealuminate when touched. The next circle then illuminated with a 0ms interstimulus interval. The order of illumination was random for each trial so participants could not predict or learn an order. After 60 seconds the screen went blank, the score was shown in the middle with instructions to “*press anywhere to play again*”. After the final trial participants were shown their score, thanked for participating and the programme was closed. Speed of reaction was represented by the number of circles touched in 60 seconds.

**Figure 3a.1**

*Reaction Time Game Screen Presentation Through one Button Press.*




*3a.2.2.1 Questionnaires*

*Achievement Goal Questionnaire - Sport (AGQ-S)*

The 2x2 AGQ-S by Conroy et al. (2003) was used. The questionnaire totalled 12 questions, 3 assigned to each of the 4 achievement goals: MAp e.g., "it is important to perform as well as I possibly can", MAv e.g., *"I worry that I may not perform as well as I possibly can"*, PAp, e.g., *"It is important to me to do well compared to others"* and Pav e.g., *"I want to avoid performing worse than others"*. Participants responded on a 7-point Likert scale ranging from 1 = *"not at all like me"* to 7 = *"completely like me*". Despite reported concerns of the AGQ-S's use of the word performance and affective terminology in the mastery-based scales (Elliot & Murayama, 2008; Warburton, 2017), the use of the word was deemed to be acceptable for this study as RT performance was the main focus on the task. Furthermore, the AGQ-S was chosen due to its reports of acceptable structural invariance and latent mean stability (Li, 2013).

The questionnaire was used in two instances (questionnaire with stem alterations in Appendix K). First, to examine participants' domain achievement goals at the beginning of the experiment. Then during the experiment, to assess participants' situational achievement goals for each task. The questionnaire was adopted for domain generality to assess domain achievement goals by adapting the stem of the questionnaire to reflect a general attitude towards activities in the sport domain:

*"Please give a response which best suits the aims you have towards sport-based activities generally. For example, strength training, walking, jogging, sport or any activity involving some form of movement or physical reaction"*

For each task condition, the questionnaire was adapted to emphasise the task the participants were about to perform:

*"Please select the response which best describes your feelings, right now, about your aim for the task you are about to complete."*

Individual situational achievement goal subscale scores were generated by taking the average of the three assigned statements.

*Subjective Task Value in Sport Questionnaire (STVSQ)*

For this study, the first question of the STVSQ (Philyaw, 2020) was adapted from "*what is your goal*?" to "*please recall the goal you were given*." The adaptation was loosely based on Van Yperen et al's (2011) manipulation check to examine if participants could recall the goal they were given. The remaining questionnaire was comprised of eight questions, examining participants' goal valuation ($\alpha$ >.74), for example "How important is it to you to be successful at this goal?" and "How hard will you try to achieve this goal?"). All questions (seen in Appendix G) are rated on a 7-point Likert scale, 1 "*not at all*" to 7 "*extremely*", with specific end statements e.g., enjoyable, happy, disappointment at the end. The questionnaire has shown good reliability and structural validity in previous tests (e.g., in Philyaw, 2020).

*The Revised Competitive State Anxiety Inventory – 2 (CSAI-2R)*

Developed by Cox et al. (2003), the 17-item inventory (Appendix L) was used to examine somatic anxiety (7 items) and cognitive anxiety (5 items) both of which have acceptable internal reliability based on Cronbach's Alpha scores ($\alpha$'s .88 and .81, respectively) and support for validity (see Cox et al., 2003). Somatic anxiety (e.g., *"I feel jittery"*), cognitive anxiety (e.g., *"I am concerned about losing*") were examined on a 4-point Likert scale (1 = *"not at all"*, 2 = *"somewhat"*, 3 = *"moderately so"*, 4 = *"very much so"*) and means scores were calculated for each.

*3a.2.2.2 Task Instructions*

Two task instructions were presented to each participant, one for each condition. The task instructions were modelled from Elliot's (1999) 2x2 framework directing participants towards achievement of standards of competence. For example, the mastery-approach task instruction focused on positive outcomes task and self-based outcomes (Van Yperen et al., 2015):

Mastery-approach task aim:

*"Your aim for this task is to hit as many lights as fast as you possibly can. Beating your previous practise time."*

The performance-approach task aim focused on positive outcomes based on normative comparison:

*"Your aim for this task is to hit as many lights as fast as you possibly can. Trying to beat some of the times listed below."*

A range of times were then listed from a pilot trial of the game.

### *3a.2.3 Procedure*

After being given the participant information sheet (Appendix M) and privacy notice (Appendix N, the same for all subsequent studies), participants were asked to complete the consent form (Appendix N: same for all studies) and domain AGQ-S. Participants were then given a task information sheet explaining the procedure. First, participants were given a practise of the RT task. After this task participants were presented with their first task aim (mastery or performance) and asked to complete three questionnaires: AGQ-S (with situational stem), the STVSQ and CSAI-2R. When presented with the task aims participants were given verbal instructions which stated, *"this is your aim or goal for this part of the experiment"*. The RT task was then completed six times. Participants were told they could use both hands during the reaction task, and they were able to take a 30 second break between each trial. After completing all six trials participants were given a 10 minute break to colour using the provided colouring book. No data or recordings were taken during the 10 minutes, it was used as a relaxation break for the participant. The experimental process was then repeated using the second task aim. Each task was given an overall score from the average of the six trials per task aim. At the end of the experiment participants were thanked and debriefed (Appendix M).

### *3a.2.4 Analysis*

Data analysis was conducted using IBM SPSS 27. The threshold for statistical significance was set with an alpha of .05. For multiple tests Bonferroni corrections were used and the reported *p* values were corrected. Following outlier removal and reliability testing, descriptives including correlations were examined, including means and SDs for each measure by instruction condition and the internal reliability for each questionnaire measure by instruction condition. A manipulation check was carried out using the first statement of the STVSQ. Situational goal adoption, determined by the situational AGQ-S, was then analysed three ways. First, a doubly multivariate analysis was used to determine differences in goal scores between conditions. Second, a one-way MANOVA was used to determine differences in subscales scores between dominance groups. Finally, a within-subjects repeated measures ANOVA was used to investigate differences in subscale scores in each instruction condition. Goal valuation (STVSQ), state anxiety (CSAI-2R) and RT performance (based on score) were analysed using 2 (dominance) x 2 (instruction) ANOVAs, followed by a paired samples, Bonferroni corrected, *t*-test for post hoc analyses of instruction effects. Domain goal profiles were established first.

## 3a.3 Results

### *3a.3.1 Data Analysis*

Data was collected for 86 participants. From this, two participants were excluded from further analysis due to technical errors with data recording. The internal reliability of the CSAI-R2 ($\alpha$'s > .796) and STVSQ ($\alpha$'s > .884) and the AGQ-S for use as a domain achievement goal questionnaire was acceptable ($\alpha$'s > .769). For situational goal investigation most AGQ-S sub-scales scores were acceptable ($\alpha$'s > .608), however performance condition PAp and PAv subscale reliability was low prior to outlier removal. One method to rectify to the low levels of reliability, to strengthen interpretation of results, may have been to examine which items affected the internal reliability. However, as only 3 items loaded to each subscale, item removal was deemed inappropriate (based on suggestions that a minimum of three items are needed to test reliability, Robinson, 2017). Therefore the low reliability of these scales will be considered when evaluating empirical findings.

The domain dominance (DDAG) was calculated for 86 participants, using the domain AGQ-S scores in the equation:

$$\textit{Dominance} = \textit{performance dominance} - \textit{mastery dominance}.$$

In total the sample contained, $n$ = 52 mastery, $n$ = 27 performance and $n$ = 5 equal dominant participants. Equally oriented participants were removed as this indicated no goal dominance. Dominance scores of the remaining participants were normally distributed W(79) = .985, $p$ = .486 $M$ = -4.03, $SD$ = 7.85, skewness = -.180. As hypothesised over 75% of participants had a dominant domain achievement goal.

The remaining 79 participants were examined for outliers using the score difference variable, calculated used the equation:

$$\textit{Score difference} = \textit{performance condition score} - \textit{mastery condition score}.$$

Outliers were determined by the score difference being 1.5 x the interquartile range above the 3rd quartile (score of 14.5) or below the 1st quartile (score of -13.5). No participants were highlighted for removal. The means and *SDs* for each variable by instruction condition measure can be seen in the correlation matrix in Table 3a.1. The matrix shows correlations in line with expectations that mastery and performance dominance scores were positively correlated.

**Table 3a.1**

*Correlations and Descriptive Statistics for Study Variables*

| | | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Mastery Dominance | 32.85 | 6.52 | | | | | | | | | | | | | | | | | | |
| 2 | Performance Domaince | 28.82 | 7.26 | .355** | | | | | | | | | | | | | | | | | |
| 3 | TP Mastery IC | 113.81 | 7.70 | .011 | .051 | | | | | | | | | | | | | | | | |
| 4 | TP Performance IC | 114.47 | 7.46 | .029 | .077 | .837** | | | | | | | | | | | | | | | |
| 5 | Mastery IC situational MAp | 5.90 | 1.03 | .499** | .164 | .160 | .137 | (.867) | | | | | | | | | | | | | |
| 6 | Mastery IC situational MAv | 5.01 | 1.32 | .494** | .128 | .182 | .216 | .458** | (.724) | | | | | | | | | | | | |
| 7 | Mastery IC situational PAp | 4.60 | 1.20 | .321** | .455** | .119 | .194 | .377** | .338** | (.649) | | | | | | | | | | | |
| 8 | Mastery IC situational PAv | 4.47 | 1.13 | .315** | .475** | .059 | .213 | .355* | .453** | .701** | (.574) | | | | | | | | | | |
| 9 | Performance IC situational MAp | 5.86 | 0.87 | .553** | .310** | .134 | .139 | .731** | .391** | .250* | .254* | (.812) | | | | | | | | | |
| 10 | Performance IC situational MAv | 4.99 | 1.23 | .562** | .239** | .133 | .176 | .295** | .630** | .255* | .322** | .403** | (.471) | | | | | | | | |
| 11 | Performance IC situational PAp | 5.07 | 0.95 | .199 | .386** | .297** | .349** | .107 | .165 | .291* | .293** | .304** | .299** | (.594) | | | | | | | |
| 12 | Performance IC situational PAv | 4.92 | 1.06 | .275* | .416** | .141 | .126 | .014 | .316** | .141 | .310** | .230* | .536** | .529** | (.324) | | | | | | |
| 13 | Mastery IC cognitive anxiety | 18.56 | 6.18 | .132 | -.002 | .365** | .326** | .293** | .442** | .255* | .199 | .205 | .334** | .372** | .333** | (.788) | | | | | |
| 14 | Performance IC cognitive anxiety | 19.49 | 6.55 | .275* | .106 | .299** | .235* | .254* | .454** | .287* | .261* | .295** | .423** | .473** | .430** | .761** | (.823) | | | | |
| 15 | Mastery IC somatic anxiety | 15.48 | 6.28 | .004 | .116 | .383** | .307** | .133 | .159 | .108 | .009 | .125 | .049 | .190 | .118 | .446** | .437** | (.895) | | | |
| 16 | Performance IC somatic anxiety | 14.99 | 5.98 | .188 | .094 | .205 | .123 | .000 | .118 | .166 | .091 | .100 | .084 | .188 | .122 | .359** | .552** | .682** | (.911) | | |
| 17 | Mastery IC value | 4.85 | .92 | .397** | .265* | .282* | .362** | .538** | .385** | .311** | .207 | .580** | .385** | .280* | .286** | .425** | .418** | .306** | .163 | (.882) | |
| 18 | Performance IC value | 4.85 | .97 | .412** | .252* | .112 | .180 | .323** | .330** | .239* | .226* | .615** | .514** | .453** | .319** | .4720** | .476** | .173 | .166 | .655** | (.889) |

*Note:* N = 79; IC = Instruction Condition; TP = Task Performance;
** Correlation is significant at the p < .01 level (2-tailed); * Correlation is significant at the p < .05 level (2-tailed);
Cronbach's alphas are shown in the diagonal.

It was also not unsurprising that the situational achievement goals were positively correlated to dominance scores. Mastery dominance was significantly positively correlated at the $p$ =.05 level to situational goals with a mastery component while performance dominance similarly related goals with a performance component. The descriptive statistics for each measure in each condition differentiated by dominance group can be seen in Table 3a.2. The table shows mastery dominant participants pressed less buttons than performance dominant individuals.

**Table 3a.2**

*Descriptive Statistics for Study Variables Separated by Dominance Group.*

| Instruction Condition | Questionnaire Subscale | Mastery Dominance $n$ = 52 | | Performance Dominance $n$ = 27 | |
|---|---|---|---|---|---|
| | | M | SD | M | SD |
| | | Situational Achievement Goal | | | |
| Mastery | MAp | 6.06 | .87 | 5.60 | 1.24 |
| | MAv | 5.27 | 1.20 | 4.51 | 1.42 |
| | PAp | 4.60 | 1.16 | 4.62 | 1.30 |
| | PAv | 4.38 | 1.17 | 4.65 | 1.06 |
| Performance | MAp | 5.89 | .92 | 5.80 | .80 |
| | MAv | 5.21 | 1.07 | 4.58 | 1.43 |
| | PAp | 4.97 | 1.06 | 5.56 | .70 |
| | PAv | 4.86 | 1.13 | 5.02 | .94 |
| | | STVSQ | | | |
| Mastery | Value | 4.89 | .96 | 4.79 | .86 |
| Performance | Value | 4.89 | .97 | 4.77 | 1.00 |
| | | CSAI-2R | | | |
| Mastery | Somatic | 14.86 | 5.12 | 16.67 | 7.04 |
| | Cognitive | 19.23 | 6.14 | 17.26 | 6.16 |
| Performance | Somatic | 14.45 | 5.38 | 16.03 | 7.00 |
| | Cognitive | 20.15 | 6.77 | 18.22 | 6.03 |
| | | Game Score | | | |
| Mastery | - | 113.67 | 6.49 | 114.07 | 9.76 |
| Performance | - | 114.30 | 6.49 | 114.78 | 9.17 |

### *3a.3.2 Manipulation Check*

To determine if participants has understood their given goal in each instruction condition, answers to the free response statement *"please recall the goal you were given*" were examined.

Responses were categorised into three groups: mastery referent, performance referent or non-task-specific, based on the terminology used. For example, a mastery referent goal mentioned *"beating a previous score/practise score*", "*my last score*", "*improving*" or any of the language from the task instruction specifically related to the mastery goal. A performance referent goal mentioned "*beating others*", the "*leader board*", position (e.g., 1st place), rank or any of language from the task instruction specifically related to a performance goal. In the mastery condition $n$ = 56 participant responses reflected adoption of a mastery goal while in the performance condition, $n$ = 41 participant responses reflected a performance goal. This suggests explicit goal adoption reflected the instructional goals

### *3a.3.3 Hypothesis 1: Situational Achievement Goal Adoption*

The effect of conditions instructions, on each AGQ-S subscale score were compared using a doubly multivariate analysis. Multivariate analysis showed significant differences in the achievement goals across instruction conditions: $F(4, 75) = 4.060$, $p = .005$ Wilk's Λ = .822, $\eta_p^2 = .178$. Examining pairwise comparisons, differences were found between the performance-based goals. In the performance condition PAp goals ($M$ = 5.07) and PAv goals ($M$ = 4.92) were significantly higher, $p$ = .002 and $p$ = .003, compared to the PAp ($M$ = 4.60) and PAv ($M$ = 4.47) goal scores in the mastery condition. Results indicate the performance instruction condition prompted higher PAp and PAv goal adoption compared to the mastery condition.

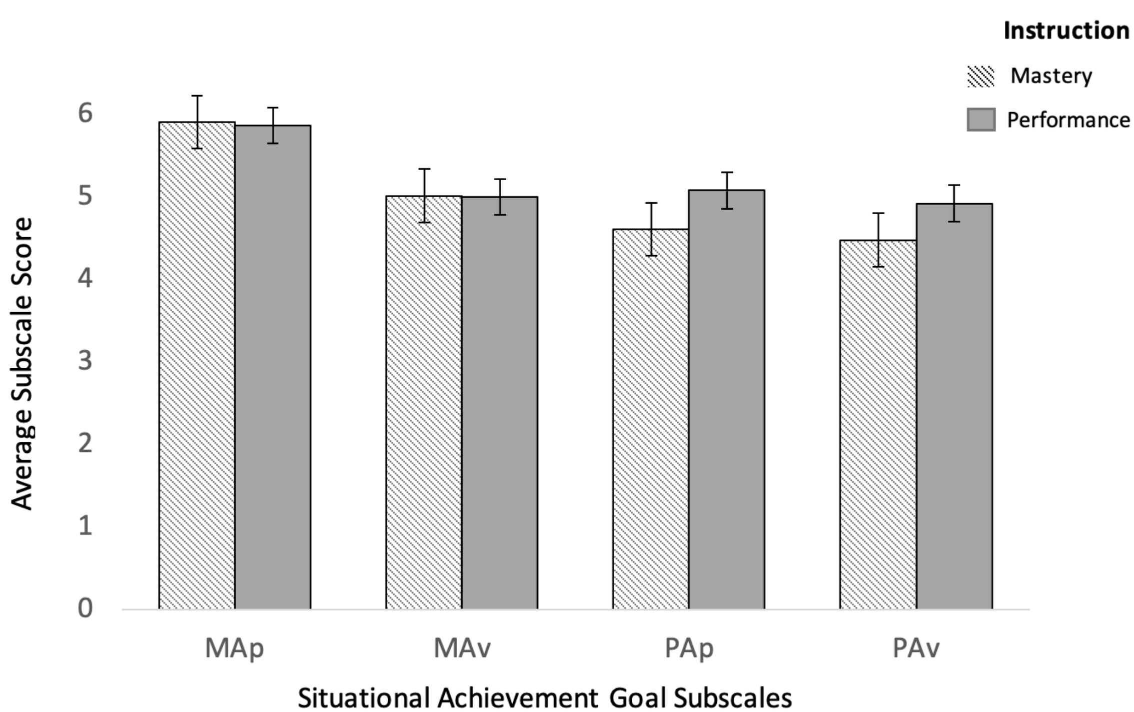
The effect of dominance on situational achievement goal adoption in each condition was examined by a one-way MANOVA. Multivariate tests showed dominance group has a statistically significant effect on situational goal adoption: $F(8, 70) = 2.698$, $p = .012$, Wilk's Λ = .764, $\eta_p^2 = .236$. Examining between-subjects effects and pairwise comparison significant differences based on dominance group were found for the MAv subscale in the mastery condition ($F(1, 77) = 6.783$, $p = .014$, $\eta_p^2 = .077$) and the performance conditions ($F(1, 77) = 4.790$, $p = .032$, $\eta_p^2 = .059$) where mastery dominant ($M = 5.27$ and $M = 5.21$) scored higher than performance dominant participants ($M = 4.51$ and $M = 4.58$). Marginally non-significant scores were found for mastery instruction MAp scores ($F(1, 77) = 3.721$, $p = .053$, $\eta_p^2 = .046$) where mastery dominant ($M = 6.06$) scored higher than performance dominant participants ($M = 5.59$).

Two within-subjects repeated measures ANOVAs, with Greenhouse Geisser correction, examined the differences between the subscale scores in each condition. Significant differences were found in the mastery condition between the four subscale scores $F(2.511, 195.867) = 41.520$, $p < .001$, $\eta_p^2 = .347$. Examining pairwise comparison, with Bonferroni corrections, MAp goal scores ($M = 5.90$) were significantly greater ($p < .001$) than MAv ($M = 5.01$), PAp ($M = 4.60$) and PAv ($M = 4.47$) goal scores. MAv goal scores were significantly greater than PAv scores ($p = .002$). There were no significant differences between PAp and PAv scores. There were also significant differences between the four subscales in the performance condition, $F(2.715, 211.752) = 22.670$, $p < .001$, $\eta_p^2 = .225$. Pairwise comparison revealed MAp goal scores ($M = 5.86$) were significantly higher ($p < .001$) than MAv ($M = 4.99$), PAp ($M = 5.07$) and Pav ($M = 4.92$) goal scores, with no significant differences between the other goal scores. Pairwise comparisons can be seen in Figure 3a.2 which shows the goal adoption in each condition.

The figure supports the statistical findings which indicated the performance condition elicited a rise in performance-based goals (PAp and PAv) compared to the mastery condition but that these differences were not strong enough to alter overall goal adoption between conditions; participants most strongly adopted MAp goals in both conditions. One curious finding also indicated that mastery dominant participants had stronger MAv goal adoption in both conditions.

**Figure 3a.2**

*Comparison of AGQ-S Subscale Scores for Each Task Instruction Condition. Error bar: +/- 1 S.E.*




*3a.3.4 Hypothesis 2a: Goal Valuation Outcomes*

A mixed model repeated measures ANONVA 2 (dominance: mastery and performance) x 2 (instruction: mastery and performance) showed small non-significant main effects of instruction $F(1, 77) = .006$, $p = .939$, $\eta_p^2 < .001$ or dominance $F(1, 77) = .303$, $p = .583$, $\eta_p^2 = .004$ and small non-significant instruction x dominance interaction effect $F(1, 77) = .025$, $p = .874$, $\eta_p^2 < .001$ on goal valuation. Overall participants showed no difference in their goal valuation in either instruction condition.

*3a.3.5 Hypothesis 2b: State Anxiety: Cognitive and Somatic*

Two, 2 (instruction) x 2 (dominance) ANOVAs were conducted, for somatic and cognitive subscales of the CSAI-R2 subscales. For somatic anxiety, no significant main effects of instruction condition $F(1, 77) = .804$, $p = .373$ $\eta_p^2 = .010$) or dominance group $F$ $(1, 77) = 1.625$, $p = .206$, $\eta_p^2 = .021$ and no effect of interaction between dominance and task instruction $F(1, 77) = .036$ $p = .849$, $\eta_p^2 < .001$) were found. For cognitive anxiety, there was no significant main effect of instruction $F(1, 77) = 3.205$, $p = .077$, $\eta_p^2 = .040$ or dominance $F(1, 77) = 1.920$, $p = .170$, $\eta_p^2 = .970$ and no effect of interaction between dominance and task instruction $F(1, 77) = .001$, $p = .970$, $\eta_p^2 < .001$. These results indicate somatic and cognitive anxiety were not affected by task instruction or dominance group.

*3a.3.6 Hypothesis 2c: Task Performance*

A mixed model repeated measures ANOVA 2 (dominance; mastery or performance) x 2 (instruction; mastery or performance) was used. There were no significant effects of instruction $F(1, 77) = 1.668$, $p = .200$, $\eta_p^2 = .021$ or effects of dominance $F(1, 77) = .063$, $p = .802$, $\eta_p^2 = .001$ on tapping score. There was also no interaction effect between dominance and instruction $F(1, 77) = .004$, p = .947, $\eta_p^2 < .001$. These results suggest RTs, judged by number of circles tapped in the mastery ($M = 113.81$) and performance ($M = 114.47$) conditions was not influenced as hypothesised: not affected by dominance groups or task instructions.

## 3a.4 Discussion

The results of this study were incongruous to the initial hypothesis. Despite the current study being suitably powered based on smallest effect of a variable of interest, the effect size of the goal valuation interaction (domain x condition) of Chapter 2, only significant results for situational goal adoption were found. No key performance-influencing dependent variable (e.g., goal valuation, anxiety or RT) was influenced by the interaction of domain and instruction condition. Furthermore, neither levels of goal valuation, levels of anxiety (somatic or cognitive) or, crucially, RTs were found to be influenced by the instruction condition, irrelevant of domain group. The absence of significant results will be briefly discussed including an overview of the methodological limitations, and differences to Chapter 2, that may have contributed to such findings. First, the results of situational goal adoption will be examined.

Using the first statement of the STVSQ as a manipulation check, explicit goal recall for each instruction condition was used to determine how well the instructions had been understood. Over half the participants recalled the goal they were given in each task instruction condition indicating a reasonably successful understanding of each goal consistent with similar previous work (e.g., Van Yperen et al., 2011). Examining implicit goal adoption through a situational-based AGQ-S, MAp was the highest scoring goal in each condition when observing all participants' scores. In the mastery condition, mastery dominant participants adopted mastery-based goals more strongly than the performance dominant group. Based on these results it is tentatively proposed that mastery dominant individuals' situational goal adoption was based on domain-situational goal congruency. This is suggested cautiously, as mastery condition MAp goal adoption was not statistically significant when examining dominance group differences. In fact, it was the MAv goal scores, in both the mastery and performance conditions, that were statistically higher for mastery dominant participants. The higher MAv goal adoption in the performance condition was particularly unexpected in line with goal congruency. However, the low internal reliability suggests the performance condition MAv goal was not accurately reflected by the AGQ-S measure. This concern undermines confidence in definitively concluding an MAv goal was adopted in the performance condition by the mastery dominant group.

Setting dominance aside, examining situational goal adoption between conditions revealed the performance condition PAp and PAv goals were higher compared to the respective mastery condition equivalents. While this was within reasonable expectations, it must be considered whether, due to the low levels of internal reliability, performance-based goals were accurately reflected in the performance conditions AGQ-S responses. As such it cannot confidently be concluded that the performance condition elicited stronger performance goal adoption. Previous studies examining AGQ-S have shown good internal reliability with all items included (Lower & Turner, 2016; Conroy et al., 2003), though there has been some dispute on the alignment of MAv goal with its theoretical construct (Elliot & Murayama, 2008; Harwood et al., 2008; Hulleman et al., 2010). For example, one item uses affective language (e.g., worry), taking the focus of the item away from goals per se; similar to the points raised prior to the adaptation of the AGQ (Elliot & Murayama, 2008). However, the primary focus of this study was not to examine avoidance-based goals: The main aim was to examine approach-based goal adoption, or lack thereof. As such it was believed the AGQ-S was suitable for this investigation. This does not mean to say avoidance goal adoption is not of interest. But in line with the weak levels of reliability found in this study, the avoidance goals were not as informative as the *absence* of strong approach goal adoption. The absence of other findings is also informative for methodological limitations of the study.

The contrast between the present study's findings and previous research concerning the emotional based self-reported measures, anxiety and goal valuation opens the possibility that the task used in the current study lacked ecological validity. According to Yeo et al. (2009), imposed situational achievement goals are more influential, leading participants to invest more effort and assign greater value to achieving their given goals, *if* the outcome of the task has meaning. This relates to the task as well as the measure of RT. Here, the task was designed to be experimentally meaningful as it related to a motor-skill. Nevertheless, it may have been perceived as too far removed from an athletic task to interest participants and it had no discernible implications (e.g., names were not placed on a leader board for future comparison or knowledge was not gained on strategy for such tasks). The minimal meaningfulness could impede the possibility that differences in intrinsic motivation, manifesting as valuation responses or performance outcomes (Merriman et al., 2012), would have be visible between goal conditions.

A second critique is that visibility in performance differences may have been suppressed by RT being based on quantitative button presses as opposed to seconds taken to complete the task (e.g, people's performance may differ when they have to press 60 buttons in the fastest time compared to having 60 seconds to press as many buttons as possible). Additionally, though improved from the previous chapter the conditions instructions could still be argued to be flawed. Greater emphasis on elements of competition in the performance condition, including beating scores on a leader board and explicit comparison of scores to others, are recommended for future replications. For the MAp goals, greater emphasis on elements of learning, improvement, skill mastery and beating one's previous score rather than focusing on "as fast you can" are needed. The effects of such changes on results will be discussed in the following chapter and considered reflectively across all studies in the discussion chapter

(Chapter 5) when considering the use of terminology throughout the thesis.

Therefore, considering the methodological limitations noted above an enhanced replication of this experiment will be conducted. It will examine the length of time taken to complete pre-set standardised RT laptop-based sequences. It will further use improved task instructions while basing the minimum sample size no that generated from the power analysis of the significant goal valuation interaction in Chapter 2. It also will aim to reach suitable levels of internal reliability for the situational goal adoption AGQ-S subscales, making necessary adjustments where appropriate, to ensure more concrete conclusions can be drawn from their respective analyses.

# Chapter 3b

Re-examining the Effects of Achievement Goals on Reaction Time. A Replication Study

## 3b.1 Introduction

Embedding the methodological modifications noted in the discussion of Chapter 3a, this study aimed to address previous weaknesses in the examination of the interaction between dominance and task instructions on reaction time (RT) performance. From the results of Chapter 2 it was indicated that a significant interaction effect would have been sufficiently powered with a minimum of 38 participants. Yet, Chapter 3a, with a sample far larger than this minimum, found small effects (effect size <.001) and no significant interaction for RT performance, goal valuation or anxiety. Possible explanations were discussed and revealed a prominent limitation; the nature of the task instructions did not accurately align with the conceptualisation of approach-based goals. Furthermore, the low internal reliability of the Achievement Goal Questionnaire-Sport (AGQ-S) when examining situational goal adoption reduced the certainty with which conclusions could be made. Drawing from strengths identified in Chapter 3a the current study will control for task difficulty, through standardised sequences, and examine RT as a variable of time as opposed to button presses.

