THE USE OF PSYCHOLOGY WITHIN STRENGTH AND CONDITIONING: COACHES' PERCEPTIONS, APPLIED USE, AND FUTURE RECOMMENDATIONS

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LIST OF ABBREVIATIONS

ASCA	Australian Strength and Conditioning Association
ATEPs	Accredited athletic training education programmes
BASES	British Association of Sport and Exercise Sciences
BPS	British Psychological Society
CSCS	Certified Strength and Conditioning specialist
NSCA	National Strength and Conditioning Association
PSPQ	Physiotherapist and Sport Psychology Questionnaire
SCSPQ	Strength and Conditioning and Sport Psychology Questionnaire
UKSCA	UK Strength and Conditioning Association

ABSTRACT

There is a paucity of research examining the use of psychological skills and strategies within strength and conditioning, this is despite research evidencing the effectiveness of psycho-physiological interventions which would be pertinent to the objectives of the strength and conditioning practitioner.

The purpose of this project was to examine the use of psychology within the strength and conditioning environment from the perspective of the strength and conditioning coaches themselves. Specifically, this project assessed the most important psychological aspects, the most frequently used skills, barriers to the use of psychology, and the psychology knowledge base for the strength and conditioning community. Finally, an experimental protocol evidenced the efficacy of employing misinformation within strength and conditioning.

The project revealed that psychology was more commonly used by more experienced professionals, nevertheless there was considerable disparity in the frequency with which psychological skills and strategies were used, with particular strategies being used significantly more than others. This was consistent with subsequent in-depth phenomenological exploration which revealed that strategies to promote confidence, skill acquisition, and regulate arousal were most frequently used. It was evident that there was uncertainty between practitioners as to the role responsibilities and the ethical boundaries associated within strength and conditioning. Furthermore, a lack of understanding was identified as the largest inhibitory factor.

Finally, guidelines are proposed as to what changes are required to facilitate the use of psychology within strength and conditioning. These comprise the increased use of continual professional development with workshop sessions developed by appropriately qualified psychologists. Equally the use of collaborative links with qualified psychologists was suggested as beneficial.

PUBLICATIONS ARISING FROM THIS RESEARCH

Journal articles

- Radcliffe, J.N., Comfort, P., & Fawcett, T. (2013). The Perception of Psychology and the Frequency of Psychological Strategies used by Strength and Conditioning Practitioners. *The Journal of Strength & Conditioning Research, 27* (4), 1136-1146.

Conference presentations

- Radcliffe, J.N., Comfort, P., & Fawcett, T. (2013). Psychological strategies included in strength and conditioning. Paper presented at BASES Conference 2013. Preston, UK.

- Radcliffe, J.N., Comfort, P., & Fawcett, T. (2013). Barriers to the inclusion of psychological strategies within strength and conditioning. Paper presented at BASES Conference 2013. Preston, UK.

- Radcliffe, J.N., Comfort, P., & Fawcett, T. (2013). The origin of the psychologically orientated knowledge base within strength and conditioning. Paper presented at BASES Conference 2013. Preston, UK.

- Radcliffe, J.N., Comfort, P., & Fawcett, T. (2013). A qualitative analysis of the psychological responsibilities of strength and conditioning practitioners. Paper presented at BASES Conference 2013. Preston, UK.

- Radcliffe, J.N., Comfort, P., & Fawcett, T. (2012). The frequency of psychological strategies used by UK strength and conditioning practitioners. Paper presented at The 2012 International Convention on Science, Education and Medicine in Sport. Glasgow, UK.

CHAPTER ONE

1. INTRODUCTION AND LITERATURE REVIEW

1.1. Introduction

The aim of this thesis was to examine the use of psychology within the discipline of strength and conditioning. This would provide the opportunity to explore the perceptions of strength and conditioning practitioners, and identify methods to facilitate the use of psychology within the strength and conditioning profession.

In order to promote the use of psychological strategies, this thesis first addressed the extent to which psychological skills were utilised by practitioners. This provided information regarding the extent to which strength and conditioning practitioners utilise psychological techniques, and identified the existence of an imbalance between the frequencies with which particular strategies are utilised. This provided encouraging data that psychological strategies are used and presented scope for exploring the reasons as to why an imbalance exists in skill use.

This thesis compared various demographics of the worldwide strength and conditioning community. Such comparisons examined the effect experience has on the use of psychological strategies, whilst, in examining the social and educational impact on the perception towards psychology, the thesis explored data from practitioners worldwide incorporating triangulation of methods.

Through exploration of variations in the use of psychology and comparisons between practitioner demographics, this thesis presents findings that enable the strategic development of the discipline to incorporate greater usage of psychology concerning the qualification and professional development of practitioners.

Furthermore, in addition to exploring the factors influencing the use of psychology, presenting implications for professional development, the thesis examined contemporary interventions highlighted by practitioners and explored the efficacy of such interventions within a laboratory setting. Such interventions included the use of misinformation of goals, the effect to which goal difficulty can shape weightlifting performance, and also the use of attentional focussing cues to examine the effectiveness of various attentional foci determined by the practitioner instruction. Overall, this thesis utilised multiple research strategies to investigate perceptions of strength and conditioning practitioners and provides recommendations for professional development and examination of the efficacy of current coaching practices.

1.2. Chapter Overview

The purpose of this chapter is to outline the rationale for the research. It will present contextual background to the importance of the research and provide a review of the literature. The review of the literature will identify the current influences that govern the use of psychology in strength and conditioning. This will be obtained through reviewing various contexts including coaching, physical therapy, and physiotherapy. This chapter will address the demands placed on the

strength practitioner and examine the effectiveness of psychological skills within the strength and conditioning domain. It will question previous research investigating the extent to which strength practitioners employ psychological techniques. The chapter will conclude by presenting the aims and objectives of the thesis.

1.3. Contextual Background

It is often noted that despite the sport psychologist being the member of the athlete support team most qualified to offer psychological interventions, access to a sport psychologist is often limited, with the psychologist being unavailable to offer advice. Furthermore when the psychologist is available, athletes are often reluctant to seek formal psychological support (Ninedek & Kolt, 2000).

It is documented that rehabilitation professionals and strength and conditioning coaches are highly valued support personnel in comparison to the less valued sport psychologist (Wilson et al., 2009). As a result, due to various constraints the specialised services of sport psychology-titled professionals are underutilised (Pain & Harwood, 2004; Zakrajsek & Zizzi, 2007; Wilson et al., 2009; Zakrajsek et al., 2011). It is suggested that the professionals best-placed to provide psychological support are those in regular contact with the athlete, for example, the sport trainer (Ford & Gordon, 1998; Scherzer & Williams, 2008) or the athletic trainer during athletic rehabilitation (Francis et al., 2000; Ninedek & Kolt, 2000). As such it would be expected that the strength and conditioning practitioner would fulfil a similar role, being well placed to provide psychological education, support and guidance. Indeed a range of researchers (Wiese & Weiss,

1987; Wiese et al., 1991; Pearson & Jones, 1992; Gordon et al., 1998; Gordon et al., 2001; Scherzer & Williams, 2008) advocate this, suggesting that professionals in regular contact with the athlete are best-placed to educate and guide with regard to psychological skills and strategies.

As a discipline, strength and conditioning can be considered a recent introduction; the strength and conditioning practitioner is now a valued member of athlete support teams within many sporting settings. The recent introduction of strength and conditioning as a standalone discipline has promoted the exploration of the requirements and responsibilities of an accredited strength and conditioning practitioner. One such competency is the ability to use psychological strategies to facilitate strength and conditioning training. Indeed, as suggested by Holloway (1994, 1995) and more recently by Mellalieu and Shearer (2012), it would be beneficial for strength and conditioning specialists to apply key psychological self-regulatory and self-expectancy theories and concepts. Despite such suggestions, and various explorations of the responsibilities of strength and conditioning professionals, the extent to which psychological skills are incorporated into strength and conditioning practices is still unclear. Furthermore, pertinent to psychology there are limited studies examining the dissemination of and engagement with the educational sources.

There is little evidence supporting the effectiveness of accreditation processes in preparing practitioners in the utilisation of psychological strategies. For the relatively contemporary profession to develop, it would be advantageous

to explore such factors key to the understanding and application of psychological strategies.

1.4. Development of Strength and Conditioning as a discipline

During the last forty years, strength and conditioning has developed as an applied scientific discipline in its own right. The importance of strength and conditioning training has been appreciated since the 1970s (National Strength and Conditioning Association, 2013). Initially the role of strength and conditioning coach was adopted by a member of the sport coaching staff, for example the basketball or US Football coach within North American colleges and universities (Martinez, 2004). Typically an individual would be appointed a strength coach on the basis of limited previous strength training experience and little more than a keen interest; therefore the coaches often lacked sufficient training to be equipped for the demands of the role (Martinez, 2004). As more organisations recognised the need for a competent strength coach, many began recruiting coaches to serve solely as the strength and conditioning coach.

The expansion of strength and conditioning as an applied discipline is illustrated by the growth of the largest worldwide professional body, namely the National Strength and Conditioning Association (NSCA; Tod et al., 2012). Since commencement in 1978, the NSCA has grown to have over 25 thousand members worldwide based on the ethos *"to unify members and facilitate a professional exchange of ideas in strength development as it relates to the improvement of athletic performance and fitness"* (National Strength and Conditioning Association, 2013). A collective of 76 founding members established the *National*

Strength Coaches Association with the targets to provide education, communication and to analyses and promote the profession of Strength and Conditioning. In order to accommodate the development of the profession the name was later amended to be the *National Strength and Conditioning Association* (National Strength and Conditioning Association, 2013). The NSCA established an international reputation with members originating from countries including Australia, China, Canada, and the UK.

The formation of the NSCA has facilitated the collaboration of wide-ranging disciplines including sport science, sport coaching, strength coaching and research, as well as medical professions including physiotherapists, athletic trainers, physicians and sports rehabilitators. Such wide-ranging members present a network from which information pertinent to strength and conditioning can be distributed via conferences and through peer-reviewed research journal publications including the monthly Journal of Strength and Conditioning Research.

In amalgamating the broad range of areas to create an independent discipline, the NSCA offered certification processes for those individuals wishing to specialise as strength and conditioning professionals. The certification process was a milestone in establishing the credibility of the profession as an independent discipline. Since 1985 the NSCA has developed two certifications; the certified personal trainer, aimed at professionals working within health and fitness settings and specific to strength and conditioning practice; and the Certified Strength and Conditioning Specialist (National Strength and Conditioning Association, 2013).

Such qualifications are regarded as measures of excellence within the strength and conditioning industry (National Strength and Conditioning Association, 2013).

Since the inception of the NSCA, additional organisations have developed, each with their own respective accrediting procedures. Formed in 1992 the Australian Strength and Conditioning Association (ASCA) is the professional educational organisation for strength and conditioning coaches in Australia representing over 2000 accredited strength and conditioning coaches (Australian Strength and Conditioning Association, 2012). More recently, the UK Strength and Conditioning Association (UKSCA) was formed in 2004 and to date represents over 350 accredited members.

The expansion of strength and conditioning as a discipline is suggested to be owing to the fact that strength and conditioning coaches often have postgraduate qualifications grounded in sport and exercise science, and the profession is achieving recognition for the promotion of health as well as sports performance (Tod et al., 2012). The growth of the discipline is also evidenced by the wealth of research currently published specific to strength and conditioning. The Journal of Strength and Conditioning Research, for example, consists of a monthly peer-reviewed journal presenting research and practical applications from a range of scientific backgrounds such as biomechanics, physiology, nutrition and psychology.

1.5. Strength and Conditioning Accrediting Organisations

1.5.1. The National Strength and Conditioning Association

The NSCA is the world's largest strength and conditioning organisation (Tod et al., 2012) responsible for over 25 thousand members. The NSCA leads the way in introducing an accreditation process for strength and conditioning practitioners. The Certified Strength and Conditioning Specialist (CSCS) is a qualification endorsed by the National Commission for Certifying Agencies is regarded as a measure of excellence by industry professionals. Introduced in 1985, the CSCS aims to identify practitioners with the required skills and knowledge to safely and effectively administer strength and conditioning programmes.

In order to be accredited as a CSCS, practitioners are required to complete two series of multiple choice questions based upon the scientific foundations and practical applications of knowledge (National Strength and Conditioning Association, 2009). Practitioners must also demonstrate continuing education upon being awarded the CSCS. This is through the continuing education programme in which practitioners must submit an activities record every three years. The activities partaken are predominantly at the discretion of the practitioner.

1.5.2. The UK Strength and Conditioning Association

A relatively recent introduction, formed in 2004, the UKSCA now has over 350 accredited members. The UKSCA was established with the objective of providing an independent voice to represent practitioners based within the UK,

whilst establishing and promoting high professional standards within strength and conditioning. Similar to the NSCA, the UKSCA has an accreditation process to identify *"Practitioners with the specialist skills and competencies for the planning and implementation of physical preparation programmes for performance".* (UK Strength and Conditioning Association, 2012a). In order to be accredited, practitioners must demonstrate understanding of human physiology in relation to exercise and competency in practical strength and conditioning coaching. The assessment consists of an examination, a practical demonstration assessment and a case study presentation. (UK Strength and Conditioning Association, 2012b). In addition, similar to the NSCA, to maintain accreditation practitioners must maintain and submit a record of continuing professional development.

1.5.3. The Australian Strength and Conditioning Association

Founded in 1992, similarly to preserve the interests of strength coaches in Australia and to provide a voice during dialogue with service providers, the ASCA represents over 2000 accredited strength and conditioning coaches. Tasked as the professional development body for Strength and Conditioning Coaches in Australia, the ASCA provides procedures to enable practitioners to become accredited strength and conditioning practitioners. The accreditation procedure is recognised through the National Coach Accreditation Scheme administered by the Australian Sports Commission. Similar to the NSCA and UKSCA, the ASCA has an official publication, namely the quarterly published *Journal of Australian Strength and Conditioning* (Australian Strength and Conditioning Association, 2012). The ASCA accreditation is a multi-staged

process in which each stage complements the previous stage. The requirements of the ASCA necessitate the completion of a workbook and observation and demonstration of coaching practice at foundation level with subsequent levels requiring the publication of an article and oral defence of training rationales.

1.6. The Role of the strength and conditioning practitioner

The strength and conditioning professional plays a crucial role in athletic settings. As defined by Kontor (1989), a strength and conditioning coach is a practitioner who:

> *"directly works with athletes to develop all physical qualities, such as speed, strength, power, agility, cardiovascular endurance, muscular endurance and flexibility including nutritional and drug free restorative considerations to improve performance and prevent injuries to specific sports." (p. 75).*

With appropriate instruction from rehabilitation specialists, strength and conditioning specialists can be an influential component of sports injury rehabilitation (Kontor, 1989; Wathen, 1989).

To date the NSCA has conducted two studies into the job analysis of strength and conditioning practitioners (Baechle, 1997; National Strength and Conditioning Association, 2009) which has been used to determine both the NSCA professional guidelines and the examination criteria for the certified strength and conditioning specialist (CSCS) examination. The NSCA define a certified strength and conditioning specialist as "*a professional who practically applies foundational knowledge to assess, motivate, educate and train athletes for*

the primary goal of improving sport performance. (NSCA, 2009, p.13) As published by the NSCA, the strength and conditioning professional guidelines state that the ability to *"use sport psychology techniques to enhance the training and/or performance of the athlete"* (National Strength and Conditioning Association, 2009, p. 13) is a scientific foundation required by certified strength and conditioning specialists. In addition the strength and conditioning specialist, having regular contact with the athlete, albeit independent of the sports coach, is in an ideal position to contribute to the psychological aspects of training (Ford & Gordon, 1998; Maniar et al., 2001; Arvinen-Barrow et al., 2010). This is emphasised as Holloway (1994, p.56) states that:

> *"A [strength and conditioning] coach who understands the concepts of sport psychology, along with the willingness to practice the skills necessary to apply them, can support the development of these qualities in the athlete and increase the likelihood of getting the strength and condition programme properly executed."*

Owing to the rapidly expanding discipline, there are copious amount of scientific literature detailing physiological adaptation to exercise and the associated underlying mechanisms; however the strength and conditioning practitioner is required to employ a broader skill set than that listed in the literature. The practitioner must be able to apply such underpinning scientific knowledge to the athlete's individual requirements (Tod et al., 2012). Despite such a wealth of literature, there seems to be limited research documenting the professional practices of the strength and conditioning practitioner.