### *3b.1.1 Current Research and Hypotheses*

The hypotheses for the current study are based on existing literature and remain the same as those articulated in Chapter 3a. While there were no significant effects in Chapter 2 or

Chapter 3a, the goal valuation and state anxiety variables remain of interest in the present study. They remain included to determine whether the null results were due methodological limitations and to maintain a degree of continuity throughout the line of investigation in the thesis. Should they yield significant findings once limitations have been addressed, they may provide a deeper insight into the effects of goal congruency on factors influencing task performance.

Therefore, to summarise, it was expected that high valuation of goals would improve task performance, and that the impact of anxiety would be moderated by the interpretation and experience designated by ones domain dominance. Reflecting the change in task instructions and standardisation of RT sequences, the current study had three aims with corresponding hypotheses:

Hypothesis 1: To examine how imposed situational goals influence situational goal adoption. Based on previous findings it is predicted that the performance condition will increase performance-based goal adoption but the overall goal adoption in both conditions will reflect the dominant domain goal of the sample.

Hypothesis 2: To examine the congruency effect on goal valuation and pre-task cognitive anxiety. Here it is predicted that individuals in congruent goal conditions will i) value the imposed goal more than those in incongruent conditions, because the goal aligns with their beliefs about what constitutes competence; ii) will report lower levels of pre-task anxiety than their incongruent counterparts (e.g., mastery dominant participants will have lower state anxiety scores then performance dominant participants in the mastery-approach condition) because congruent conditions minimise feelings of threat (Eynseck, 1992) to individuals' standards of competence.

Hypothesis 3: To examine the interaction between domain dominance and situational goals on RT performance. It is predicted, based on Chapter 2, that there will be a congruency effect, where domain dominant individuals will have a faster RT in the condition with congruent instructions than in conditions with incongruent instructions.

## 3b.2 Method

### *3b.2.1 Sample*

The study received ethical approval from a Departmental Research Ethics Committee[1]. The power analysis conducted in Chapter 2 indicated a minimum sample size of 38 would be adequate to obtain a significant interaction with a medium effect size. Chapter 3a obtained a sample of N = 72 but failed to generate a significant interaction. Based on a sample of 140 participants (79% female) and a sensitivity analysis using G*power, it was found that the current study would be able to detect a minimum effect size of $F = .098$. The sample included students from Durham University and students/adults from non-academic environments, recruited through volunteer and opportunistic sampling online and in person. Before starting the experiment, participants gave full and informed consent knowing they could withdraw at any time. Durham University students were credited with 40 minutes participant credit for completing the study.

### *3b.2.2 Materials*

#### *3b.2.2.1 Apparatus and Stimuli*

A Huawei MediaPad M5 Lite 10.1-inch touch screen tablet was used. Between conditions, participants were granted a break in which a general conversation occurred, which reduced

[1]Ref: PSY-DT51901

the rehearsal effect and ensured the effect of the specific instruction was tested. The tablet displayed 12 buttons which participants used to complete three Arduino microcontroller coded BATAK style sequences; a pilot sequence and one sequence each for the mastery and performance condition, each controlled for equal difficulty. Each sequence totalled 72 button presses with 71 moves, with no button being repeated in immediate succession. Buttons illuminated red and remained on until struck out with a 0ms interstimulus interval between button press and next stimulus illumination. Each sequence consisted of 6 sub-sequences in which all 12 buttons would be pressed. Sequences were coded based on cross (across the centre buttons to the other side, e.g., button 5 to button 7), near (on the same side of the middle, e.g., button 7 to button 2) and equal (moves to or from the centre two buttons, e.g., button 2 to button 6) buttons moves. The buttons were presented as 22.5mm circles on a 136mm x 217mm landscape display. There circles were equally spaced with a horizontal distance of -91mm, and vertical distance of - 52.5mm, centre to centre. At the end of the sequence participants' completion time was presented in the middle of the screen for feedback.

#### *3b.2.2.2 Questionnaires*

*Achievement Goal Questionnaire - Sport (AGQ-S)*

The 2x2 AGQ-S by Conroy et al. (2003), adapted for the sport domain from Elliot and McGregor's (2001) Achievement Goal Questionnaire, was used. The questionnaire totalled 12 questions, 3 assigned to each of the 4 achievement goals: MAp e.g., *"it is important to perform as well as I possibly can*", MAv e.g., "*I worry that I may not perform as well as I possibly can*", PAp, e.g., "*It is important to me to do well compared to others*" and Pav e.g., "*I want to avoid performing worse than others*". Participants responded on a 7-point Likert scale ranging from 1 = "*not at all like me*" to 7 = "*completely like me*". Despite reported concerns of the AGQ-S's use of the word performance in the mastery-based scales, the use of the word was deemed to be acceptable for this study as reaction time performance was the main focus on the task. The AGQ-S was chosen to maintain consistency in the replication of the previous study.

The questionnaire was used in two instances (Appendix K). First, to examine participants' domain achievement goals at the beginning of the experiment. Then during the experiment, to assess participants' situational achievement goals for each task. The questionnaire was adapted for domain generality to assess domain achievement goals by adapting the stem of the questionnaire to reflect a general attitude towards activities in the sport domain:

*"Please give a response which best suits the aims you have towards sport-based activities generally. For example, strength training, walking, jogging, sport or any activity involving some form of movement or physical reaction"*

For each task condition, the questionnaire was adapted to emphasise the task the participants were about to perform:

*"Please select the response which best describes your feelings, right now, about your aim for the task you are about to complete."*

Individual situational achievement goal subscale scores were generated by taking the average of the three assigned statements.

*Subjective Task Value in Sport Questionnaire (STVSQ)*

For this study, the first question of the STVSQ (Philyaw, 2020) was adapted from "what is your goal?" to "please recall the goal you were given." The adaptation was loosely based on Van Yperen et al.'s (2011) manipulation check to examine if participants could recall the goal they were given. The remaining questionnaire was comprised of 8 questions, examining participants' goal valuation ($\alpha$ >.74), e.g., "How important is it to you to be successful at this goal?" and "How hard will you try to achieve this goal?"). All questions (seen in Appendix G) are rated on a 7-point Likert scale, 1 "not at all" to 7 "extremely", with specific end statements e.g., enjoyable, happy, disappointment at the end. The questionnaire has shown good reliability and structural validity in previous tests (e.g., in Philyaw, 2020).

*Revised Competitive State Anxiety Inventory - 2 (CSAI-2R)*

Developed by Cox et al. (2003), the 17-item inventory was used to examine somatic anxiety (7 items) and cognitive anxiety (5 items) both of which have acceptable internal reliability based on Cronbach's Alpha scores ($\alpha$ .88 and .81, respectively) and support for validity (see Cox et al., 2003). Somatic anxiety (e.g., *"I feel jittery*") and cognitive anxiety (e.g., *"I am concerned about losing*") were examined on a 4-point Likert scale (1 = not at all, 2 = somewhat, 3 = moderately so, 4 = very much so) and means scores were calculated for each.

### *3b.2.2.3 Condition Instructions*

Two sets of situational instructions were given. Both instructions began with the same task information and stem. Key differences between the instructions were then highlighted in bold to emphasise the focus of the instruction to the participants:

*"This is a reaction-based game where the time taken to press 72 lights is measured. One light will appear at a time, in order for the next light to appear you must hit the first. The lights will appear in a randomised order. You will have two attempts at the game in this round. Your first attempt will be a practice. This allows you to generate your baseline reaction time".*

Mastery-Approach Condition:

*"You should use this first attempt to* ***learn and build a strategy*** *in order to better your reaction time on your second go. You will be asked to verbalise and write down this strategy. The time you achieve in the second round is the time we will use to determine if you have* ***improved from your previous score****. Therefore, your goal is to* ***beat your first score*** *and* ***show improvement*** *on the task. Other people's times DO NOT matter, and you should only focus on* ***your score and skill****."*

Performance-Approach Condition:

*"You should use this first attempt to see where your reaction time would place you on the leader board, in order* ***beat more people on your second go****. The time you achieve in the second round is the time we will use to determine where you* ***place on the leader board****. Therefore, your goal is to* ***beat other people****'s times and get a place in, at least, the* ***top 5 on the leader board****. Other people's scores* ***DO matter*** *and you should* ***focus on beating others****."*

Each task aim corresponded to a specific questionnaire set, differentiated by the first two questions: the AGQ-S, STVSQ and CSAI-2R remained the same. The mastery condition questionnaire asked participants "*what is your strategy to better your time for this task*?" while the performance condition asked them to state their "*previous score on the leader board*" (the leader board: Appendix O).

### *3b.2.3 Procedure*

Participants were presented with the participant information sheet (Appendix P) detailing the three-part experimental process, followed by the consent form and privacy notice (Appendix N) and the domain based AGQ-S. Part 1: Using the pilot sequences participants were given three practice attempts on the tablet program to familiarise themselves with the program and task. This was in line with research demonstrating fast initial RT improvement occurs between the first two test sessions (Del et al., 2014). Therefore, practice trials ensured stabilisation of participant RT improvement and removed any practice effects so they did not confound the effects of instruction. Part 2: Participants were given their first task instruction (mastery and performance instructions were counterbalanced between participants) and told there were their goals for this part of the experiment. At this point in the performance condition they were shown the leader board. Participants then completed their practice attempt followed by the corresponding questionnaire set before attempting their second, time recorded, attempt. After their final attempt participants were told they could have a break in which a general conversation took place. Participants then repeated part 2 with the alternate instruction and questionnaire set. Participants were then thanked and debriefed (Appendix P).

#### *3b.2.4 Analysis*

Data analysis was completed using IBM SPSS 27. The threshold for statistical significance was set with an alpha of .05. For multiple tests Bonferroni corrections were used and the reported $p$ values are corrected. Following outlier removal and reliability testing, descriptives including correlations were examined including means $M$ and standard deviations (*SD*s) as well as the internal reliability for each questionnaire measure by instruction condition. A manipulation check was carried out using the first statement of the STVSQ. Situational goal adoption, determined by the situational AGQ-S, was analysed three ways. First, a doubly multivariate analysis was used to determine differences in goal scores between conditions. Second, a one-way MANOVA was used to determine differences in subscales scores between dominance groups. Finally, a within-subjects repeated measures ANOVA was used to investigate differences in subscale scores in each instruction condition. Goal valuation (STVSQ), state anxiety (CSAI-2R) and RT performance were analysed using 2 (dominance) x 2 (instruction) ANOVAs, followed post hoc analyses (Bonferroni corrected paired samples *t*-tests).

## 3b.3 Results

### *3b.3.1 Data Analysis*

Three participants' data were removed due to incomplete questionnaire responses. The internal reliability of the STVSQ and CSAI-2R was acceptable ($\alpha$'s > .84 or $\alpha$'s > .81 respectively). The AGQ-S was acceptable for use as a domain achievement goal questionnaire ($\alpha$'s >.75) and for situational goal adoption investigation ($\alpha$'s > .67).

Domain dominance (DDAG) was then calculated for 140 participants, using the domain AGQ-S scores in the equation:

*Dominance = performance dominance – mastery dominance.*

In total the sample contained, $n$ = 97 mastery, $n$ = 35 performance and $n$ = 8 equal dominance participants. Equally dominant participants were removed as this indicates no goal dominance: N = 132. Dominance scores of the remaining participants, were normally distributed W(132) = .984, $p$ = .119 $M$ = -4.61, $SD$ = 7.94, skewness = -.268.

The remaining 132 participants were examined for outliers using the score difference variable, calculated using the equation:

*Score difference = performance condition reaction time - mastery condition reaction time.*

Outliers were determined by the score difference being 1.5 x the interquartile range above the 3rd quartile (5385ms) or below the 1st quartile (-6209.5ms). Three participants were highlighted for removal, N = 129: $n$ = 94 mastery dominant and $n$ = 35 performance dominant. The means and SDs for each variable by instruction condition measure can be seen in the correlation matrix in Table 3b.1. The correlation matrix shows mastery dominance is significantly positively correlated to MAp and MAv goals, while performance dominance is significantly positively correlated to PAp and PAv goals in both instructions conditions. This supports initial hypothesis that situational goal adoption may be related to goal congruency. The descriptive statistics for each instruction condition measure and each measure differentiated by dominance group can be seen in Table 3b.2. On average, RT appears to faster in goal congruent conditions: mastery dominant faster in the mastery condition and performance dominant faster in the performance condition.

**Table 3b.1**

*Correlations and Descriptive Statistics for Study Variables*

| | | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Mastery Dominance | 34.60 | 4.54 | | | | | | | | | | | | | | | | | | |
| 2 | Performance Dominance | 30.08 | 7.52 | .191* | | | | | | | | | | | | | | | | | |
| 3 | TP Mastery IC | 36746.95 | 3607.51 | .030 | -.079 | | | | | | | | | | | | | | | | |
| 4 | TP Performance IC | 36372.69 | 3268.22 | .090 | -.132 | .825** | | | | | | | | | | | | | | | |
| 5 | Mastery IC situational MAp | 5.97 | .855 | .539** | .084 | .062 | .099 | (.712) | | | | | | | | | | | | | |
| 6 | Mastery IC situational MAv | 5.62 | 1.055 | .701** | .168 | -.007 | .039 | .609** | (.876) | | | | | | | | | | | | |
| 7 | Mastery IC situational PAp | 4.90 | 1.449 | .205* | .828** | -.099 | -.141 | .154 | .236** | (.917) | | | | | | | | | | | |
| 8 | Mastery IC situational PAv | 5.00 | 1.504 | .153 | .801** | -.075 | -.140 | .058 | .262** | .843** | (.931) | | | | | | | | | | |
| 9 | Performance IC situational MAp | 5.85 | .876 | .511** | .172 | .242** | .284** | .533** | .366** | .199* | .110 | (.668) | | | | | | | | | |
| 10 | Performance IC situational MAv | 5.47 | 1.277 | .661** | .277** | .012 | .056 | .341** | .665** | .284** | .279** | .581** | (.919) | | | | | | | | |
| 11 | Performance IC situational PAp | 5.27 | 1.295 | .156 | .659** | -.075 | -.177* | .068 | .182* | .724** | .602** | .117 | .253** | (.908) | | | | | | | |
| 12 | Performance IC situational PAv | 5.34 | 1.273 | .152 | .667** | -.069 | -.128 | -.003 | .217* | .659** | .714** | .057 | .324** | .783* | (.867) | | | | | | |
| 13 | Mastery IC cognitive anxiety | 18.62 | 6.51 | .245** | .195* | .043 | .074 | .123 | .384** | .167 | .196* | .278** | .309** | .220* | .221* | (.808) | | | | | |
| 14 | Performance IC cognitive anxiety | 20.28 | 7.19 | .329** | .169 | .054 | .040 | .073 | .400** | .112 | .193* | .098 | .368** | .214* | .260** | .703** | (.826) | | | | |
| 15 | Mastery IC somatic anxiety | 14.78 | 6.07 | .095 | .227** | -.027 | .037 | .081 | .226* | .169 | .225** | .215* | .239** | .125 | .142 | .671** | .512** | (.880) | | | |
| 16 | Performance IC somatic anxiety | 16.42 | 6.80 | .134 | .166 | -.056 | -.053 | .023 | .281** | .160 | .252** | .045 | .251** | .169 | .220* | .555** | .681** | .725** | (.907) | | |
| 17 | Mastery IC value | 5.45 | .92 | .536** | .161 | .088 | .109 | .440** | .485** | .170 | .115 | .442** | .479** | .253** | .259** | .297** | .265** | .087 | .167 | (.843) | |
| 18 | Performance IC value | 5.10 | 1.10 | .302** | .242** | .147 | .049 | .156 | .234** | .280** | .223* | .519** | .476** | .363** | .283** | .336** | .305** | .230** | .155 | .527** | (.895) |

*Note*: N = 129; IC = Instruction Condition; TP = Task Performance;
** Correlation is significant at the $p < .01$ level (2-tailed); * Correlation is significant at the $p < .05$ level (2-tailed);
Cronbach's alphas are shown in the diagonal.

**Table 3b.2**

*Descriptive Statistics for Study Variables Separated by Dominance Group*

| Instruction Condition | Questionnaire Subscale | Mastery Dominance *n* = 94 | | Performance Dominance *n* = 35 | |
|---|---|---|---|---|---|
| | | M | SD | M | SD |
| | | Situational Achievement Goal | | | |
| Mastery | MAp | 6.05 | .87 | 5.76 | .80 |
| | MAv | 5.75 | 1.02 | 5.27 | 1.07 |
| | PAp | 4.50 | 1.36 | 5.98 | 1.09 |
| | PAv | 4.66 | 1.50 | 5.93 | 1.05 |
| Performance | MAp | 5.91 | .84 | 5.69 | .97 |
| | MAv | 5.55 | 1.18 | 5.27 | 1.50 |
| | PAp | 4.98 | 1.31 | 6.07 | .83 |
| | PAv | 5.08 | 1.31 | 6.03 | .86 |
| | | Subjective Task Value in Sport | | | |
| Mastery | Value | 5.38 | .86 | 5.30 | 1.08 |
| Performance | Value | 5.05 | .97 | 5.22 | 1.10 |
| | | CSAI-2R | | | |
| Mastery | Somatic | 14.62 | 5.98 | 15.22 | 6.38 |
| | Cognitive | 18.44 | 6.56 | 19.09 | 6.44 |
| Performance | Somatic | 16.29 | 6.50 | 16.78 | 7.62 |
| | Cognitive | 20.34 | 7.16 | 20.11 | 7.37 |
| | | Game Score | | | |
| Mastery | - | 36602.43 | 3451.84 | 37135.09 | 4023.68 |
| Performance | - | 36492.14 | 3278.86 | 36051.89 | 3264.89 |

### *3b.3.2 Manipulation Check*

To determine if participants has understood their given goal in each instruction condition, answers to the free response statement *"please recall the goal you were given"* were examined. Responses were categorised into three groups: mastery referent, performance referent or non-task-specific, based on the terminology used. For example, a mastery referent goal mentioned *"beating a previous score/practise score"*, "*my last score*", "*improving*" or any of language from the task instruction specifically related to the mastery goal. A performance referent goal mentioned “*beating others*”, the “*leader board*”, position (e.g., 1st place), rank or any of language from the task instruction specifically related to a performance goal. In the mastery condition 60.5% of participant responses reflected adoption of a mastery goal while in the performance condition, 74.4% of responses reflected a performance goal.

### *3b.3.3 Hypothesis 1: Situational Goal Adoption*

The effect of condition instructions on each AGQ-S subscale score were compared using a doubly multivariate analysis. Multivariate analysis showed significant differences between the achievement goals across each instruction condition $F(4, 125) = 5.297$, $p < .001$, Wilk’s Α = .855, $\eta_p^2 = .145$. Pairwise comparison using Bonferroni corrected *t*-tests, revealed significant differences between the performance-based goals. The PAp goal was significantly higher ($p < .001$) in the performance condition ($M = 5.27$) compared to the mastery condition ($M = 4.90$) and similarly the PAv goal score was also significantly higher ($p = .001$) in the performance condition ($M = 5.34$) compared to the mastery condition ($M = 5.00$). As the Table 3b.1 shows, MAp and MAv goals were higher in the mastery condition compared to the performance condition but these differences did not reach statistical significance ($p = .104$ and $p = .089$ respectively).

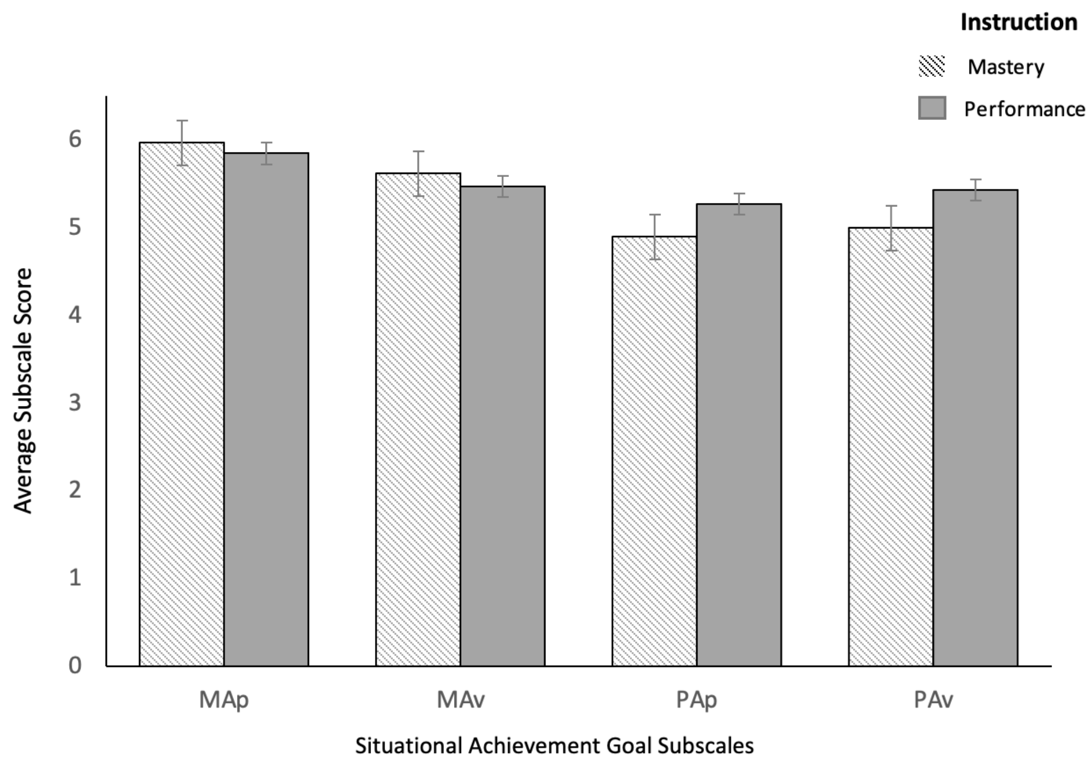
Using a MANOVA, differences in goal scores between dominance groups were examined. Multivariate tests showed significant differences in subscale scores between dominance groups $F(8, 120) = 7.286$ p < .001; Wilk’s Α = .673, $\eta_p^2 = .327$. Examining between-subjects, univariate tests, dominance groups had a significant effect on mastery condition MAv scores ($F(1, 127) = 4.586$, $p = .021$, $\eta_p^2 = .023$), PAp scores ($F(1, 127) = 33.225$, $p < .001$, $\eta_p^2 = .207$) and PAv scores ($F(1, 127) = 21.331$, $p < .001$, $\eta_p^2 = .144$). Mastery dominant participants scored higher ($M$ = 5.75) than performance dominant participants ($M$ = 5.27) on the MAv subscale whereas on the PAp and PAv subscales performance dominant scored higher ($M$ = 5.98 and $M$ = 5.93 PAp and PAv respectively) than mastery dominant ($M$ = 4.50 and $M$ = 4.66 PAp and PAv respectively) participants. Dominance groups also had a significant effect on the performance condition PAp ($F(1, 127) = 20.931$, $p < .001$, $\eta_p^2 = .141$) and PAv ($F(1, 127) = 15.754$, $p < .001$, $\eta_p^2 = .110$) subscale scores where performance dominant (PAp, $M$ = 6.07 and PAv, $M$ = 6.03) scored higher than mastery dominant (PAp, $M$ = 4.98 and PAv, $M$ = 5.08) participants. These results indicate domain dominance affected degree of achievement goal adoption.

Two within-subjects repeated measures ANOVA's, one for each instruction, identified significant differences in the subscale scores within the mastery condition, $F(1.653, 211.534) = 33.981$, $p < .001$, $\eta_p^2 = .210$, and the performance condition, $F(13.124, 1.383) = 9.490$, $p < .001$, $\eta_p^2 = .069$. Pairwise comparison using Bonferroni corrected $t$-test, for the mastery condition revealed, MAp scores ($M$ = 5.97) were significantly greater ($p < .001$) than MAv ($M$ = 5.62), PAp ($M$ = 4.90) and PAv ($M$ = 5.00) scores. MAv scores were significantly greater ($p < .001$) than PAp and PAp scores and there were no significant difference between PAv and PAp. Pairwise comparison using Bonferroni corrected $t$-tests for the performance condition revealed, MAp scores ($M$ = 5.85) were significantly greater than MAv ($p < .001$, $M$ = 5.47), PAp ($p < .001$, $M$ = 5.27) and PAv ($p = .001$, $M$ = 5.34).

The results demonstrated that the performance dominance individuals had a higher proclivity towards performance-based goals in both conditions. The results also indicate the performance-based goals were more strongly adopted in the performance compared to the mastery condition in line with the imposed goal instructions: Though the MAp goal was ultimately the most strongly adopted for each condition. This can be seen in Figure 3b.1.

**Figure 3b.1**

*Comparison of AGQ-S Subscale Scores for Each Task Instruction Condition. Errors bars showing 1+/-S.E.*




*3b.3.4 Hypothesis 2a: Goal Valuation*

Goal valuation was examined via a mixed model repeated measures ANOVA 2 (dominance; mastery or performance) x 2 (instruction; mastery or performance). The results showed no significant effects of dominance $F(1, 127) = .051$, $p = .821$, $\eta_p^2 <.001$ or an instruction X dominance interaction effect $F(1, 127) = 1.497$, $p = .223$, $\eta_p^2 = .012$ for goal valuation. However, a medium significant effect of instruction condition on goal valuation was found: $F(1, 127) = 3.972$, $p = .048$, $\eta_p^2 = .030$, where goals in the mastery instruction condition were valued higher $M = 5.35$ ($SD = .92$) than those in the performance instruction condition $M = 5.10$ ($SD = 1.10$). These results suggest the goal given in the mastery instruction condition was more highly valued by participants than the goal given in the performance instruction condition, irrespective of dominance.

*3b.3.5 Hypothesis 2b: Competitive Anxiety*

Two mixed model repeated measures ANOVAs, 2 (dominance; mastery or performance) x 2 (instruction; mastery or performance), were used to examine somatic and cognitive anxiety. For somatic anxiety, there was no significant interaction effect $F(1, 127) = .016$, $p = .900$, $\eta_p^2 < .001$ or between subjects effect of dominance $F(1, 127) = .210$, $p = .648$, $\eta_p^2 = .002$. However, there was a significant, medium effect of instruction $F(1,127) = 11.322$, $p = .001$, $\eta_p^2 = .082$. Somatic anxiety was significantly higher in the performance condition ($M$ = 16.42, $SD$ = 6.80) compared to the mastery condition ($M$ = 14.78, $SD$ = 6.07). For cognitive anxiety there was no significant interaction effect, $F(1, 127) = .674$, $p = .413$, $\eta_p^2 = .005$ or between subjects effect of dominance, $F(1, 127) = .027$, $p = .870$, $\eta_p^2 < .001$. However, there was a significant main effect of instruction $F(1, 127) = 7.687$, $p = .006$, $\eta_p^2 = .057$. Cognitive anxiety was significantly higher in the performance condition ($M$ = 20.27, $SD$ = 18.62) compared to the mastery condition ($M$ = 18.62, $SD$ = 6.51). Overall, it appears, on average, that participants were more aroused (somatic anxiety) and more concerned with potential performance consequences (cognitive anxiety) in the performance condition.

*3b.3.6 Hypothesis 3: Reaction Time*

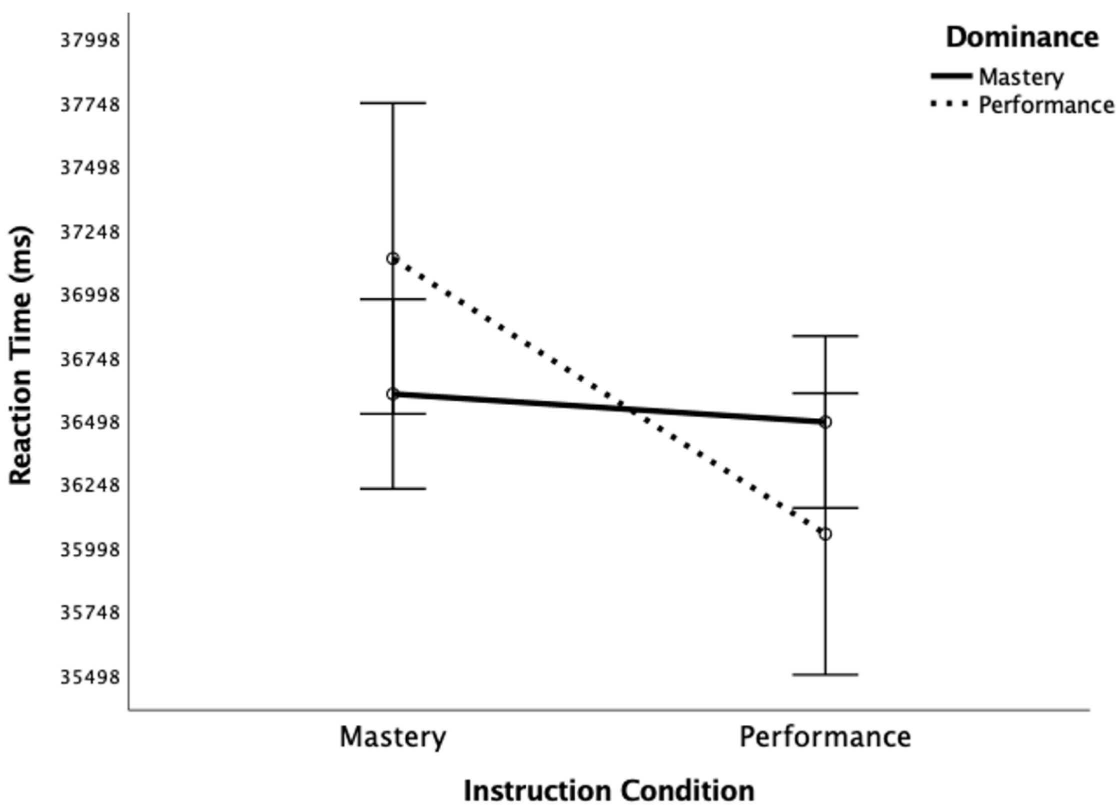
A mixed model repeated measures ANOVA 2 (dominance; mastery or performance) x 2 (instruction; mastery or performance) was used to examine differences in participant RT. There was a significant main effect of instruction with a medium effect size, $F(1, 127) = 8.914$, $p = .003$, $\eta_p^2 = .066$, and a significant interaction effect between dominance and instruction condition: $F(1, 127) = 5.924$, $p = .016$, $\eta_p^2 = .045$. There was no between subjects effect of dominance, $F(1, 127) = .005$, $p = .944$, $\eta_p^2 <.001$.

Post hoc analysis via paired samples $t$-test for each dominance group showed a significant difference in RT between conditions for the performance dominant participants, $t(34) = 3.041$, $p = .005$, $d =.295$, where RT in the performance condition was faster ($M = 36051.89$ms) than in the mastery condition ($M = 37135.09$ms). No significant differences in RT were found for the mastery dominant group, $t(93) = .539$, $p = .591$, $d = .033$, between the mastery condition ($M = 36602.3$ms) and the performance condition ($M = 36492.14$ms).

The data show that on average, performance dominant participants were faster under performance instructions than mastery instructions. In contrast, mastery dominant participants performed similarly in both conditions. This difference can been seen in Figure 3b.2.

**Figure 3b.2**

*Reaction Time ANOVA: Domain and Situational Goal Interaction. Error bars showing +/- 1 S.E*



## 3b.4 Discussion

The current study was an enhanced replication of Chapter 3a, examining the effect of domain and imposed situational goal congruency on RT performance. In line with Chapter 2 the results showed a significant effects of goal congruency. Between goal dominance and task instruction, performance dominant participants demonstrated improved RT in the goal congruent PAp condition while mastery dominant participants' RT was similar across both conditions. Also, in line with goal congruency are some of the situational goal adoption findings. The performance dominant group adopted stronger performance-based goals in the PAp condition and though mastery dominant participants' goal adoption was not as marked, there was greater MAv goal adoption in mastery condition compared to performance dominant participants. Performance dominant participants also adopted domain goal congruent situational goals in the mastery condition. Instruction-based effects were also seen. For example, considering state anxiety, it appears, on average, that participants were more aroused (somatic anxiety) and more concerned with potential performance consequences (cognitive anxiety) in the performance condition. However, one must be mindful not to conclude higher levels of anxiety in the PAp condition were because this goal was more valued (assuming anxiety levels increase when trying to achieve a higher valued goal because the goal is more meaningful; van de Pol & Kavussanu, 2011), as it was the MAp goal that received higher goal valuation scores. Investigating situational goal adoption irrespective of dominance, it was found performance-based goals were adopted more strongly in the performance condition and mastery-based goals more strongly in the mastery condition (though not to statistical significance) than in mastery and performance conditions respectively. The findings will be discussed along with their link to theoretical implications, previous literature, chapters and future investigations.

### *3b.4.1 Imposed Goals and Reaction Time Performance*

The main finding of interest is the interaction between dominance and task condition which resulted in improved RT for performance dominant participants in the performance task condition. This supports the findings in Chapter 2. The results also challenge previous suggestions (e.g., made by Van Yperen et al.'s, 2015 meta-analysis) that time pressure and normative comparison undermine task performance because performance-based goals shift one's attention away from the task (e.g., Sarason et al., 1986). However, Benita et al. (2017) argued that there are specific circumstances under which the relationship of PAp goals and improved task performance manifest. A position aligned with Gaudreau and Braaten (2016) whose results indicated PAp goals are not inherently detrimental. Such findings are supported by the current study as performance dominant participants' RT improved in the PAp goal condition. Stoeber et al. (2009) also found specific PAp goals were more beneficial for performance in time sensitive situations such as races (e.g., triathlons) where performance was judged on time. This finding was replicated in Meira and Fairbrother's (2018) work for performance dominant individuals in particular. Both Stoeber et al. and Meira and Fairbrother's findings are similar to the current study. It could be speculated that improved task performance in PAp condition for performance dominant individuals occurs because the alignment of domain and imposed goals strengthens the standards by which competence is valued (Scheltinga et al., 2017). But because this was not reflected in the goal valuation results it is possible other factors contributed to the positive influence of PAp goals, for example, task meaningfulness and length.

Benita et al. (2017) also suggested performance goals were better for performance in short-term tasks. The current study involved a short-term task where long-term learning and improvement (factors associated with mastery goals) were not essential to succeed. It is possible performance dominant participants may have identified with the instant gratification of beating others offered in performance condition. Thus, fuelling their faster RT as the task was more meaningful and the condition instructions more motivational for them: van de Pol and Kavussanu (2011) found stronger PAp goal adoption also corresponded with more effort in competition contexts providing additional performance benefits. Stronger PAp goal adoption is supported by higher situational PAp goal adoption by performance dominant participants in the performance condition. Mastery dominant participants' RT may have shown significant improvement in the mastery condition had the task been more long-term allowing the task instructions to be more meaningful. Reduced task meaningfulness can be supported by the lack of significant MAp goal adoption in the mastery condition by mastery dominant participants. However, if goal valuation is used as a representation of task meaningfulness, the theory that performance goals were meaningful (to performance dominant participants), leading to improved RT, would not be supported. Goal valuation in the current study was found to be higher for the mastery instructions with no interaction effect. However, other emotional and psychological factors must also be considered, including state anxiety, goal adoption and effort.

### *3b.4.2 Task Goals and State Anxiety*

In the performance condition state anxiety (somatic and cognitive) scores were higher than in the mastery condition. Dewar et al. (2013) found that the performance goal condition was related to higher levels of pre-competitive excitement: A positive reappraisal of symptoms of high arousal and therefore anxiety (Brooks, 2014). Excitement is also linked to interest in an interest-excitement relationship where interest "shares conceptual space with intrinsic motivation" (Amundrud 2009, p.11). Therefore excitement (or interest) towards an impending task can be a demonstration of intrinsic motivation which has been found to be positively related to task performance outcomes (Meriman et al., 2012): A possible explanation for the RT findings in the performance condition. However, previous literature demonstrates mixed results concerning the relationship between PAp goals and intrinsic motivation/intrinsic enjoyment (Adie & Jowett, 2010; Edwards, 2014; Hulleman et al., 2008). More consistent are the positive relationships found between PAp and cognitive anxiety (Midgley et al., 2001: As cited in Kaplan & Maehr, 2007), often viewed as an undesirable relationship due to the negative implications associated with high cognitive anxiety (e.g., choking; Wang et al. 2004). Conversely, negative relationships have been found between MAp and cognitive anxiety (Stan & Oprea, 2014) and in some cases MAp goals have been found to lessen cognitive anxiety (Li, 2013; Morris & Kavussanu, 2008). This suggests two possibilities for the current study. The performance goal condition increased cognitive anxiety, or the mastery goal decreased cognitive anxiety; neither can be examined without pre-test anxiety data. It has also been found higher scores of somatic as well as cognitive anxiety have been linked to high-pressure situations: Mesagno et al. (2012) found somatic anxiety in basketball players was significantly higher in the high-pressure phase. The high-pressure phase involved the use of monetary incentives, videotaping and an audience. The performance goal condition in this study could be likened to a high-pressure situation through the use of the performance-contingent leader board incentive, possibly accounting for the increase in state anxiety found in this condition.

It has generally been assumed that high levels of somatic and cognitive anxiety (worry, nervousness, high arousal, butterflies) were detrimental to performance (Hardy, 1997). However, mechanistic theories (e.g., inverted U-hypothesis [Yerkes & Dodson, 1908], zone of optimal functioning theory [Hanin, 1980]) and demonstrations by other researchers have shown increased anxiety or arousal can co-exist with improved levels of performance, often depending on positive perceptions of arousal/anxiety (Jamieson, 2017; Moore et al., 2015). In this study, it is speculated that improved RT in the performance condition, found primarily for the performance dominant group, could be due to their experiences in dealing with high levels of cognitive anxiety. It has been proposed that experience and regulation mediate the relationship between PAp goals and achievement outcomes (Edwards, 2014; Hagan et al., 2017). For instance, Wang et al. (2004) suggested that for those with performance domain dominant achievement goals, performance may be better under pressure/in anxiety inducing situations because such individuals are accustomed to performing with a higher level of baseline anxiousness due to their high 'normal' level of anxiety. Though one must be cautious linking performance dominant participants' improved RT in the performance condition to participants' ability to deal with high levels of anxiety as there was no effect of dominance for state anxiety in the current study. Rather than drawing speculative conclusions, it would have been interesting and informative to ask participants not just if they felt elements of state anxiety but how they interpreted such feelings. For example, Jones and Hanton (1996) demonstrated that competitive swimmers reported both cognitive and somatic anxiety symptoms as being more facilitative if they had positive expectations of goal achievement.

#### *3b.4.3 Additional Considerations: Goal Congruency*

A final avenue to consider, explaining the increase in anxiety, is the congruency between task instructions (impose situational goals), adopted goals and dominant domain goals. The situational AGQ-S demonstrated significant adoption of MAp goals in both task conditions. This goal adoption is particularly relevant for the PAp condition with higher levels of anxiety.

During this condition mastery dominant participants were aware their performance was being compared to that of others, an opposing reference to the standard of competence they chose to adopt (self-referent standard) and held (domain dominant goal) for the performance task, creating a degree of goal incongruency. For the performance dominant participants the imposed goal and their domain goal were congruent, increasing performance expectations and a need to demonstrate competence. But, their adopted goal was an MAp goal (highest overall goal in each condition), resulting in a different level of goal incongruency. Therefore, it could be possible incongruency between adopted and imposed situational goals resulted in an internal conflict surrounding individuals' valuations of their standards of competence, leading to an increase in anxiety (Eysenck, 1992). For the performance dominant participants, this threat may have facilitated RT performance to minimise aversive state anxiety (Eynseck et al., 2007). For mastery dominant participants, though RT facilitation did not occur, performance was also not debilitated despite reports of higher levels of anxiety in the PAp condition. This leads one to question whether it is different types of goal congruency that alter task performance based on the degree of internal conflict they create. In light of this there are three types of goal congruency relationships that should be considered: total goal congruency (domain, adopted and imposed goals align), partial domain congruency (domain and imposed goals align), partial adopted congruency (adopted and domain goals align).

#### *3b.4.4 Comparison to Previous Results and Future Investigations*

The following section will briefly consider the comparison of this study to previous chapters, in terms of results and their interpretations. The present study found the same domain X instruction interaction seen in Chapter 2. However there are key differences that must be acknowledged, namely the differences in effect sizes. The effect sizes for the interaction ($\eta_p^2$ = .045) and post-hoc *t*-tests (*d* = .295) in the present study were a lot smaller than those found in Chapter 2 ($\eta_p^2$ = .34 and *d* = .615). It is possible that these differences in the magnitude of experimental effects could be attributed to the requirements of the different tasks, specifically their level of cognitive demand. For example, Chapter 2's memory task included a larger cognitive component than the simple RT task in Chapter 3a. This suggests the influence of task requirements should be taken into consideration when comparing effect sizes between studies. Fundamentally, a key point to consider is whether effect sizes of the magnitude found in this study are enough to make a meaningful difference to outcomes in sport activities. Take for example the men's 100m final in Toyoko 2021. First place, Italy's Jacobs, ran a time of 9.80 seconds while second place, USA's Kerley, ran 9.84 seconds. Four one hundredths of a second was the difference between the gold and silver, winning and losing in the minds of some athletes. These fine margins are common in elite sport and have been recognised for the important impact they have on facilitating overall improvement. For example, Brailsford's strategy of "the aggregiation of marginal gains" used to improve the trajectory of British cycling focused on making 1% changes to everything involved in cycling. These small changes resulted in British cyclists winning 60% of the gold medals available at the 2008 Olympic Games in Beijing five years later (Clear, 2018). If small changes and fine margins play such a large role in elite sport, it stands to reason that small effects, such as those found in this study, can also have important implications on real-world outcomes. Therefore, despite the small size, the emergence of a significant interaction between domain and instruction goals for simple RT tasks is worth further inspection. As with any small effect, testing its replication in similar tasks and new samples is necessary.

Comparing the presence of statistically significant findings to the absence of such findings in the previous chapter warrants exploration into the effects methodological alterations, namely task instructions, can have on statistical differences. The task instructions in the present study were more aligned with the theoretical concept of the goals than in either of the two previous studies. Specifically, the use of the words 'improve', 'previous score' and a focus on strategy for the mastery condition, and normative comparison and 'beating others' in the performance condition. The use of comparable terminology between the task instructions and the questionnaires allowed goals to be better understood in this study, demonstrated by higher percentages of accurate recall in the manipulation check. This greater conformation in the task instructions to the theoretical concept of goals could also have contributed to task-requirement based differences in effect size. Additionally, time rather than number of button presses being the focus of the task may have contributed to the significant findings compared those in Chapter 3a. Time is a more sensitive measure, being a scale rather than a discreet unit, which allows it to detect smaller changes in performance. This sensitivity may have allowed significant difference to be found in RT.

In conclusion, the current study offered a sufficiently powered test to support growing literature arguing that there are circumstances in which PAp goals are beneficial for performance, for example, in time-sensitive, motor-skill based tasks. Importantly the study provides evidence to answer the key research question *how do imposed approach goals interact with domain goals to affect motor performance* by supporting the importance of goal congruency, particularly for performance dominant individuals. The results also suggest goal congruency may extend beyond a two-factor relationship (domain and situationally imposed goals). They suggest domain dominant, imposed situational and adopted situational goals' relationship, and the effects on task performance, should be considered. Lastly, the findings demonstrated the facilitatory effects of state anxiety for performance, but further examination of its antecedents in relation to domain goals and goal congruency need to be considered.

# Chapter 4

## A S.T.A.R.R. Debut: Examining the Facilitatory Factors of Reaction Time on a Novel Reaction Time Machine

### 4.1 Introduction

This chapter investigated the relationship between domain dominant and situational goal congruency and the consequences for reaction time (RT) performance, replicating and extending Chapter 3b and Chapter 2's findings. While the congruency effect (significant interaction between domain and task instruction for RT) found in Chapter 2 was not replicated in Chapter 3a, it was seen in Chapter 3b among other notable findings. Specifically, situational goal adoption did not mimic the imposed goal in each task condition, instead mastery-approach (MAp) goals were adopted, on average, more than other goals in each task condition (mastery and performance goal conditions). State anxiety was heightened in the performance-approach (PAp) goal condition, consistent with previous research in competition settings (e.g., Dewar et al., 2013; Mesagno et al., 2012). Particularly interesting were the faster RTs in the PAp goal condition for the performance dominant group. Drawing on previous literature it was postulated that incongruent imposed and adopted situational goals in the PAp condition instigated a rise in state anxiety. The rise was the result of perceived "threat" to competence standards (Eynseck, 1992) which, through functional interpretation by the performance dominant group, facilitated RT performance (Eynseck et al., 2007; Jamieson, 2017; Moore et al., 2015; Thomas et al., 2009). The present study aimed to replicate Chapter 3b's exploration into the research question How do imposed approach goals interact with domain goals to affect motor performance? using a more physically demanding task to improve the ecological validity of the study. It aimed to do this by investigating the relationship between domain, situational goal (both imposed and adopted) congruency and task performance, in addition to further exploring the effects of task instructions, state anxiety and goal valuation on task performance.

One physically demanding task that is widely used in sport and exercise settings is the BATAK task. This is typically used to train and assess the speed, hand-eye, coordination and agility of athletes through RT, and involves whole-body movement to enable responses. Correlational relationships have been found between performance on BATAK machines and other motor tests that have reliably been used to assess RT (Giercuk & Bujak, 2014). Here, therefore, it is argued that using a BATAK machine and BATAK style task to test the effects of achievement motivation on RT advances the ecological validity of the previous work in this thesis (i.e., a lab-based computer task).

### *4.1.1 Domain and Situational Achievement Goals and Their Congruency*

Reaction time performance has thus far been posited to be affected by the relationship between internal and external goal structures: domain goals and imposed situational achievement goals respectively. Specifically, that a goal congruent relationship (domain and imposed situational goals are the same) would facilitate improved task performance compared to an incongruent (different domain and imposed situational goals) goal relationship. Chapter 3a contradicted this hypothesis but the findings from Chapter 3b supported performance facilitation as a result of goal congruency for the performance dominant group in the PAp goal condition. The effect of other congruency relationships was also alluded too, as factors such as goal valuation, state anxiety and situational goal adoption suggested goal congruency was not as simple as initially thought. The findings in Chapter 3b suggested there were three factors in the congruency relationship, imposed situational goal, adopted situational goal and dominant domain achievement goal.

The importance of this three-factor relationship was initially neglected, in part, because previous experimental research often found the adopted situational goal was a reflection of the imposed goal (e.g., manipulation check measures used by Van Yperen et al. (2011) to represent situational goal adoption) and thus assumed it to be the goal adopted for the task (Anderman & Midgley, 1997; Roeser et al., 1996; Urdan, 2004: found in Meece et al., 2006). However, this is not an accurate portrayal of the theoretical consensus on how situational goals are adopted (e.g., Darnon et al., 2009 interactionist models). Interactionist models (e.g., those by Dweck & Leggett, 1988; Jagacinski et al., 2001; Nicholls, 1984; Papaioannou et al., 2004; Treasure & Roberts, 1995) suggest that situational goal adoption is the result of an interaction between domain and imposed situational goals, but this notion is often denied adequate investigation in empirical studies. However, the theoretical consensus that adopted goals are affected by the interaction between domain and imposed goals is supported by the findings of the previous chapters of this thesis. More specifically, explicit goal adoption (where participants are asked to recall the goal they had been given) in both conditions tended to reflect the imposed situational achievement goal. Whereas an implicit measure of goal adoption (situational Achievement Goal Questionnaire -Revised [AGQ-R] or Achievement Goal Questionnaire - Sport [AGQ-S]), did not consistently correspond to the imposed situational goal; MAp goals scored higher in both conditions across all participants. As such the adopted situational goal in previous studies could be interpreted as a reflection of the sample's average domain dominant mastery goal (over 50% of the samples in each study have reported having a mastery dominant domain goal). This situational goal adoption, considered with improved RT in the PAp condition for the performance dominant group, higher goal valuation in the MAp condition, and higher state anxiety levels in the PAp condition, opened the possibility of the consequential relationships between not only domain dominant and situational goals but the adopted situational goal as well: Three relationships were considered.

1. Total congruency: **All three goal types** align and are **congruent** (e.g., in Chapter 3b the performance dominant group in the PAp condition had greater PAp goal adoption than in the mastery condition).

2. Partial domain congruency: **Domain** and **imposed goals** are **congruent** but incongruent to the adopted situational goal (e.g., performance dominant individuals in the PAp goal condition where MAp goals were significantly adopted compared to PAp goals).

3. Partial adopted congruency: **Domain** and **adopted situational** goals are **congruent** but incongruent to the imposed situational achievement goal (e.g., if performance dominant participants scored higher on PAp goal adoption in the MAp condition).

An additional factor which will also be reconsidered is goal valuation. How individuals value the imposed achievement goal has previously been examined as representing factors of importance, attainment, effort and expectancy of success. Such factors that, as posited by regulatory fit theory (Higgins, 2000) for example, are affected when the goals an individual pursues align (or fit) with their personal beliefs (regulatory orientation). The theory proposes that when someone believes there is a 'fit' of motivational orientation they will be more engaged (e.g., willing to put in more effort) and value the goal more (e.g., find it more important, Higgins, 2005). In Chapter 3b it was found goals in the MAp condition were valued more than those in the PAp condition. The adopted goal, on average for the total sample, in the MAp condition aligned with the mastery dominant participants' domain goal. As goal valuation scores were also higher in this condition, the regulatory fit theory is supported for the mastery dominant participants. However, this 'fit' did not translate into performance improvements. In comparison, the performance dominant participants had a degree of goal alignment in the PAp condition as the imposed and domain goals aligned. While this alignment in the PAp condition did not translate into high levels of goal valuation, RT was better for this group. Considering high goal valuation, according the regulatory fit theory, is related to increases in effort, it begs the question as to whether an increase in effort necessarily corresponds to improved RT based on the previous chapters' findings. Rather the results suggest a nod to the influence of other factors such as the positive interpretation of state anxiety.

### *4.1.2 Current Research*

The current chapter aimed to replicate Chapter 3b and investigate if findings generalised to more a physically demanding and effortful task. Additional attention was paid to the mechanistic relationship between anxiety and task performance as well as the influence of the relationship between the imposed and adopted situational goals referred to in Chapter 4b. To do this I continued to examine the effects of imposed approach-based situational goals on task performance along with reports of goal valuation and state anxiety in relation to domain dominance. This line of investigation generated three hypotheses.

*Hypothesis 1, Situational Goal Adoption and Goal Valuation*: Based on findings in Chapters 2, 3a, and 3b it is predicted situational goal adoption will reflect individuals' DDAG. For example, if the majority of participants have a mastery dominant domain goal, situational goal adoption will also be, on average, mastery-based across conditions. Based on theoretical arguments (e.g., regulatory fit theory, Higgins, 2005), and aligned with the data in Chapter 3b, it is proposed that this adopted goal and domain goal alignment will result in goal valuation scores being higher for goals in the mastery condition than the performance condition, which will carry a degree of incongruency.

*Hypothesis 2, Cognitive Anxiety*: Based on the previous study and literature associating increases in anxiety to performance-based goal conditions, it is posited that cognitive anxiety will be higher in the PAp goal condition compared to the MAp goal condition. Higher levels of state anxiety are expected when there is a degree of goal incongruency (such as in partial adopted or partial domain congruency) as noted in Chapter 3b.

*Hypothesis 3, Task Performance*: Based on the RT results from Chapter 3b and evidence that motor skill acquisition is better in a PAp goal condition (Meira & Fairbrother, 2018), it is hypothesised that RTs will be faster in the PAp goal instruction condition but that there will also be a significant interaction between domain dominance and task instruction. Specifically, that domain congruent instructions will elicit faster RTs for performance dominant individuals.

## 4.2 Method

### *4.2.1 Sample*

The study received ethical approval from the Durham University Psychology Department Ethics Committee[1]. An *a priori* power analysis, based on Chapter 3b's RT interaction effect size ($\eta_p^2$ = .045), using G*power 3.1 identified a required sample of N = 82 for .80 power and .05 error.

A sample of 100 participants (*n* = 59 female and *n* = 41 male) from the general population

[1] Ref: PSYCH-2019-02-25T13:40:53-dhzp44

(incl. North-West netball and cricket clubs, a recreational gym and schoolteachers) and students from Durham University were recruited through online advertisement (example in Appendix J) and team collaboration (Appendix Q: participant information was attached to sports team recruitment emails). Coaches, headteachers and gym managers consented to the experiment set up and members being approached to participate. University students of psychology were awarded 30 minutes participant credit for their participation. The sample comprised of athletes ($n$ = 58) and non-athletes ($n$ = 42). Participant ages ranged from 18-50+ years (estimated $M$ = 25.73).

### *4.2.2 Apparatus*

#### *4.2.2.1 Reaction Time Apparatus: S.T.A.R.R. Machine*

Due to the versatility needed to collect a range of participant data, the testing equipment needed to be easily transportable. A BATAK machine was less specified to the needs of the current study, difficult to transport, extremely expensive to hire and had no familiarisation protocols for use in empirical investigation (Ellison, 2015). Therefore, a specialised Speed, Time, Accuracy, Reaction, Response (S.T.A.R.R.) machine was built with similar dimensions to a BATAK but modified to collapse for transportation. A familiarisation protocol for the S.T.A.R.R. machine (used to test RTs) was based on data around practice effects and familiarisation for other physical RT tasks. Del Rossi et al. (2014) for example demonstrated fast initial RT improvement occurred between the first two test sessions. Therefore, it was decided that experimental testing on the S.T.A.R.R. machine would begin after participants had been given three attempts of a practice replication of the test procedure to ensure responses would be less confounded by simple effects of task familiarisation.

The machine stood 192 centimetres (cm) tall on two removable legs (see Appendix R, Figure R.1, for a life scale). The machine dimensions, button layout and the corresponding number assigned to each button for sequence coding can be seen in Figure 4.1 and Figure 4.2. The keypad at the top of the machine was used to code participants and select one of three, Arduino microcontroller coded sequences: a pilot sequence and a separate sequence for the mastery and performance goal conditions. Each sequence totalled 72 button presses with 71 moves, with no button being repeated in immediate succession.

**Figure 4.1**

*Frame Design Measurement (mm) Specifications for the S.T.A.R.R. Machine.*

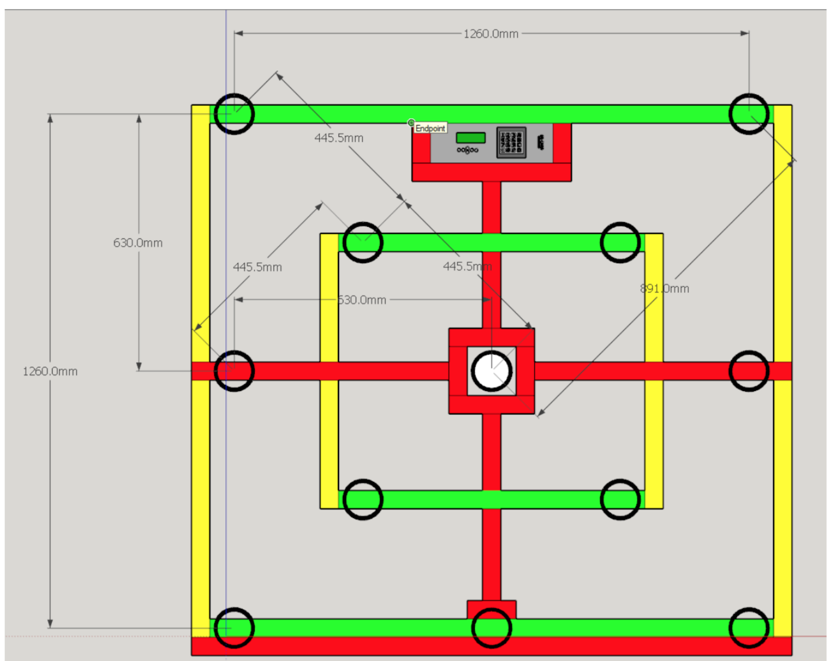
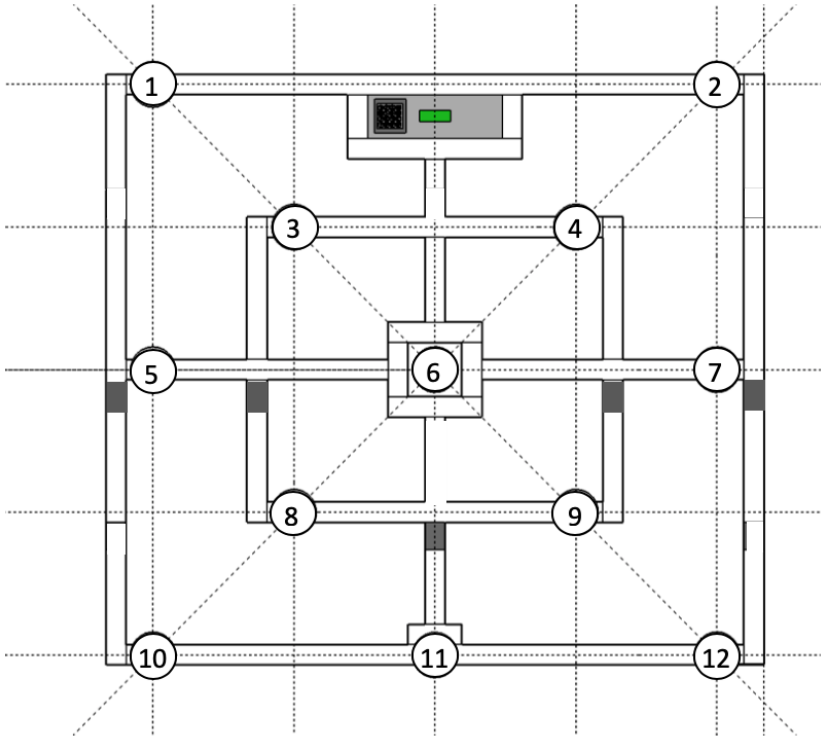


**Figure 4.2**

*S.T.A.R.R. Machine Button Arrangement with Numbers for Sequence Allocation*




Buttons illuminated red and remained on until struck out with a 0ms interstimulus interval between button press and next stimulus illumination. Each sequence consisted of 6 subsequences in which all 12 buttons would be pressed. Sequences were coded based on *cross* (across the centre buttons to the other side, e.g., button 5 to button 7), *near* (on the same side of the middle, e.g., button 7 to button 2) and *equal* (moves to or from the centre two buttons, e.g., button 2 to button 6) buttons moves. The machine recorded the participant code, the sequence, the order and time of each button press, the number of errors and the error location in the sequence.