The multifaceted role of a strength and conditioner has been examined in various contexts, ranging from the practices within various North American sports (Sutherland & Wiley, 1997; Ebben & Blackard, 2001; Durell et al., 2003; Ebben et al., 2004; Ebben et al., 2005; Duehring et al., 2009), the sources of scientific data and training upon which the strength and conditioner's practice is based (Durell et al., 2003), to job analyses and demographics of coaches working at differing levels of competition (Pullo, 1992; Massey et al., 2004; Massey et al., 2009; Duehring & Ebben, 2010).

According to the 1988 Role Delineation Study (National Strength and Conditioning Association, 1988), the prime responsibilities of the strength and conditioning practitioners consists of programme design, exercise technique, testing and evaluation, nutrition, exercise and science knowledge, and organisational and administrative duties. Despite this direction towards the responsibilities of the strength and conditioning practitioner, variation exists in the specific practices employed. For example, Ebben and Blackard (2001) identified differences in the style of fitness tests employed in terms of attribute tested and the frequency of conducting such tests. It was noted that differences existed concerning perceptions of the most effective weightlifting exercises, and of protocols to incorporate into strength and conditioning programmes.

The strength and conditioning professional is required to work within an interdisciplinary team often fulfilling additional roles, especially at sub-elite levels, including assistant skills and tactical coaching (Pullo, 1992; Massey et al., 2004; Massey et al., 2009; Duehring & Ebben, 2010). Furthermore Brooks et al.

(2000) emphasised that a strength and conditioning practitioner is primarily a coach, that is they must provide social, emotional, and physical development. The role of a strength and conditioner is clearly a complex one and requires further scrutiny.

According to Tod et al. (2012), the role of the strength and conditioner changes over time; the effects of personal experience contributing to the role demanding a more versatile and client-driven perspective in which managing the athlete's significant others (e.g. coaches and family members) becomes increasingly important. Furthermore, the coach occasionally assumes a counselling role in which the athlete shares sensitive information. In the multidisciplinary sports team the strength and conditioning coach increasingly becomes aware of the implications of their prescribed programmes regarding further components of the athlete's training, and with experience is occasionally required to serve as a line manager to junior coaches (Tod et al., 2012).

Tod et al. (2012) also noted through qualitative analysis that experienced strength practitioners were more readily able to modify a particular programme to an individual client's needs. The importance of developing athlete buy-in was identified as a common theme amongst strength practitioners. The ability to develop a positive rapport, with the client trusting that methods used would provide the desired outcome, was a prime quality acknowledged by experienced practitioners (Tod et al., 2012).

Through the work of Tod et al. (2012), it is apparent that as strength practitioners gather experience, there is also an increased awareness of so-called softer skills in addition to the established training responsibilities of the practitioner. Tod et al. (2012) surmise their work in stating that effective strength and conditioning coaches are required to (a) focus on attributes, in addition to physical attributes, which will assist the athlete in developing their competition readiness; (b) have a sound technical knowledge grounded in research and applied experience; (c) be competent in developing positive rapport and trust with clients; and (d) be adaptable in tailoring programmes to the specific requirements of the individual.

1.7. Ethical Considerations

With the responsibilities of the strength and conditioning specialist being to employ psychological elements, and the growth of sport psychology and interest regarding the application of psychological skills training in wider coaching (Weinberg & Gould, 2010a), the sport community has questioned the training requirements and the qualifications required to implement psychological skills and the location of the theoretical ethical boundary (Wilson et al., 2009; Zizzi et al., 2009). This is pertinent as the appropriate level of qualification and training has been questioned by athletic directors (Wilson et al., 2009). Indications exist that sporting directors are uncertain of what constitutes sufficient training to equip a practitioner with the appropriate knowledge to effectively employ psychological skills (Wilson et al., 2009).

It is clear that sport psychology is a discipline in its own right, with the title of Sport and Exercise Psychologist receiving protected status within The United Kingdom (Health Care Professions Council, 2012). Individuals receive considerable training and assessment to become a certified Sport Psychologist and it is possible that there are instances requiring the experience and intervention of appropriately licensed practitioners which go beyond the use of psychological skills training and competencies of the sport coach (Andersen et al., 2001; Hack, 2005; McCann, 2005). In such instances the appropriate referral network should be to the Psychology-titled professional. (Hemmings & Povey, 2002).

Within the USA there is growing awareness of the competencies required to use psychological strategies. For example the need to have a measure of competencies and assessment of individual's qualifications has been stressed by the United States Olympic Committee, and has resulted in the establishment of the Sport Psychology Register and Association of Applied Sport Psychology (Zizzi et al., 2009).

There has been some progress in defining competence and suggesting who is qualified to educate athletes regarding their psychological skills. However, whilst it is the responsibility of the Psychologist to offer counselling and even attend to clinical issues (Andersen et al., 2001), the use of psychological performance enhancement skills offers a blurred boundary, eliciting questions as to who is qualified to administer such skills (Zizzi et al., 2009). This is further exacerbated by the absence of guidelines on the application of mental skills within coaching (Zizzi et al., 2009).

It is noted that the level of competence is difficult to ensure due to the diverse backgrounds of those who administer psychological strategies (Zizzi et al., 2009). Furthermore the requirement to use 'psychological skills' to enhance performance is a role responsibility of Strength and Conditioning Specialists accredited by the NSCA (National Strength and Conditioning Association, 2009), yet appears to receive little assessment in the accreditation process of the UKSCA (UK Strength and Conditioning Association, 2012b). This is mirrored in other disciplines, such as sport coaching, athletic training, and physiotherapy, regarding the training requirements to equip practitioners with the required skill set (Zizzi et al., 2009). Such organisations (National Athletic Trainers' Association, 2006) state that particular skill sets should be learned (for example, somatic and cognitive regulatory strategies), however they do not require the use of these skills within the role responsibilities (Zizzi et al., 2009). Furthermore, some state that only those licensed as psychologists are able to provide psychological support to their athletes (Zizzi et al., 2009). However, this would be unfeasible as there would be insufficient numbers of psychologists to provide the required service (Danish & Hale, 1981) and would additionally prohibit the support personnel with the greatest contact with the athlete, for example coaching and rehabilitation professionals, from implementing psychological skills (Zizzi et al., 2009).

The question is posed as to whether coaches can use mental skills training if they have had no formal training (Zizzi et al., 2009). There are indications that without sufficient training, negative outcomes may arise and form misperceptions that psychological interventions are ineffective or even detrimental. The potential

problems associated with untrained professionals approaching mental skills include offering a 'canned' approach in which individual differences are neglected, an insufficient range of skills to provide suitable interventions combined with an insufficient awareness of the appropriate time to administer interventions, and a lack of the pedagogical knowledge required to communicate and rationalise the use of such skills with athletes (Orlick & Partington, 1987; Danish et al., 1993; Hardy, 1996; Tod & Anderson, 2005). Such negative outcomes would negatively impact on the likelihood of applying psychological strategies.

Concerning the increasing demand for psychological skills training (Weinberg & Gould, 2010a) and the unrealistic view that qualified psychology-titled professions provide psychological skills in their entirety (Danish & Hale, 1981), other support staff could be involved with teaching of psychological skills with appropriate role clarification (Zizzi et al., 2009). This is evident within athletic training (Wiese & Weiss, 1987; Wiese et al., 1991; Brewer et al., 1994; Ford & Gordon, 1998; Cramer & Perna, 2000), physiotherapy (Francis et al., 2000; Hemmings & Povey, 2002; Jevon & Johnston, 2003; Arvinen-Barrow et al., 2007; Hamson-Utley et al., 2008; Arvinen-Barrow et al., 2010), and sport coaching (Gould et al., 2002).

This would be especially important when considering the financial and logistical barriers to employing a psychologist (Kremer & Marchant, 2002; Pain & Harwood, 2004), resulting in athletes being unable to receive the professional services of a sport psychology consultant. Weinberg and Gould (2010a) propose

that ideally coaches would receive instruction from psychologists to increase the proficiency of the coaches.

This has proved beneficial in the athletic training setting (Clement & Shannon, 2009), however similar results are yet to be seen in the strength and conditioning domain. It is clear that, with appropriate role descriptors and boundaries positioned, Strength and Conditioning Professionals can provide a valuable service to the athletes they support.

1.8. Training Methods and Sources of Information for Strength and Conditioning Specialists

Despite various examinations of the practices and role description of the strength and conditioning professional, limited studies have examined the sources of information on which their practice is based. Utilising Survey methods, the scientific data that forms that basis of practitioners' work was examined in both US high school (Komarek, 1996) and US Collegiate (Durell et al., 2003) settings. Kormarek (1996) identified that the greatest source of information used by North American high school strength and conditioning coaches was other coaches, specifically North American Collegiate coaches, and the training programmes that they use. In light of this Durell et al. (2003) examined the practices of collegiate coaches. It was found that all of the respondents had a baccalaureate degree as a minimum, with over two-thirds holding a master's degree in a relevant discipline such as exercise science. Concerning certification, three-quarters of the respondents held the CSCS qualification; practitioners also possessed wide-ranging qualifications including weightlifting and personal training qualifications.

The incidence of practitioners holding the CSCS, although high (75%), is surprising. This is owing to the perception that the CSCS is the only certification that is considered essential within all divisions of the North Collegiate Athletic Association (Martinez, 2004). Whilst it is now considered essential to hold a strength and conditioning qualification, this perception has evolved. For example, twenty years ago Pullo (1992) conducted a similar survey identifying that it was considered "nonessential" to possess strength and conditioning certification, but "essential" to hold university qualifications at bachelors and masters level.

It is now considered "very essential" to hold such higher education qualifications (Martinez, 2004). This demonstrates that, as the profession is evolving, the academic burden is increasing for strength and conditioning practitioners, with greater emphasis on qualifications and certification. However, given the emphasis on such qualifications, certification as a source of information on which to base practice ranked low; only one percent of sampled collegiate coaches identifying that certification provided the knowledge on which to base practice (Durell et al., 2003). This is in contrast to gaining information through the use of Journal articles, principally from the Journal of Strength and Conditioning Research, which 94% of the respondents identified as an information source they utilised. Nonetheless despite journal articles being the most frequently used source, the perceived most important sources of information were fellow coaches (Durell et al., 2003).

The findings of Kormarek (1996) and Durell et al. (2003) that the fellow coach is a key information source is mirrored in the work of Tod et al. (2012).

Utilising qualitative interview methods it was evident that coaches value the input and guidance from their fellow strength and conditioning coaches. It was also apparent that the constructive appraisal offered by peers is instrumental in allowing the coach to develop self-confidence regarding the techniques that they employ. Similarly the experience of working with clients was a key information source that equipped the practitioner with the skills to assess an athlete's specific needs and tailor individualised training programmes (Tod et al., 2012). Numerous practitioners attributed this increased confidence to the experience of working directly with clients (Tod et al., 2012).

It is clear that the learning through experience is fundamental for the developing strength and conditioning practitioner. However, using quantitative methods Durrell et al. (2003) discovered that only eight percent of practitioners identify personal experience as the most important source of information. The reasons for this apparent discrepancy are unclear. It is plausible that given the reliance on other coaches, (with 47% stating coaches are the most important information source) rank ordered personal experience would indeed rank highly. As Tod et al. (2012) did not quantify the information sources it is possible that despite personal experience and colleagues both being key information providers there is still an emphasis on the reliance on colleagues for information.

Durrell et al. (2003) noted that the use of journals was a fundamental information source both frequently cited by professionals and highly ranked as an important source. Through qualitative analysis it was apparent that reliance on literature varied throughout the practitioner's development. Tod et al. (2012)

concluded that as practitioners develop, decision making rationale originates from internal sources such as developing personal knowledge, as opposed to an early career reliance on external sources for example textbooks and other practitioners. Tod et al. (2012) stated that whilst evidence-based practice is fundamental, reflected in Durrell et al. (2003), as the practitioner gains experience the human component becomes dominant with the emphasis on developing individualised programmes in view of the client's personality and needs; further development equips the practitioner to integrate research into practice whilst accounting for the personal requirements of individual clients. Strength and conditioning practitioners stated how their previous experience before becoming a strength practitioner has also shaped their practice. It was through their own experience that practitioners developed an appreciation of the demands placed on the athletes (Tod et al., 2012).

In addition to practical experience and peer support, an additional source is the mentor. The role of the mentor becomes clear as it is through the mentor, or professional elder, that the additional 'soft skills' and attitudes are developed (Tod et al., 2012). It is proposed that as a "helping profession" (Tod et al., 2012, p.858) similar to disciplines such as psychology and physiotherapy, and considering the value of experience and mentorship, a supervision process would aid the practitioner development (Tod et al., 2012). However, the respective strength and conditioning associations appear to fail to provide such an opportunity to the same extent as other professions (Tod et al., 2012).

Regarding the studies exploring the development of strength and conditioning professionals, particular caveats must be expressed. Firstly the work of Durrell et al. (2003) utilised a sample comprising professionals practicing in North America. It is therefore impossible to generalise the findings to a wider population. For example it is possible that factors such as culture and accrediting body may influence the practitioner development. Tod et al. (2012) did however employ a broader sample comprising practitioners working within the UK, USA New Zealand and accredited by either the NSCA or the UKSCA or holding dual accreditation. Nonetheless the small sample size (n=15) lacks generalisability despite offering detailed and valuable information. Furthermore the previous studies provide detail about the development of skills relevant to strength and conditioning as a whole. There is no evidence addressing development concerning specifically the use of psychology within strength and conditioning.

1.9. Perceptions towards psychology

As a relatively contemporary profession, with content-specific academic papers, professional governing bodies, and academic courses only appearing post 1960, there has been an increase in attention given to sport psychology as both an applied profession and an academic subject (Gee, 2010).

The previous 20 years has witnessed a rapid expansion in sport psychology research, exploring a wealth of topic areas in both an academic and applied practice settings with robust evidence supporting the use of sport psychology as a performance aid (Mellalieu and Hanton, 2009). However, despite the exploration of the responsibilities and practices of strength and conditioning practitioners, the

research has focused predominantly on the utilisation of physical training strategies. In contrast there is a dearth of research examining the use of psychology within applied strength and conditioning practice. This is emphasised by the widely-used *Strength and Conditioning Practices of Professional Strength and Conditioning Coaches* survey instrument (Ebben & Blackard, 2001; Ebben et al., 2004; Ebben et al., 2005; Simenz et al., 2005; Duehring et al., 2009; Massey et al., 2009), which focuses on various physical training practices with only the miscellaneous section of "unique aspects" offering scope to examine psychological skill use. Consequently such studies have failed to yield data indicating the use of psychological strategies within strength and conditioning practice.

Through observational techniques Massey et al. (2002) led the way in determining the frequency with which psychological skills were used by strength and conditioning coaches. The study highlighted the value of motivational techniques within strength and conditioning, with behaviours such as those termed by Massey et al. (2002) as 'hustle' and 'praise' being observed. The paper served as a concern that there is a lack of emphasis on specific psychological strategies evidenced witi9n strength and conditioning. The majority of the existing literature examined the behaviour of strength and conditioning professionals without objectively exploring the extent to which key psychological strategies (Holloway, 1994, 1995) are implemented or perceptions towards the effectiveness of such strategies.