*4.2.3 Questionnaires*

*Achievement Goal Questionnaire - Sport (AGQ-S)*

The 2x2 AGQ-S by Conroy et al. (2003) was used. The questionnaire totalled 12 questions, 3 assigned to each of the 4 achievement goals: MAp (e.g., *"it is important to perform as well as I possibly can*"), Mastery-avoidance (MAv: e.g., *"I worry that I may not perform as well as I possibly can*"), PAp, (e.g,. *"It is important to me to do well compared to others*") and Performance-avoidance (PAv: e.g., "*I want to avoid performing worse than others*"). Participants responded on a 7-point Likert scale ranging from 1 = "*not at all like me*" to 7 = "*completely like me*". The AGQ-S was used to maintain continuity to previous experiments in the bid to investigate the interaction between domain and situational achievement goals and task performance.

The questionnaire was used in two instances. First, to examine participants' domain achievement goals at the beginning of the experiment. Then during the experiment, to assess participants' situational achievement goals for each task. The questionnaire was adapted for domain generality to assess domain achievement goals by altering the stem of the questionnaire to reflect a general attitude towards activities in the sport domain:

"*Please give a response which best suits the aims you have towards sport-based activities generally. For example, strength training, walking, jogging, sport or any activity involving some form of movement or physical reaction*"

For each task condition, the questionnaire was adapted to emphasise the task the participants were about to perform:

"*Please select the response which best describes your feelings, right now, about your aim for the task you are about to complete.*"

Individual situational achievement goal subscale scores were generated by taking the average of the three assigned statements (questionnaire in Appendix K).

*Subjective Task Value in Sport Questionnaire (STVSQ)*

The first question of the STVSQ (Philyaw, 2020) was adapted from "*what is your goal*?" to *"please recall the goal you were given*." The adaptation was loosely based on Van Yperen et al.'s (2011) manipulation check to examine if participants could recall the goal they were given. The remaining questionnaire was comprised of 8 questions, examining participants' valuation (e.g., *"How important is it to you to be successful at this goal?*" and "*How hard will you try to achieve this goal?*)". All questions (seen in Appendix G) are rated on a 7-point Likert scale, 1 "not at all" to 7 "extremely", with specific end statements (e.g., enjoyable, happy, disappointment) at the end. In previous chapters and testing, these factors have shown consistent factors and reliability scores; Cronbach alpha's ($\alpha$) greater than .70 for each subscale when used in two goal conditions (Philyaw, 2020).

*The Revised Competitive State Anxiety Inventory - 2 (CSAI-2R)*

Developed by Cox et al. (2003), the 17-item inventory was used to examine somatic anxiety (7 items) and cognitive anxiety (5 items) both of which have acceptable internal reliability based on Cronbach's alpha scores ($\alpha$ .88 and .81, respectively) and support for validity (see Cox et al., 2003). Somatic anxiety (e.g., "I feel jittery") and cognitive anxiety (e.g., "I am concerned about losing") were examined on a 4-point Likert scale (1 = not at all, 2 = somewhat, 3 = moderately so, 4 = very much so) and means scores were calculated for each (questionnaire in Appendix L).

### *4.2.4 Condition Instructions*

Two sets of situational instructions were given. Both instructions began with the same stem: "You will have two attempts at the game in this round. Your first attempt will be a practice. This allows you to generate your baseline reaction time". Key differences between the instructions were then highlighted in bold to emphasise the focus and differences in the instructions to participants.

The mastery condition:

*"You should use this first attempt to **learn and build a strategy** in order to better your reaction time on your second go. You will be asked to verbalise and write down this strategy. The time you achieve in the second round is the time we will use to determine if you have **improved from your previous score**. Therefore, **your goal** is to **beat your first score** and **show improvement on the task**. Other people's times **DO NOT matter**, and you should only focus on **your score and skill**."*

The performance condition:

"*You should use this first attempt to see **where your reaction time would place you on the leader board**, in order beat more people on your second go. The time you achieve in the second round is the time we will use to **determine where you place** on the leader board. Therefore, **your goal** is to **beat other people's times** and get a **place in, at least, the top 5** on the leader board. Other people's scores **DO matter** and you should focus on **beating others**."*

Each task aim corresponded to a specific questionnaire set, differentiated by the first two questions: the AGQ-S, STVSQ and CSAI-2R remained the same. The mastery condition questionnaire asked participants *"what is your strategy to better your time for this task?"* while the performance condition asked them to state their "*previous score on the leader board"*.

### *4.2.5 Procedure*

Participants were presented with the general participant information (Appendix S) detailing the experimental, three-part, process followed by the privacy notice consent form (examples in Appendix N) which included demographic questions and the domain-based AGQ-S. Part 1: Using the pilot sequence, participants were given three practice attempts on the machine. A brief pilot study demonstrated that RTs improved over the first three trials before stabilising, in line with research demonstrating fast initial RT improvement occurs between the first two test sessions (Del Rossi et al., 2014). Therefore, the practice trials were also used to allow participants' RTs to stabilise, so practice effects did not confound the effects of the instructions. Participants were informed this was to allow them to become comfortable with the machine, style and length of sequences. Part 2: Participants were given their first task instruction (mastery and performance instructions were counterbalanced between participants) and told these were "*their goals for this part of the experiment*". At this point in the performance condition they were also shown the leader board. They then completed their part 2 'practice go' followed by the corresponding questionnaire set before taking their second attempt at the game. After their go (and addition to the leader board if needed in the performance condition) participants were told this concluded part 2 and that anything that has gone before can now be forgotten as they entered the third and final part of the experiment. Part 3: Repeated part 2 with alternate instruction and questionnaire set. If participants asked about other players' scores, prior to or after the performance goal condition they were told by the experimenter "*that it did not matter"*. Participants were thanked and debriefed at the end of the experiment (Appendix S).

### 4.2.6 Analysis

Data was analysed using IBM SPSS 27. The threshold for statistical significance was set with an alpha of .05. For multiple tests Bonferroni corrections were used and the reported *p* values were corrected. The means and standard deviation (*SD*) for each measure and correlations between variables were also examined. A manipulation check was carried out using the first statement of the STVSQ. Situational goal adoption, determined by the situational AGQ-S, was analysed three ways. First, a doubly multivariate analysis was used to determine differences in goal scores between condition. Second, a one-way MANOVA was used to determine differences in subscales scores between dominance groups. Finally, a within-subjects repeated measures ANOVA was used to investigate differences in subscale scores in each instruction conditions. Goal valuation (STVSQ), state anxiety (CSAI-2R) and RT performance were analysed using 2 (dominance) x 2 (instruction) ANOVAs, followed by post hoc analyses (Bonferroni corrected paired sampled *t*-tests) for any main effects.

## 4.3 Results

### 4.3.1 Data Analysis

Data was initially collected for 100 participants. Two participants did not complete all the questionnaire measures and so were excluded from the study. The internal reliability of the STVQS and CSAI-2R was acceptable ($\alpha$'s >.83 and $\alpha$'s >.87 respectively). The AGQ-S showed good internal reliability to examine domain dominance ($\alpha$'s > .83) along with good reliability in each instruction condition ($\alpha$'s >.81).

Domain dominant achievement goals (DDAG) were calculated for $n = 98$ participants using the domain AGQ-S scores in the equation:

*Dominance = performance dominance – mastery dominance*.

In total the sample contained, $n = 60$ mastery, $n = 29$ performance and $n = 9$ equal dominant participants. The 9 participants with equal dominance were removed as this indicates no goal dominance, N = 89. Dominance scores were normally distributed $W(189) = .986$, $p = .440$ $M = -4.35$, $SD = 8.59$, skewness = -.223.

Participants were examined for outliers using the score difference variable calculated using the equation:

*Score difference = performance condition reaction time - mastery condition reaction time.*

Outliers were determined by the score difference being 1.5 x the interquartile range above the 3rd quartile (2.51 seconds) or below the 1st quartile (-8.24 seconds). Eight participants were highlighted for removal, N = 81: $n = 53$ mastery dominant, $n = 28$ performance dominant. The means and SDs for each variable by instruction condition measure can be seen in the correlation matrix in Table 4.1. The matrix shows both performance and mastery situational MAp goals were the only goals to be significantly positively correlated to task performance. Further descriptive statistics for each instruction condition measure differentiated by dominance group can be seen in Table 4.2. The average RT scores indicate both dominance groups were faster in the performance condition.

**Table 4.1**

*Correlations and Descriptive Statistics for Study Variables*

| | | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Mastery Dominance | 31.91 | 6.78 | | | | | | | | | | | | | | | | | | |
| 2 | Performance Dominance | 27.51 | 8.85 | .365** | | | | | | | | | | | | | | | | | |
| 3 | TP Mastery IC | 56.94 | 7.88 | -.283* | -.048 | | | | | | | | | | | | | | | | |
| 4 | TP Performance IC | 54.10 | 7.75 | -.266* | -.056 | .957** | | | | | | | | | | | | | | | |
| 5 | Mastery IC situational MAp | 5.85 | 1.01 | .629** | .324** | -.340** | -.315** | (.828) | | | | | | | | | | | | | |
| 6 | Mastery IC situational MAv | 4.97 | 1.50 | .758** | .399** | -.167 | -.108 | .515** | (.804) | | | | | | | | | | | | |
| 7 | Mastery IC situational PAp | 4.38 | 1.73 | .349** | .774** | -.089 | -.084 | .490** | .463** | (.956) | | | | | | | | | | | |
| 8 | Mastery IC situational PAv | 4.49 | 1.81 | .287** | .705** | .125 | .100 | .313** | .463** | .773** | (.935) | | | | | | | | | | |
| 9 | Performance IC situational MAp | 5.88 | 1.07 | .495** | .322** | -.312** | -.319** | .797** | .345** | .400** | .234* | (.821) | | | | | | | | | |
| 10 | Performance IC situational MAv | 4.94 | 1.67 | .682** | .397** | -.151 | -.108 | .417** | .843** | .429** | .451** | .406** | (.937) | | | | | | | | |
| 11 | Performance IC situational PAp | 5.08 | 1.45 | .346** | .722** | -.182 | -.198 | .371** | .399** | .716** | .547** | .422** | .486** | (.899) | | | | | | | |
| 12 | Performance IC situational PAv | 4.90 | 1.71 | .333** | .623** | .103 | .072 | .178 | .423** | .574** | .701** | .219* | .587** | .773** | (.918) | | | | | | |
| 13 | Mastery IC cognitive anxiety | 20.64 | 8.01 | .455** | .381** | -.001 | .020 | .315** | .586** | .408** | .524** | .227* | .579** | .356** | .529** | (.875) | | | | | |
| 14 | Performance IC cognitive anxiety | 20.24 | 6.77 | .351** | .322** | -.207 | -.217 | .432** | .366** | .369** | .294** | .314** | .408** | .374** | .362** | .472** | (.893) | | | | |
| 15 | Mastery IC somatic anxiety | 17.67 | 7.07 | .285* | .191 | -.146 | -.113 | .244* | .366** | .236** | .280* | .082 | .392** | .195 | .285** | .611** | .511** | (.903) | | | |
| 16 | Performane IC somatic anxiety | 18.50 | 8.08 | .172 | .077 | -.206 | -.191 | .192 | .271* | .134 | .183 | .072 | .316** | ,244* | .241* | .477** | .449** | .713** | (.929) | | |
| 17 | Mastery IC value | 5.31 | .86 | .388** | .529** | -.128 | -.100 | .603** | .427** | .651** | .548** | .637** | .456** | .539** | .432** | .484** | .343** | .287** | .126 | (.831) | |
| 18 | Performance IC value | 5.18 | .97 | .210 | .421** | -.188 | -.201 | .528** | .226* | .598** | .438** | .603** | .293** | .597** | .394** | .306** | .526** | .234* | .195 | .738** | (.843) |

*Note:* all outliers have been removed, N = 81; IC = Instruction Condition; TP = Task Performance;
** Correlation is significant at the $p < .01$ level (2-tailed); * Correlation is significant at the $p < .05$ level (2-tailed);
Cronbach's alphas are shown on diagonal.

**Table 4.2**

*Descriptive Statistics for Study Variables Separated by Dominance Group*

| Instruction Condition | Questionnaire Subscale | Mastery Dominance *n* = 53 | | Performance Dominance *n* = 28 | |
|---|---|---|---|---|---|
| | | M | SD | M | SD |
| | | Situational Achievement Goal | | | |
| Mastery | MAp | 5.87 | .98 | 5.73 | 1.26 |
| | MAv | 5.08 | 1.63 | 4.63 | 1.66 |
| | PAp | 4.67 | 1.36 | 5.23 | 1.75 |
| | PAv | 4.53 | 1.76 | 5.38 | 1.49 |
| Performance | MAp | 5.92 | .86 | 5.89 | 1.23 |
| | MAv | 5.15 | 1.40 | 4.67 | 1.74 |
| | PAp | 3.93 | 1.56 | 5.85 | 1.33 |
| | PAv | 4.01 | 1.80 | 5.59 | 1.40 |
| | | STVSQ | | | |
| Mastery | Value | 5.18 | .79 | 5.57 | .95 |
| Performance | Value | 4.98 | .90 | 5.55 | .99 |
| | | CSAI-2R | | | |
| Mastery | Somatic | 17.71 | 5.83 | 17.60 | 9.08 |
| | Cognitive | 20.15 | 7.59 | 21.57 | 8.82 |
| Performance | Somatic | 18.28 | 7.42 | 18.93 | 9.33 |
| | Cognitive | 19.66 | 5.83 | 21.33 | 8.27 |
| | | Game Score | | | |
| Mastery | - | 56.93 | 7.67 | 56.97 | 8.42 |
| Performance | - | 54.44 | 7.37 | 53.46 | 8.51 |

### *4.3.2 Task Instruction Manipulation Check*

To determine the extent to which participants had understood and remembered their given goal in each condition, the free responses from the STVQS, "*please recall the goal you were given*" were examined. Responses were categorised into three groups: mastery referent, performance referent or non-task-specific, based on references to the task aims.

For example, a mastery referent goal would include mention of “improvement” or “beating **my first** score” or specific reference to a previous score or self-improvement, whereas a performance relevant goal would mention "beating others” or getting on the “leader board” or in the “top 5”. Non-task-specific goals would be generic for example saying, “to hit buttons quickly”, “do my best” or “beat my score” with no reference to previous scores, others or self-specific improvement. In the mastery condition over half ($n$ = 49) of participants recalled a mastery referent goal ($n$ = 29 recalled a non-task-referent and $n$ = 3 a performance goal). In the performance condition over half of participants ($n$ = 53) recalled a performance referent goal, ($n$ = 22 a non-task-specific goal and $n$ = 6 a mastery referent goal). Results indicate a moderate level of participant understanding of the specific goal in each condition.

### *4.3.3 Hypothesis 1a: Situational Goal Adoption*

The effect of condition instructions on each AGQ-S subscale score were compared using a doubly multivariate analysis. Multivariate analysis showed significant differences in achievement goals across each instruction condition $F(4, 77) = 7.278$, $p$ <.001, Wilk’s A = .726, $\eta_p^2 = .274$. Pairwise comparison using Bonferroni corrected $t$-tests, revealed significant differences were found between the performance-based goals. The PAp goal was significantly higher ($p < .001$) in the performance condition ($M$ = 4.94) compared to the mastery condition ($M$ = 4.38). Similarly, the PAv goal was also significantly higher ($p$ = .008) in the performance condition ($M$ = 5.08) compared to the mastery condition ($M$ = 4.49). No significant differences were found between the mastery-based goals in either condition (MAp, $p$ = .693; MAv, $p$ = .743), the mean scores can be seen in the correlation table. These results suggest greater performance goal adoption in the performance condition than the mastery condition.

Using a MANOVA, differences in goal scores between dominance groups were examined.

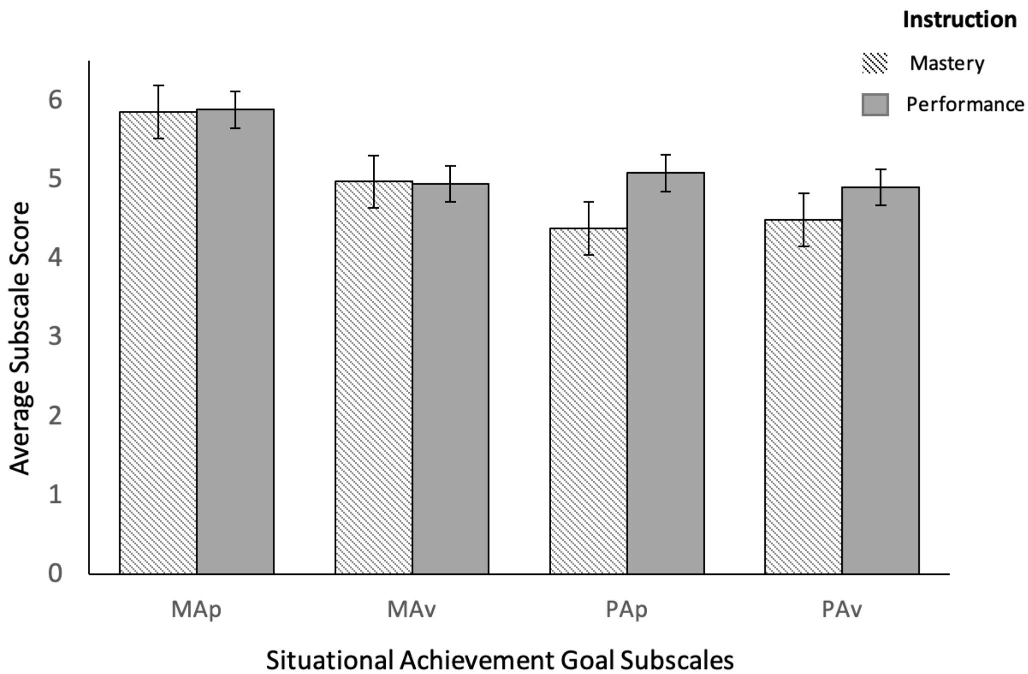
Multivariate tests showed significant differences in subscales between dominance groups: $F(8, 72) = 6.183$, $p < .001$, Wilk's Λ = .593, $\eta_p^2 = .407$. Between subjects univariate tests revealed dominance groups had a significant effect on mastery condition PAp scores ($F(1, 79) = 11.62$, $p = .001$, $\eta_p^2 = .128$) and PAv scores ($F(1, 79) = 11.850$, $p = .001$, $\eta_p^2 = .130$). Performance dominant participants scored higher on both PAp ($M = 5.85$) and PAv ($M = 5.60$) goals in the mastery condition than the mastery dominant participants (PAp, $M = 4.67$; PAv, $M = 5.33$). Dominance groups also had a significant effect on the performance condition PAp scores ($F(1, 79) = 13.83$, $p <.001$, $\eta_p^2 = .149$) and PAv scores ($F(1, 79) = 7.621$, $p = .007$, $\eta_p^2 = .088$), where performance dominant participants scored higher on both goals (PAp, $M = 5.23$; PAv, $M = 5.38$) than mastery dominant participants (PAp, $M = 3.93$; PAv, $M = 4.01$).

Two within-subjects repeated measures ANOVA's, one for each instruction condition with Greenhouse-Geisser correction, identified significant differences between the four achievement goals in the mastery condition $F(2.354, 118.321) = 30.245$, $p < .001$, $\eta_p^2 = .274$ and the performance goal condition $F(2.448, 195.847) = 14.975$, $p <.001$, $\eta_p^2 = .158$. In the mastery condition the MAp goal score ($M = 5.85$) was significantly greater ($p <.001$) than MAv ($M = 4.97$), PAp ($M = 4.38$) and PAv ($tM = 4.49$) goals and the MAv goal score was significantly greater ($p <.001$) than the PAp goal score. In the performance condition, the MAp goal ($M = 5.88$) was significantly greater ($p <.001$) than the MAv ($M = 4.94$), PAp ($M = 5.08$) and PAv ($M = 4.90$) goals.

As the bar chart in Figure 4.3 illustrates, the performance condition elicited higher PAp and PAv scores compared to the mastery condition. The statistical analysis indicated performance dominant individuals had a proclivity to more strongly adopt performance-based goals than their mastery dominant counterparts. Nevertheless, as shown in the figure, the results support that a MAp goal was most strongly adopted in each condition.

**Figure 4.3**

*Comparison of AGQ-S Subscale Scores for Each Task Instruction Condition. Errors bars showing 1+/-S.E.*




### *4.3.4 Hypothesis 1b: Goal Valuation*

A mixed model, repeated measures, ANOVA, 2 (dominance; mastery or performance) x 2 (instruction; mastery or performance), was used to examine goal valuation. There was a medium and statistically significant main effect of dominance $F(1, 79) = 6.246$, $p = .015$, $\eta_p^2 = .073$ which showed performance dominant individuals ($M = 5.56$) placed more value on the instructions they received than their mastery dominant counterparts ($M = 5.08$). The main effect of instruction was small and not statistically significant $F(1, 79) = 2.012$, $p = .160$, $\eta_p^2 = .025$ as was the instruction x dominance interaction $F(1, 79) = 1.382$, $p = .243$, $\eta_p^2 = .017$. The results indicate dominance had an effect on how goals were valued, suggesting performance dominant individuals placed a higher value on their goals.

### 4.3.5 Hypothesis 2: Competitive State Anxiety

Two mixed model repeated measures ANOVAs, 2 (dominance; mastery or performance) x 2 (instruction; mastery or performance), were used to examine somatic and cognitive anxiety. There were no significant instruction effects $F(1, 79) = 1.926$, $p = .169$, $\eta_p^2 = .024$, dominance effects $F(1, 79) = .028$, $p = .868$, $\eta_p^2 <.001$ or interaction effect $F(1, 79) = .310$, $p = .579$, $\eta_p^2 = .004$ for somatic anxiety. There were also no significant effects of instruction $F(1, 79) = .166$, $p = .684$, $\eta_p^2 = .002$, dominance $F(1, 79) = 1.084$, $p = .301$, $\eta_p^2 = .014$ or interaction $F(1, 79) = .019$, $p = .892$, $\eta_p^2 <.001$ for cognitive anxiety. Therefore, task instructions and goal dominance created no differences in levels of competitive state anxiety.

### 4.3.6 Hypothesis 3: Reaction Time Performance

A mixed model repeated measures ANOVA 2 (dominance; mastery or performance) x 2 (instruction; mastery or performance) was used to examine differences in participant RT between conditions. There was a large and statistically significant main effect of instruction $F(1, 79) = 128.698$, $p <.001$, $\eta_p^2 = .620$, such that RT was significantly faster in the performance condition ($M = 54.10$ seconds) compared to the mastery condition ($M = 56.94$). The main effect of dominance was small and not statistically significant $F(1, 79) = .065$, $p = .799$, $\eta_p^2 =.001$. The instruction x dominance interaction had a medium effect size but just failed to reach statistical significance $F(1, 79) = 3.684$, $p = .059$, $\eta_p^2 = .045$.

## 4.4 Discussion

The current study replicated and extended the investigation from Chapter 3b using a more ecologically valid and meaningful task. It considered the extended relationships between internal (domain dominant goals) and external (imposed situational) goal structures and personal or adopted situational goals raised in Chapter 3b and the effect of these relationships on RT performance, state anxiety and goal valuation. Two similarities to previous findings are important to highlight. First, that over 90% of the total sample population had a dominant domain achievement goal. This supports Van Yperen's (2006) early hypotheses, in which over 85% of participants were posited to hold a domain dominant goal, and is aligned with findings of Chapters 2, 3a, and 3b. Of these, over half the participants were mastery dominant, consistent with previous domain dominant goal distributions (Chapter 3a, and 3b). Second, situational goal adoption results were similar to those found in Chapter 3b and Benita et al. (2017), particularly with regards to participants' indication of greater MAp goal adoption via the AGQ-S in both conditions. Despite these similarities a number of notable unexpected findings emerged.

Similar to Chapter 3a, there were no differences in levels of state anxiety. So, unlike Chapter 3b, it cannot be suggested that participants in either group found one condition more cognitively or somatically evoking than the other. Further differences also emerged in ratings of goal valuation with performance dominant participants showing higher value towards the imposed goals in both condition. Finally, and most curious considering previous findings, were the RT performance results: Only in the PAp condition, regardless of dominance, was task performance faster. The results from the investigation of the three main hypotheses suggest the conclusions drawn in previous chapters about the effects of valuation and influence of state anxiety on task performance will need to be re-examined. The following sections will discuss the findings, their relationship to one another (e.g., how level of goal valuation may relate to levels of state anxiety) and plausible role in influencing participants' RT performance.

### *4.4.1 Situational Goal Adoption and Goal Valuation*

The saliency of imposed achievement goals was examined through participants' responses to the first question of the STVSQ. This manipulation check showed goal recall between instruction conditions (60-65% mastery and performance goal conditions respectively) was more equal than in Chapter 3b (65% accuracy in the mastery condition, and 74.4% accuracy in the performance condition) and greater in the performance condition than Chapter 3a (51% accuracy). This balanced recall suggests the PAp goal instructions were as salient to participants as the MAp goal instructions. The performance dominant participants rated the value placed on both MAp and PAp goals higher than those in the mastery dominant group, arguably another demonstration of goal saliency. But within-condition examination of the AGQ-S subscale scores revealed that overall participants adopted a MAp goal in both task conditions. Therefore, it is reasonable to suggest situational goal adoption and its relationship to the valuation of the imposed goals is more complex than initially thought.

The performance dominant group adopted a situational MAp goal for the task (like the mastery dominant participants). But they also showed a strong alignment towards PAp and PAv situational goal adoption in each condition (also seen in Van Yperen, 2006), according to the scores on the AGQ-S subscales. The stronger proclivity towards the performance-based goals suggests the performance dominant group interpreted the task instructions as supporting, to a degree, their normative-based internal cognitive schema. The support of their schema may account for the performance dominant group's higher valuation of the imposed goals in both the MAp and PAp conditions, in line with regulatory fit theory (Higgins, 2000). However, the imposed goal and, on average, adopted MAp goals in the MAp condition aligned with the mastery dominant participants' achievement-based schemas. Yet there was no evidence of a mastery dominant group proclivity to mastery-based goals or greater goal valuation in the mastery condition. This finding would appear to then counter the support for the regulatory fit theory: When the goals an individual pursues align (or fit) with their personal beliefs (regulatory orientation) they are thought to value the goal more (Higgins, 2005). Higher goal valuation is also thought to be linked to higher task engagement, which can otherwise be viewed as task effort. In previous research goal valuation has been linked to increases in in-task effort. For example, PAp goals were found to be more valued in competition contexts which also corresponded with increases in effort during competitions (Biddle et al., 2003; van de Pol & Kavussanu, 2011). This expected correspondence between value and effort in competition contexts may, arguably, be demonstrated in faster RT in the performance condition. However, unlike in Chapter 3b, there was no improvement in performance dominant participants' RT in the PAp condition; this group's higher goal valuation did not translate into performance facilitative efforts.

### *4.4.2 Goal Valuation, Effort and Task Performance*

In their work, Attali and Areili-Attali (2015) found that game conditions with extrinsic motivators, such as rewards points, led to higher reports of task effort then conditions with no reward. In the PAp goal condition, the opportunity to place on the leader board was an extrinsic motivator. However, reports of goal value, interpreted as a reflection of effort, were equivalent in the MAp (no reward) and PAp (reward) conditions. The fact goal valuation in the PAp condition was rated higher by performance dominant participants may allude to the leader board creating a more meaningful task. Further evidence of an increase in effort is the faster RT in the PAp condition. One may assume more effort equals better task performance, and less effort equals poorer performance. In this sense, it is then possible that the leader board (an extrinsic motivator) did incite an increase in effort in the PAp condition but that this effort was only reported prior to the task by the performance dominant participants. Even though it may be suggested that RT in the PAp condition was a reflection of a positive effort-performance relationship outcome, it is an assumption made with caution as effort and performance outcomes are not always positively correlated (Eysenck et al., 2007; Nebel et al., 2017; Seifriz et al., 1992).

The RT performance and goal valuation results suggest there may have been unseen discrepancies between pre-task effort and in-task effort expenditure. These discrepancies could be interpreted in a number of ways. For example, if there was in increase in effort mid task, which participants did not anticipate they would give, it would not be reported before starting the task. Moreover, the discrepancy in effort could be due to an influence of social desirability. If participants did not want to seem too competitive (e.g., DiMenichi and Tricomi, 2015, found people viewed being overly competitive as a negative trait in others) or they did not want to be seen as needing to put in effort in order to succeed (e.g., people can view needing to put effort into a task as a sign of lesser ability, [Nicholls, 1984]), they may have reported lower levels of intended effort. This is more likely from the mastery dominant group who did not show increases in goal valuation. Finally, it may have been the type of congruency relationship between the three achievement goals (domain, imposed situational and adopted situational goal), among other factors, that that influenced the amount of effort expended in the task and consequently resulted in faster RTs in the PAp goal condition.

### *4.4.3 Factors Influencing Reaction Time*

Fastest RTs were facilitated in what could arguably be a partial adopted congruent goal condition. In this condition the domain and adopted situational achievement goals are congruent with one another but incongruent to the imposed situational goal. Reaction times were significantly faster in the PAp imposed situational goal condition. In this condition the imposed PAp goal was incongruent to the situational goal participants adopted (on average a MAp goal) and the most dominant domain goal (mastery dominant) for the sample. However, unlike Chapter 3b, where the RT improvements were argued to be a result of partial domain congruency (which also contains an incongruency between adopted and imposed goals), the congruency relationship in the present study was not found with increased levels of state anxiety. It was previously suggested that incongruent adopted and imposed goals may lead to an increase in anxiety which could facilitate RT performance through either, functional interpretation of anxiety (Eynseck et al., 2007; Jamieson, 2017; Moore et al., 2015; Thomas et al., 2009) or an increase in effort in order to minimise aversive feelings and thoughts (Eynseck, 1992). As no such increase in anxiety was found in this study, despite an adopted and imposed goal incongruency, it suggests other mechanisms may have facilitated RT performance.

One factor to consider is attention. Yang et al. (2018) proposed that creating a competitive environment could improve task attention. A method of determining improvements in attention is to compare reaction response times between conditions where a faster RT suggests more attention is given to the task (DiMenichi & Tricomi, 2015). In their investigation of the effects of competition on attention DiMenichi and Tricomi (2015) found that, in tasks requiring physical effort, RTs were faster in a competitive environment (i.e. the PAp goal condition) compared to a self-based task environment (i.e., the MAp goal condition). Therefore, it could be argued that RTs were faster in the PAp goal condition because the competitive environment improved participants' task attention.

A second factor to consider is the type of task, specifically its novelty, time-sensitive nature and lack of consequences. First, the task itself (BATAK style RT) was new to participants. Meira and Fairbrother (2018) found individuals performed better in PAp conditions when motor tasks required learning. As the S.T.A.R.R. machine was a novel motor task, it required a degree of learning for participants. Therefore, the novelty of the task could explain why participants RTs were better in the PAp goal condition. Second, the task was time sensitive. As Stoeber et al. (2009) found, PAp goals were more beneficial for task performance in time sensitive situations. Participants in the present study had to press 72 buttons in as quick a time as possible. Therefore, the instructions in the PAp goal condition may have been more beneficial and resulted in faster RTs because task performance was dependent on speed. Finally, the task had no long-standing implications for participants. As Benita et al. (2017) found, performance-based goals were superior for eliciting better task performance in tasks which were short-term. Achieving MAp goals requires a degree of long-term investment in order to learn, develop and master a skill. However, PAp goals can be fulfilled by simply demonstrating superiority to others in a short space of time. The present study lasted 20 minutes in total and had no implications for participants once all tasks had been completed. As such the PAp goal condition held an instant gratification for participants if they achieved their goal and beat others, which could only be done with fast RTs.

While considering other influential factors which could explain improved RT in the PAp condition, it is necessary to not utterly neglect the effects of anxiety and arousal. Despite showing no direct influence in the present study, state anxiety should still be considered due to the findings in Chapter 3b and the plethora of studies demonstrating the effects of anxiety on task performance (e.g., Eysenck et al., 2007; Fazey & Hardy, 1988; Hanin, 1980; Nien & Duda, 2008; Spielberger et al., 1970, to name a few). Levels of anxiety have been shown to influence an individual's level of arousal, a positive interpretation of somatic anxiety, which in turn can affect factors shown to have a direct influence on task performance, such as attention. The lack of anxiety differences compared to previous investigations examining achievement goals and task environments in relation to pre-task anxiety suggest a there may be some limitations with the present study.

### *4.4.4 Limitations: Consequences for Results Interpretation and Future Improvements*

The first limitation to consider is the interpretation of participants' in-task effort. Participants were asked, prior to each task, to report the level of effort they intended to expend. This was interpreted through the goal valuation measure. Increases in effort were only reported by the performance dominant group yet there were no corresponding RT effects associated with that group. Rather, results indicated participants, on average, put more effort in the PAp goal condition (as indexed by faster RTs). If, however, at the end of the experiment, participants reported which condition they thought they put more effort into, it could allow experimenters to generate a more accurate model of the relationship between effort and task performance: A model that does not assume better task performance always coincides with more in-task effort.

A second limitation is the examination of state anxiety. Asking participants to complete questionnaires that examine not only the intensity but participants' interpretation of anxiety may have been useful (e.g., interpretation version of CSAI-2). Individual interpretation of anxiety can explain more variance in participants' task performance. Swain and Jones (1996) showed this when examination of basketball players interpretation of cognitive anxiety predicted more of the variance in match performance then the CSAI-2's (Martens et al., 1990) measure of the intensity of anxiety symptoms. One measure which examines individuals' interpretation of cognitive anxiety that can be used during performance and therefore represent how anxiety symptoms and their interpretation fluctuate mid-task (Butt et al., 2003) is the

Immediate Anxiety Measurement Scale (IAMS: Thomas et al., 2002). Measures such as the IAMs could help researchers draw conclusions as to why (was it the interpretation?), when (at what point during the task?) and for whom (which participants?), differences in anxiety can facilitate task performance.

### *4.4.5 Conclusion*

The present study embedded methodological improvements on previous chapters with regards to task instructions, task validity, and recording of dependent variables. Though the findings were different to those in Chapter 3b they still provided an insight into the relationship between goal structures: internal domain goals and external imposed situational goals, and their influence on personal adopted situational goals. The results reinforced the notion that there are three factors to consider when determining the alignment of an individual's standards of competence for a task. In particular, the findings stress the importance of considering the difference between the imposed achievement goals and those that participants actually adopt. The study supports more recent literature concerning the facilitative effects of PAp imposed environments on specific time and motor-skill based tasks, but indicates further exploration is required to fully understand the intertwined mechanisms (e.g., state anxiety, goal valuation, motivational imposed climates) that play a role in achievement goals' relationship to motor performance, specifically RT.

# Chapter 5

Discussion

## 5.1 Overview

Guided by the 2x2 achievement goal model (Elliot & Murayama, 2008) and the interaction effect model (Murayama & Elliot, 2009) the current thesis addressed a key research question: How do imposed approach goals interact with domain goals to affect motor performance? Following a methodological review which revealed limited person-oriented studies investigating the effects of internal goal structures on performance, four empirical studies were conducted. These studies examined the interaction between domain and situational achievement goals on task performance and moderators of performance such as goal valuation and state anxiety. Particular attention was given to the differences between imposed and adopted situational goals (Darnon et al., 2012). Supported by previous research (e.g., Darnon et al., 2012; Granero-Gallegos et al., 2017; Trenz & Zusho, 2011; Warburton, 2017), a goal congruency relationship was hypothesised whereby task performance would be better in goal congruent compared to goal incongruent conditions. The following discussion will begin by presenting the key findings. The implications of these for the thesis' key research question concerning the interaction model and goal congruency are then considered. Methodological, terminological considerations and limitations will also be reviewed, including the contribution of this work to the wider research field.

## 5.2 Key Findings

Chapter 2, a methodological pilot using a within-between subject design, highlighted several methodological limitations that would need to be addressed if the design was to be used in future studies investigating the effects of domain and situational goal congruency. These included: refining and streamlining the method of sample collection (e.g., modifying the use of the DDAG to select participants, adapting the study to avoid the use of sample recall, and decreasing the temporal separation between task conditions); the modification of task instructions to capture, more accurately, the theoretical essence of mastery and performance-approach goals, and the use of consistent terminology throughout all research tools (e.g., task instructions and questionnaires). The study also suggested the presence of a performance-modifying interaction between domain and situational performance goals. The exploration of this interaction formed the basis of subsequent studies. Despite the failure to observe significant effects on task performance or moderators of performance in Chapter 3a, the study did identify further methodological limitations that may have contributed to the absence of significant findings. One such limitation was the use of a discreet unit of performance compared to a scale measurement (e.g, button presses vs time) used in Chapter 2. A second limitation, though much improved from Chapter 2, was that the mastery task instructions may have remained insufficiently aligned with their theoretical conceptualisation affecting the inducement of situational goals. Chapter 3b, implementing the changes suggested in Chapter 2 and Chapter 3a, found a significant reaction time (RT) enhancement as a result of congruent performance goals. This chapter also demonstrated an increase in state anxiety in the performance-approach condition. Chapter 4 increased the demands from a computer-based to a more physically demanding task. This chapter found no congruency interaction effects for key outcome variables. But found RT performance was significantly better in the performance-approach condition. In the latter two chapters differences were also seen in goal valuation. In Chapter 3b valuation was found to be higher in the mastery compared to the performance condition while in Chapter 4 the performance dominant group reported valuing the imposed goals more. On initial examination the pattern of findings across studies suggests the performance-approach goal condition may be the most beneficial to motor performance. However, this claim requires further examination, with the first focus here on the interaction of domain and situational achievement goals as internal and external goal structures.

## 5.3 The Interaction Between Domain and Situational Achievement Goals

The relationship between personal and situational achievement goals has been investigated by a number of models in the achievement goal literature (Dweck, 1986; Dweck & Leggett, 1988; Jagacinski et al., 2001; Papaioannou et al., 2004; Treasure & Robert, 1995). However, these models, predominantly grounded in the work of Nicholls, investigated only dispositional achievement goals and external goal structures (e.g., components of motivational climate) and not necessarily together. Grounded in Elliot's achievement goal framework the interaction model, proffered by Murayama and Elliot (2009), was used as the framework in this thesis to simultaneously investigate internal goal structures (domain goals), personal goals (defined as adopted situational goals) and external goal structures (motivational climates) and the effect of their relationship on three outcomes variables.

One key variable in this thesis was task performance. An interaction effect of domain dominance and imposed situational goals on RT performance was identified and replicated (Chapters 2 and 3b). In both these studies, performance dominant individuals performed better in the performance goal condition. In Chapter 4, there was a significant effect of performance goals. Collectively, these findings suggest there is an effect of performance goals on RT, which can be dependent on the domain dominant goal of the participant. This result is similar to Meira and Fairbrother's (2018) findings, in which novel motor skill performance was better for performance goal-oriented individuals in performance-approach climates. The performance goal-based findings support claims that when situational and domain goals are congruent, tangible aims are made stronger and more precise (Han, 2016; Kaplan & Maehr, 2007). A precision which, in turn, moderates achievement outcomes because of a suggested increase in goal strength. In other words, in the performance condition, an individual's predetermined contextual goal demonstrated a positive indirect influence on task behaviour through a direct alignment with the imposed situational goal (Elliot & Church, 1997; Payne et al., 2007). However, in some studies such as Kim et al.'s maze task (2021), the interaction between performance goals and performance climates has been found to be detrimental to task performance. Rather than performing the task faster, as found in Chapters 2's memory task and 3b's reaction tapping task, participants were slower to complete the maze task. If this contrary finding has been the case in other studies, why then was RT better with performance goal interactions in some empirical chapters in this thesis? To answer this, one must look at the other variables that were investigated. Variables that could be affected by the domain-situational goal interaction which, in turn, could be used to explain the mechanisms that influence task performance (Darnon et al., 2009; Murayama & Elliot, 2009). One such variable was the adopted situational goal.

### *5.3.1 Adopted vs Imposed Situational Goals*

It has been indicated throughout this thesis that goals in a situation can come in two forms: goals that are imposed, and those that are adopted. The adoption of achievement goals in this thesis was examined by responses to the situational based Achievement Goal Questionnaire - Revised (AGQ-R; Elliot & Murayama, 2008) or Achievement Goal Questionnaire-Sport (AGQ-S; Conroy et al., 2003). In Chapters 3a, 3b and 4, the mastery-approach goal was the strongest adopted goal in the mastery condition. In Chapter 2 the performance approach-goal score was significantly higher than other goals in the performance-approach condition. This supports previous research showing performance-based climates were positively related to performance-approach goals and mastery climates to mastery-based goals (Darnon et al., 2012; Granero-Gallegos et al., 2017; Trenz & Zusho, 2011; Warburton, 2017). For example, as in Cumming et al. (2008) and Smoll et al. (2007), athletes coached by a style promoting normative comparison and competition endorsed situational goals which reflected competition and normative comparison: performance-based goals.

Initially these results may suggest an automatic adoption of imposed goals. However, theoretical research, such as the interactionist perspective (or studies investigating the interaction of dispositional goals and situational goals, Dweck & Leggett, 1988; Roberts et al., 2007; Treasure & Roberts, 1995) or models such as Murayama and Elliot's (2009), has suggested goal adoption is a result of an interaction between goals promoted in the motivational climate (or other external goal structures) and an individual's goals (personal goals or internal goal structures e.g., domain goals). Though inadequately examined in empirical studies there is experimental evidence supporting interactionist perspectives where goal adoption is not a direct reflection of goals imposed by external goal structures (e.g., Darnon et al., 2009). One such example includes the studies in this thesis. The studies uniquely examined the interaction of external (situational goals) and internal (domain goals) goal structures and demonstrated the influence of one's internal goal structures (or goal for the domain) on goal adoption is more profound when the adopted goal is incongruent with the goal imposed by external goal structures such as task instructions. For example, in Chapters 3a, 3b and 4, mastery-approach goals were found to be the most strongly adopted goal in the performance-approach goal condition. Had the adopted goal been influenced by the imposed goal alone, the strongest adopted goal in the performance condition would have been performance-approach. These results therefore suggest that the goals the individuals adopted in the task were likely moderated by additional factors such as their internal goal structures, consistent with interaction based theories. This is because internal goal structures, if particularly strong (Roberts et al., 1997), can influence the perception of environmental goal structures (Roeser et al., 1996), and consequently affect the situational, or personal, goals an individual adopts. Therefore, it could be argued those with stronger internal goal structures are more resistant to adopting different goals presented by external goal climates.

Evidence of this can be seen in Darnon et al.'s (2009) academic based study. The authors found that although teachers aimed to encourage mastery-approach goals, students reported adopting performance-approach goals as they believed them to be better indicators of success. This finding supports that the interaction of goal structures can not only affect performance as a behavioural outcome, but the influential antecedent factors of such behavioural outcomes: adopted situational/personal goals (Murayama & Elliot, 2009). Further examining Darnon et al.'s example, where students adopted performance-approach goals irrespective of a mastery-approach goal climate, it could be argued performance-approach goals were the domain goals for these students. In that case the adopted goal reflected individuals' internal goal structure, the performance domain goal. These ideas were supported by findings in Chapter 3b and 4 in two ways. First, the performance dominant participants' strongest situational achievement goal being the performance-approach goal: Not only in the performance condition but also the mastery condition. Second, participants' adoption of mastery-approach goals as the most strongly adopted goal in the performance condition when excluding dominance groups.

Examining the subtleties and direction of goal preference it can also be seen that the performance goal condition did elicit a slight preference for stronger performance-approach goal adoption in Chapters 3a, 3b and 4. The difference in goal adoption between conditions (e.g., the performance condition performance-approach goal adopted compared to the mastery condition performance-approach goal adoption) showed that performance goals were adopted greater in the performance condition compared to the mastery condition. In Chapter 3b the same relationship can be seen for mastery-approach goals in the mastery condition, though this difference did not reach statistical significance. These findings provide further tentative support for the notion that imposed goals are not always the goal adopted and that alternative factors, such as internal goal structures, can impact achievement goal adoption. Following this line of argument about the influence of internal goal structures, the identification of stronger mastery-approach goal adoption compared to other goals in all conditions is consistent with stronger mastery domain goal adoption in the sample. In all experiments, over half of the sample had a mastery domain goal. Therefore, it is not surprising, given the previous arguments of internal goal structure's influence, that mastery-approach goals were most strongly adopted in each goal condition. The findings discussed here lead to another relationship that has been considered during the empirical chapters while examining the interaction framework, goal congruency.

### *5.3.2 Goal Congruency*

To investigate the interaction model a two-factor congruency relationship was proposed, between domain and situational imposed achievement goals. When examining the difference between adopted and imposed situational goals, this two-factor consideration was extended to also include adopted situational goals. In Chapter 3b, three types of goal congruency relationships were proposed. First *total goal congruency*: All three goal types align and are **congruent** (e.g., in Chapter 3b the performance dominant group in the performance-approach condition had greater performance-approach goal adoption than in the mastery condition). Second, *partial domain congruency*: Domain and imposed goals are **congruent** but **incongruent** to the adopted situational goal (e.g., Chapters 3a, 3b and 4 where mastery-approach goals were adopted to a significantly greater degree overall compared to other goals even by performance dominant individuals in the performance-approach goal condition). Finally, *partial adopted congruency*: Domain and adopted situational goals are **congruent** but **incongruent** to the imposed situational achievement goal (e.g., as in Chapter 4, where the performance dominant group showed a significantly stronger proclivity towards performance-approach goal adoption in the mastery-approach condition). These relationships were initially proffered to account for the perceptions of the causes of increased state anxiety in the performance condition in Chapter 3b. They were based on the notion that internal conflict surrounding an individual's valuation of standards of competence could lead to an increase in anxiety (Eysenck, 1992). The models are also based on arguments given here, and throughout the thesis that domain goals may, in a sense, override the influence of imposed situational goals. However, one must also consider the congruency between imposed and adopted situational goals. Thus, I also wish to explore *partial imposed congruency*: When imposed and adopted goals are **congruent** but **incongruent** to the dominant domain achievement goal. This is because in some empirical studies the convention of the imposed goal being assumed to be the adopted goal, irrespective of the domain goal, is seen (e.g., Darnon et al., 2012; Granero-Gallegos et al., 2017; Van Yperen et al., 2011). In other studies, like Chapter 2, this direct reflection is not assumed as domain goals are considered and adopted goals are separately investigated through questionnaire methods, but the adopted goal still reflects the imposed goal.

The goal congruency relationship was also suggested to explain task performance. Specifically, it was hypothesised that task performance would be better in goal congruent compared to goal incongruent conditions. There was mixed support for this proposition across studies in the thesis; in Chapter's 2 and 3b the RT improvements were found in a partial domain congruent condition. Specifically, the performance dominant group in the performance-approach condition. For RT performance in Chapter 4, a congruency relationship could not be easily established. No domain goal effects were found, and the adopted situational goal was incongruent to the imposed goal for the improved RT found in the performance condition. This suggests the congruency hypothesis may not account for all task performance outcomes. However, goal congruency has not just been posited to impact task performance and situational goal adoption but, as Higgin's regulatory fit theory suggests (Higgins, 2000), goal valuation.

Regulatory fit theory (Higgins, 2000) posits that when someone believes there is a 'fit' of motivational orientation they will be more engaged (e.g., willing to put in more effort) and value the goal more (e.g., find it more important, Higgins, 2005). However, the results of goal valuation analysis, found in the Chapter's 3b and 4 did not support regulatory fit theory's hypothesis. Should the hypothesis have been supported, the performance dominant group would have shown an increase is goal valuation scores in the performance-approach condition, and the mastery dominant group an increase in the mastery-approach condition. Intriguingly, Chapter 3b revealed mastery condition goals were rated higher than performance goals and Chapter 4 showed higher valuation scores for the performance dominant group in both goal conditions. For Chapter 3b it could be argued that, although there was no statistical domain goal influence, 72% of the sample held a mastery domain dominant goal. Therefore, there was a degree of goal alignment, in a partial imposed congruency relationship, as the mastery-approach goal was the significantly adopted dominant situational goal in the mastery condition. Nevertheless, this "fit" in the mastery condition leading to increased value in achieving the task aims, did not transpire into physical performance benefits. Therefore, interpreting these findings is somewhat challenging. In some cases, it has been shown that effort and performance outcomes are not always positively correlated (Eysenck et al., 2007; Nebel et al., 2017; Seifriz et al., 1992). The absence of performance benefits then poses the question of whether increased goal value translates to an increase in performance facilitating effort. In other words, does the increase in goal value affect the goal's meaningfulness to the extent task performance can be improved. To answer this, I will revert to considering the overarching key research question of the thesis, that is, how do imposed approach goals interact with domain goals to affect motor performance?

## 5.4 Approach-Based Goals: Which is Better?

One way to answer the main research question, *How do imposed approach goals interact with domain goals to affect motor performance?* is to consider which of the imposed goals is more facilitative for motor performance. To do this efficiently to answer the broader research question and to interpret the real-world application of findings, it was deemed necessary to consider the impact goals have on other variables, which have been shown to impact task performance. These variables included state anxiety and goal valuation. This section of the discussion will begin by examining performance-approach goals, as this goal is found to have significant relationships with RT performance and state anxiety.

### *5.4.1 Imposing Performance-Approach Goals*

The results of Chapters 3, 3b and 4 indicate task performance was better in the performance condition, where instructions focused on performing better than others. While Chapters 2 and 3b supported this with an interaction with performance dominant domain goals, the results ultimately show the positive effects on behaviour happened in the performance goal condition. The findings support results from Stoeber et al. (2009) who found specific performance-approach goals were more beneficial for performance in time sensitive situations such as races (e.g., triathlons) where performance was judged on time. Therefore, one could argue the performance-approach benefits were because task performance, and as such valuations of competence, were determined by one's demonstration of skill against time. However, the goal instructions given to participants in this thesis' empirical chapters emphasised other-based referents of competence, in line with the standards 2x2 model of achievement goals. As time appears to be a contributing factor to the improved task performance it may suggest that participants interpreted the requirements of the task as necessitating demonstration of competence over beating others alone. Therefore, when given the performance condition instructions, the combination of both standards and standpoint referents of competence may have led to increased goal cementation and consequently improved RT.

Better performance in the performance condition is also consistent with results found by Meira and Fairbrother (2018). The authors saw better learning of a novel stabilometer motor skill balance task in performance-approach climates. These findings suggest performance-approach goals facilitate performance in tasks where the motor skill is novel, particularly when considering Chapter 4's use of the BATAK task. A novel task chosen so that performance differences could be attributed to instruction manipulation rather than participants' experience. Finally, the improvement in the performance condition could be attributed to the use of the external motivator. In the performance condition the extrinsic reward was the leader board. In later studies, particularly Chapter 4, participants were given the reward of writing their own name on the leader board. Previous studies in non-human primates (Mir et al., 2011) and those examining spatial location and rewards (Dunne et al., 2015; Milstein & Dorris, 2007; Takikawa et al., 2002; Wang et al., 2013) have found external motivators to be a facilitator of RT. Therefore, it could be the use of the reward in the performance condition that led to RT improvement. This suggests performance-approach goals are facilitative in conditions offering a reward to participants beyond intrinsic success or accomplishment of achieving such as claiming World Championships titles or sponsorship deals for winning at the Olympics.

However, the performance condition benefits were found in contradiction to some previous findings. For example, findings in Van Yperen et al.'s (2015) meta-analysis and Kim et al. (2021), where only students in the performance goal structure showed decreased performance (increased time to solve the maze). These studies suggested time pressure and normative comparison could undermine task performance by shifting the individual's attention away from the task (e.g., Sarason et al., 1986). Van Yperen et al. (2015) initially posited that laboratory experiments struggled to show the same performance benefits in the performance condition as those conducted in field studies. Van Yperen and colleagues suggested this may be because in experimental research the imposed goal is assumed to be the situationally dominant achievement goal, while in field studies individuals are more likely to be asked to indicate their dominant goal. Field studies accounting for dominant goal adoption may reveal different performance goal benefits not seen in laboratory experiments. Senko (2019, p.2) also reasoned performance goal differences between laboratory and field studies may be because experimental conditions "typically deploy the appearance type of performance goal". This may account for the possible contradiction in performance goal findings. The appearance type of goal differs from a normative goal in that the first focuses on demonstration of competence and the latter on standards (reference based on others) of competence. The laboratory-style studies in this thesis employed the standards of competence framework, thus focusing on normative goals through task instructions. Nevertheless, as noted earlier with regards to the time component of the RT task, participant interpretation of the task requirements may have been focused on the demonstration of competence. The studies in this thesis also assessed participant's reported dominant goals, both for the domain and the situationally adopted goals, allowing for easier comparison between field and laboratory research as requested for by Van Yperen et al. (2015). Using this method, the present experimental chapters found performance benefits in the performance condition, like in many field studies. However, further comparisons would need to be made to discern whether this addition can resolve the conflict between laboratory and field study findings.

The examination of domain dominant goals implies the performance-approach condition boosted the benefits of personal performance goals in time sensitive motor tasks. Interestingly, this conclusion differs to the one drawn by Senko (2019) where a context hypothesis was considered. The hypothesis proposes "that each goal's benefits emerge only when the broader context supports the goal" (Senko, 2019, p.10). In this sense the improvement in RT in a partial domain congruent condition in Chapters 3 and 4b acts as evidence for previous congruency-based hypotheses. However, Senko (2019) concluded 65 tests (on various outcome variables) found in 13 studies contradicted the hypothesis generated by the context framework. He stated no studies found performance goal benefits to be boosted in normative conditions. Therefore, additional mechanisms, also affected by goal congruent relationships, may explain the RT improvement for the performance dominant individuals in the performance-approach condition. For example, Attali and Areili-Attali (2015) found that game conditions with extrinsic motivators, such as reward points, led to higher reports of task effort than conditions with no reward. As such mechanisms of goal valuation (related to effort) and state anxiety, the additional outcome variables investigated in this thesis, must be considered when determining not just if performance-approach goals are the most beneficial, but *why*, in order to answer the broader question of how imposed and domain goals interaction to affect performance.

### *5.4.2 The Contribution of State Anxiety and Goal Valuation to Performance-Approach Goal Benefits*

In some cases, participants are believed to put more effort into completing the task in order to "minimize [the] aversive state anxiety" (Eynseck et al., 2007, p.337) as a result of perceived 'threat'. Evidence of this may be seen in Chapter 3b as increases in cognitive and somatic anxiety were found in the performance condition which was also the condition with better RT performance. This positive performance-anxiety relationship may be due to the interpretation of anxiety-based autonomic symptoms as excitement (Brooks, 2014) in the performance goal condition. For example, cognitive and somatic symptoms have been reported as facilitative by competitive swimmers (Jones & Hanton, 1996), while the performance goal condition has been related to higher levels of pre-competition excitement (Dewar et al., 2013). Reaction time improvement may also be due to the increase in arousal promoted by feelings of ‘threat’ in competitive contexts (e.g., Luft et al., 2009, concluded RT tends to be faster after an increase in arousal). However, there are findings that suggest performance-approach goals have been detrimental for test anxiety (Linnenbrink, 2005) and in turn outcome performance (Delavar et al., 2011; Wang et al., 2004). While the results of Chapter 3b may suggest that state-anxiety induced by the performance-approach condition facilitated RT performance, the absence of this finding within the other chapters of the thesis indicates more research is needed to explore the positive performance-anxiety relationship.

The anxiety findings in Chapter 3b may also suggest that improved RT in the performance condition could be related to an increase in auxiliary processing (Eynseck et al., 2007). The increased resources are devoted to processing and increasing effort as a coping mechanism (Mahoney & Avener, 1977; Hagan et al., 2017) in order to reduce worry which arises as a result of increased anxiety (a negative interpretation of somatic anxiety: Hall & Kerr, 1997). As such, according to processing efficiency theory (PET; Eynseck & Calvo, 1992), worry can increase motivation to reduce negative feelings that arise in stressful situations. The increase in motivation can lead to enhanced effort, thus providing an alternative link between RT performance and increased state anxiety. However, whether facilitated performance because of an increase in state anxiety in the performance condition was the result of an increase in effort should be considered pragmatically. One may wish to assume that more effort would equal better task performance and less effort would equal poorer task performance. However, effort and performance outcomes are not always positively correlated (Eysenck et al., 2007; Nebel et al., 2017; Seifriz et al., 1992). A key tenant of Nicholls’ achievement goal framework even centres on the differentiation of effort and ability. As such, considering the complexity of the effort-performance relationship it is necessary to continue to consider additional explanations of the empirical findings.

Another explanation for RT benefits found in the performance goal condition is posited by theorists supporting multiple goal adoption or a multiple goal perspective. Multiple goal adoption suggests that performance-approach goal endorsement is beneficial, when mastery goals are also endorsed (Harackiewicz et al., 2002). In situational goal adoption it is speculated single goals would be adopted for a specific task but the orthogonal relationship of goals (Roberts et al., 2007) would allow for goal switching if the demands of a task changed (Fryer & Elliot, 2007). In Chapter 4, RT performance was found to be better in the performance goal condition. In this condition, the imposition of performance-approach goals was shown to have influenced participants' goal endorsement. Results of the AGQ-S showed participants scored higher on the performance-approach goal subscale in the performance goal condition compared to the mastery condition. The results of the AGQ-S also demonstrated that participants' strongest goal adoption for the performance-approach condition was a mastery-approach goal, interpreted as the goal adopted for the task. Therefore, the improved RT in the performance-approach condition in Chapter 4 may be explained because performance-approach and mastery-approach goals were adopted together. Similar results were also found in Chapter 3a, though with no performance benefits. In Chapter 3b, performance benefits were also seen when performance-approach and mastery-approach goals were adopted together. However, in Chapter 3b the congruency between the imposed goal and domain goal for the performance dominant group could also have contributed to performance benefits as discussed in section 5.3.