A British Association of Sport and Exercise Sciences (BASES) Special Interest group meeting raised concerns about the representation of psychology within strength and conditioning. Tod (2008; D. Tod, Personal communication, E-mail received 22/09/11) raised the following points concerning the representation of psychology within strength and conditioning:

> *"Psychological factors in strength and conditioning seem not well recognised and this may be because (a) psychologists do not have the knowledge to apply psychological strategies in useful ways within Strength and Conditioning, or (b) strength and conditioning professionals do not get an adequate understanding of psychology during their training. What are some of the psychological factors that contribute to success in strength and conditioning programmes and how have members learned about them and tried to use them?"*

Consequently the examination of how psychological interventions are utilised by the strength and conditioning practitioner is a vital step in facilitating the development of strength and conditioning as an expanding discipline. Despite the relative lack of research a number of studies have examined the utilisation of, and perceptions towards, psychology within various contexts. Subsequently, the joint deductive and inductive nature of the research demands the exploration of established reasons within other domains accounting for the perceptions towards, and prescription of, the use of psychological strategies within the professional athlete support environment.

1.9.1. Sports Coaches

There are mixed perceptions towards the use of psychology within sport settings. A general consensus exists that psychology is beneficial, with coaches perceiving the benefits of sport psychology and the use of sport psychology consultants as awareness and interest in the discipline increases (Wilson et al., 2009). Nonetheless this has not been reflected in the recruitment of sport psychologist consultants within either the UK or North America (Pain & Harwood, 2004; Wilson et al., 2009). The barriers to employing sport psychologist consultant demonstrate the importance of athlete support professions in offering psychological input.

Sullivan and Hodge (1991) explored the views of athletes and coaches towards psychology within New Zealand. It was concluded that all coaches sampled utilised psychology within their prescribed training with, on average, 12% of training time allocated to psychological skills. Whilst this early study appears encouraging, the caveat exists that the sample comprised of elite athletes and their coaches, this view may not be consistent throughout wider participation sport. The use of psychology was considered very important to success yet the coaches perceived themselves to possess inadequate knowledge to optimise the use of psychology. It was evident that despite a moderately high proportion (65%) indicating that they have had exposure to sport psychology either through training workshops or observations of psychology practitioners, the main source of knowledge was text books, however the coaches also described that mental skills are developed during physical practice. Whilst providing encouraging findings concerning the value and use of psychology, concerns exist with sports peoples'

understanding of what constitutes sport psychology with ranging definitions offered, for example suggesting ‘daydreaming’ comprised mental training.

Gould and colleagues (1990b) and Howe (1993) similarly noted that sports coaches are only moderately prepared for employing psychological techniques despite demonstrating assurances towards physical training competencies. The consensus was that coaches had undergone little or no formal training, with much of their psychology-based skills developed through the modelling of other sports professionals. It was however encouraging that the surveyed coaches demonstrated a high acceptance of psychological skills training programmes.

Gould et al. (1990b) examined the effectiveness of a development training programme to promote the use of psychology. Post workshop, coaches initially presented greater intent to use psychology within training however overtime this aspiration diminished with many of the newly acquired skills not incorporated into training. It is apparent that without the continual inclusion of psychology within coaching supported by practitioners knowledgeable and competent in the use of psychology, the emphasis on the psychological components of training and performance will diminish. Howe (1993) suggested it is imperative that the psychological skills be integrated into physical training with greater involvement of the coach.

Recently Zakrajsek et al. (2011) concluded that coaches perceive mental skills training to be very important within American Football, and that such skills are readily developed through appropriate training. Despite recognition of the

benefits of a mental skills training programme, the majority of the surveyed coaches did not implement such techniques and were reluctant to recruit the support of a sport psychology consultant.

It is important to consider that sport psychology does not receive a favourable opinion universally. Psychology is often mistakenly associated as only useful for so called 'problem athletes' to provide short-term solutions (Kremer & Marchant, 2002). Likewise within association football there is the opinion that psychological interventions are applicable only to 'problem athletes,' with mentally 'strong' athletes not benefitting from sport psychology due to the evident underlying perception that psychology is considered to be common sense (Pain & Harwood, 2004). The misconception also exists that sport psychology does not differentiate from psychological health domains such as clinical psychology and psychotherapists (Linder et al., 1991).

Wilding (2009) presents the argument that despite previous ignorance to the function and application of sport psychology, athletic coaches are now enthusiastic to incorporate psychological skills into their training programmes. It is no longer the naivety concerning the effectiveness of the psychological components that is causing the neglect of such skills; rather it is the execution of such individualised psychological skills and introduction of applicable techniques. The majority of coaches now consider psychology to be a valuable asset, however are reluctant to utilise such techniques for fear or negatively affecting performance (Wilding, 2009). It remains to be seen if this developing trend is shared universally.

Creasy et al's (2009) article briefly addressed the views of North American athletics coaches to determine if coaches were implementing psychological strategies, and what factors influenced the use of mental training. There was overwhelming evidence that coaches perceived mental skills as effective however only 9% of the sample responded that they implement psychological strategies; time restrictions and lack of knowledge were the prime reasons for neglecting psychological skills. This coincides with the views of other professions (Ninedek & Kolt, 2000; Hemmings & Povey, 2002; Devonport, 2006; Hamson-Utley et al., 2008; Wilding, 2009; Arvinen-Barrow et al., 2010) that athlete support such as physiotherapists and athletic trainers are open to using psychological skills, but have insufficient knowledge and understanding of implementing strategies.

1.9.2. Athletic Trainers and Sports Rehabilitators

It is apparent that the use of psychology within athletic training and rehabilitation is a developing area. With athletic trainers educational standards requiring trainers to be educated about the psychological aspects of injury and specifically the utilisation of psychological skills to aid recovery (National Athletic Trainers' Association, 2006), it is apparent there are similarities in both the role demands and the educational standards of strength and conditioning practitioners and athletic trainers. As such it is relevant to examine the perceptions of such professions. Ford and Gordon (1998) administered a survey to 350 sport trainers and therapists working in either New Zealand, Australia, or Canada. It was clear that psychology was considered important and a valuable asset in aiding

recovery. However despite the consensus that trainers should use psychology and that psychological interventions during rehabilitation are important, it was also apparent that practitioners experience low levels of satisfaction with the learning applicable psychological techniques.

Supporting the assertion that practitioners may well find that education is lacking with regard to psychology, Cramer and Perma's (2000) review identified that certified athletic trainers do not perceive themselves prepared to identify psychological components relevant to injury. This was largely attributed to the fact that at the time of compiling the review there was no compulsory inclusion of formal psychological training. Such early findings are cemented by the survey conducted by Wiese et al. (1991). Among the 115 respondents surveyed there was a consensus that it is important to educate practitioners regarding the use of psychological techniques, and that more education classes were wanted. It was identified that practitioners perceive the majority of psychological skills, noticeably communication, facilitating social support and encouraging motivation, as important or very important. It was noted that particular strategies such as mental imagery, concentration, and relaxation were not valued as important. It was proposed that this may have been due to practitioners' unfamiliarity with such techniques, and that they were therefore consequently reluctant to rank them highly, or that they did not believe that such specific skills would benefit the athlete within the rehabilitation setting.

The change to the certification process means that since 2004 the only route to certification within athletic training requires students to be enrolled in accredited athletic training education programmes (ATEPs) with the introduction of an intern route. This was done in order to ensure that educational competencies and proficiencies are adhered to, one of which is the use of psychological interventions (Stiller-Ostrowski & Ostrowski, 2009). The introduction of the certification pathway allowed for the comparison of practitioners becoming certified pre and post compulsory ATEPs. Hamson-Utley et al. (2008) reported that when comparing graduation programmes there was no difference in the perceptions towards psychology, consequently evidencing a potential disconnect between the ambitions and the outcomes of the new certification process.

One such proposed reason was that the use of psychological skill, despite being afforded time during the curriculum, was only addressed at a superficial level, with many practitioners feeling underprepared (Stiller-Ostrowski & Ostrowski, 2009). Additionally, many practitioners consider the use of psychological techniques to be outside their responsibilities, with the responsibility lying with psychology-titled professional (Stiller-Ostrowski & Ostrowski, 2009). However, athletic training personnel did demonstrate greater acceptance and more positive perceptions toward psychology when they had undergone formal training in the use of psychology within a rehabilitation setting compared to those that did not engage in any formal psychology training (Hamson-Utley et al., 2008). Notwithstanding the apparent ineffectiveness of the new certification pathway in addressing practitioners' applied use of psychology, the work of Hamson-Utley et al. (2008) contrasted previous work (Wiese et al.,

1991) showing there was an overall positive appraisal of the effectiveness of psychology with an increasing number of strategies being valued. One proposed reason for such a difference is the time elapsed between studies. It is reported that within North America there have been changes to the openness and acceptance of using psychology within the rehabilitation setting (Hamson-Utley et al., 2008), however this view is as yet unable to be generalised to international demographics. Despite the lack of differences between the practitioners undergoing different certification pathways, there were differences between physiotherapists and athletic trainers, with the athletic trainers having a more positive perception of psychology overall (Hamson-Utley et al., 2008). This was attributed to the professional approach, with athletic trainers utilising motivational goal setting and strategies to enhance pain tolerance. This demonstrates that the vocational demands, such as maintaining athlete adherence and increased pressure regarding the speed of rehabilitation, can shape the use of psychological strategies.

1.9.3. Physiotherapists

Despite the more favourable attitude towards psychology of athletic trainers compared to that of physiotherapists within North America (Hamson-Utley et al., 2008), the review of literature suggests that the perception of athletic trainers is mirrored by physiotherapists. As a helping profession, similar to both athletic training and strength and conditioning, physiotherapists are often considered best-placed to address the psychological aspect of an athlete's rehabilitation (Francis et al., 2000; Hemmings & Povey, 2002; Arvinen-Barrow et al., 2007; Arvinen-Barrow et al., 2010).

Ninedek and Kolt (2000) conducted a questionnaire surveying the views of Australian physiotherapists. Similar to North American athletic trainers (Hamson-Utley et al., 2008), the physiotherapists perceived a range of psychological skills as important, such as appropriate goal-setting, motivational strategies and effective communication, however reported that particular skills were unimportant and underutilised, such as relaxation techniques and mental imagery. Similar to athletic trainers this is surprising, as the physiotherapists believed anxiety and stress to be common reactions to injury, for which imagery and relaxation strategies are appropriate alleviating psychological techniques. This may illustrate a potential lack of awareness of the benefits or the applications of particular techniques.

The perceptions towards psychology and the willingness to utilise such strategies were unaffected by the attendance of formal psychology training post certification, however it should be noted that owing to the Australian undergraduate curriculum all respondents would have been exposed to basic psychology instruction (Ninedek & Kolt, 2000). Nonetheless, this finding is interesting as in North American athletic trainers, participation in formal training was a factor contributing towards an increased positive perception of psychology (Hamson-Utley et al., 2008). In contrast, the physiotherapists felt their awareness of psychological strategies and applications was developed via experiential learning.

Despite the negative perception towards particular strategies, physiotherapists value the role of psychology within their practice. In support of previous work (Ninedek & Kolt, 2000), Francis et al. (2000) surveyed physiotherapists working within an Australian city and similarly concluded that physiotherapists value psychology, however they perceive particular strategies such as imagery and relaxation to be ineffective. It was encouraging that there was evidence supporting the importance to understand conditions such as anxiety, however the physiotherapists believed that they did not need knowledge in strategies, for example mental imagery, to alleviate such conditions. It should be noted that the respondents' doubt of the effectiveness of such techniques may indicate a lack of familiarity, rather than a perception that they are ineffective (Francis et al., 2000).

Hemmings and Povey (2002) surveyed the views of 90 UK Physiotherapists. It was apparent that the respondents used a variety of psychological skills within patients' treatment, including the use of goal setting and encouraging positive self-talk. Nonetheless, as reflected in previous studies of sports medicine professionals (Wiese & Weiss, 1987; Wiese et al., 1991; Brewer et al., 1994; Ford & Gordon, 1998), the physiotherapists were keen to develop further awareness of the applications of psychology with regard to rehabilitation.

Jevon and Johnston (2003) examined the knowledge of physiotherapists working with British Olympic athletes with regard to the psychological aspect of their practice. The qualitative approach yielded findings indicating that physiotherapists lack formal training with regard to both the theory and practical

application of psychology. This would align with previous conclusions that physiotherapists want further training (Hemmings & Povey, 2002), although only three of the 19 participants reported taking developmental courses in psychology. Of the courses attended, none were provided by recognised bodies such as the British Association of Sport and Exercise Sciences or the British Psychological Society (BPS).

Through qualitative analysis it was apparent that the participants who attended training courses valued psychology more than those that have not attended relevant training. It is important to emphasise that the descriptive analysis does not infer causation. It is possible that an increased prior interest in psychology may have guided physiotherapists towards attending further training rather than the training itself instilling the increased perceived importance of psychology.

An advantage of the interpretive nature of qualitative analysis is that the implicit use of psychological strategies can be observed. Despite varying perceptions of the importance of psychology, all practitioners described the implicit and informal use of psychology despite many not referring to formally recognised interventions. Such examples created themes such as dissociative techniques, healing imagery, and reflective listening, with the majority of the practitioners suggesting that the skills were developed experientially (Jevon & Johnston, 2003).

Quantitative and qualitative studies conducted by Arvinen-Barrow and colleagues (Arvinen-Barrow et al., 2007; Arvinen-Barrow et al., 2010) suggest that practitioners are aware of knowledge gaps within their practice with reference to psychological strategies. Practitioners are typically capable at identifying symptoms of prevalent concepts such as stress and anxiety yet feel ill-equipped to provide applicable techniques, with decisions made based upon intuition gained through experience rather than formal education. Particular skills were utilised such as goal-setting and positive self-talk, conversely skills such as imagery and relaxation techniques were neglected. There was an apparent lack of perceived importance associated with imagery and relaxation. Such strategies were the exception to the widespread interest in wanting to learn more.

1.10. Reasons for neglecting Psychology

Despite a large and robust body of knowledge advocating the use of sport psychology as a performance aid (Hardy, 1996; Gee, 2010), there are clearly apparent barriers to the use of psychology within sport settings with a significant share of the sporting fraternity hesitant to employ such techniques or enlist the support of a sport psychology professional (Ferraro & Rush, 2000; Anderson et al., 2004; Gee, 2010). This is despite the viewpoint that "*If so many people need psychology support and are aware they have this need, why don't they seek treatment more often?*" (Ferraro & Rush, 2000, p. 9). As a result of the evident mismatch between the apparent value of psychology and the utilisation of psychological techniques within sport, researchers have attempted to ascertain the reasons for such a disparity.

Creasy et al. (2009, p. 13) asks the question, *"Are you coaching Mental Skills?"* and *"Why not?".* In exploring the rationale as to why not, the suggestion is presented that a perceived lack of time and a lack of knowledge is responsible for the underutilisation of psychological skills within sport coaching. Specifically, all of the North American coaches sampled indicated that the inclusion of a mental training programme would be considered should the expended time not become prohibitive to the athletes training, specifically if lasting less than 15 minutes a week. This is indicative of not only a perceived lack of time but also an apparent lack of acknowledgment of the benefits and applications of psychological skills training. This is reflected in the perceptions of other coaches, for example the ability to systematically integrate psychological strategies within track and field (Wilding, 2009) is becoming a contemporary concern distanced from the historic barriers of lacking awareness and receptivity. It is evident that athletics athletes and coaches value the role of psychology as a performance aid, fostered through improved education, yet the understanding of application is lacking.

One such model which could account for an individuals behaveiour, that is prescribing of administering psychological interventions and support is the Theory of Planned Behaviour (Ajzen, 1991). The Theory of Planned behaviour assumes three determining factors that account for an individual's intended behaviour. These factors consist of *attitude towards the behaviour*, *subjective norm,* and *perceived behavioural control*. In examining the reasons for the prescription, or lack of prescription, of psychological strategies by strength and conditioning coaches, considerations of the theory of planned behaviour is a

suitable approach. It would appear that as a concept the Theory of Planned Behaviour aligns with potential inhibiting factors observed within other athlete helping domains such as sport coaching, physiotherapy and athletic training. However, critics of the Theory of Planned behaviour have highlighted shortcomings of the model (Armitage & Conner, 2001). Such criticism of the model lie with Ajzen's (1991) assumption that perceived behavioural control and self-efficacy are interchangeable. Authors have proposed that control and self-efficacy are not synonymous, with Bandura arguing that planned behavioural control and self-efficacy are different concepts (Bandura, 1986) Nevertheless the theory of planned behaviour provides a useful underpinning theory on which to guide the examinations the reasons accountable for the neglect of the prescription of psychological strategies.

1.10.1. Understanding and Knowledge of Psychology

Symptomatic of a lack of knowledge being an inhibitory factor, the examination of various athlete support and health professions indicates that practitioners are yearning for a greater understanding of the application of psychological skills. Such examples include physiotherapy, in which despite implementing varying psychological techniques pertinent to the injury, rehabilitation practitioners are voicing a need for further knowledge in the application of psychological strategies (Ninedek & Kolt, 2000; Hemmings & Povey, 2002). Furthermore, despite the appreciation that particular regulatory strategies are beneficial to the rehabilitation process, physiotherapists are unsure as to the applications of such techniques (Ninedek & Kolt, 2000). Nonetheless, in refuting earlier studies in which the health profession indicated such regulatory

cognitive strategies as unimportant (Wiese et al., 1991), it is evident that perceptions are shifting towards the benefits of integrated psychological support.

However, this is not a universal opinion, with particular skill sets considered unimportant from the perspective of physiotherapists (Francis et al., 2000). The apparent inconsistency in opinions, especially considering equivalent sample pools, is interesting. Despite the perception that such cognitive skills are unimportant, the results indicated a disparity between an appreciation of particular regulatory cognitive skills and the need to understand stress and anxiety manifestations (Francis et al., 2000). This may imply that there is an appreciation of an outcome that is required yet the processes to achieve such an outcome are not understood.

Owing to the lack of knowledge being a prime motive for the underutilisation of psychology by 'helping profession' practitioners, the educational pathways are a noteworthy discussion. Arvinen-Barrow et al. (2010) suggested that the methods of integrating psychological aspects of rehabilitation into applied practice was neglected within physiotherapy training and it would be beneficial to include such training. This would suggest that many interventions are based on intuition or 'gut-instinct' formed through experiential learning (Arvinen-Barrow et al., 2010).

Further evidence for the ineffectiveness of formal training in equipping practitioners with the required psychological skill set is found in the analysis of research drawing comparisons between those that received formal education in

psychology as part of professional training and those that did not (Ninedek & Kolt, 2000; Hamson-Utley et al., 2008). Such examples conclude that there is no difference in attitudes or applications depending on formal education, consequently implying that the formal education of psychology is ineffective in equipping practitioners with competencies additional to those developed through experience. It appears evident that it is not the underpinning knowledge of psychology, but rather the experience of practical applications which is contributing to the underutilisation of psychological skills and strategies.

It is unfortunate that aside from research exploring the work of rehabilitation professions, the vast majority of the existing literature examines the perception towards using psychology within sport through the means of employing a sport psychology consultant. Nonetheless, this offers the opportunity to explore the barriers to incorporating psychology within sport. It is evident that there are misconceptions as to what sport psychology comprises.

Various studies have identified that a lack of understanding exists within coaching and administrative staff as to what comprises a sport psychology session (Ferraro & Rush, 2000; Gardner, 2001; Pain & Harwood, 2004; Zakrajsek & Zizzi, 2007; Zakrajsek et al., 2011). It is apparent that, certainly within particular domains, there is a stigma present towards the use of psychology, with the sporting fraternity equating the work of a sport psychologist consultant to that of other mental health specialists, for example councillors, psychiatrists and psychotherapists (Ravizza, 1988; Linder et al., 1991; Van Raalte et al., 1996). This is apparent more recently within English association football in which the

sport psychologist consultant was referred to as a ‘shrink’ (Pain & Harwood, 2004) with little purpose over and above offering quick-fix solutions to ‘problem players’.

It is interesting that the naivety is attributed to a lack of confidence in the role psychology has in benefiting sporting performance. Indeed, lacking confidence in sport psychology has been demonstrated as the largest predicting factor for a coach to employ such strategies, greater than both stigma tolerance and personal openness (Zakrajsek & Zizzi, 2007; Zakrajsek et al., 2011). This would indicate that, encouragingly, the stigma towards sport psychology may be diminishing over time, however sports personnel are unaware of the psychological strategies and how this may improve sport performance; this would partially support earlier studies in which the difficulty in quantifying the benefits was highlighted (Pain & Harwood, 2004).

An outcome of examinations of coaches’ perceptions towards psychology is the development of a four factor model comprising stigma tolerance, confidence, personal openness, and cultural preferences (Zakrajsek et al., 2011). This unequivocally states that there is progress yet to be made in incorporating psychology within sport settings. An interesting observation is that the efficacy of coaches in implementing selected mental skills is comparable to that reported by psychologists (Zizzi et al., 2009). Thus, notwithstanding the potential of a skewed sample as the result of response bias (due to the respondents’ interest in psychology), it is evident that sport coaches, contrary to rehabilitation practitioners, perceive themselves to be as equipped as psychologists regarding

the administration of mental training skills and yet still a underlying lack of confidence in the benefits of psychology exists.

A disconnect exists in which sports coaches perceive they have efficacy in implementing certain mental skills, yet the broader review suggests that coaches have a reduced confidence in the outcome of using such skills. An alternative analogy may be that it is not the confidence in the benefits of psychology per se resulting in an underutilisation; rather it is the notion that psychology is 'common sense' and the role of a sport psychologist is redundant, resulting in the low confidence in approaching sport psychology consultants.

The conception that coaches can apply psychological techniques equally with psychologists is especially pertinent when examining economical and logistical barriers associated with employing additional personnel (Kremer & Marchant, 2002; Pain & Harwood, 2004). However, ultimately, this demonstrates a naïve approach to the processes and application of psychological strategies and is an area worth further exploration.

1.10.2. Time

Whilst it is apparent that knowledge of the application of psychology poses a considerable barrier, there is a perception that time availability may be a limiting factor. When examining the receptivity of athletes to psychological interventions the notion of lacking time was evident with collegiate ice hockey players expressing reservations over the implementation of psychology programme due to reducing the amount of time in order to prepare for the game

(Dunn & Holt, 2003). There was the opinion that the introduction of psychological skills training was a distracting feature in the lead up to competition.

Despite valuing the contribution of psychology, the concept of time presents when examining experiences of using psychology during rehabilitation processes. Time availability was considered fundamental, with physiotherapists often stating insufficient time with impending rehabilitation goals approaching resulted in psychological interventions becoming inconsequential (Arvinen-Barrow et al., 2010).

From the perspective of employing a psychology-titled professional, the aspect of time is also prevalent with the time taken away from training noted a reason for not employing the sport psychology consultant (Kremer & Marchant, 2002; Pain & Harwood, 2004). It is pertinent to acknowledge time constraints, particularly when strength and conditioning coaches are often quoted as suffering time pressures implying that additional training elements would be introduced if the time was available with the responsibility of various responsibilities resulting in an increased burden (Massey et al., 2009).

It is evident that the notion of time is a barrier to the applied use of psychology however it is possible that the perceived lack of time may be a manifestation of insufficient knowledge, either concerning the benefits of psychology or the time efficient integration of strategies. Indeed, Creasy (2009) identified that if the integration of psychological skills could be confined to 15

minutes per week coaches were unanimous in considering introducing a psychological component to training.

1.10.3. Culture

As previously discussed, knowledge and understanding is an instrumental factor in promoting psychology, with researches advocating the need for outreach programmes to improve understanding (Gardner, 2001; Pain & Harwood, 2004; Zakrajsek & Zizzi, 2007; Wilson et al., 2009). However specific cultural differences appear to contribute to the reluctance to incorporate psychology.

The 'negative halo' surrounding psychology has been reported to carry expected ridicule from peers and fans at the expense of psychological support (Linder et al., 1991). Drawing possible relationships between stigma tolerance and knowledge and understanding there is evidence that coaches with a higher standard of formal education demonstrate more positive attitudes toward psychology (Zakrajsek et al., 2011). This is also reflected in athletes, as high school athletes had a marginally more negative attitude than their older collegiate counterparts (Martin, 2005).

It remains evident that within sport coaching there is a stigma attached to the use of psychology. Stigma tolerance is regarded as a limiting factor when considering the application of psychological skills (Martin, 2005; Zakrajsek & Zizzi, 2007; Wrisberg et al., 2009; Gee, 2010; Zakrajsek et al., 2011). The misconception prevails that sport psychology is synonymous with other mental health professions for example psychotherapy and clinical psychology (Linder et

al., 1991; Gee, 2010). Therefore, it is worthy to explore the reasons attributing to the presence of such a stigma. The role of stigma tolerance is pertinent in coaches and athletes alike and a predictor of intentions to employ sport psychology consultants (Martin et al., 2004; Martin, 2005; Zakrajsek & Zizzi, 2007; Wrisberg et al., 2009; Gee, 2010; Zakrajsek et al., 2011).

Greater prevalence of stigma exists in athletes competing in contact sports compared to those competing in non-contact sports (Martin et al., 2004; Martin, 2005). Gender role socialisation, the norms and ideologies shaping the attitudes and behaviours of constituting being either male or female (Curry, 1993; Steinfeldt & Steinfeldt, 2010; Zakrajsek et al., 2011), are influenced by sporting involvement, especially those sports that require a significant amount of physical contact to demonstrate prowess (Messner, 1995). Such sports require physical dominance demonstrated via confrontation and reinforce the perception that pain acceptance and physical risk is necessary to demonstrate masculinity (Messner, 1995).

Being involved in such contact sports can impact on help-seeking behaviour under the misconception that psychology is for the weak or even implies femininity (Zakrajsek et al., 2011). Thus, the 'macho' element of sport participation is perceived to be at risk should the athlete demonstrate help-seeking behaviour. This is further emphasised by the prevalence of research demonstrating a greater stigma presented by males than females (Linder et al., 1991; Martin et al., 2004; Martin, 2005; Zakrajsek & Zizzi, 2007), with females more receptive to psychological input and less prone to identify with their own culture (Martin et

al., 2004) or associate risk and pain acceptance with their social identity (Messner, 1995).

Specific to cultural differences, demographic variations appear to be a contributing factor to the openness towards psychology. Inconsistencies are presented in what shapes intentions to use psychological interventions. For example, age and competitive level were predictive of intentions to seek additional services in North America (Martin, 2005), but not in New Zealand (Anderson et al., 2004), offering indications that the culture in New Zealand is more accepting towards psychology. In directly comparing perceptions from North America, the United Kingdom and Germany, Martin et al. (2004) identified that attitudes towards psychology can be attributed to nationality, in addition to gender and sport type. It was concluded that athletes from North America were more prone to exhibit a stigma towards psychology than those of the other examined nationalities (Martin et al., 2004). This was attributed to the cultural differences formed through capitalist ideologies devaluating individuals seeking aid, evident in the United States of America, whilst promotional campaigns have been thought to promote the use of help-seeking behaviours (Martin et al., 2004).

1.10.4. Sport Type

The type of sport clearly has implications for the utilisation of psychological skills and strategies. This is witnessed when comparing contact sports to non-contact sports. Specifically this proposed to be attributable to cultural norms in which athletes have been socialised into such as the ‘macho’ element associated with contact sports. In addition, depending on whether the

sport is individual or team based, psychological strategies receive differing levels of acceptance. Strategies directed to improving team dynamics, communication for instance, were reported to be received more favourably by team sport athletes compared to individual athletes (Wrisberg et al., 2009), conversely specific regulatory techniques for use within competition were received less favourably by team sport athletes than individual sport athletes (Wrisberg et al., 2009). This would indicate that the intentions to use psychological strategies are based on the perceived usefulness to the specific athlete and sport in question and as such is governed by the knowledge of the athlete.

1.10.5. Athlete Perception

The athlete's perception is critical to facilitating the inclusion of psychology within strength and conditioning. The athlete must personally justify the merit of employing psychological principles within their chosen discipline (Brooks & Bull, 2001). Early research suggested mixed perceptions, varying from Canadian Olympic athletes stating that the influence of psychology had positive benefits, to implying doubts that the employed techniques were of to benefit performance, with negative experiences reported when working with sport psychology consultants (Orlick & Partington, 1987).

Subsequent research exploring the perceptions of North American athletes demonstrated a more favourable consensus, with athletes perceiving that mental skills training was beneficial to performance and offering a more universally favourable opinion of working with sport psychology practitioners (Gould et al., 1991). The results of the studies into Olympic athlete's perceptions indicate that

the prior negative experience may impart a reluctance to engage with the psychological component of training.

1.11. Importance of Psychology in Sport

Psychological skills training is a term derived to depict techniques and strategies intended to teach or develop mental skills that aid performance (Vealey, 1994). The major foundation of psychological skills training is that all athletes are 'healthy' and the facilitator serves as an educator to shape the cognitive skills required to address the various demands associated with sport (Vealey, 1994).

Successful sporting performance is dependent upon both physical and psychological skills and abilities; however, enduring physiological sporting adaptations fail to explain momentary performance fluctuations. Indeed successful sporting performance is dependent upon the use of psychological skills (Frey et al., 2003), emphasised as Williams and Krane (1993) discovered that psychological factors account for between 40 and 90% of sporting success. Unsurprisingly, an abundance of research into the psychological characteristics possessed by successful athletes is present.

Sport psychology research exploring academic and applied practice settings provides a robust evidence base supporting the use of sport psychology as a performance aid (Mellalieu & Hanton, 2009). Sport psychology research has typically focussed on areas such as imagery use (Vealey, 1994; Callow & Waters, 2005; Lebon et al., 2010), goal setting (Devonport, 2006; Thelwell et al., 2008; O'Brien et al., 2009), stress regulation (Gaudreau & Blondin, 2002; Hanton et al.,

2008; Hill et al., 2009), mental toughness (Gould et al., 2002; Gucciardi et al., 2009b, 2009a; Crust & Azadi, 2010), attention focussing (Ford et al., 2005a; Weiss et al., 2008; Marchant et al., 2009), situational self-confidence (Fitzsimmons et al., 1991; Bandura & Locke, 2003; Feltz et al., 2008), and self-talk (Tod et al., 2003; Hardy et al., 2005a; Tod et al., 2009).

In addition to numerous strands of sport psychology, research has explored the use of psychological interventions in a range of sporting, conditioning, and rehabilitation domains examining both individual skills and combinations. For instance, O'Brien (2009) explored the use of goal setting by elite and none elite boxers whilst Thelwell *et al*. (2006) studied the effectives of self-talk, imagery and relaxation interventions within association football. In addition to intervention studies, research has also focused on the psychological characteristics and strategies employed by successful athletes compared to less successful, for example the development of Olympic athletes (Weinberg et al., 2000; Gould et al., 2002) and how expertise and perceived success is reflected in psychological skill use in practice and competition (Thomas et al., 1999; Frey et al., 2003).

Demonstrating the importance of psychological skills, Williams and Krane (1993) identified that superior performance could be accredited to specific strategies and constructs, amongst others including: goal setting; self-confidence; imagery; regulation of arousal; and concentration. Furthermore, Gould *et al.* (2002) demonstrated that successful Olympians possess psychological traits encompassed within the umbrella categories of: personality characteristics; performance enhancement skills; motivational issues; coping ability;

moral/sportsmanship; and balancing sport and lifestyle demands. Moreover, only Olympians, high in confidence, capable of setting goals, surmounting adversity, visualising success, and moderating arousal, competed to their potential (Gould et al., 1999a; Greenleaf et al., 2001; Gould et al., 2002). It is also acknowledged that the use of psychological skills, particularly concentration, preparatory strategies, anxiety management, and confidence and motivation are a differentiating factor in the success exhibited by athletes (Mahoney et al., 1987). Athletes at differing competitive levels demonstrate an increased success as psychological skill usage increases (Mahoney et al., 1987).