Despite the outcome benefits for performance-approach goals being shown in empirical findings (e.g., Benita et al., 2017; Elliot et al., 2006; Stoeber et al., 2009; Senko, et al., 2013;

Van Mierlo & Van Hooft, 2020), including those in the thesis, and multiple goal perspectives, there are theorists who support a mastery goal perspective (Barron & Harackiewicz, 2001). In this perspective, mastery goals are thought to be the most facilitative goals for cognitive and achievement outcomes for all individuals, particularly in education settings (Alrakaf et al., 2014; Kaplan & Middleton, 2002; Midgley et al., 2001, Hulleman & Senko, 2010; Van Yperen et al., 2015). Therefore, considerations of the influence of mastery-approach goals will also be examined.

### *5.4.3 Imposing Mastery-Approach Goals*

The findings of this thesis do not support previous conclusions that mastery goals lead to better performance (Van Yperen et al., 2014). Nor do they support that when aiming to enhance performance outcomes, achievement goal interventions (e.g., in the classroom or sports environment) should focus on promoting only mastery-approach goals (Van Yperen et al., 2015). One point to consider is that the performance benefits found in the performance-approach condition may have been the result of a decrease in performance in the mastery goal condition. Particularly in those studies which showed RT benefits for performance dominant individuals as no such improvement was found for mastery dominant participants. Could it therefore be argued that the imposition of normative standards impaired those with mastery domain goals? As no performance baseline was taken this thought remains speculative as there was no way to determine if performance in the mastery condition declined. One could suggest, as Kavussanu et al. (2009) did, that because of a single post-manipulation trial, participants were not afforded the possibility to fulfil mastery-based aims. The lack of significant findings related to the mastery condition may be because the design of the task itself was not one which afforded a learning opportunity. Therefore, even though participants adopted a mastery-approach goal in the mastery condition, the environment was not conducive to mastery goal fulfilment. An example of this for a mastery goal was seen in Van Yperen et al.'s (2009) study. The authors concluded their lack of performance goal-related findings may have been due to their achievement context promoting intrapersonal standards. Comparing this observation to significant findings for performance goals in the present thesis, it could be possible that the context did not highlight intrapersonal (mastery) standards, but rather interpersonal (performance) standards. Consequently, RT facilitation in the present studies appears to be fuelled by imposed performance-approach goals. Not only because of the alignment with performance dominant individuals but because the task was time-based and aligned more with normative, interpersonal referent standards affording performance goals an environment in which to thrive compared to mastery goals. This conclusion suggests the empirical findings of this thesis may be related to methodological factors of the task prompting environmental constraints on the imposed goals. Such factors will now be considered.

## 5.5 Task Properties and Effects on Imposed Goals

The research in this thesis, thus far, supports Benita et al.'s (2017) deduction that there are specific circumstances under which the relationship of performance-approach goals and improved task performance manifest. However, it would be neglectful to not have considered the implications factors of the task have on such outcome. For example, task length (e.g., Benita et al., 2017) and meaningfulness (Kaplan & Maehr, 2007; Niemvirita et al., 2019) have been shown to play important roles in determining the adoption, and influence of, performance goals in inducing better performance.

### *5.5.1 Task Length and Complexity: Effects on Performance, Goal Valuation and Anxiety*

The performance dominant individuals improved RT in the performance instruction condition may be explained, in part, by the proposal that performance goals are better for performance in short-term tasks (Benita et al., 2017; Le Bouc & Pessiglione, 2013). In short-term tasks participants can receive instant gratification for their performance, obtaining their valuation of competence through task accomplishment sooner rather than later. The performance dominant participants' higher goal valuation scores in both conditions in Chapter 4 support this idea and implies they may have been more inclined to invest mental effort in the task. In contrast, Van Yperen et al. (2009) suggested that in short-term situations, mastery goals may have minimal impact on performance improvements. This could account for the absence of any effects on RT for the mastery dominant participants. Had the task been more long-term, it may have been more meaningful (shown by goal valuation scores) to mastery dominant participants, as they would have the opportunity to show improvement and learning over a period of time. As such the RT tasks in this thesis taking space within 20 minutes, with no long-term requirements, may have contributed to the null effects of mastery goals. Task length may also account for performance dominant participants valuation of mastery goals in Chapter 4.

Along with task length, task complexity may also be a factor. Reaction times have been found to change based upon a number of factors (Konsinski, 2013), including reaction conditions (simple/complex/response: Luce, 1986; Welford, 1980). Some have suggested that when tasks are complex it is better to assign mastery (or learning) goals (Winters & Latham, 1996, from Kanfer et al., 2017). This assignment allows participants to keep critical attentional effort on learning the task not prioritising normative comparison (Kanfer et al., 2017). As such, it may be reasonable to assume that the improved RT in performance conditions was because the RT tasks were relatively simple. Thus, normative comparison fuelled, rather than deteriorated, performance because attentional effort was not taken from learning the task. Additionally, Steele-Johnson et al. (2000) proposed performance-oriented individuals find greater satisfaction on simple tasks, as such tasks provide better opportunity for demonstration of ability. Comparatively, mastery-oriented individuals find greater satisfaction when completing complex tasks, as they can demonstrate progress in their learning and accomplishment. Greater satisfaction on simple tasks for performance dominant individuals can be related to the performance dominant groups report of higher goal valuation across conditions in Chapter 4. The relatively simple RT task provided this group greater affordance to achieve successful normative comparison thereby allowing the individuals to feel satisfied in their achievement leading them to value the goal more. This discussion indicates the task characteristics can contribute to explaining the empirical findings found in this thesis. However, these insights into the effects of task characteristics on empirical findings necessitates the need to consider the methodological design of the studies.

## 5.6 Methodological Considerations and Limitations

The following section will discuss the methods used in this thesis. It will examine some of the methodological choices along with their limitations, any amendments that could have been made and the implications of the choices on research findings.

It was initially identified that very few studies had used a within-subjects design when investigating the effects of imposed goals on participants' state anxiety, goal valuation and task performance. I argued it would be insightful to examine how participants performed in both goal conditions as this would allow investigations to consider if, and or how, imposed goals differentially affected individuals with distinctive domain goals. This line of investigation would also continue down the road of a person-oriented approach within achievement goal research (Niemivirta et al., 2019). In Chapters 2, 3a, 3b and 4 I employed a within-subjects design, whereby each individual participated in both goal conditions. The person-oriented design was broadened as individuals were divided into groups based on their domain goals. By using this design, I was able to determine that imposed achievement goals can affect individuals with mastery and performance domain goals in different ways. For example, in Chapter 2, for an academic based task, it was shown that when performance domain dominant individuals were given mastery goals their memory recall was not as fast as when they were given performance goals. In Chapter 3b, the performance dominant participants scored higher on performance-approach goals in their implicit goal adoption in both the mastery and performance goal conditions. Additionally, in Chapter 4, differences were found between performance dominance groups and levels of goal valuation. Performance dominant participants rated goals as more valuable in both conditions compared to the mastery dominant participants. These findings suggest that considering an individual's domain motivation, an internal goal structure when considering Murayama and Elliot's (2009) interaction model, is important when determining how external goal structures (e.g., factors of motivational climate) can affect not only task performance, but situational goal adoption or goal valuation. The use of the within-subject design also allows one to eliminate internal goal structures as extraneous variables and conclude that a goal effect is due to external goal structures such as imposed achievement goals. For example, in Chapter 3b somatic and cognitive anxiety were higher in the performance condition, and in Chapter 4 RT performance was faster in the performance goal condition. Both findings showed no difference between dominance groups. Therefore, it can be said the performance-imposed goal was responsible for the significant anxiety and RT findings with the influence of person-oriented factors accounted for.

However, one limitation to consider when determining the extent of goal responsibility is that the present studies did not use a control group. It was noted in Chapter 2 that the decision to refrain from using a control group was supported by several studies examining imposed situational goals which also did not use a control group (e.g., Anseel et al., 2011; Elliot et al., 2005; Elliot et al., 2006; Kavussanu et al., 2009; Ntoumanis et al., 2009; Senko et al., 2013). Furthermore, the use of the within-subject design indicated the need for a control group was reduced as participants acted as their own control. Nevertheless, this is not to say the use of a control group would not beneficial to provide a measure of baseline performance from which to draw comparisons between experimental manipulations such as situational goal adoption. Using a control group as baseline may allow researchers to more accurately determine if task instructions led to an improvement in RT or if the improvements were the result of performance detriments in other conditions. To achieve this differentiation a control group could be used in three ways. An equal dominance group, a no goal task instruction or both. Using an equal dominance group would allow researchers to determine how situational goal adoption was influenced without a predetermined degree of goal congruency. This could allow stronger conclusions that the performance-approach task instructions elicited faster RT independent of goal dominance or alternatively could demonstrate that the instruction conditions are most effective when there is an element of domain congruency/incongruency. By using a no goal task instruction participants would take part in three trials: mastery-approach goal, performance-approach goal and no goal conditions.

The third way a control group could be used is a combination of both equal dominance and a no goal task. A control group in this sense could be used to determine the effects on performance when individuals with equal goal dominance are placed in a no goal condition. A control group with no goal dominance in a no goal instruction condition may be less willing to invest the required amount of effort to keep up their performance speed (de Koning et al., 2011; Marcora & Staiano, 2010). This is because there is less meaning to the outcome of the task. For example, it has been suggested that if the outcome of the task has meaning imposed situational achievement goals are more influential (Yeo et al., 2009). If there is no meaning to a task outcome, because a participant has not been given a goal to achieve, it is possible there will be less effort invested in completing the task which could result in poorer task performance. Consistent with this prediction, Barte et al. (2019) found that participants in a motivation group were able to maintain high levels of motivation compared to a control (no motivation) group, despite exhibiting equal levels of fatigue. The authors suggested the motivation and consequently speed performance differences were due to a reduction in perceived effort by the control group. As participants in the control group were less motivated, they were not as willing to maintain investing high levels of effort at the cost of feeling fatigued. Therefore, using a control group in future achievement goal research could be useful to enlighten the importance of the value achievement goals give participants and how that value can translate to performance facilitation.

In terms of the findings and conclusions of the present thesis, future research using a control group may give more context in relation to the endorsement of situational mastery-approach goals in the performance condition. Current conclusions suggested the mastery-approach goal was adopted because it was the dominant domain goal of the majority of individuals in each sample. However, by using a control group researchers may find the adoption of mastery-approach occurred independently of domain or imposed situational goals and in fact was related to the sample population. For example, the present thesis consisted largely of highly motivated university students, who may be more likely to adopted mastery-approach goals for the tasks they are given (e.g., Hall et al., 2015; Midgley et al., 2001). However, if the studies were conducted using only elite level athletes situational goal adoption may reflect a performance-approach goal as this goal is more endorsed in sporting contexts (Šmela et al., 2017). Alternative explanations for goal adoption, including but not limited to those mentioned, may be better explored if researchers include a control group in future investigations. The consideration of the control group and additional task conditions brings us to reflect on the feasibility of participants completing the two tasks in the within-subjects design used in present thesis. The feasibility of this was examined in Chapter 2.

Chapter 2 used a participant recall system for its sample collection, based on participants' domain scores in a two part study. It also had at least one week between each instruction condition. This allowed me to examine participants with the most extreme domain goal scores (to create a clear difference in groups) and to allow for some temporal separation between conditions. However, recalling participants from part one of a study was not as effective as initially hoped. There was a limited participant response resulting in a smaller than desired sample and a degree of participant drop off between conditions, a common cost associated with studies involving long temporal separation (Podsakoff et al., 2012). This demonstrated recall as a method of sample collection, and the temporal separation of a week between conditions, was not suitable for future studies. Therefore, based on the pilot study findings, it was decided all participants' data would be collected in one experimental session in the hope of minimising participant drop off.

However, reducing temporal separation opened the study to other possible methodological biases. One example associated with limited temporal separation is repetition in questionnaire responses (Podsakoff et al., 2003). When participants completed three highly similar questionnaires within twenty minutes it is possible a degree of residual overlap occurred as previous responses did not have long enough to leave participants' short-term memory (Podsakoff et al., 2012). This type of response fatigue may not have been seen if the length between experimental conditions in Chapter 2 had been maintained. However, according to Podsakoff et al. (2012) the ideal length of temporal separation between conditions is difficult to determine. Therefore, while there is reason to argue the limited time frame between conditions may have affected questionnaire responses, there is no set amount of time that would allow one to avoid this methodological limitation.

Continuing with the consideration of the questionnaire responses, it is also necessary to discuss the exact responses and alternative explanations for questionnaire findings. One particular finding of interest is that of the AGQ-S responses for situational goal investigation. In all studies it was found that mastery-approach goals were more strongly adopted across all participants when examining situational goal adoption. One could assume this was because, ultimately, participants found this goal to be the most suitable for the task, despite the performance goal condition. Though it was determined earlier that the task embodied performance goals in numerous ways (task length, normative comparison, time-based task etc.), one must consider if the mastery-approach goal adoption was given because of social desirability. As a society we are often told not to compare ourselves to others. Being competitive is often viewed as a negative trait: DiMenichi and Tricomi (2015) found overt competitiveness was implicitly viewed as a negative quality. As such individuals may have explicitly under-quantified their competitiveness to appear socially desirable, thus accounting for the mastery-approach adoption across conditions. The same assumption could be drawn for the greater goal valuation reported in the mastery condition in Chapter 3b. The greater valuation could represent the psychological meaningfulness of goals to the individuals or, could it be explained by demand characteristics. Did participants believe that they were supposed to value mastery goals (goals which value learning and improvement) over goals embodying competitiveness because of the social desirability implications surrounding performance goals? The possible interpretations of the questionnaire findings lead me to contemplate the accuracy of the questionnaires in representing the characteristics (namely achievement goal adoption and goal valuation) they were used to examine.

### *5.6.1 Evaluating the Questionnaires*

The two questionnaires used in this thesis to examine achievement goal adoption were the AGQ-R (Elliot & Murayama, 2008; Chapters 2) and the AGQ-S (Conroy et al., 2003; Chapter 3a-4). The AGQ-R has been extensively used in educational literature (e.g., Elliot et al., 2017; King & McInerney, 2014; Senko et al., 2013; Senko, 2019) while the AGQ-S has been used extensively in the sport psychology literature (Harwood et al., 2008; Van Yperen et al., 2014). These questionnaires have also been designed around achievement goals conceptualised based on the standards of competence: comparing competence to the task/self and others (master and performance goals respectively). In their review, Van Yperen et al. (2014) found the AGQ-R and AGQ-S had the largest percentage of explicit items specifically referencing standards of competence. This comparison was to the trichotomous AGQ (Elliot  Church, 1997), 2x2 AGQ (Elliot & McGregor, 2001), Task and Ego in Sport Questionnaire (Duda & Nicholls, 1992), Perception of Success Questionnaire developed by Roberts et al. (1998), Patterns of Adaptive Learning Survey (PALS) developed by Midgley's et al. (2000) and the Goal Orientation Scale developed by Button et al. (1996). The AGQ-S and AGQ-R have also shown good internal reliability with all items included (Cook et al., 2017; Conroy et al., 2003; Lower & Turner, 2016). Therefore, these questionnaires were deemed appropriate for use in the investigation of achievement goals based on the standards of competence.

However, it would be remiss not to acknowledge some criticisms, particularly of the AGQ-S. Some researchers would argue the use of AGQ-S was inappropriate as it contained some affective components in the mastery-avoidance item (Darnon et al., 2012; Warburton, 2017). This critique arises because the AGQ-S was based on the AGQ (Elliot & McGregor, 2001) whose shortcomings, outlined by Elliot and Murayama (2008), included the use of affective (emotion based) components. There is also some dispute on the alignment of mastery-avoidance goal in the AGQ-S with its theoretical construct (Elliot & Murayama et al., 2008; Harwood et al., 2008; Hulleman et al., 2010). For example, the use of affective language (e.g., worry), taking the focus of the item away from goals per se; similar to the points raised prior to the adaptation of the AGQ (Elliot & Murayama, 2008). In order to overcome these issues, some researchers such as Warburton (2017) decided to adapt items from the AGQ-R for use in the sport domain rather than use a sport specific measure with theoretical limitations. Other alternatives could be to adapt questionnaires such as the 3x2 AGQ-S (Mascret et al., 2015) for use in a 2x2 framework. The full use of the AGQ-S in the present thesis was deemed appropriate because while avoidance goals were not the primary focus it was deemed important not to exclude them entirely because of the investigation into situational goal adoption.

As investigation of situational goal adoption in empirical studies is limited I adopted the position that it was necessary to investigate the four achievement goals from the 2x2 framework. Indeed, Morris and Kavussanu (2009) showed, using a hierarchical regression analysis, that the addition of approach-avoidance goals was valuable to AGT, enabling examination of whether, and if so the degree to which, avoidance goals were adopted. Including avoidance goals in empirical investigation, despite promoting only approach-only in the task aims, reflected the notion that individuals do not just adopt the goal presented to them in a task. Had only approach goals been examined, the more nuanced relationships between goal dominance and situational goal adoption may have been missed. For example, in Chapter 3a it was found that mastery dominant participants scored higher on mastery-avoidance goals than performance dominant participants. Similar results were found in Chapter 3b along with mastery-avoidance goals being scored higher than performance-approach and performance-avoidance goals in the mastery condition. This finding was replicated in Chapter 4, where performance dominant participants scored higher on performance-avoidance goals, indicating greater proclivity towards the goal, compared to mastery dominant participants. These results demonstrating a degree of avoidance goal adoption support studies which indicated avoidance goal adoption by participants (e.g., Van Yperen, 2006, found 35% of participants adopted an mastery-avoidance goal) and thus the necessity to include avoidance goals in the empirical investigation of situational goal adoption. This is not to say the results do not need to be interpreted with some caution because of the identified limitations with the AGQ-S but it does support the inclusion of all goals in the present thesis. Future studies would endeavour to consider a more reliable measurement to investigate the adoption of 2x2 standpoint goals which also addresses a remaining limitation: The statements used are restrictive. They ask participants about their goals, but participants "may not actually think in terms of goals when they are in achievement settings" (Da Costa, 2015, p.64; for further discussion on questionnaire statements see Da Costa, 2015). This point is further contemplated in the discussion on terminological considerations and limitations.

Another example of questionnaire reliability, particularly relating to the interpretation of results pertains to the Situational Task Value in Sport Questionnaire (STVSQ: Philyaw, 2020). Thus far, assumptions have been made that the greater value assigned to the goal the more meaningful the goal to the individual. However, this was an inference as meaningfulness was not directly assessed. Therefore, we must consider if meaningfulness was accurately represented by the measure of goal valuation. The goal valuation was also used as a representation of participants effort (i.e., the more valued the goal, the more meaningful to the participant resulting in more in task effort). Evaluating participants effort prior to the task only showed how much effort the participants intended to exert during the task. Therefore, assumptions on effort-performance relationships were inferred. For example, one may normally infer that more effort would lead to an increase in performance. From the empirical findings this did not appear to be the case. Chapter 3b showed greater valuation for mastery goals while Chapter 4 demonstrated performance dominant participants had greater valuation for both mastery and performance goals. These increases in goal valuation did not directly correspond to RT effects. For example, in Chapter 3b, the faster RT was in the performance condition. If, rather than evaluating effort prior to the task, participants were asked to report which condition they thought they put more effort into at the end of the experiment, it could allow experimenters to generate more objective models of the relationship between effort and task performance. Models that do not depend on experimenter interpretation that greater goal valuation leads to improved performance because of in-task effort. This suggests allowing participants to interpret their own emotions may be useful to inform empirical interpretations. An example of this approach was applied by Swain and Jones (1996). The authors found examination of basketball players interpretation of cognitive anxiety predicted more of the variance of in-match performance then the CSAI-2's (Martens et al., 1990) measure of the intensity of anxiety symptoms.

One measure which examines individual's interpretation of cognitive anxiety that can be used during performance is the Immediate Anxiety Measurement Scale (IAMS: Thomas et al., 2002). This measure allows representation of how anxiety symptoms and their interpretation can fluctuate mid-task (Butt et al., 2003). Measures such as the IAMS could help researchers draw conclusions as to why (was it the interpretation?), when (at what point during the task?) and for whom (which participants?), differences in anxiety can facilitate task performance. Measures such as these for goal valuation and state anxiety could reveal the more delicate relationships between performance and antecedent behavioural factors that pre-condition questionnaires may overlook. They may also imbue empirical interpretations with a more accurate representation of how individual differences moderate the effects of imposed achievement goals. In a bid to include some individual consideration into the effects of achievement goals the AGQ-R and AGQ-S were also used in the generation of the dominant domain achievement goal (DDAG) component. This component, its creation, use, and limitations will now be considered.

### *5.6.2 The DDAG Component: Strengths and Limitations*

Before discussing the limitations of the DDAG, it is necessary to discuss some of the advantages to using the DDAG tool which shares similarities to a traditional median split. In Chapter 2, the DDAG was first used to create distinct groups, based on individual's domain achievement goal, to investigate the individual differences in the effects of imposed approach-based goals. Domain achievement goals have been described as occurring in an orthogonal relationship (Roberts et al., 2007), whereby goals can be simultaneously adopted. Within simultaneous adoption one goal is posited to be more dominant with the continued influence of other achievement goals (Van Yperen, 2006). Previous methods, such a median split (used by authors such as: Da Costa, 2015; Pintrich, 2000) and cluster analysis (as used studies in detailed in Niemivirta et al., 2019), have been used to examine this type of goal relationship. However, unlike traditional median splits, which change when the median of the sample changes (Pastor et al., 2007), the DDAG determined groups by scores being higher or lower than zero: Zero signifying the middle range of scores on the DDAG continuum (or where mastery and performance scores are equal). Zero, or equal dominance, was used as the "median" as this would allow a consistent division across all studies. Allowing the split to take a somewhat more person-centred approach than traditional median split analyses which, as Niemivirta et al. (2019) suggest, are not fully person-centred. Median or mean split analysis as a method of categorisation reflects the median or mean at the sample-level rather than the individual-level (Fryer & Elliot, 2007). So, when the sample changes, so to would the median or mean and consequently the way in which individuals are categorised (Pastor et al., 2007). For example, in one sample individual A could be categorised as performance-dominant because of the sample-based median. However, in a second study the same individual, with the same dominance score, could be categorised as mastery-dominant because the scores of the overall sample have changed the median. This shift between samples creates difficultly when comparing results and conclusions across multiple studies as one has no consistent means of identifying the dominance group of individuals. Using zero as the "median" point by which to categorise individuals irrespective of the statistical median, allows comparison to be drawn between previous and future studies about the effects of task instructions on specific dominance groups (e.g., individual A would be categorised the same in each study if their score was to remain the same). An advantage when comparing the results of subsequent empirical studies in this thesis.

Another advantage to using the simple DDAG tool over traditional median split analysis for investigations using the 2x2 framework was the manageability of the number of groups.

This was particularly the case for the pilot study in Chapter 2. For example, Shih (2005) examined students using the trichotomous framework and, using median split, created a total of eight groups. Four groups based on high and low mastery and performance-approach goals and four groups based on high and low performance-approach and performance-avoidance. The number of participants required to first, check the method and then subsequently test multiple studies in a mixed model design (with adequate samples in each group) with the number of groups that would be required for the 2x2 framework was not deemed feasible; especially considering the participant were initially selected using extreme DDAG scores which would require an even larger sample collection that seen in stage one in Chapter 2. Therefore, the DDAG was used to create two meaningfully distinct dominance groups. Within each dominance group the mastery and performance-based scores were significantly different, where the highest mean in each dominance group was that of the corresponding subscale group (e.g., in the mastery dominant groups scores were higher than performance dominant groups scores and visa versa). Furthermore, the groups were found to be significantly different and independent from one another. Based on these statistical findings, as well as the good internal reliability found for the dichotomised groups, the DDAG continued to be used in Chapters 3a, 3b and 4 as a methodological tool to categorise participants into between-subjects groups to assess the effects of situationally imposed achievement goals on participants with different domain dominant goals. Continuing to use the DDAG also allowed other methodological modifications to be made to Chapter 2's pilot study in subsequent chapters while still allowing a degree of continuity between studies throughout the thesis. However, it must be noted here that while the DDAG is different to conventional and more traditional median split analysis it is ultimately not a "new method". Though it may have some advantages, its method of participant categorisation has led to several issues that need to be addressed.

#### *5.6.2.1 The DDAG'S Limitations*

Within each dominance group individuals were categorised together whether they had low or high goal scores or score differences (the difference between mastery and performance goals). This is potentially problematic as individuals could, arguably, be further categorised into high and low subgroups. For the purpose of the current thesis and its exploration into the effects of approach-based goals, combining high and low dominantly different individuals was sufficient. This was because the DDAG was not used to establish the absolute strength of an individual's domain dominance. If research were to investigate the effects of the strength of domain dominance then further revision into high and low subgroups would be required. One may argue that by not including or creating groups based on the extant of score differences, the distinctiveness of the DDAG groups is drawn into question. As noted previously, Chapter 2 confirmed the distinctiveness of the groups created by the DDAG. Distinctiveness was also established in each subsequent chapter to confirm the two groups were remained statistically different. Exploratory *t*-tests confirmed that dominance groups in Chapters 3a, 3b and 4 were statistically different to one another ($p$ <.001) and could therefore be used to reflect independent groups. The statistical investigations for each chapter can be seen in Appendix T. It was important to confirm the groups were distinctive in later chapters for another reason. The initial vision for the DDAG was to use it as a tool to select, in a principled way, participants with extreme score differences. However, the extraneous variables and methodological limitations identified in Chapter 2 (such as the two-part sample collection) deemed this extreme difference selection unfeasible in future studies. Despite its infeasibility in the present thesis, use of the extreme score differences is something that may be worth revisiting in future endeavours especially when considering the relative strength of goals.

As well as considering the distinctiveness of the two groups it was also necessary to consider their internal reliability. For each chapter the internal reliabilities, analysed by Cronbach's Alphas, were deemed acceptable when the mastery-based goals and performance-based goals were grouped together creating a dichotomy. The dichotomy was created in an attempt minimise the number of groups and in doing so attempted to utilise the contribution of both approach and avoidance components because, at the time of conception, it was thought vital to include in some way, the valence of goals. Therefore, each group was comprised of the six subscales: Three mastery-approach and three mastery-avoidance for the mastery dominance score (MDS), and three performance-approach and three performance-avoidance for the performance dominance score (PDS). While the reliability confirmed the dichotomy of the AGQ-R and AGQ-S was suitable for use in the present studies, it is necessary to consider that a reliable two-factor structure of the AGQ-S has not been shown in all empirical studies. For example, some empirical work has examined the factor structure of the AGQ-S as a two-factor model and shown weak model fit, suggesting the questionnaire does not sufficiently operate in such a way (e.g., Conroy et al., 2003). This draws into question the reliability of the present studies' dichotomous domain model and makes one consider whether there are more appropriate methods by which to investigate domain goals considering both approach and avoidance tendencies. Such a consideration warrants the recommendation that future research should i) not attempt to use grouping variables to evaluate goal differences, ii) consider the use of a questionnaire that can account for the valence of goals and be represented by goals' definitional component, or iii) use only the approach or avoidance-based goals in investigations.

The collapsing across valence groups must also be considered in relation to the empirical findings. For example, what effects may individuals with strong mastery-avoidance tendencies have had on the mastery dominant group? Would individuals with stronger mastery-approach tendencies have responded differently to the situational goals compared to their mastery-dominant counterparts? Could the combination of approach and avoidance tendencies in the mastery dominant group have contributed to the unexpected absence of mastery condition related performance improvements? Mastery-avoidance is of particular interest in this situation because this may have had additional implications on results considering the limitations of the mastery-avoidance goal in the AGQ-S (see, Darnon et al., 2012 and Elliot & Murayama, 2008). While the DDAG does not provide the sensitivity for independent influence of approach and avoidance goals on findings, some exploration and consideration will be given to the potential effects this collapsing of groups may have had on the present findings. This support future research with indications of why it is important to consider goal valence and how goal valence might drive differences in findings.

#### *5.6.2.2 The Impact of Collapsing Across Valence Groups*

In Chapter 3b increases in state anxiety were found in the performance-approach condition. This increase in anxiety was ascribed as a reflection of the predominantly mastery dominant sample's internal conflict with requirements needed to achieve task competence in the performance condition. From previous research it has been shown that mastery-avoidance goals are strongly associated with increase in cognitive and somatic anxiety (Li, 2013; Sideridis, 2008). It has also been shown that second to mastery-approach, the mastery-avoidance goal is the highest adopted goal by athletes. For example, Van Yperen and Renekma (2008) found mastery-approach goals were adopted by most participants (e.g., 68%) and the mastery-avoidance goal was the second highest adopted goal with 15% participant adoption: similar results were found by Fernandez-Rio et al. (2014). Considering these findings, it could be suggested that the increase in anxiety found in Chapter 3b may be due to a subset of participants with high levels of mastery-avoidance goals. This mastery-avoidance dominant group would have a complete goal incongruency due to differences in both valence and definitional components. Thus leading to greater cognitive dissonance and consequently increasing the mastery-avoidance individuals' already heightened level of anxiety If this group were larger in Chapter 3b than in other chapters, it may allow speculation that the statistically significant increase in anxiety found in Chapter 3b was actually the result of the mastery-avoidance groups increase in anxiety adding noise to the data.