The premise exists that psychological skills can be learnt and developed through practice (Vealey, 1994). The use of psychological skills training has been examined in a diverse range of sports, including, for instance, Ten Pin Bowling (Thomas et al., 1996), association football (Thelwell et al., 2006), golf (Thomas & Fogarty, 1997), simulated triathlon (Thelwell & Greenlees, 2001), swimming (Bar-Eli & Blumenstein, 2004; Sheard & Golby, 2006), badminton (Bebetsos & Antoniou, 2003), modern pentathlon (Bertollo et al., 2009), rugby union (Evans et al., 2004; Neil et al., 2006), tennis (Mamassis & Doganis, 2004; Greenwald, 2009; Girod, 2010), boxing (O'Brien et al., 2009), ice hockey (Rogerson & Hrycaido, 2002), Golf (Short et al., 2002; Smith et al., 2008), weight training (Silbernagel et al., 2007), karate (Seabourne et al., 1985), scuba diving (Terry & Mayer, 1998), horse riding (Callow & Waters, 2005), and endurance running (Patrick & Hrycaiko, 1998).

It is evident that over a broad range of settings, psychological skills training is beneficial in regard to facilitating performance. Furthermore evidence suggests that although a distinguishing factor in predicting success (Mahoney et al., 1987; Gould et al., 1999a; Greenleaf et al., 2001; Gould et al., 2002), with increased interest in elite athletes, psychological skills are also demonstrated to be effective for non-elite populations evidenced by novice golfers (Beauchamp et al., 1996). Consequently, as supported by the psychological pyramid of peak performance (Gould & Damarjian, 1998), it appears that the attainment of the right combination of psychological skills with consideration of the sport demands (Taylor, 1995) serve as a prerequisite for an optimal peak-performance.

Notwithstanding flow-state and peak-performance being distinct phenomena, concerning a psychological state and level of accomplishment respectively (Jackson et al., 2001), the two phenomena are often regarded as being interlinked as peak-performance is often accompanied by a psychological flow-state (Jackson & Roberts, 1992) characterised as "a state of consciousness where one becomes totally absorbed in what one is doing, to the exclusion of all other thoughts and emotions" (Jackson & Csikszentmihalyi, 1999) occurring when there is a perceived balance between the challenge of a task and one's perceived ability (Csikszentmihalyi, 1990; Jackson & Csikszentmihalyi, 1999).

Jackson *et al*., (2001) examined the correlation of the occurrences of flow-state and specific psychological and physical attributes. Noticeably, stronger correlation was observed between psychological attributes and occurrences of flow state, than was found between physiological attributes and flow, thus

supporting the notion that sporting prowess is dependent on psychological skills and performance fluctuations are attributable to cognitive factors. Whilst supporting previous work (Rogerson & Hrycaido, 2002; Thelwell et al., 2006) showing that psychological skills training improves performance, Couture *et al*., (1999) concluded that that attainment of optimal performance requires psychological skills to regulate the physiological state. Consequently, it is apparent that producing the optimal performance is dependent on psycho-physiological control.

1.12. Psycho-physiological research

It is widely acknowledged that there is a natural connection between the psychology and the physiology of an athlete (Gee, 2010) with cognitions and affects directly influencing responses at a physiological level (Bradley & lang, 2000). The current research knowledge, discussed in the subsequent section has evidenced the potential for psychological interventions employed within research being translated into practical sport specific situations.

Academic interest in psycho-physiological research has led to a wealth of research exploring how psychological interventions affect variables pertinent to strength and conditioning, with psychological interventions demonstrating acute performance benefits. Lebon *et al.* (2010) demonstrated that a six week mental imagery training programme was able to induce strength gains compared to a control of no imagery training with no recorded anthropometric adaptations. Pertinent to technique, critical to many strength and conditioning exercises, Hardy and Callow (1999) examined the use of internal and external imagery of a

gymnastics task demonstrating appropriate use elicited technique improvements. In addition to cognitive imagery techniques, research has addressed the use of emotive imagery on strength. Murphy *et al.* (1988) concluded that whilst emotive imagery causes an increase in arousal, the correct focus of the imagery is important to cause a strength gain. In addition to imagery interventions, there has been interest towards athletes' attentional focussing. Under controlled conditions an internal focus of attention has been found to induce greater electromyography activity compared to external (Vance et al., 2004; Marchant et al., 2009) whilst external focus has resulted in increased strength (Marchant et al., 2009) and power (Ford et al., 2005a).

Studies have examined the use of video modelling and feedback (Catina, 2009; Rucci & Tomporowski, 2010; Rymal et al., 2010) demonstrating that using a combination of video and verbal feedback improved the technical performance of the power clean whilst video only feedback did not (Rucci & Tomporowski, 2010). The use of self-talk and psyching-up strategies has received attention; however the findings are equivocal with researchers debating the effectiveness of psyching-up strategies (Tod et al., 2003; McGuigan et al., 2005; Tod et al., 2009).

The effect of self-efficacy and perceived task difficulty has been widely examined through the use of strength tasks (Fitzsimmons et al., 1991; Wells et al., 1993; McMahon, 2009), with manipulated self-efficacy having implications for maximal strength and endurance. Research has also demonstrated the benefits of using goal setting (Weinberg et al., 1985; Baker, 2000; Tod & McGuigan, 2001; Gilson, 2010) within a training programme and concluded that the athlete's

motivational orientation must be considered within strength training (Fry & Fry, 1999; Gilson et al., 2008) and that the proximity and specificity of goals can directly influence muscular endurance (Weinberg et al., 1985).

1.13. Absolute and relative performance

In acknowledging the psycho-physiological aspect of sports performance it is important to view performance in both absolute and relative terms (Gee, 2010). Absolute performance refers to the maximum an athlete can achieve. The optimal absolute output is believed to be directly related to physiological composition which is heavily shaped through genetic factors but is to some extent trainable through conditioning work. Such examples would include muscle composition and architecture, body height and mass, and aerobic and anaerobic capacity. These factors determine the maximal possible output for an individual athlete. Conversely relative performance accounts for fleeting variances.

Despite the theoretical concept of absolute performance reflects a maximal output, relative performance considers impeding factors, for example environmental conditions, one key element which regulates the relative performance of an individual athlete is the cognitions of the athlete (Gee, 2010). It should be recognised that through the psychological conditioning of athletes, the aim is to achieve the smallest difference between absolute and relative performances.

1.14. Psychology use in Training

During training, an athlete aims to improve performance by practicing to improve transfer into a competitive environment (Frey et al., 2003). Therefore, the high dependence upon cognitive skills in competition suggests that there should be an equivalent use in practice. It is recognised that utilising cognitive techniques in practice, as opposed to exclusively in competitions, prevents detrimental performance resulting from using unfamiliar mental strategies (Weinberg & Williams, 1998). Furthermore, the incorporation of psychological skill in both practice and competition was observed to differentiate between medallists and non-medallist Olympians in the 2000 Olympic games (Taylor et al., 2008). Furthermore, the use of psychological techniques in training was found to be linked to the most successful performers in both the 1984 Olympic Games (Orlick & Partington, 1988) and touring golf professionals (McCaffrey & Orlick, 1989). Moreover, athletes may spend 99% of their time in practice compared to competition (McCann, 1995), emphasising the importance of practice. Additionally, the generalised schema theory (Schmidt, 1975) presents the need for cognitive processes such as self-talk and mental imagery when learning a skill.

In concurrence with the idea that performance can be improved through prescribed psychological interventions in practice environments, Weinberg and Comer (1994) found that psychological interventions improved performance in 85% of the studies reviewed. Additionally, studies have examined sport and position-specific psychological skills and strategies. In support of Taylors' (1995) conceptual framework, Thelwell *et al*., (2006) found that specific training

comprising of relaxation, imagery, and self-talk elicited small, albeit varying, levels of improvement between participants.

Preliminary work by Thomas *et al.* (1999) and subsequent validation and refinement (Lane et al., 2004; Hardy et al., 2010b) has identified and analysed the most prevalent strategies used in both practice and competition. In developing the Test of Performance Strategies, a commonly used psychological test (Weinberg & Gould, 2010a), Thomas *et al.* (1999) identified eight prevailing psychological strategies used by athletes during competition. These comprised: imagery, self-talk, relaxation, activation, goal setting, negative thinking, emotional control, and automaticity. Similarly, these skills are prevalent in practice with the exception of negative thinking, replaced by attentional control, hence supporting the notion that psychological skills developed through practice are transferred to competition (Weinberg & Williams, 1998; Frey et al., 2003).

Despite identifying skill prevalence in both competition and training (Thomas et al., 1999) it must be considered that there is broad variation in what an individual may perceive as important (Seiler, 1992). Therefore depending on individual differences, perceptions regarding effectiveness, and sport requirements (Taylor, 1995), there will be differences in the strategies employed. Nonetheless, supporting the development of the Test of Performance Strategies (Thomas et al., 1999), there is a consensus within the applied sport psychology profession that important areas are goal setting, regulating arousal imagery, relaxation and self-talk (Gould et al., 1989; Gould et al., 2002). These specific strategies concur with early research with sports coaches that mental toughness, emotional regulation

and concentration are important factors, whilst indicating a desire to implement regulatory strategies and concentration boosting techniques (Gould et al., 1987a).

Early research (Gould et al., 1987a; Gould et al., 1989) resulted in a proposed two-tier structure for mental training in which higher order elements such as arousal, control, preparatory strategies, leadership, and confidence are regulated through various second-order elements comprising relaxation, imagery, reinforcement, self-talk, goal setting and attentional focussing (Howe, 1993). The proposed second tier skills can be used alone or in conjunction to benefit the first order themes. Such a two-tier model is in concurrence with specific recommendations for strength coaches. Holloway (1994, 1995) and Mellalieu and Shearer (2012) suggested that it would be beneficial for strength and conditioning specialists to apply key psychological strategies such as imagery, goal setting, arousal regulation, and self-talk to their clients' individualised programmes.

Despite the exploration of the characteristics and development of successful athletes (Gould et al., 2002) and strategies differentiating between levels of success (Mahoney et al., 1987; Gould et al., 1999a; Gould et al., 2002; Taylor et al., 2008) there is little focus within strength and conditioning on the specific inclusion of second-tier psychological strategies used to develop the skills demonstrated, nor the rationale for employing such strategies with little attention provided to the potential influence of differing disciplines.

The nature of the discipline will shape the type of strategies that are employed, for example, explosive actions compared to endurance performances

and fine motor skills (e.g. archery) compared to gross motor skills (e.g. power lifting), whilst the duration of the task and the intervals between activities will significantly impact the method of psychological preparation (Taylor, 1995). Thus, particular psychological strategies may be more pertinent to certain sports. This would be an important consideration for strength and conditioning coaches who work with varying athletic disciplines and provide instruction for various training activities (Ebben & Blackard, 2001; Massey et al., 2002; Ebben et al., 2004; Massey et al., 2004; Ebben et al., 2005; Duehring et al., 2009; Massey et al., 2009; Duehring & Ebben, 2010; Tod et al., 2012).

Schnabel et al. (2008, cited in Birrer and Morgan, 2010) proposed a model to categorize the most salient demands of a particular sport. Similar to the work of Taylor (1995), the initial model took account of duration, intensity and continuity of the impact; task variability and complexity; movement patterns and complexity; and cooperation (Schnabel et al., 2008, cited in Birrer and Morgan, 2010) with the subsequent addition of training scope, intensity and duration; psychosocial development; and the risk of injury and death (Birrer & Morgan, 2010). On the basis of the sport demands, the psychological skills required are hypothesised to be attention, motivation, volition, arousal regulation perceptual cognitive function, motor control, personal development, life skills, coping skills, communication, leadership and recovery skills (Birrer & Morgan, 2010).

Clearly the varying sport demands that a strength and conditioning professional may witness result in a complex role in applying psychological skills and strategies within training situations and is a much unexplored research area.

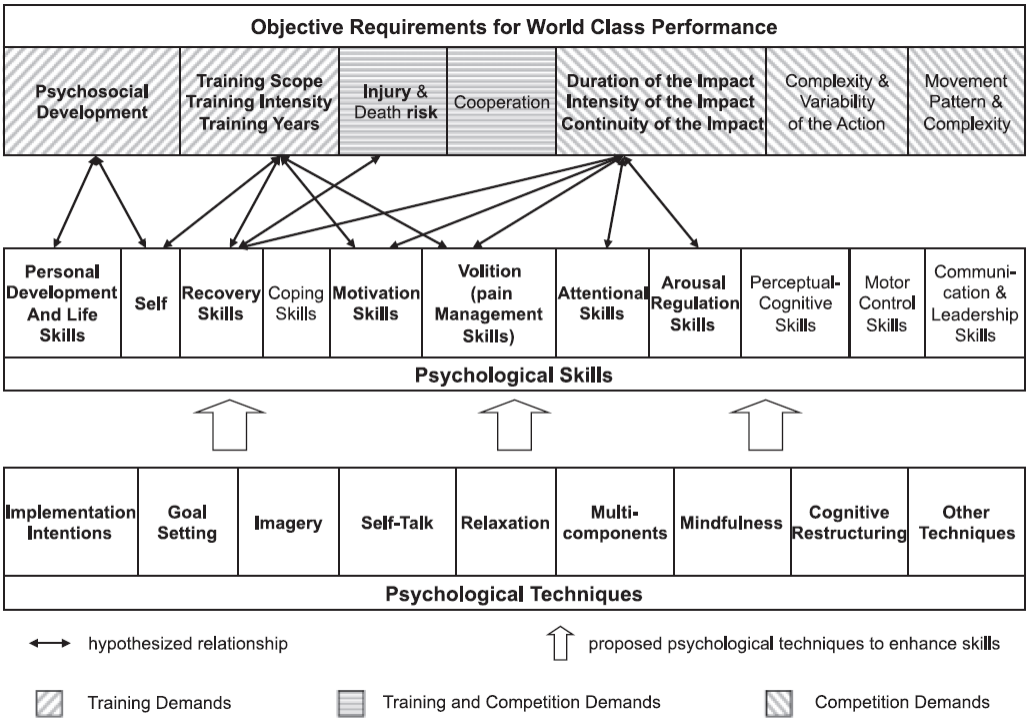

Figure 1.1 Potential Psychological skills to cope with the psychological requirements for world class sport and the psychological techniques to develop them (Birrer and Morgan, 2010, adapted for Schnabel et al. 2008)

1.15. Aim and Objectives

The aim of the thesis is to examine the use of, and perceptions towards, psychological skills by strength and conditioning practitioners. This will be conducted using a multi-faceted approach centred on the experiences of the strength and conditioning practitioners themselves.

The body of research aims to quantify the frequency with which strength and conditioning practitioners are currently using psychological skills and strategies within applied practice. The research will then shift to a naturalistic approach to explore the perceived responsibilities of the practitioners and the specific detail concerning how strength and conditioning coaches apply psychological interventions with the ambition to develop a model of the most commonly used techniques.

The thesis will offer an experimental laboratory-based study to demonstrate the effectiveness of a psychological intervention identified within the present research. Furthermore the thesis will explore the preventative factors inhibiting the use of psychological interventions and seek to identify recommendations for practice. The research will conclude with the provision of applied recommendations for the strength and conditioning practitioners.

1.16. Summary of Objectives

- Determine the frequency of psychological skills and strategies use by strength and conditioning practitioners
- Determine the most important psychological factors within strength and conditioning
- Explore the methods in which strength and condition practitioners employ psychological strategies
- Experimentally determine the effectiveness of the use of goal setting and misinformation to manipulate lifting performance
- Examine the perceived role of the strength and conditioning coach with respect to psychological responsibilities
- Determine who is the main provider of psychological support from the viewpoint of the strength and conditioning coach
- Examine perceived barriers to the use of psychological strategies within strength and conditioning
- Explore the knowledge base from which the psychological practice of strength and conditioning coaches originates
- Provide applied recommendations concerning the use of psychology within strength and conditioning

CHAPTER TWO

2. Research Methodology

2.1. Chapter overview

The present chapter will provide an overview of the methodological approaches and concepts which underpin the research strategy. The chapter will detail the research methods used and provide a comprehensive critical appraisal of such techniques to provide a rationale as to the role of such methods within the present series of research studies. A summarising reiteration of the specific research methods can be found within respective research chapters. This comprises the use of survey and questionnaire design in Chapter Three, the use of semi structured interviews and interpretive phenomenological analysis in Chapters Four, Five and Six, and finally the use of biomechanical analysis of the hang power clean when subjected to a misinformation condition in Chapter Seven.

2.2. Definition of terms

2.2.1. Ontology

A strand of metaphysics, ontology is the study of reality, existence, becoming, and being. Ontology is concerned with what entities can be present and thus how such entities can be ordered within groups and hierarchical structure based upon variation and similarities (Lincoln & Guba, 1985). The current research will evaluate psychology within strength and conditioning adhering to ontological principles of what is psychology within strength and conditioning

from the perception of practitioners, how is it applied within the professional filed and how much is it used with regard to frequency of interventions.

2.2.2. Paradigm

A paradigm is regarded as a collection of ideas, perceptions, concepts, and values located within, and typical of, a community which subsequently creates a perspective of reality resulting in the subsequent structuring and organisation of the community (Capra, 1997). Such paradigms are typically divided to be either positivist or naturalist paradigms.

2.2.3. Positivist Paradigm

The positivist viewpoint is concerned with the notion that one objective truth is obtainable and that reality is distinct and tangible in which the researcher and subjects matter are independent of each other (Donovan-Hall & Dibb, 2008). Specifically positivism implies that it is through removal of the researcher from the subject environment that an objective truth can be obtained (Lincoln & Guba, 1985). Such a positivist approach is typical of quantitative research methods.

2.2.4. Naturalist Paradigm

The naturalist perception is that the social realities are constructed by those individuals partaking and such realities are multiple and holistic in nature (Lincoln & Guba, 2000). Furthermore Lincoln and Guba (2000) distinguish between positivistic and naturalistic approaches with regard to interaction between the knower and the known, the positivistic view considers the knower to

be independent to the known, whilst the naturalistic perspective acknowledges the knower and the known to be interactive and indivisible. In addition, owing to the realities being constantly shaped by on-going interactions with those participating, it is then impossible to shape cause and effect, whilst positivist enquiry is able to distinguish between preceding causes and subsequent events.

2.2.5. Epistemology

Distinct form ontology, epistemology is the strand of philosophy concerned with the study of knowledge, for instance what is known and what mechanisms augment the development of knowledge (Eatough, 2012).

2.2.6. Realism

An epistemological perspective, realism proposes that there is unlimited access to the world and consequently individuals' perspectives are a true reflection of the world. Thus from a realist perspective, acquiring knowledge of the world is merely discovering what is already out there (Eatough, 2012). Therefore realism aligns with the positivist philosophy and, in the extreme, is dismissed by the qualitative research community (Eatough, 2012). However the perspective of the 'critical-realist' (Eatough, 2012, p. 328) is less polar, that is, in suggesting that access to the real world is mediated by social, cultural, and historical influences.

2.2.7. Relativism

Polar to realism, relativism adopts the stance that knowledge of the world is a result of their multiple competing, socially constructed, perspectives. Furthermore, rather than the passive observation of the world that results in knowledge it is the varied interactions within the world which result in the development of knowledge (Eatough, 2012). With regard to research methods the relativism approach is aligned with discursive approaches different to realism and critical-realism which align with the experiential approach (Eatough, 2012).

2.3. Methodological stance

The thesis will adopt a mixed methods approach which contains the attributes of positivism and the naturalistic perspective. The rationale will now be discussed concerning how such a stance aligns with the present research question and the methodology and caters to address the research questions positioned within the positivist paradigm and the naturalist paradigm.

The primary methodological objective is to examine the strategies, concepts, and beliefs embedded within applied strength and conditioning practice. Thus, owing to the lack of a pre-existing framework and the exploratory nature of the research, inductive processes shall be used. Inductive processes allow concepts and themes to emerge from the data utilising a bottom up approach. The aim is to explore a research domain and discover the theory implicit within the data. Nevertheless, the research is mixed methods in nature and as such exhibits characteristics of deductive analysis, by which, the premise of supposed psychological skills and strategies used by strength and conditioning practitioners

are examined with regard to aligning and contrasting practice with that of other previously explored research areas. Consequently in merging research approaches, for example the use of qualitative and quantitative research methods, theoretical frameworks are able to be constructed. Subsequent sections will extrapolate the research approaches and discuss their alignment with the specific research objectives.

A mixed method approach is advantageous as the presence of both positivist and naturalistic ontologies, each aligned with quantitative and qualitative methods respectively, present distinct qualities to the research (Cupchik, 2001). Research has documented the benefits of adopting a mixed method approach. Specifically, the approach can result in conclusions differing from those utilising one method alone and the use of duel methods can enable a more robust integration of the produced data set (Moffatt et al., 2006).

The current research examining the perspectives of the strength and conditioning practitioners and the experiences of implementing psychological interventions research is heavily positioned within the naturalistic paradigm, consequently the research is orientated around the qualitative approach. That is not however to suggest that the quantitative role is redundant. Furthermore it should be stressed that the emphasis on the use of qualitative methods are based upon the ease at which measures are presented more easily to the 'human-as-instrument' (Lincoln & Guba, 1985). Thus, naturalistic exploration tends to prefer methods which extend normal human behaviour, for instance speaking and discussing (Lincoln & Guba, 1985). Nevertheless it is acknowledged that there are

many opportunities for quantitative data to be utilised within the naturalistic paradigm (Lincoln & Guba, 1985), for example within the present body of work, measuring the frequency of use of particular psychological strategies using surveys thus providing indication of preferences towards particular interventions across a large sample.

The quantitative approach within psychology is diagnostic and whilst acknowledging social phenomena, such an approach reduces phenomena into more simplistic models. Owing to the isolation of variables the process is self-terminating and although such an approach can result in greater precision of results there is the danger that such simplification can result in aspects of the phenomena under investigation being neglected (Cupchik, 2001).

The qualitative approach is holistic and explores the phenomenon as a whole system and perusing patterns within the system bounds. This affords the possibility to understand the different ways in which system parts interrelate. Furthermore such a naturalistic qualitative perspective *"reflects an empathetic understanding as if the structure of the world is seen through the eyes of the participants"* (Cupchik, 2001). A phenomenological grounding is adopted to enable the understanding of the dynamics of the worldview. Such a process is regarded as constructive, as the meaning is generated by those external to the social world under investigation (Cupchik, 2001).

2.4. Constructivism

Constructivism has been defined as:

> *"The view that all knowledge and therefore all meaningful reality as such is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context" (Crotty, 1998, p. 42)*

Constructivists contend that neither truth nor meaning can be described as objective; knowledge being socially and historically constructed and not independent of the holder (Lowenthal & Muth, 2008). Lowenthal and Muth (2008) contend that constructivism is a product of combined perspectives from the psychology, philosophy, social, and educational domains.

The participant-researcher collaboration within the open-ended perspective of constructivism enables the participant to assist the researcher in progressing and evolving research questions to gain a detailed understanding of the social phenomena being researched (Johnson et al., 2000). The notion of multiple constructions of reality is likely to aid the understanding of complex social phenomena, for example perspectives and attitudes towards psychological strategies. In adopting a constructivist stance, the thesis explored the experiences of the practitioners to examine how beliefs and knowledge which govern the use of psychological interventions are formed within strength and conditioning.

2.4.1. *Assumptions of Constructivism*

As stated, constructivism is based upon assumptions about *reality*, *knowledge* and *learning*. In order to rationalise the constructivist stance each one of the assumptions will be addressed with regard to the specific research aims.

2.4.1.1. Reality

Individuals' reality do not present a true representation of reality, rather interpretation is governed by lenses of interpretation (Kukla, 2000). Thus ranging social and personal factors are instrumental in allowing an individual to construct reality. The constructivist viewpoint is that it is the social intervention that results in the creation of reality. Therefore within the present context, it is presumed that an individual's perception towards psychology is created through interpretation of their present circumstances and such a perspective may not align to that of other individuals.

2.4.1.2. Knowledge

Knowledge is constructed by, and within, the individual however it is socially mediated (Tobin & Tippins, 1993; Gredler, 1997). Therefore is it presumable that the beliefs of coaches are evolving, and constantly being influenced by personal experiences and exposure to the behaviours of others.

2.4.1.3. Learning

Constructivism theorists regard learning as a mechanism that is not isolated within the individual, rather learning is governed by social processes with meaningful learning resulting from engagement within social activities (Guba & Lincoln, 1994). It is therefore theorised that an individual's, in this instance a strength and conditioning coaches', learning will be shaped by the interactions with other coaches, athletes, and service providers and the quality of learning is governed by the extent to which the individual invests in such social processes.

2.5. Research design

The present study employed three primary methods to examine the research question aligned with the deductive-inductive methodological stance. The transition through the various research staged in answering the present research question is evident in Figure 2.1.

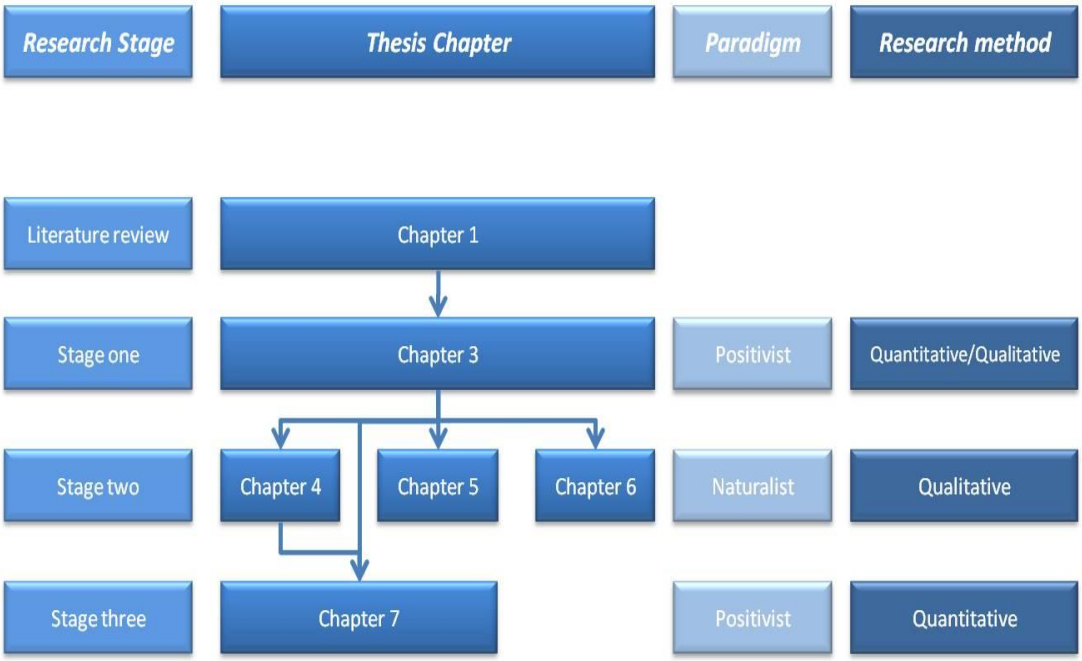

Figure 2.1 Overview diagram representing the specific chapters and the relationship with the chosen research method and paradigm.

Stage one comprised the development and administration of a questionnaire to explore the frequency of psychological skills used within strength and conditioning. This stage, grounded within the positivist paradigm, aimed to quantify the extent to which psychological strategies are employed by strength and conditioning practitioners and determine which psychological concepts are the most important within the strength and conditioning domain. The initial use of a deductive measure allowed for the focus of the subsequent research methods to address the most prevalent emerging concepts.

Progressing from the initial identification of the frequencies and importance of psychology within strength and conditioning, *stage two* progressed the research question through adopting a naturalistic stance comprised of employing a series of semi-structured interviews. The aim of such interviews was to explore, in detail, the way in which psychological skills are applied and perceptions towards the use of such strategies within the present context. Additionally, the naturalistic enquiry would identify what factors govern the use of psychology and the perceived effectiveness of sport psychology. Furthermore the level of detail afforded by the qualitative approach would enable the detailed exploration of further research questions related to the perceived role responsibilities, competencies, and professional development provisions for strength and conditioning coaches.

Chapter Four developed the research question in examining in detail the specific skill and strategies that are used and how they are implemented within strength and conditioning practice. Chapter Five examines the role perceptions of the practitioners and the perceived values of using psychology within strength and conditioning. The final naturalistic chapter, Chapter Six examined how the practitioners developed the understanding of psychology and examined the barriers to the inclusion of psychological interventions within strength and conditioning.

The previous stages of research presented in Chapters Three and Four identified commonalities and variations in practice. This included the determination of prevalent themes. One core prevalent theme throughout the

research was the use of goal setting and self-confidence. Consequently in identifying the prevalence of such concepts but variation in providing goal setting strategies it was pertinent to employ an experimental approach in attempting to answer the research question relating to the effectiveness of proposed goal setting approaches. *Stage three* adopted a positivistic stance to examine the emergent prevalent strategy of goal setting and the thematic connection with self-confidence. This approach allowed the examination of the effectiveness of the strategy and a comparison of the documented efficacy for such a technique with that observed under experimental controlled conditions. This stage attempted to measure the extent to which lifting performance is influenced by self-efficacy which was manipulated through misinformation concerning the task goals.

2.6. Research methods

Aligning with the methodological stance, the following section will detail and provide the rationale for the specific research methods used to answer the research question. This section will document the use of quantitative approaches used in study one within Chapter Three, the use of qualitative methods in subsequent studies (Chapters Four, Five, and Six), and finally the use of quantitative study within the laboratory setting measuring the effect of misinformation on kinetic variables of the hang power clean exercise. Chapter specific procedures are found in the respective chapters.

2.7. Quantitative approach

Study one endeavours to use a deductive approach through which established psychological strategies, recognised within ranging contexts, are

examined in specific relation to the usage of psychological strategies. Aligned towards the positivist paradigm, quantitative measures will allow specific strategies to be grouped and ordered numerically in relation to the frequency of use and also to allow the differences and similarities between population demographics to be examined.

The positivist paradigm allows the formulation, and test, of hypotheses and explore how the measured variables interact (Ashworth, 2008), for instance the interaction between participant demographics and the frequency of psychological strategy usage. Whilst the positivist viewpoint affords the ability to test concepts experimentally, such a paradigm risks neglecting previously unexplored concepts unique to the research area.

2.8. Questionnaires

The questionnaire is the most commonly employed research method within the social sciences, with the attractiveness owing to the simplicity and relative low cost in addition to the versatility offered by such a method. Questionnaires are sufficient in many research areas to enable real world judgements to be made to develop policy and test hypotheses (Fife-Schaw, 2012). Questionnaires have been a useful tool in examining the perceptions of various demographics towards psychology (Wiese et al., 1991; Hemmings & Povey, 2002; Arvinen-Barrow et al., 2007; Zakrajsek & Zizzi, 2007; Arvinen-Barrow et al., 2008; Hamson-Utley et al., 2008; Wilson et al., 2009). Questionnaires are particularly useful when working with large numbers of participants due the reduced cost and time restrictions compared to other research methods.

2.8.1. Open Questions

Open-ended questions do not offer a response option, allowing the respondent to answer what is deemed appropriate by the respondent themselves. This allows responses that may have not been considered by the researcher. However the open format and the individual, albeit synonymous, responses present the possibility of coding errors by the researcher (Fife-Schaw, 2012). Chapter Three employs open questions within the questionnaire to provided further information concerning the importance of particular psychological concepts. The use of open questions was deemed appropriate owing to the lack of existing research examining the important psychological characteristics within the strength and conditioning domain.