Results must also be considered for the performance dominant group and the influence of performance-approach and performance-avoidance. Research indicates that performance-avoidance goals are more detrimental to outcome performance than mastery-avoidance goals (Elliot & Moller, 2003). With this view in mind, one may speculate that individuals with higher performance-avoidance goals would perform worse on the motor tasks than their performance-approach counterparts. If this were the case, the performance-avoidance groups RT performance would add noise to the data and potentially lead to non-significant findings for the performance dominant group. However, the performance dominant group was found to have increased levels of goal valuation and demonstrate RT improvements in the performance condition (Chapter 4). Due to the significant findings found in relation to the performance group, and the strong likelihood that participants with strong performance-avoidance goals were included in the performance dominant group, it brings into question the extent of performance-avoidance goals' influence. Described as the most deleterious goal (Elliot & Moller, 2003) it would be posited that the goal's effects would be strong enough to override positive attributes of the those dominant in performance-approach. However, the present findings, would appear to support the contrary. The positive effects of the performance-approach goal were stronger than the deleterious ones heavily attributed to the performance-avoidance goal. As such the degree to which the performance-avoidance goals may negatively affect performance or goal adoption would be interesting to consider. However, as the DDAG does not provide the sensitivity for the investigations mentioned here they are merely speculative but provide the stepping stones for further research avenues.

Ultimately the DDAG is a simple, if flawed, way of categorising individuals into groups, and one which enabled analysis of the core hypothesis of this thesis. Nevertheless, future investigations would benefit from examining alternative methods to categorise participants based on the theoretical characteristics of domain achievement goals Including consideration of high and low dominance scores and the division of approach and avoidance goals as posed by the theoretical framework. The theoretical characteristics of the domain achievement goals also brings to light the terminology used within the thesis. A factor which not only affects the operationalisation of motivational components but the empirical findings and their comparison to other studies.

## 5.7 Terminological Considerations and Limitations

One example of the effects of terminology, touched upon in Chapter 2, was based on the terms used for tasks instructions. In this chapter the term aim was used in task instructions while the term goal was used in questionnaires. This has been a point of contention in the achievement goal literature: what the term ‘goal’ represents in ‘achievement goal’ (Elliot et al., 2005; Elliot & Murayama, 2008; Van Yperen, 2006; Van Yperen et al., 2011). Traditionally goals were defined as the purpose for achievement. Semantically, purpose included both reason for and aim of achievement. For example, some have argued that the term ‘goal’ can be represented as an aim, orientation or combination of reason and aim (Elliot, 2006). It was thought the reasons aspect of purpose included additional components, motivating achievement goals beyond competence. However, achievement goals in this thesis are viewed as the cognitive representations of competence-based aims (Elliot, 1999; Elliot & Thrash, 2001). Where the reason aspect of purpose has been removed, grounding the definition of achievement goals only in competence (Elliot et al., 2011). This is not to say other definitions of goals are incorrect and while researchers may, correctly or not, use the terms goal and aim interchangeably it does not necessarily mean participants will do the same. The interchangeable use of aim and goal between researchers can be paralleled to the labels used for achievement goals (see Hulleman et al., 2010; Van Yperen, 2021). The diverse use of terms within the literature can not only impact theoretical understanding and clarity but, as was potentially the case in Chapter 2 and Chapter 3a, empirical findings.

The use of the terms aim and goal interchangeably was posited to have affected the response rate in the STVSQ manipulation check. Participants were reported saying “I haven’t been given a goal” when asked to “recall the goal” they were given. When the task instructions were adjusted in later chapters to match the terminology used in the questionnaires, correct responses on the manipulation check increased (e.g., correct responses were given by over 60% of participants in both conditions in Chapter 3b and 4 compared to under 50% in the performance condition in Chapter 3a). This alignment of terminology may also have been seen in responses to the AGQ-S examining implicit situational goal adoption. For example, Chapter 3b and 4 saw changes in goal adoption based on participant’s domain achievement goals as hypothesised. Whereas such changes were not seen in Chapter 2 and 3a where terminology differed. The differences in goal adoption as situational cues improved differs from the arguments put forward by Roberts et al. (1997). The authors noted that internal goal structures (in their case dispositional goal orientations) would be dominant in an individual's task-based goal involvement (situational goal adoption) if environmental cues were vague. In the experiments conducted in this thesis the opposite appears to be true. The stronger the environmental cues (the task instructions), the stronger the influence an individual's domain goal seemed to have on situational goal adoption. The suggestions put forward here for the consideration of the limitations and effects of terminology are by no means exhaustive. Further discussion can be seen in reviews by Hulleman et al. (2010) highlighting performance-approach goals and normative language and Da Costa (2015) examining challenges of questionnaires in achievement goal research and other papers such as Mascret et al. (2015) to name a few. The tentative exploration set out in here highlights the importance for studies to decide their terminology and make sure all with components are consistent. This will help clarify the literary contribution of empirical studies more easily within their chosen framework aiding the development of achievement goal theory (AGT).

## 5.8 Contributions to the Literature

One key contribution of this thesis was the examination of an interaction relatively overlooked in achievement motivation literature. While there is a plethora of research on the interaction between person and situation (e.g., Ames, 1992; Boardley & Kavussanu, 2010; Duda, 2005; Elliot, 1999, 2005; Elliot & Fryer, 2008; Geukes et al., 2012; Jagacinski et al., 2001; Lau & Nie, 2008; Miera & Fairbrother, 2018; Nien & Duda, 2008, 2009; Papaioannou et al., 2004; Treasure & Roberts, 1995), the person is often represented by dispositional goals. Additionally, the research is also more commonly situated in Nicholls' achievement goal framework. However, fewer studies have examined a person-situation interaction grounded in Elliot's standpoint achievement goal framework. Even less research has examined the influence of domain goals (as context-specific internal goal structures) and the consequences of their interaction with situation-specific goals (as external goal structures) on task performance and the adopted situational goal. The present studies demonstrate the importance of considering domain goals as they influence the interpretation of external goal structures. Furthermore, considering the interactions found, the findings stress the importance of not assuming the imposed situational goal will be the situational goal individuals adopt especially in empirical research. This informs future research of the need to implement methodological tools to examine adopted situational goals. Additionally, by highlighting some of the terminological inconsistencies between AGT studies, frameworks and questionnaires and implications on empirical findings, this thesis demonstrates the significance of aligning theory and methodology. It also emphasises the need to consider the theoretical differences, which can be implied through terminology during empirical interpretation to improve comparison within the wider literary field.

A second contribution is based on the performance-approach goal findings. Performance-based goals were initially thought to be associated with maladaptive outcomes for both behaviour and performance (Benita et al., 2014; Elliot & Harackiewicz, 1996; Lachman, 2014) because of the negative theoretical links to the definitional performance component. Evidence put forward in this thesis supports the growth of literature demonstrating the positive outcomes that can be associated with performance-approach goals (Barron & Harackiewicz, 2003; Elliot et al., 1999; Elliot & Moller, 2003; Harackiewicz et al., 2002; Hulleman et al., 2010; Meira & Fairbrother, 2018; Wolters, 2004), particularly in the sport domain. One outcome in particular is the relationship to task performance. However, as once stated by Elliot et al. (2005), our data does not suggest discouraging mastery-approach goals. Nor does it suggest that performance attainment is the outcome of greatest importance. Other outcomes such as creativity, intrinsic motivation, well-being and learning must also be considered. As aspects of well-being (other than considerations of anxiety) were not investigated in this thesis, the full benefits of performance-approach goals cannot be stated. The effect of performance-approach goals should be considered in relation to any costs associated with the adoption or imposition of that goal to make a holistic person-centred decision as to whether the performance benefits are worthwhile.

The implications of the current findings also go beyond academic research. Examining social media, the interest in motivation can be seen beyond the academic field. For example, motivation is widely publicised, promoted and discussed in podcasts (e.g., Dabek et al., 2020; Mundie, 2020) helping individuals achieve their goals in health, fitness and education. Motivation is also emphasised as a key factor differentiating athletes at the elite level (e.g., Šmela et al., 2017) and it is even viewed as a key construct in employment sectors: Often included in performance appraisals for managers as well as coaches and educators (e.g., DeNisi & Murphy, 2017). Yet, despite this interest in the reasons why people do certain things, or why people behave in certain ways, there remains many contrasting views. Therefore, the dissemination of this research, examining how motivational climates affect individuals with differing motivational dominances, can be informative for coaches, teachers, physiotherapists and others those who use motivation to help others reach fitness, athletic or educational goals.

This research also indicates that promoting competitive achievement should not be viewed as socially undesirable. For use in practical application this conclusion can help mentors actively encourage healthy competition, so long as it is promoted in conditions (e.g., short-term, motor skill tasks) where the benefit of the performance-approach goal out-weighs the costs (e.g., the associated physical task benefits do not harm the individual's well-being). In sport, the results suggest performance-approach goals can also be used to improve fitness levels. For example, when training hand eye coordination, cardiovascular endurance and spatio-temporal orientation, such as in football or wrestling, RT training has shown to be beneficial. Particularly when using BATAK machine style training (Gierczuk & Bujak, 2014). Therefore, if improving RT can improve fitness[1], and performance-approach goals can improve RT, it stands to reason that performance-approach goals can help improve fitness. However, Ellison et al. (2018) concluded in their investigation on hand eye coordination and general ability that there is unlikely to be a transfer to sport performance when training on general hand-eye coordination devices. Therefore, while performance-approach goals may be beneficial for RT, it would be presumptuous to expect direct transfer to sport performance. That is not to say performance-approach goals do not have their benefits for performance under specific circumstances. Improved performance with performance goals may be seen in short duration task requiring physical effort (e.g., sprinting), in tasks that are time sensitive (e.g., races) or highly rewarding (e.g., competitions). In summary, the findings of the current thesis have practical contributions to RT performance and the encouragement of performance-approach goals. Further research is needed to extrapolate such findings to other sport performance and associated consequences to well-being.

## 5.9 Emerging Reflections

A PhD is considered to be a journey (McCulloch, 2013). Throughout their journey, postgraduate researchers have the opportunity, with support and guidance, to develop their academic identity; gain confidence to work autonomously; take responsibility for the work of

[1] Reaction time is a skill-related component of physical fitness (Caspersen et al., 1985). Therefore, improving RT scores can be said to improve levels of fitness based on quantitative scores

others; demonstrate their effective communication of complex ideas and independence. These are also some of the criteria PhD students should meet to be awarded a doctoral degree (FHEQ criteria for level 8; Durham university). In order for the student to determine if they have met these criteria, it is recommended that they reflect upon their journey. Therefore, in reflection of my journey, there are some key points I wish to discuss.

The first pertains to the use of the BATAK style machine in Chapter 4. Designing and building a new machine was more cost effective than hiring a BATAK. It allowed the machine to be more specialised for the study as it was designed for the specific requirements of experimental data collection: recording error presses, participant code and task conditions. It was also designed to be more easily transportable allowing for a wider range of participant sampling. The creation of the machine afforded me opportunities to gain experience in liaising with technology teams, designing specifications and building timeframes. It also allowed me to further develop my budgeting and interpersonal skills, communicating between departments to acquire funding for equipment and travel. Nevertheless, the S.T.A.R.R. machine was still a prototype and not without complications. In the early stages of testing the machine required a lot of maintenance to withstand heavy use (7, 144 button sequences from each participant). After several attempts at consistent use, it was decided that the machine could not tolerate the initial sequence length or number of trials. However, due to the necessity of the three practice attempts to reduce the interference of practice effects (Del Rossi et al., 2014), it was decided to halve the sequence length rather than reduce the number of trials. Reducing the sequence length proved favourable as it also reduced the length of experimental sessions meaning participants were i) more willing to participate and ii) could be tested in a limited time frame. Overall, creating and using the S.T.A.R.R. machine was effective and beneficial for the experiment. Participants also found it more engaging stating it was “more fun to take part it in then some other psychology experiments" (Anonymous Participant). Therefore, while also increasing the likelihood of future participation and interest levels, the S.T.A.R.R. machine has the potential to be used in many different avenues of future investigation for RT performance. I would argue the creation of the machine, along with other various models allowed me to disseminate my research in the department, to sports teams, at the annual Schools Science Festival and allowed me to inspire undergraduate projects.

The second reflection is a personal insight gleamed from the study of human motivation. In the years of studying achievement motivation, I have expanded my belief that there are many nuances to human behaviour, much of which is dictated by individuality. By trying to categorise that individuality one begs the question, are we trying to over-simplify a complex behaviour? Are we trying to minimise the effort needed to understand each person as a unique individual? Having spent the last four years examining how to motivate people to achieve their best performance these are some of the questions that I have been left with. That is not to say that examining the consequences of motivational imposition through environmental components does not have benefits. Determining in what circumstances certain individuals may feel more anxious, work-avoidant, or their goals are not meaningful may help avoid diminished well-being. For example, if performance is facilitated through threat appraisal, does the individual have the adequate coping mechanisms to deal with feelings of anxiety so such threat does not become a danger to their welfare (Adie et al., 2008)? With that in mind should individual well-being be of greater priority than outcome performance when considering motivation? Can performance and well-being coincide? Using the experience I have gained, I have applied not just my empirical findings but theoretical knowledge to my personal coaching and teaching practises. The use of the research in my own practice has confirmed that not all aspects of motivation are quantifiable. One cannot practically apply theoretical findings without having an additional intuition of human behaviour. There are too many extraneous variables which, if accounted for in laboratory experiments, would not reflect motivation in ecologically valid settings.

That is not to say studying motivation is not informative and extremely useful. I merely suggest that the study of motivation alone may not be enough to determine the factors that facilitate task performance for all individuals in all circumstances. One must have the ability to apply that knowledge and know how to adapt based on subtle and spontaneous factors. For example, PhD students are encouraged to succeed. But the requirement of that success can be all consuming. It includes conducting empirical studies, literature reviews, participating in conferences, taking on academic responsibilities like teaching, publishing, writing a thesis and more within a specific time frame. Supervisors must be able to motivate students to continue to work to a high standard, but the individuality of each student needs to be considered. I am lucky to have had two supervisors who have been able to do just that. Despite a relatively atypical experience during the course of my PhD, my supervisors have helped me to grow and develop my knowledge acquisition, articulation and academic identity (Quigley, 2011). Having learnt first-hand, on many occasions both in and out of my PhD experience, that things do not always go to plan I have certainly become more adaptable. Just as I would expect coaches and teachers to be when motivating their students.

## 5.10 Conclusion

Overall, the findings in this thesis demonstrate the complexity of how humans create and respond to motivational goals and how these goals drive a range of psychological processes impacting motor performance. Evidence of the interaction between internal and external goal structures, in the form of domain and imposed approach goals, in the present thesis supports a conclusion that performance-approach goals can positively affect RT performance for individuals with pre-defined performance domain goals. The results therefore support and extend previous interaction models by highlighting the importance of internal goal structures in the form of domain goals. Furthermore, the effects of the interaction between internal and external goal structures illuminates the importance of empirically examining, in line with theoretical assumptions, the goals individuals adopt in motivational environments and considering the inclusion of this factor in congruency models. The findings place the thesis in the growing stream of empirical studies unveiling the circumstances in which normative-referent goals can be used to promote motivation to improve motor performance.

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# Appendix A

## Chapter 2: Consent Forms

### Participant Consent form (stage 1)

**Title:** Understanding the effects an individual motivational orientation can have on Coordination and Synchronisation.

(This form should be completed by the participants in full)

| | **Please circle** |
|---|---|
| Have you read the Participant Information Sheet? | Yes No |
| Have you received satisfactory information about the questionnaire, its use and the intended use of any data which you supply? | Yes No |
| Have you received satisfactory answers to of your questions? | Yes No |
| Have you had the opportunity to ask questions and to discuss the questionnaire? | Yes No |
| Do you consent to be contacted for the second stage of the study? | Yes No |
| Do you understand you are free to withdraw yourself and results from the study:<br>At any time<br>Without a specified reason<br>Without any adverse result of any kind? | Yes No |

I have read and understand the terms of participating in the study and that my data will be confidential and destroyed once the experiment has been fully completed.

Participant Name………………………………………………………… Age……… Research Code……….

Signed……………………………………........... Date…………….

**Participant Consent form (stage 2)**

**Title:** Understanding the effects an individual motivational orientation can have on Coordination and Synchronisation.

(This form should be completed by the participants in full)

| | **Please circle** |
|---|---|
| Have you read the Participant Information Sheet? | Yes No |
| Have you received satisfactory information about the questionnaire, its use and the intended use of any data which you supply? | Yes No |
| Have you received satisfactory answers to of your questions? | Yes No |
| Have you had the opportunity to ask questions and to discuss the questionnaire? | Yes No |
| Do you understand you are free to withdraw yourself and results from the study:<br>At any time<br>Without a specified reason<br>Without any adverse result of any kind? | Yes No |

I have read and understand the terms of participating in the study and that my data will be confidential and destroyed once the experiment has been fully completed.

Participant Name………………………………………………………. Age……… Research Code……….

Signed………………………………………….......... Date…………….

# Appendix B

Chapter 2: Participant Information Sheet

## Information Sheet: Overall study

My name is Rebekah Brockbank, I am a PhD student in the psychology department, supervised by Dr Dan Smith. I am interested in collecting data on Durham University student's achievement orientations (or AGOs).

The aim of the current study is to investigate the effects of the relationship between achievement goal orientation and learning a finger tapping sequence. In order to do this, the study is separated in two parts.

Part 1:

- Aims to determine the distribution of achievement goal orientations within Durham University.
- This will be done through the completion of the AGO-revised questionnaire (Elliot & M, 2008).
    - o Please be aware this is not a diagnostic tool.
    - o The questionnaire should take no longer than 15 minutes to complete
- All information and answers will be kept confidential and anonymity will be preserved.

Part 2:

- The second part of this study is interested in investigating the effects of an individuals' achievement goal orientation on learning a finger tapping sequence.
- The second part of this study will be recruited via random selection of the participants who completed part 1, agreed to being contacted for stage 2 and have not left Durham University.
- Chosen participants will be contacted via email asking for confirmation of whether they would like to continue with stage two.
- Participants willing to be involved in stage two will be sent details of the next proceedings, participants who do not wish to continue to be involved will be removed from the contact list.

Should you consent to participate in the study you will be asked to complete the Achievement Goal Orientation-revised (AGO, Elliot & M, 2008) to determine your achievement goal orientation. The questionnaire can be completed with an experimenter present or can be completed electronically via email distribution.

The second stage of the study will involve two trials in which the objective is learning a finger tapping sequence. More information of which will be provided should you be selected to participate

Please contact me via [redacted] for a consent form or any further information.

# Appendix C

## Achievement Goal Questionnaire - Revised

**Achievement Goal Questionnaire-Revised (AGQ-R)**
Elliot, A. J., & Murayama, K. (2008). On the measurement of achievement goals: Critique, illustration, and application. *Journal of Educational Psychology*, *100* (3), 613-628.
With additional work-avoidance statements

Scale:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly Disagree | Disagree | Neither | Agree | Strongly Agree |

1. My aim was to completely master the material presented in **my course**
2. I planned to get through the course by doing the least amount of work possible
3. I was striving to do well compared to other students
4. I preferred not to work hard for my modules
5. My goal was to learn as much as possible
6. My aim was to perform well relative to other students
7. My goal was to do a little work as possible
8. My aim was to avoid learning less than I possibly could
9. My goal was to avoid performing poorly compared to others
10. I was striving to understand the content (of my course) as thoroughly as possible
11. My goal was to perform better than the other students
12. My goal was to avoid learning less than it is possible to learn
13. I was striving to avoid performing worse than others
14. I was striving to avoid an incomplete understanding of the **course material**
15. I intended to work really hard in **my course**
16. My aim was to avoid doing worse than other students.

Mastery-approach: Q1, Q5, Q10,
Mastery-avoidance: Q8, Q12, Q14
Performance-approach: Q3, Q6, Q11
Performance-avoidance: Q9, Q13, Q16
Work-avoidance: Q2, Q4, Q7, Q15

# Appendix D

## Chapter 2: Participant Recruitment

### Participant Information Sheet (stage 2 proceedings)

My name is Rebekah Brockbank, if you are receiving this you completed the first stage of my study about achievement orientation of Durham University students (the AGO-revised questionnaire) and consented to being partaking in the second stage of the experiment.

The aim of this second stage is to examine learning of a finger tapping sequence. You will be asked to perform the experiment TWICE: once on two separate occasions. The time taken for each test will depend on you as an individual.

On each occasion, you will be presented with a set of instructions. These instructions will explain what will happen during the task and your aims for the task. The sequences you will be asked to learn will appear on a computer touch screen. You will learn the sequences individually and are asked not to discuss the sequences with any other participants.

Should you wish to continue with this stage of the experiment, a meeting time will be arranged where you will be given an information sheet explaining the task and consent form.

# Appendix E
## Chapter 2: Stage 1 Additional Descriptive Data

Descriptive statistics of stage one respondents shows most respondents of the N=157 respondents (93%) were taking undergraduate courses (67.8% of respondents answered the questionnaire reflecting on their first year, 19.2% second year, 11.6% third year and 1.35% fourth year) and the rest (7%) were taking postgraduate courses in the previous year. 60% of participants were taking a sport and exercise or psychology degree course. Table E.1 shows the mean subscale scores and reliability information of the 2x2 achievement goals represented by the AGQ-R. The table shows all goals had good internal reliability and MAv was the lowest scoring goal.

**Table E.1**

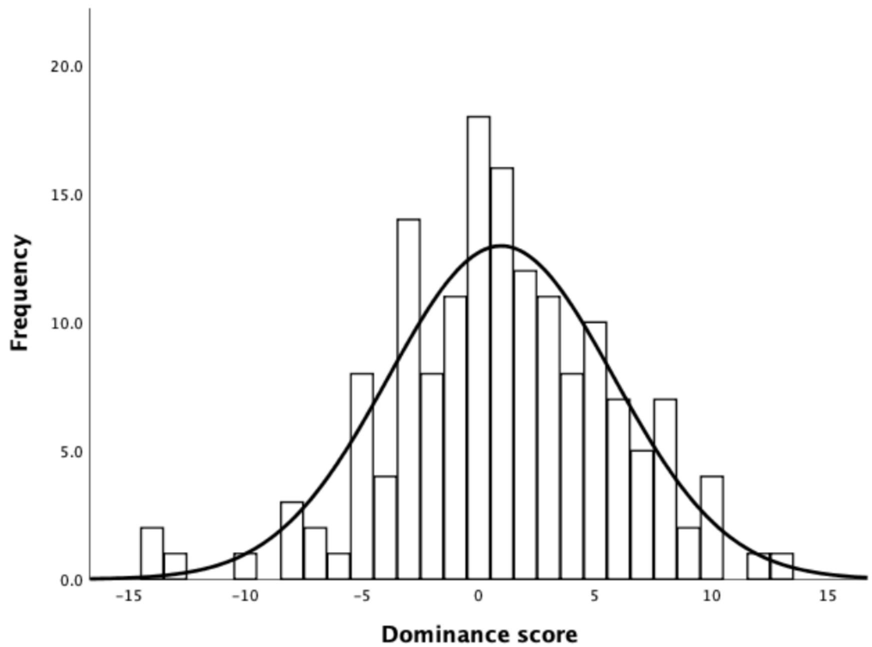
*2x2 achievement goal descriptive statistics, N = 157 participants*

| | Mastery | | Performance | |
|---|---|---|---|---|
| | Approach | Avoidance | Approach | Avoidance |
| Mean | 3.70 | 2.99 | 3.64 | 3.49 |
| SD | .874 | .811 | .943 | .959 |
| Alpha($\alpha$) | .80 | .64 | .85 | .74 |

The histogram in Figure E.1 shows the normal distribution of the DDAG scores calculated from the raw AGQ-R scores.

**Figure E.1**

*Histogram of Participants' DDAG Score Distribution, N = 157 Students*



# Appendix F

## Situational stem Achievement Goal Questionnaire - Revised

**Situational Achievement Goal Questionnaire-Revised (AGQ-R)**
Elliot, A. J., & Murayama, K. (2008). On the measurement of achievement goals: Critique, illustration, and application. *Journal of Educational Psychology*, *100* (3), 613-628.

Scale:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Strongly Disagree | Disagree | Neither | Agree | Strongly Agree |

1. My aim is to completely master the material presented in **this task**
2. I am striving to do well compared to other participants
3. My aim is to avoid doing worse than other participants
4. My goal is to lean as much as possible while completing this task
5. My aim is to perform well relative to other participants
6. My aim is to avoid learning less than I possibly could for this task
7. My goal is to avoid performing poorly compared to others
8. I am striving to understand the content (of the task) as thoroughly as possible
9. My goal is to perform better than the other participants
10. My goal is to avoid learning less than it is possible to learn to complete the task
11. I am striving to avoid performing worse than others
12. I am striving to avoid an incomplete understanding of the task

Mastery-approach: Q1, Q4, Q8
Mastery-avoidance: Q6, Q10, Q12
Performance-approach: Q2, Q5, Q9
Performance-avoidance: Q3, Q7, Q11

# Appendix G

## Subjective Task Value in Sport Questionnaire

Please answer the questions with regard to your personal aims for this task. The Likert scale questions are on a scale of 1-7: 1 = not at all, 4 = moderately, 7 = extremely.

1. What is your goal for this activity? (Please recall the goal you were given)
2. Please rate the value you place on this goal on a scale of 1-7

   **Not at all valuable** 1 2 3 4 5 6 7 **Extremely Valuable**
3. How much do you think you will enjoy this activity?

   **Not at all enjoyable** 1 2 3 4 5 6 7 **Extremely Enjoyable**
4. How happy will you be if you achieve this goal?

   **Not at all happy** 1 2 3 4 5 6 7 **Extremely happy**
5. How disappointed will you be if you do not achieve this goal?

   **Not at all disappointed** 1 2 3 4 5 6 7 **Extremely disappointed**
6. How important is it to you to be successful at this goal?

   **Not at all important** 1 2 3 4 5 6 7 **Extremely important**
7. How important is it to you to not fail at this goal?

   **Not at all important** 1 2 3 4 5 6 7 **Extremely important**
8. How hard will you try to this goal?

   **Not at all hard** 1 2 3 4 5 6 7 **Extremely hard**
9. How confident are you that you will achieve this goal?

   **Not at all confident** 1 2 3 4 5 6 7 **Extremely confident**

# Appendix H

Chapter 2: Procedure Documents

## Participant Information

The aim of this second stage is to examine learning of a finger tapping, memory-based sequence. You will be asked to perform the experiment TWICE: on two separate occasions. The time taken for each test will depend on you as an individual.

On each occasion, you will be presented with a set of instructions and task aims. These instructions will explain what will happen during the task and your aims for the task. The sequences you will be asked to learn will appear on a computer touch screen. You will learn the sequences individually and are asked not to discuss the sequences with any other participants.

Having read your instructions, you will then be asked to complete two questionnaires with you task aims in mind.

The questionnaires will be:

1) Achievement Goal Questionnaire – Revised
2) Subjective Task Value in Sport Questionnaire

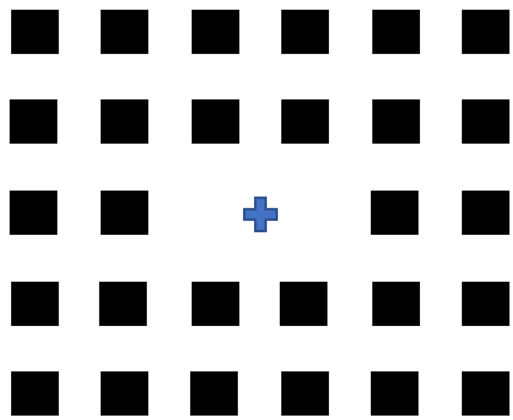
Should you wish to withdraw at any point from this experiment you may do so without consequence.

Please feel free to ask any questions at any point.

Thank you for your participation.

## Task Instructions

This is a finger tapping task, sequence memory-based task. During the task, you will be presented with a sequence where 9 boxes, of a 24-box array, will flash. An example layout is below (note the middle 'box' will not be included). The boxes will flash one at a time in a sequential order. When the full sequence has finished, you will be required to repeat the sequence by tapping the boxes in the correct order with your right index finger. An audible beep will indicate when you are able to begin repeating the sequence.



You must click 9 boxes each time you tap out the sequence. Once you have touched 9 boxes, the trial will end, and you will be given feedback – a red rectangle will represent an incorrect selection, while a green square will represent a correct selection. You will then be prompted by instructions in the centre and shown the sequence again.

The task will end when you have tapped out 3 consecutive error free sequences.

**Debrief**

Thank you for participating in this study, your participation has been greatly appreciated. The aim of this study was to examine the relationship between your individual achievement goal orientation and condition instructions. Specifically, we were interested in how and if they're interaction affected your performance in the finger tapping task.

I would like to ensure you that your information and results will be kept confidential and anonymously coded. I would like to also remind you that should you wish, you will be able ask for your data to be excluded from the study at any point.

If you have any further questions please feel free to contact myself or my supervisor

[redacted]

[redacted]

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# Appendix I

## Chapter 2: Trial and Error Data

Exploratory analysis was conducted to investigate if the number of trials and errors had any effect on recall time or if these results were influenced by the relationship between task instructions and dominance. A repeated measures, 2 (mastery vs performance) X 2 (mastery dominant vs performance dominant), ANOVA was used to analysis the number of trials and errors and the possibility of a time accuracy trade off.

**Table I.1**

*ANOVA Results for Condition Trials and Errors, df = 1, 13*

| | Mastery Instruction *M (SD)* | Performance Instruction *M (SD)* | $F$ | $p$ | $\eta_p^2$ |
|---|---|---|---|---|---|
| Errors | 10.20 (4.66) | 9.33 (3.24) | | | |
| *Effects of dominance* | | | 0.07 | .936 | .001 |
| *Effects of instruction* | | | 1.094 | .315 | .078 |
| *Interaction* | | | .292 | .598 | .022 |
| Trials | 25.47 (18.72) | 21.80 (10.83) | | | |
| *Effects of dominance* | | | .005 | .945 | .000 |
| *Effects of instruction* | | | 1.094 | .315 | .078 |
| *Interaction* | | | .005 | .945 | .000 |

The results in the table show neither analysis yielded any significant results. This suggests task condition and dominance group did not affect the number of trails taken or errors made trying to achieve the task.

# Appendix J

## Chapter 3a: Participant Advert

Participant pool advertisement

PhD study: Reaction Time and Achievement Goals

This PhD study consists of a Batak style reaction time game and number of questionnaires assessing achievement goals.  The study will last approximately 40 minutes and you will receive 40 minutes participant pool credit.
The experiment will take place in the Psychology department (another location can be arranged if this is unsuitable).
If you wish to take part, please follow the doodle poll link to select a date and time for participation.

https://doodle.com/poll/mak7xqf6k4zf96n9

For further details or if you have any questions please email [redacted]

Supervisor Dr Dan Smith: [redacted]

# Appendix K

## Achievement Goal Questionnaire - Sport

**Achievement Goal Questionnaire – Sport**

*Domain Stem:* Please give a response which best suits the aims you have towards sport based activities generally. For example strength training, walking, jogging, sport or any activity involving some form of movement or physical reaction.

*Situational Stem:* Please select the response which best describes your feelings, right now, about your aim for the task you are about to complete

Responses are given on a scale of 1-7. 1 (not at all like me), 2 (somewhat not like me), 3 (a little not like me), 4 (neither), 5 (a little like me), 6 (somewhat like me), 7 (completely like me)

1. It is important to me to perform as well as I possibly can
2. It is important to me to do well compared to others
3. I just want to avoid performing worse than others
4. I worry that I may not perform as well as I possibly can
5. It is important for me to perform better than others
6. I want to perform as well as it is possible for me to perform
7. It is important to me to avoid being one of the worst
8. I'm often concerned that I may not perform as well as I can perform
9. It is important for me to master all aspects of my performance
10. Sometimes I'm afraid that I may not perform as well as I'd like
11. My goal is to do better than other performers
12. My goal is to avoid performing worse than everyone else.

*Questions for each achievement goal*
*MAp: Q1, Q6, Q9*
*MAv: Q4, Q8, Q10*
*PAp: Q2, Q5, Q11*
*PAv: Q3, Q7, Q12*

# Appendix L

## Revised Competitive State Anxiety Inventory - 2

**Revised Competitive State Anxiety – 2, from (Cox et al., 2003)**
'A number of statements that athletes have used to describe their feelings before competition are given below' Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now – at this moment. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer which describes your feelings right now.
Likert Scale 1-4, (1=not at all, 2= somewhat, 3=moderately so, 4=very much so)

1. I feel jittery
2. I am concerned that I may not do as well in this competition as I could
3. I feel self-confident
4. My body feels tense
5. I am concerned about losing
6. I feel tense in my stomach
7. I'm confident I can meet the challenge
8. I am concerned about choking under pressure
9. My heart is racing
10. I'm confident about performing well
11. I'm concerned about performing poorly
12. I feel my stomach sinking
13. I'm confident because I mentally picture myself reaching my goal
14. I'm confident that others will be disappointed with my performance
15. My hands are clammy
16. I'm confident of coming through under pressure
17. My body feels tight

Scoring

- Somatic anxiety: 1, 4, 6, 9, 12, 15, 17
- Cognitive anxiety: 2, 5, 8, 11, 14
- Self-confidence: 3, 7, 10, 13, 16
- Subscale score is obtained by summing, dividing by number of items and multiplying by 10. Score range is 10 to 40 for each subscale. If an athlete fails to respond to an item, merely sum and divide by items answered.

# Appendix M

## Chapter 3a: Procedure Documents

Participant Information Sheet

Project title: Effects of motivation on performance in reaction time task.
Researcher(s):[redacted]
Department: Psychology Applied
Contact details:[redacted]

Supervisor name: Dr. Daniel Smith
Supervisor contact details:[redacted]

You are invited to take part in a study that I am conducting as part of my undergraduate dissertation project at Durham University.

This study has received ethical approval from the psychology ethics committee of Durham University.

Before you decide whether to agree to take part it is important for you to understand the purpose of the research and what is involved as a participant. Please read the following information carefully. Please get in contact if there is anything that is not clear or if you would.
The rights and responsibilities of anyone taking part in Durham University research are set out in our 'Participants Charter':
https://www.dur.ac.uk/research.innovation/governance/ethics/considerations/people/charter/

What is the purpose of the study?
The aim of this study is to…

- see how task performance is affected by aim.
- The study will be conducted from October 2019 to March 2020.

Why have I been invited to take part?
You have been invited because …

- You are an adult that is over the age of 18 of any gender.
- You have normal/corrected-to-normal vision.

Do I have to take part?
Your participation is voluntary and you do not have to agree to take part. If you do agree to take part, you can withdraw at any time, without giving a reason. Your rights in relation to withdrawing any data that is identifiable to you are explained in the accompanying Privacy Notice.

What will happen to me if I take part?
If you agree to take part in the study, you will…

- In the task you will be asked to complete a performance task as quickly as possible. The performance task involves pressing the yellow circles on the screen as quickly as possible after they have appeared. You will have 5 trails in the first instance we will allow you to practise the program so that you are familiar with it. After this, you will have a timed practise to make you prepared for the first critical trial. The critical trial will follow, where you must try to score as highly as possible in the given time. After this, the practise and critical trials will occur again to try and beat your previous scores.

- Before the experiment takes place, participants will be asked to complete CSAI 2 questionnaire, the AGQR questionnaire.
- Goal valuation will be done after the practise and critical conditions.
- Completion of the task will take place at Science Site. The experiment will take no longer than one hour.
- When answering the questionnaires participants can omit any questions that they do not wish to answer.
- Participants will be rewarded with appropriate participant pool credits in line with their participation.

Are there any potential risks involved?

- There are no potential risks involved in this study.

Will my data be kept confidential?
All information obtained during the study will be kept confidential. If the data is published it will be entirely anonymous and will not be identifiable as yours.

Full details are included in the accompanying Privacy Notice.

What will happen to the results of the project?

- The results obtained in this experiment will be reported in our final dissertation projects. The publication date for this is expected to be June 2020.

All research data and records needed to validate the research findings will be stored for 10 years after the end of the project. 10 years is the standard under the University's data management policy, but may vary.

Who do I contact if I have any questions or concerns about this study?
If you have any further questions or concerns about this study, please speak to the researcher or their supervisor. If you remain unhappy or wish to make a formal complaint, please submit a complaint via the University's Complaints Process.

Thank you for reading this information and considering taking part in this study.

## DEBRIEF

Thank you for your participation. I would like to take this time to tell you a little more about my experiment.

This research is interested in examining the effects of task aims on individuals' performance in a task. Each individual is differently motivated in different areas, such as in Work, Academics or Sport. I am interested in firstly finding out how individuals are globally motivated when they are in activity related environments. The two ways people are motivated are Mastery and Performance. Those dominant in mastery are more motivated to improve by developing their performance, gaining and mastering new skills. Those dominant in performance are motived by demonstrating their competence, comparing their performance to others and wanting to be the best. Through this experiment, I am looking at whether someone's performance is affected by the task aims they are given. For example, if someone is globally motivated by competition then they will perform better in a task when they are given aims that encourage competitiveness, compared to when they are given aims that encourage them to do their best for their own improvement.

In this experiment you were given the same task with two different aims. I will be looking at how your performance varied between the two different aims and how this links to your global motivational profile for activities/sport. Additionally, we were also interested in how an individuals' anxiety levels would be effected when they received different aims.

If you have any questions, please feel free to ask/contact me via emai[redacted]

Thank you once again for your participation.

Rebekah Brockbank

# Appendix N

Privacy Notice and Consent Form

**Privacy Notice**

Durham University

**PART 1 – GENERIC PRIVACY NOTICE**

Durham University's responsibilities under data protection legislation include the duty to ensure that we provide individuals with information about how we process personal data. We do this in a number of ways, one of which is the publication of privacy notices. Our privacy notices comprise two parts – a generic part and a part tailored to the specific processing activity being undertaken.

**Data Controller**
The Data Controller is Durham University. If you would like more information about how the University uses your personal data, please see the University's Information Governance webpages or contact:

Information Governance Unit
Telephone: (0191 33) 46246 or 46103
E-mail: info.access@durham.ac.uk

**Data Protection Officer**
The Data Protection Officer is responsible for advising the University on compliance with Data Protection legislation and monitoring its performance against it. If you have any concerns regarding the way in which the University is processing your personal data, please contact the Data Protection Officer:

Jennifer Sewel
University Secretary
Telephone: (0191 33) 46144
E-mail: jennifer.sewel@durham.ac.uk

**Retention**
The University keeps personal data for as long as it is needed for the purpose for which it was originally collected. Most of these time periods are set out in the University Records Retention Schedule.

**Your rights in relation to your personal data**

**Privacy notices and/or consent**
You have the right to be provided with information about how and why we process your personal data. Where you have the choice to determine how your personal data will be used, we will ask you for consent. Where you do not have a choice (for example, where we have a legal obligation to process the personal data), we will provide you with a privacy notice. A privacy notice is a verbal or written statement that explains how we use personal data.

Whenever you give your consent for the processing of your personal data, you receive the right to withdraw that consent at any time. Where withdrawal of consent will have an impact on the services we are able to provide, this will be explained to you, so that you can determine whether it is the right decision for you.

**Accessing your personal data**
You have the right to be told whether we are processing your personal data and, if so, to be given a copy of it. This is known as the right of subject access. You can find out more about this right on the University's Subject Access Requests webpage.

**Right to rectification**
If you believe that personal data we hold about you is inaccurate, please contact us and we will investigate. You can also request that we complete any incomplete data.

Once we have determined what we are going to do, we will contact you to let you know.

**Right to erasure**
You can ask us to erase your personal data in any of the following circumstances:

- We no longer need the personal data for the purpose it was originally collected
- You withdraw your consent and there is no other legal basis for the processing
- You object to the processing and there are no overriding legitimate grounds for the processing
- The personal data have been unlawfully processed
- The personal data have to be erased for compliance with a legal obligation
- The personal data have been collected in relation to the offer of information society services (information society services are online services such as banking or social media sites).

Once we have determined whether we will erase the personal data, we will contact you to let you know.

**Right to restriction of processing**
You can ask us to restrict the processing of your personal data in the following circumstances:

- You believe that the data is inaccurate and you want us to restrict processing until we determine whether it is indeed inaccurate
- The processing is unlawful and you want us to restrict processing rather than erase it
- We no longer need the data for the purpose we originally collected it but you need it in order to establish, exercise or defend a legal claim and
- You have objected to the processing and you want us to restrict processing until we determine whether our legitimate interests in processing the data override your objection.

Once we have determined how we propose to restrict processing of the data, we will contact you to discuss and, where possible, agree this with you.

**Making a complaint**
If you are unsatisfied with the way in which we process your personal data, we ask that you let us know so that we can try and put things right. If we are not able to resolve issues to your satisfaction, you can refer the matter to the Information Commissioner's Office (ICO). The ICO can be contacted at:

Information Commissioner's Office
Wycliffe House
Water Lane
Wilmslow
Cheshire
SK9 5AF
Telephone: 0303 123 1113
Website: Information Commissioner's Office

**PART 2 – TAILORED PRIVACY NOTICE**

This section of the Privacy Notice provides you with the privacy information that you need to know before you provide personal data to the University for the particular purpose(s) stated below.

**Type(s) of personal data collected and held by the Psychology (Applied) Department and method of collection:**
Your name will be asked for on a consent form. Demographic data such as your age, gender, handedness will be collected on a separate questionnaire.

**How personal data is stored by the Psychology (Applied) Department:**
All data will be kept strictly confidential and anonymous by the research team. You will be allocated an anonymous number for data collection which will not be connected to your name or identity. This anonymous number will be given to at the beginning of the experiment. Consent forms will be stored in hard copy in a locked filing cabinet and will be destroyed after 10 years or once the data is published, depending on whichever is earliest. Demographic questionnaires will be transferred onto an electronic database, on a password protected computer and hard copies will be kept in locked storage and destroyed at the end of the experiment. Data will not be available to anyone outside the research team. If data is included in any publication it will be entirely anonymous and will not be identifiable as yours.

**How personal data is processed by the Psychology (Applied) Department:**
Information will be entered into a database for analysis. Your name is necessary for consent, but this will be kept separately and your data will be completely anonymised. Demographic data is necessary to accurately characterise our sample but will be kept separately and not identifiable.

**Withdrawal of data**
It will not be possible to identify you from any of the data we hold so data will not be able to be withdrawn. As data is given an anonymous code before starting the experiment which is not linked to any personal information.

**Who the Psychology (Applied) Department shares personal data with:**
No personal data will be shared, however anonymised (i.e. not identifiable) data may be used in publications, reports, presentations, web pages and other research outputs. At the end of the project, anonymised data may be archived and shared with others for legitimate research purposes.

**How long personal data is held by the Psychology (Applied) Department:**
We will hold your personal data (Consent forms) until the end of the PhD (March 2021) after which it will be destroyed

**How to object to the Psychology Department processing your personal data:**
If you have any concerns regarding the processing of your personal data, or you wish to withdraw your data from the project, contact Daniel T. Smith (daniel.smith2@durham.ac.uk, 01913340436).

**Further information:**
The research project is being supervised by Dr. Dan Smith from the psychology department of Durham University.

# Consent form

**Title:** [redacted]

**Researcher(s)**: Rebekah-Danielle Brockbank [redacted]
**Department:** Psychology
**Contact details** [redacted]

**Supervisor name**: Dr Dan Smith
**Supervisor contact details:** [redacted]

This form is to confirm that you understand what the purposes of the project, what is involved and that you are happy to take part. Please **initial** each box to indicate your agreement:

| | Initial |
|---|---|
| I confirm that I have read and understand the information sheet dated 22/11/2018 and the privacy notice for the above project | |
| I have had sufficient time to consider the information and ask any questions I might have, and I am satisfied with the answers I have been given | |
| I understand who will have access to personal data, how that data will be stored and what will happen to the data at the end of the project | |
| I agree to take part in the above study | |
| I understand that my participation is voluntary and that I am free to withdraw:<br>At any time<br>Without a specified reason<br>Without any adverse result of any kind? | |

I have read and understand the terms of participating in the study and that my data will be confidential and any personal data will be disposed of once the experiment has been completed.

Participant Name…………………………………………………………. Research Code……….
(Block Capitols)

Participants signature…………………………………

Date…………

# Appendix O

## Chapter 3b: Leader Board

The leader board:

| Participant Number | Score in the Task |
|---|---|
| 68 | 27989 |
| 16 | 34496 |
| 59 | 38043 |
| 85 | 38505 |
| 46 | 39782 |
| 36 | 40861 |
| 25 | 57487 |

# Appendix P

## Chapter 3b: Procedure Documents

Participant Information Sheet

Project title: Effects of motivation on performance in reaction time task.
Researcher(s): [redacted]
Department: Psychology Applied
Contact details: [redacted],
[redacted]

Supervisor name: Dr. Daniel Smith
Supervisor contact details: [redacted]

You are invited to take part in a study that I am conducting as part of my undergraduate dissertation project at Durham University.

This study has received ethical approval from the psychology ethics committee of Durham University.

Before you decide whether to agree to take part it is important for you to understand the purpose of the research and what is involved as a participant. Please read the following information carefully. Please get in contact if there is anything that is not clear or if you would.
The rights and responsibilities of anyone taking part in Durham University research are set out in our 'Participants Charter':
https://www.dur.ac.uk/research.innovation/governance/ethics/considerations/people/charter/

What is the purpose of the study?
The aim of this study is to…

- see how task performance is affected by aim.
- The study will be conducted from October 2019 to March 2020.

Why have I been invited to take part?
You have been invited because …

- You are an adult that is over the age of 18 of any gender.
- You have normal/corrected-to-normal vision.

Do I have to take part?
Your participation is voluntary and you do not have to agree to take part. If you do agree to take part, you can withdraw at any time, without giving a reason. Your rights in relation to withdrawing any data that is identifiable to you are explained in the accompanying Privacy Notice.

What will happen to me if I take part?
If you agree to take part in the study, you will…

- In the task you will be asked to complete a performance task as quickly as possible. The performance task involves pressing the yellow circles on the screen as quickly as possible after they have appeared. You will have 5 trails in the first instance we will allow you to practise the program so that you are familiar with it. After this, you will have a timed practise to make you prepared for the first critical trial. The critical trial will follow, where you must try to score as highly as possible in the given time. After this, the practise and critical trials will occur again to try and beat your previous scores.

- Before the experiment takes place, participants will be asked to complete CSAI 2 questionnaire, the AGQR questionnaire.
- Goal valuation will be done after the practise and critical conditions.
- Completion of the task will take place at Science Site. The experiment will take no longer than one hour.
- When answering the questionnaires participants can omit any questions that they do not wish to answer.
- Participants will be rewarded with appropriate participant pool credits in line with their participation.

Are there any potential risks involved?

- There are no potential risks involved in this study.

Will my data be kept confidential?
All information obtained during the study will be kept confidential. If the data is published it will be entirely anonymous and will not be identifiable as yours.

Full details are included in the accompanying Privacy Notice.

What will happen to the results of the project?

- The results obtained in this experiment will be reported in our final dissertation projects. The publication date for this is expected to be June 2020.

All research data and records needed to validate the research findings will be stored for 10 years after the end of the project. 10 years is the standard under the University's data management policy, but may vary.

Who do I contact if I have any questions or concerns about this study?
If you have any further questions or concerns about this study, please speak to the researcher or their supervisor. If you remain unhappy or wish to make a formal complaint, please submit a complaint via the University's Complaints Process.

Thank you for reading this information and considering taking part in this study.

# Debriefing Sheet

Project title: Effects of motivation on performance in reaction time tasks

Thank you for taking part in this study. What I want to find out from this research is whether the type of aim can alter your motivation to complete the performance task. The practice trials were used to elicit mastery motivation and the critical trials were used to elicit personal performance motivation. Previous studies have concluded that mastery goals produce more motivation than performance goals. In these studies researchers only tend to ask about the individual's motivation, instead of measuring motivation objectively using a reaction time task. We designed this experiment to see how different types of goals affected task performance. We expect to find that performance goals produce more motivation when it is measured objectively.

You were asked to complete two questionnaires to assess your motivation type and anxiety level. This allows for us to be able to determine to what extent they assess competence relative to mastery and/or performance related criteria. This allows for us to be able to see how these interact to impact reaction times on the critical trials.

You were not told the full extent of the aim as we did not want them to alter your behavior and performance on the task drastically in each condition. You were not deceived in any other way, and all data will be kept anonymous.

If you would like further information about the study or would like to know about what my findings are when all the data have been collected and analysed then please contact me on [redacted]cannot however provide you with your individual results.

If taking part in this study has raised any specific concerns, then I would suggest you speak to your GP or other health professional.

# Appendix Q

## Chapter 4: Sports Teams Recruitment

Experiment requirements, timings and dates: X team

*Session Time*: Each testing session will take **approximately 2hrs**. In this time, 6 participants can be tested.

*Set up*: I will endeavour to arrive 30mins prior to the start of the session/agreed upon experiment start time in order to set up equipment. The machine will need to be set up against a wall and if there is no covering, the experiment will be weather dependent.

*Pre-requisite*: In order for time efficiency, **a document will be emailed** to team members (or to coaches to distribute) containing the participant information sheet, privacy notice and link to the consent form and online questionnaire. In **order to participate** in the physical experiment this **consent form and questionnaire** will need to have been **completed prior to the session**. I will arrive with a check list to confirm which members have completed the questionnaire and can be tested.

*The experiment:* Each participant will **actively partake** in the experiment for **approximately 20-25mins**, after which point, they are free to return to training. Due to the time limitations of the sessions and number of team members, it is estimated that **approximately 3-5 sessions may be needed** in order to complete the data collection. This may change depending on the number of members who consent to taking part. Further questionnaires during the experiment will ideally be completed on a laptop, however if internet access if unavailable paper copies will be provided.

*Additional information:* Each participant taking part in that particular session will be given a participant card. This card will be used by the experimenter to track the stages of the experiment and conditions that have been completed. This **card will also contain the team members anonymous participant code** which will also be assigned to the submitted consent form.

End of experiment: A full debrief will be given when the team has been tested. If they wish, teams will also be given access to the experimental findings once the experiment has finished. They will also be acknowledged in the final thesis and any published papers which use their data.

*Possibly dates:*

*Location*: *Day, Time* (number of sessions, number of participants

- Session 1:
- Session 2:
- Session 3:
- Session 4:

# Appendix R

Chapter 4: S.T.A.R.R. Machine

**Figure R.1**

*S.T.A.R.R. Machine in use During Testing.*

Consent gained from anonymous participant for use of the photograph.

# Appendix S

## Chapter 4: Procedure Documents

### Participant Information Sheet

Project title: Making you move faster: achievement motivation and its impact on reaction time

**Researcher(s)**: Rebekah Brockbank
**Department:** Psychology
**Contact details**: [redacted]
**Supervisor name**: Dr Dan Smith
**Supervisor contact details**: [redacted]

You are invited to take part in a study that I am conducting as part of a PhD at Durham University. This study has received ethical approval from Psychology departmental ethics committee of Durham University. I am a third-year psychology PhD student with an MSc and BSc with Durham University Psychology department.

Before you decide whether to agree to take part it is important for you to understand the purpose of the research and what is involved as a participant. Please read the following information carefully. Please get in contact if there is anything that is not clear or if you would like more information.

**What is the purpose of the study?**
The aim of the current study is to investigate how motivation affects task performance. To do this we will be determining your global motivation for activity/sport-based task, specific motivation for the experimental task and performance time in a reaction time task. The study should completed by March 2020.

**Why have I been invited to take part?**
You have been invited to take part because you are over the age of 18 with normal or corrected to normal vision and no physical injuries.

**Do I have to take part?**
Your participation is voluntary, and you do not have to agree to take part. If you do agree to take part, you can withdraw at any time, without giving a reason. [Your rights in relation to withdrawing any data that is identifiable to you are explained in the accompanying Privacy Notice].

**What will happen to me if I take part?**
If you agree to take part in the study, you will complete a number of stages:
1. You will be asked to complete the consent form and a questionnaire.
2. You will have three practise goes on the machine
3. You will then receive some task instructions and aims and then have one go on the reaction time machine.
4. You will then complete three questionnaires before completing your second go.

Steps 3 and 4 will then be repeated after a reprieve/sport task. In total, time spent on the machine and questionnaires will take around 15 minutes to complete.

The questionnaires:

An introductory questionnaire (completed once)

- The Achievement Goal questionnaire – Sport (Conroy et al., 2003)

Three further questionnaires (completed twice)

- Achievement goal questionnaire – sport
- Achievement goal check
- Revised Competitive sport anxiety inventory – 2 (Cox et al., 2003)
- (please be aware none of these questionnaires are used as diagnostic tools).

And a reaction time task (completed twice)

- The reaction time task is conducted on a full-size reaction time machine. Detailed explanation of the task aims will be given after consent.

**Are there any potential risks involved?**

The experiment may have a physical expenditure but should not result in any discomfit or injury. There are also no expected personal benefits to taking part, however you may possibly find out a little more about how motivation affects your performance.

**Will my personal data be kept confidential?**

All the information obtained during the study will be kept confidential. You will be given an anonymous code which will be used for all your questionnaire and experimental data. If the data is published it will not be identifiable as yours. The online questionnaire data is only accessibly through password log in.

**What will happen to the results of the project?**

We are aiming to publish the results obtained from this study after its completion. No personal data will be shared, however anonymised (i.e. not identifiable) data may be used in publications, reports, presentations, web pages and other research outputs. At the end of the project, anonymised data may be archived and shared with others for legitimate research purposes.

All research data and records needed to validate the research findings will be stored for 10 years after the end of the project.

**Who do I contact if I have any questions or concerns about this study?**

If you have any further questions or concerns about this study, please speak to the researcher or their supervisor. If you remain unhappy or wish to make a formal complaint, please submit a complaint via the University's Complaints Process.

Any questions, please feel free to contact:
Rebekah Brockbank: [redacted]
Dan Smith: [redacted]

# DEBRIEF

Thank you for your participation. I would like to take this time to tell you a little more about my experiment. I am examining the relationship between individuals' dispositional (personality, domain-based) and situational (task-based) achievement goals and the effect their relationship has on task performance.

Each individual is differently motivated to achieve. This motivation also differs depending on the domain. For example, individuals are motivated different in the Work domain compared to the Academic or Sport domain. The two ways people are motivated are Mastery and Performance. Those dominant in mastery are more motivated to improve by developing their performance, gaining and mastering new skills. Those dominant in performance are motived by demonstrating their competence, comparing their performance to others and wanting to be the best. The first questionnaire was used to determine how you are globally motivated for tasks in a sporting environment.

Examining the relationship between dispositional goals and s ituational tasks, a previous study found individuals who were globally motivated by competition performed better on a memory task when they are given specific aims that encourage competitiveness, compared to when they are given aims that encourage them to do their best for their own improvement. The current study aimed to replicate this finding for a physical task.

In this experiment you were given the same task with two different aims, one focused on bettering your own performance (mastery) and another focused on beating other (performance). I will be looking at how your performance varied between the two different aims and how this links to your global motivational profile for activities/sport. Additionally, we were also interested in how an individuals' anxiety levels would be affected when they received different aims. We hypothesised that when instructional aims were different to your dispositional motivation you would be more anxious and less confident then when the instructional aims aligned with your dispositional goals.

If you have any questions, please feel free to ask/contact me or my supervisor via email: [redacted]

Thank you once again for your participation.

Rebekah Brockbank

**Supervisor contact information**
Daniel T. Smith, PhD
[redacted]

# Appendix T

## Discussion: Additional DDAG Investigations

Below are the statistical investigations of the DDAG component for Chapters 3a, 3b and 4.

**Chapter 3a**: Mastery dominance $\alpha = .860$; performance dominance $\alpha = .881$. Mastery and performance dominance scores are significantly different ($t(78) = 4.555$, $p < .001$) and within each dominance group there is a significant difference between mastery and performance dominance scores ($p < .001$). In the mastery dominant group the mastery dominance scores were significantly higher ($M = 34.62$) than the performance dominance scores ($M = 26.21$). In the performance dominant group the performance dominance scores were significantly higher ($M = 33.85$) than the mastery dominance scores ($M = 29.44$).

**Chapter 3b**: Mastery dominance $\alpha = .761$; performance dominance $\alpha = .895$. Mastery and performance dominance scores are significantly different ($t(128) = 6.421$, $p < .001$) and within each dominance group there is a significant difference between mastery and performance dominance scores ($p<.001$). In the mastery dominant group mastery dominance scores are significantly higher ($M = 35.48$) than performance dominance scores ($M = 27.51$). In the performance dominant group, performance dominance scores ($M = 36.97$) are significantly higher than mastery dominance scores ($M = 32.23$). Indicating each dominance group represents higher scores in its respective orientation scale.

**Chapter 4**: Mastery dominance $\alpha = .850$; performance dominance $\alpha = .907$. Mastery and performance dominance scores are significantly different ($t(80) = 4.421$, $p < .001$) and within each dominance group there is a significant difference between mastery and performance dominance scores ($p < .001$). In the mastery dominant group the mastery dominance scores were significantly higher ($M = 33.23$) than performance dominance scores ($M = 23.92$). In the performance dominant group, performance dominance scores were significantly higher ($M = 34.29$) than mastery dominance scores ($M = 29.43$). Indicating each dominant group represents higher scores in its representative orientation.