2.8.2. Closed Questions

Closed questions are questions which required responses from a series of options. The advantage of the closed format is the ease of quantifying responses as the coding format is predetermined. Furthermore the speed of completing the questionnaire and analysing the data using closed questions makes such a format attractive to both the researcher and respondent. The main limitation of closed questions concerns the potential of 'forced' responses when the options do not align with the views of the respondent (Fife-Schaw, 2012). The present research used closed questions only when measuring frequency, for instance *'How often do you set agreed goals with athletes?'*, in which the responses catered for all options using a five-point likert rating scale ranging from *'not at all'* to *'all the time'*.

2.8.3. Question order

The order in which questions are asked has provoked debate as to the location of demographic or taxing questions. It could be suggested that presenting demographic questions at the start would ensure that such data is recorded; however it may compromise the quality of the data due to fatigue. It is recommended that questions become progressively less taxing towards the end of the questionnaire (Fife-Schaw, 2012). The present questionnaire design conversely presented the open ended, and potentially more challenging, questions at the conclusion of the questionnaire. This was calculated as the prior determination of the perceived most important attributes may have resulted in a desirability bias in which the responses favoured tactics aligned with the characteristic deemed most important.

2.8.4. Internet-based questionnaires

Chapter Three administered the questionnaire utilising the Bristol Online Survey (Bristol University: UK). Internet-based surveys have been used effectively when exploring perceptions towards psychology (Arvinen-Barrow et al., 2008; Wilson et al., 2009). Increasingly the internet has made the administration of surveys less demanding and affords the opportunity to approach a large range of participants. The use of electronic questionnaires allows compulsory questions and notifications of omitted responses to reduce the chance of missing data. Nevertheless such methods pose potential limitations. For example there may be uncertainty as to who the actual respondent is. This was addressed by using recognised origination mailing lists (in the case of Australian Strength and Conditioning Association and the United Kingdom Strength and

Conditioning Association) approaching organisation gate keepers (in the case of the National Association of Strength and Conditioning) and requesting that surveys be emailed to accredited members and thus meeting the participation criteria. As a final measure, screening measures were included within the demographic information to ensure that participants met the eligibility criteria. These included stating the type of sports in which the strength and conditioning coach practices as well as the accrediting body under which the practitioner worked.

A second potential limitation concerns the potential exclusion of individuals without access to computers or internet. It was determined that it would be uncharacteristic of the sample population, being within developed countries and regularly receiving organisation email correspondence, to not have access to computing or internet resources.

The final concern is that of confidentiality. Participant responses were immediately uploaded to a secure encrypted and password protected website through which only the researcher had access.

The concept of voluntary informed consent is pertinent within internet-based survey research. To ensure this was obtained the initial page of the survey did not contain any questions and emphasised that the questionnaire was voluntary. There was a button to agree and continue with the research. Upon completing the survey, there was a page to thank the individual for completing the instrument.

2.9. Qualitative approach

Adopting a deductive-inductive approach, subsequent studies presented in Chapters Four, Five, and Six, adopt a qualitative inductive perspective grounded within the naturalist paradigm. The inductive perspective allows emergent theories and concepts to arise throughout the course of the research, whereby rather than desiring causal inference; it is the on-going and evolving nature that fosters a rich data pool from which to construct thematic concepts.

Concerning the evolving discipline and the specific exploration of psychology, an area often stigmatised within sport (Martin et al., 2004; Martin, 2005; Zakrajsek et al., 2011), the present methodology must create an environment to encourage the free and open disclosure of information pertaining to the research aims. However, it is acknowledged that within the constructivist stance, reality is constructed jointly by both the participant and the researcher, and through focusing the attention of the participant, the data obtained is restricted by the very interactions between the participant and the investigator (Cupchik, 2001). Considerations must be made that the approach is interpretive; the *truth* is screened by the participant perspective whilst *meaning* is constructed not only by the individual but also via interactions between the investigator and the participant. (Lincoln & Guba, 1985).

The present research therefore adopts the stance that the researcher is inseparable from the participants when constructing the data. In acknowledging that the reality is built by both the participants and the researcher, the current work will adopt the constructivist viewpoint.

2.10. Interviews

Interviewing is critical to many types of research and is reported as the most common method within psychology research (Willig, 2008). Interviewing involves an interaction, most commonly a verbal dialogue, between the researcher and the participant. As a method, interviewing per se is not linked to any one specific stance; rather it is the subsequent analysis that aligns the method with the research stance. Thus the flexibility offered by interviewing makes the method a popular choice and well suited to mixed methods research (Breakwell, 2012).

2.10.1. Interview structure

The structure of the interview is an important consideration as poorly thought out structures can result in data lacking in detail or validity. The three main stages comprise the introduction, the questioning, and the conclusion.

The introduction is required to be sufficiently detailed to confirm that voluntary informed consent is obtained, however it is important to not detail any expectations as this could compromise the response validity. Nevertheless the participant must feel at ease and consequently the research was introduced using the broad descriptions emphasising the unexplored area of research and that it was the perceptions of the individual towards psychology that was being explored with no right or wrong answers.

The questioning is designed around the interview schedule. There are varying styles of questioning ranging from unstructured to fully-structured. Fully-structured questions in the polar extreme constrain both the interviewer and

interviewee; the interviewer has a set wording and order to present whilst the interviewee must respond to a series of options. The benefit of such an approach lies with the ease of analysis and consistency and comparability of the data. However, the constrained nature of the approach does not allow the opportunity to reveal unexplored concepts.

Partially-structured, or semi-structured interviews, aim to explore a series of topics whilst not constrained to the order in which questions are asked. This approach lacks the comparability and consistency of the structured method however, aligned more with the naturalistic paradigm this approach, allows for the creation of a fluid narrative enabling the disclosure of ranging topics. Indeed such an approach is considered the exemplary data collection method aligned with Interpretive Phenomenological Analysis (Smith & Eatough, 2012). It must be acknowledged, however, that ultimately the data quality is governed by the skill of the researcher rather than the method used.

Using semi-structured interviews offers freedom to modify the question order to maintain free-flowing interviews as topic areas may naturally progress. It was noted that the initial structure of the interview will open with simple questions to create participant-researcher rapport and progress to potentially controversial areas - for instance how professional accreditation accommodates psychology.

2.10.2. Validity and reliability of inteviews

The interview is a self-report measure and therefore subject to similar validity threats as other self-report measures. These include participant self-report bias or social desirability bias. It is possible that the respondents may offer responses which they perceive will be aligned with what is perceived as desirable by either the researcher or the community. Equally there could be the chance of sabotage by the respondents knowingly offering false information should they disagree with the research or dislike the researcher. To counter this, the professional position of the researcher (as a practicing sport and exercise scientist and teacher of sport psychology) was withheld to prevent social desirability bias.

There is the potential for the researcher themselves to influence that data through the manner in which questions are asked and behaviours demonstrated through the interview. It is possible that such characteristics, termed interviewer effects, are demonstrated unknowingly by the researcher. This was addressed using pilot testing in which the voice recording was critiqued by the researcher to identify any potential shaping behaviours. To further minimise interviewer effects all interviews were conducted by the PhD researcher thus any potential interviewer effects would be present across all collected data.

Aligned with good professional practice, post interview reflections were performed noting instances which may have influenced that data collected. This included situations in which effective probes were used or the natural flow of the dialogue was impeded. To ensure that validity of the interviews was not compromised audio recordings were used thus ensuring the data is a true

representation of the interview. Member checking was used in which transcriptions and extracted themes were emailed to the participant to validate. This ensured that the participant's experience had been accurately recorded and demonstrates the increased reliability of the results (Tod et al., 2012).

2.10.3. Interview sampling

Interview participants were recruited through convenience and snowball sampling. Respondents to the survey were invited to provide contact details should they wish to be involved in further interview research. Participants were recruited within the same sampling frame as that used for the survey questionnaire. This consisted of administering the survey to strength and conditioning practitioners accredited by the UKSCA, the NSCA, or the ASCA. Participants were included on the basis that they were accredited members with contact details available either in the public domain, or via organisational gate keepers. There was no exclusion criteria based upon age, gender, nationality, additional qualifications, or experience

In addition to the convenience sampling, snowball sampling was used; when post interview participants were asked to recommend other individuals who may be willing to participate. Snowball sampling is useful when all participants within the sampling frame are located within a similar community of practice (Bowling, 2009). Participants were then contacted via email and screened to ensure the inclusion criterion was met.

There are strength and weaknesses associated with the use of non-random sampling. Firstly there is the risk that the data is not a true representation of the entire population. Secondly, it is possible that the data may not be representative of the population demographic in question. This is owing to the voluntary nature of the study and as such it is possible that the participants have an interest in sport psychology, otherwise they may not be motivated to participate, and thus may offer a view point which exaggerates that of the population.

2.11. Interpretative Phenomenological Analysis

The present section will establish the rationale for adopting the Interpretive Phenomenological Analysis (IPA) approach when approaching the more naturalistic research question. IPA is centred on the notion that humans are self-interpreting beings (Taylor, 1985) and thus individuals are engaged in interpreting the objects, people, and scenarios within their lives (Smith & Eatough, 2012). The objective of IPA is the analysis of how individuals make sense of their lived experiences (Smith & Eatough, 2012).

IPA is underpinned by phenomenological and hermeneutic principles. Rather than attempting to produce an objective statement or examine the particular object in comparison to scientific criteria, phenomenology addresses how events appear to individuals and how the particular individual perceives and understands the experience (Smith & Eatough, 2012). However, linked to constructivism is the notion that the individuals *reality* is mediated depending upon context and consequently challenges the researcher in performing IPA to make sense of the participants interpretation of their life world.

It is fundamental to acknowledge that in adopting an IPA stance, it is how the reality is perceived and made meaningful by the individual that is of interest. However, in adopting such a double hermeneutic stance, access to the individual's experiences is limited by the researcher's ability to interpret the participant's interpretations, which may be influenced by the researcher's own thoughts and conceptions (Brocki & Wearden, 2006; Smith & Eatough, 2012). Thus, IPA emphasises the active and integral role the researcher must adopt in the process (Brocki & Wearden, 2006; Smith & Eatough, 2012), that is to say that the researcher must endeavour to adopt the perspective of the participant when analysing IPA data.

2.11.1. Critique of IPA

Owing to the recent acknowledgment and development of IPA as a research tool there has been little critique of the approach (Braun & Clarke, 2013), despite its wide acceptance across a range of psychology-orientated research areas (Larkin et al., 2006). The debate lacking within the scientific community is likely to be due to the rapid and cooperative development of the discipline with only limited defining concepts (Smith, 2004; Larkin et al., 2006).

The ideographic nature of IPA allows the exploration of personal meanings, which is a key consideration when examining perceptions and rationale for behaviours. The ideographic approach also enables rich data to be achieved and presented in thematic form using small samples however the required detailed and extensive analysis is demanding for the researcher (Larkin et al., 2006). IPA

is distinct from other qualitative methods (discourse analysis for instance) owing to the phenomenological perspective. The phenomenological foundation of the approach focuses on the experiential claims of the participant which is vital in exploring how attitudes are constructed, how knowledge is gained, and how behaviours are executed.

Proponents of IPA have warned against the risk of the approach being too descriptive (Larkin et al., 2006) and state that greater emphasis must be afforded to the interpretation component (Brocki & Wearden, 2006). Advocates for IPA have commented that the method is attractive owing to accessibility and flexibility to varying research questions (Smith, 2004; Brocki & Wearden, 2006; Larkin et al., 2006). The notion of accessibility, indeed regarded by university research supervisors as one of the least demanding research methods (Madill et al., 2005), may however be a misconception as IPA is criticised for being overly descriptive with insufficient interpretive analysis performed and therefore, despite providing under-researched groups an outlet (Larkin et al., 2006), the potential of IPA is often undermined.

Smith (2004) proposed that the 'levels of interpretation' (p. 44) are a crucial characteristic to effective and meaningful research. Smith (2004) contends that the analysis is grounded within the text yet progresses to deeper interpretive analysis exploring meaning and subsequently to the underpinning psychological analysis. It has previously been stated that researchers often fail to afford focus to higher levels of interpretive and psychological analysis (Smith, 2004; Larkin et al., 2006), Smith (2004) questions what, within an emerging research domain, is

sufficient level of analysis and contends that the inexperienced researched should endeavour to satisfy the interpretive component through the observations of the use of temporal variations and metaphors within the narrative.

Variations in research methods exist within the IPA literature evidencing the flexibility of the approach, and have resulted in the suggestion that IPA be considered a stance rather than a single research method (Larkin et al., 2006). This is in contrast to the views that rigid guidelines must be adhered to (Braun & Clarke, 2013). Nevertheless in endeavouring to provide a deep interpretive analysis, the guidelines of Smith (Smith & Osborn, 2003; Smith & Eatough, 2012) will be followed. Furthermore the increased flexibility afforded by adopting an IPA approach has been reported as being mistaken for experimental rigour(Larkin et al., 2006). To ensure scientific rigour the guidelines for naturalistic enquiry proposed by Lincoln and Guba (1985) will be adhered.

2.11.2. Stages of IPA analysis

The premise of IPA is that the researcher is attempting to learn something about the participants world view. What is essential to the approach is that, rather than making measurements concerning frequency, it is the meaning that is fundamental and the analysis focus should revolve around understanding the meanings in terms of content and complexity (Smith & Osborn, 2003). The aim of IPA is therefore to measure resonance of themes with regard to depth of meaning. Deep meaning within the narratives is often not present at the superficial level and thus a detailed interpretive approach is required with a ‘sustained engagement with the text’ (Smith & Osborn, 2003, p. 66).

Following the ideographical approach, analysis is performed on a case-by-case basis. This works with individual examples prior to making common categorisations. Initially the transcript is read numerous times to become familiar with the account. Using a free textual analysis the researcher then comments on the text with no restrictions. The second phase attempts to make sense of the initial comments and to record emerging themes. This stage challenges the researcher to identify themes that enable theoretical connections to be made both within and between cases.

In connecting the themes, theoretical and thematic clustering enables the presence of emerging themes to be observed. Such clustering is likely to identify themes linking with other concept and the presence of subordinate or hierarchical structure (Smith & Osborn, 2003). Throughout the thematic clustering, the themes are cross referenced with the script to ensure a true capture is being made, for instance ensuring thematic links are reflected in the narrative. Selective supporting quotes are extracted to evidence and ensure that the interpretation is a true representation. Subsequent ordering provides a coherent and hierarchal structure naming and linking the most resonant themes. Themes may be omitted on the basis of lacking resonance of a lacking fit within the emerging thematic structure.

Upon completion of a case, the analysis was then progressed onto a second individual transcript. The previously identified themes guided the analysis however care was taken to be attentive to the emergence of new themes. The aim

was to "*respect convergences and divergences – recognising ways in which accounts from participants are similar but also different*" (Smith & Osborn, 2003, p. 73). After the completion of the analysis, a final record of subordinate themes was created, taking care to not excessively emphasise the prevalence of particular themes, rather focus on the richness of the text or the depth of meaning extracted (Smith & Osborn, 2003).

2.12. Establishing scientific rigour in IPA

Qualitative research, particularly IPA, has been criticised for lacking in scientific rigour (Larkin et al., 2006). Furthermore naturalistic enquiry methods have been criticised for being "*undisciplined, sloppy and merely subjective*" (Lincoln & Guba, 1985, p. 234). Lincoln and Guba (1985) propose useful criteria applicable to the naturalistic paradigm. These comprise truth value, applicability, consistency, and neutrality.

Truth value is a challenging concept within the naturalistic paradigm owing to reality being devised from a collective of multiple constructive realities and thus measures such as randomisation or control groups become redundant. In demonstrating truth value within naturalistic enquiry, it is the responsibility of the researcher to represent such multiple constructions adequately in order to credibly display that such reconstructions derive from the original constructions (Lincoln & Guba, 1985).

Applicability is the extent to which the findings can be transferred to different contexts. Lincoln and Guba (1985) contend that in demonstrating

transferability the burden does not lie with the original researcher, rather it lies with the person looking to make the transfer. It is however the responsibility of the researcher to make appropriately explicit descriptions of the participant sample group to enable the judgement of the applicability of the results.

Consistency is a measure of reliability and the extent findings can be replicated. Within the naturalistic paradigm, however, such consistency in results is challenging to achieve. Not least because of temporal influences of participant constructed realities; indeed Lincoln and Guba (1985) present the useful analogy that it is "*impossible to cross the same stream twice*" (p. 299).

Neutrality is a concept synonymous with objectivity. Objectivity is the notion that conclusions about a topic are only provided by the topic in isolation. This is to suggest that objectivity is present when the researcher is distanced from the research area. Clearly such a definition of objectivity is impossible to adhere to given the integral role of the researcher within the data collection and interpretive analysis. Rather it is important to acknowledge the role of the researcher and the importance of providing unbiased findings which are grounded in the presentation of the data (Lincoln & Guba, 1985).

In examining the methodology of naturalistic enquiry Lincoln and Guba (1985) propose that qualitative research be able to demonstrate credibility, trustworthiness, transferability, and confirmability.

2.12.1. Credibility

Five major techniques have been proposed to enable credible conclusions to be made. These consist of measures to increase the likelihood that credible findings will be produced, an external check on the enquiry process, refinement of working hypothesis in light of developing findings, a reference with raw data, and a confirmation of findings with their original source.

There are three activities to increase the likelihood of credible findings, the first of which is prolonged engagement in which the research has sufficient time to learn the culture in which the research question is located. In the present example the researcher is a practicing sport and exercise scientist with previous experience working within the strength and conditioning field, and as such was aware of characteristics specific to the culture. This enabled the building of rapport and enabled the fluid discussion of context specific examples.

The second method is through persistent observation in which the researcher is immersed in the context to enable the observation of ranging and multiple influences that impact the phenomena under investigation. The researcher was able to integrate within and observe strength and conditioning practice to enable the salient concept to be explored during interview.

The final method in increasing the likelyhood of credible finding is triangulation. Triangulation concerns the verification of results by the use of different researchers, different methods, or different sources. The use of different methods is appropriate owing to the mixed method design. Thus interview

respondents partook in both quantitative and qualitative methods. The cross reference between sources provided support for the credibility of the data and findings and interestingly offered differences worthy of exploration. Furthermore in endeavouring to provide triangulation of sources, participant groups were recruited from ranging international settings for instance the UK, the USA and Australia. Thus data scource triangulation was perfromed by which information obtained from participants from differing cultural and professional backgrounds evidences the extent to which similar thematic emergances occurred across different backgrounds (Tod et al., 2012). It must be noted however that a limitation of the present research is that only one researcher was engaged in the research and as such triangulation involving other researchers was not conducted. Hoverer, audience triangulation was used in which an experienced qualitative investigator reviewed selected quotes to ensure all relevant themes were exposed and to prevent experiment bias (Tod et al., 2012).

Referential adequacy is a measure to increase credibility. This consists of withholding an amount of raw data from analysis, instead subjecting the archived data to analysis to provided credence to the original findings. Such an approach was not used owing to the time limitations and the danger of omitting relevant data, especially perusing ideographic principles.

The final method in providing credible findings is the use of member checks. Member checking involves presenting raw data to the participants to validate the accurate collection of data. Member checking, regarded as the most important method in the demonstration of credible findings (Lincoln & Guba,

1985), can be progressed in elevating levels of detail ranging from confirmation of raw text to presenting the participants with the interpretation of findings. The present study used member checking, with a return rate of 17%, to validate the raw text and the presentation of particular thematic emergences.

2.12.2. Transferability

Transferability is in essence the extent to which the results can be applied outside of the research sample. Although described by Lincoln and Guba (1985) as being only the responsibility of the research to make accurate representation of participant characteristics to enable other to make the judgment of transferability. The present research proposes research based upon a broad demographic and utilised case cross-checking throughout. The resonance of themes within the sample provides support for the transferability of findings within demographically similar populations. Nevertheless, it is beyond the scope of the current study and further work study is required to evaluate the transferability of the proposed models within different contexts.

2.12.3. Dependability and Confirmability

Dependability is the ability of the findings to be repeated and consistent, confirmability is the degree to which the research findings are unbiased and attributable to the research participants. The research audit is regarded as the prime method of demonstrating both confirmability and dependability (Lincoln & Guba, 1985). Despite a true audit, as detailed by Lincoln and Guba (1985), not being completed, elements were integrated within the research to demonstrate structured processes and critical appraisal. Firstly the research has adhered to consistent methodological constraints as agreed and governed by the University

Research Ethics panel, this ensured that the method can be attributed to the research outcome and thus the procedure can be repeated. It is noteworthy that this does not necessarily imply the same results would be obtained should the study be replicated owing to variation in research interpretation. Indeed, Yardley (2000) suggests that the interpretive approach is ill-fitted to measures of reliability. Secondly, throughout the process the use of expert practitioners within strength and conditioning and sport psychology and IPA were used as sounding boards. This enabled critical appraisal of the processes employed from the conception of interview schedules through to the identification of thematic emergences with cross reference to transcripts.

2.13. Reflexivity

Reflexivity concerns an awareness of the influence that the researcher can possess over the research. Willig (2008) suggests the need for both personal and methodological reflexivity. It is important to be conscientious regarding the influence that the researcher's background, experiences and perceptions can have over the research. A useful way of ensuring reflexivity is through reflective practice recoding instances in which prior knowledge, perceptions or experience may have influenced the research.

2.14. Declaration of professional role of the researcher

Within naturalistic enquiry there is the notion that the results are inherently biased owing to the ways in which the researcher can influence the research process. For instance the method and the style of questions presented and the interpretation performed will shape the data produced (Yardley, 2008). However,

the removal of such potential influential factors would also negatively impinge on the benefits of qualitative study, for instance subjective experiences and in depth exploration (Yardley, 2008). Thus previously discussed measures shall be employed to demonstrate the validity of the qualitative strand of research.

Nevertheless the perceived role of the researcher can produce a desirability bias phenomena by which the respondents may shape responses' depending on those aligned with socially desirable norms. To prevent this care was taken to label the researcher emphasising the role as a researcher with interest in strength and conditioning. Specific applied practice professional roles were withheld from the participants.

2.15. Handling of data

All raw data was stored within locked filing cabinets at the earliest possible opportunity. Electronic data was transferred to password-protected personal computers. Upon transfer of data all digital recordings were deleted. With the exception of the signed informed consent and numeric coding system used, there was no reference possible between information provided and individuals. Such personal information was duly filed using either password-protected computers or locked filing cabinet to which only the researcher had access.

2.16. Ethical considerations

Throughout the course of the study the research guidelines of the British Psychological Society (BPS) and the British Association of Sport and Exercise Scientists (BASES) was adhered to. Such guidelines state the importance of voluntary informed consent, confidentiality, and anonymity.

Participants were requested to provide written consent which was reiterated prior to data collection data. Consent was provided in the form of a signed consent document. In instances when signed consent could not be obtained then verbal consent was deemed suitable and recorded for the interviews. Using electronic surveys with the Bristol Online Survey, consent was presumed upon receipt of the completed survey (Hewson, 2003). Care was taken to ensure that the participant information clearly stated that the research was voluntary and how the data would be handled. Participant demographic data were treated with strict confidentially, with any data presented being aggregated so as to not enable the identification of individual participants. Participants were clearly told that their participation was voluntary and that they had the right to withdraw at any point without providing a reason.

While conducting naturalistic enquiry there is the possibility that the participants may provide unexpected information for instance providing information that negatively represents an organisation. It was therefore imperative that whilst promoting a fluid dialogue the participants were informed of the confidentiality of the information that they disclosed. The present study did not envisage the declaration of any illegal activity however participants were

informed that such declaration would have to be referred to the appropriate organisations. To confirm that the research was ethical the proposal was submitted to the College of Health and Social Care Research Ethics and Governance committee for approval and duly approved.

CHAPTER THREE

3. The frequency of psychological strategies used by strength and conditioning practitioners

3.1. Chapter Overview

This chapter will present the specific details of the protocol method and findings from study one. The rationale and the methodologies are outlined and justified, whilst the results of the study are discussed with respect to existing literature whilst offering direction applicable for practitioners and future researchers. This section aimed to quantify the use of psychological skills and strategies, and provide possible research questions for further investigation.

3.2. Introduction

Strength and conditioning has developed from an amalgamation of various long-standing disciplines with the strength and conditioning practitioner being required to draw on knowledge from ranging disciplines such as psychology, biomechanics, nutrition, and exercise physiology. To date the NSCA has conducted two studies into the job analysis of strength and conditioning practitioners (Baechle, 1997; National Strength and Conditioning Association, 2009) which have been used to determine both the NSCA professional guidelines and the examination criteria to for the Certified Strength and Conditioning Specialist (CSCS) examination. As published by the NSCA, the strength and conditioning professional guidelines state that the ability to *"use sport psychology techniques to enhance the training and/or performance of the athlete"(p.13)* is a

scientific foundation required by certified strength and conditioning specialists (National Strength and Conditioning Association, 2009). In addition, as a sport training practitioner in regular contact with the athlete, the strength and conditioning specialist is in an ideal position to contribute to the psychological aspects of training (Ford & Gordon, 1998; Maniar et al., 2001; Arvinen-Barrow et al., 2010). Furthermore, the coach, rather than psychology-titled professionals, has been previously identified as the favoured provider of psychological support (Maniar et al., 2001). It would therefore be beneficial for strength and conditioning practitioners to have knowledge of select psychological techniques and applications within applied practice.

Academic interest in psycho-physiological research has led to a wealth of research exploring how psychological interventions affect variables pertinent to strength and conditioning. Holloway (1994, 1995) suggested that it would be beneficial for strength and conditioning specialists to apply key psychological self-regulatory and self-expectancy theories and concepts such as imagery, goal setting, motivation, and self-talk to their clients' individualized programmes, however there is limited research suggesting the use of interventions by strength and conditioning coaches.

Literature has examined the behaviour of strength and conditioning professionals without objectively exploring either the extent to which key psychological strategies (Holloway, 1994, 1995) are implemented or the perceptions towards the importance of such strategies. Studies have used a combination of self-report inventories (Brooks et al., 2000; Magnusen, 2010) and

observation (Massey et al., 2002; Gallo & De Marco, 2008) with focus on coaching styles and behaviours. Through observational techniques, Massey et al. (2002) led the way in determining the frequency of psychological skills used by strength and conditioning coaches. The investigation highlighted the value of motivational techniques within strength and conditioning with behaviours such as 'hustle' and 'praise' being observed, however it also served as a concern that particular psychological strategies such as positive modelling were neglected.

The multifaceted role of a strength and conditioning coach has been examined in various sporting contexts (Pullo, 1992; Sutherland & Wiley, 1997; Ebben & Blackard, 2001; Durell et al., 2003; Ebben et al., 2004; Massey et al., 2004; Ebben et al., 2005; Duehring et al., 2009; Massey et al., 2009; Duehring & Ebben, 2010). Despite the exploration of the responsibilities and practices of strength and conditioning practitioners, prior research has focused predominantly on physical training strategies with a dearth of research examining the use of psychology within applied strength and conditioning practice and thus present research is important in filling the current void.

The examination of how psychological interventions are utilized by the strength and conditioning practitioner and the perceived importance of psychological components is a vital step in facilitating the development of strength and conditioning as an expanding discipline. The present study hypothesized that due to the documented benefits brought through the utilization of particular strategies, strength and conditioning practitioners will indeed use psychological strategies as part of their applied practice. However as the

frequency of skill use is unknown the present research attempts to answer that research question.

It would be expected that strategies such as those that increase adherence to exercise and motivation will be valued as important and expected to be utilized frequently, reflecting the existing work of Massey et al. (2002). Conversely it is to be expected that due to a perceived lack of awareness and time restraints, particular strategies will be perceived as unimportant and underutilised. However, owing to the absence of previous studies, it is unclear which skills will be neglected and on what the justifications for selection of psychological skills is based.

Recently Tod et al. (2012) examined the professional development themes within strength and conditioning. It was concluded that as a practitioner gains experience there also gain responsibilities and skills. Such skills were identified to be developed experientially, lacking formal training. One such skill of note was that of the increased use of 'soft skills' relating to the use of communication strategies and building rapport with athlete clients. Thus it was apparent that it is through the increased contact and therefore increased varied scenarios that promoted the development of skills which were not formally instructed as part of strength and conditioning certification.

In addition to the experiential nature with which new skills are developed by strength and conditioning coaches, it was also identified that coaches transferred skills between vocations. Thus it is likely that previous experience

within a different context can provide practitioners with the skills or interest to employ such strategies within strength and conditioning.

This study will consider the perceptions of practitioners from leading strength and conditioning professional bodies with an aim to quantify the frequency to which practitioners utilise psychological skills, the particular strategies perceived to be most important to strength and conditioning and to identify possible factors such as experience, and accreditation programmes that account for variations in the use of psychological strategies. It is through analysing such previously neglected variables that professional development can be targeted towards promoting the use of such key psychological strategies.

3.3. Hypothesis

Based upon the notion that within strength and conditioning additional skills are developed experientially and have been observed to transfer between contexts (Tod, 2012) it is anticipated that:

- The more experienced strength and conditioning coached will employ significantly more psychological skills than lesser experienced coaches.
- Context-specific skills will be used significantly less than the skills which are generalisable across domains, for instance goal setting.

3.4. Method

3.4.1. Ethical Approval

Prior to commencing the study the University of Salford Ethical Review Board provided approval for the experimental procedures. Prior to participation all subject received an invitation email document containing participant information, including clear explanation of the potential benefits and risks associated with the research, how the data would be handled, the dissemination of findings, and the voluntary nature of the study. An email contact was provided for the lead investigator should any potential applicants request additional information. As has been used previously and recommended with web-based survey design (Andrews et al., 2003), informed consent was received subsequent to receiving the participant information the participants 'clicked' that they wished to take part in the study.

3.5. Survey sampling

The questionnaire (Chapter Three) surveyed the perceptions of strength and conditioning and the frequency of psychological strategies used employed purposive sampling (Bowling, 2009). This consisted of administering the survey to strength and conditioning practitioners accredited by the UKSCA, the NSCA, or the ASCA. Participants were included on the basis that they were accredited members with contact details available either in the public domain, or via organisational gate keepers. There was no exclusion criteria based upon age, gender, nationality, additional qualifications, or experience however such demographic information was collected for subsequent analysis. It was presumed

that all recipients of the survey were able to complete the instrument as all the above accrediting bodies present examination material in English language.

3.5.1. Participants

104 participants responded completing the survey. Two participants did not meet the eligibility criteria of being accredited as a strength and conditioning practitioner by a recognized strength and conditioning association (UK Strength and Conditioning Association, NSCA, Australian Strength and Conditioning Association). 102 participants met the eligibility criteria comprising 90 men and 12 women with a mean age of 34.7 ± 9.7 years. Participants had a mean experience of 7.4 ± 5.2 years working as a strength and conditioning practitioner. 36.5% of respondents were part-time whilst 63.5% worked as full-time practitioners. Participants were registered with the following organizations: UK Strength and Conditioning Association (UKSCA): n=41; NSCA: n=48; Australian Strength and Conditioning Association (ASCA): n=48. A number of participants were affiliated with more than one organisation.

3.5.2. Procedure

The survey was administered in electronic format using the Bristol Online Survey instrument (Bristol University: UK). Convenience sampling was used, contacts were collected from publicly available databases (UKSCA n= 101 and ASCA n=425) and through distribution on the researcher's behalf by organisation administration staff (BASES n=111). The instrument was emailed with a covering letter introducing the research. The survey contained participant information.

Participants received two follow-up reminders and were thanked upon completion. NSCA distributed the survey in the NSCA December e-bulletin to members on the mailing list (NSCA n≈26,000). The survey was active for a seven month period (August 2010- February 2011).

3.5.3. Pilot testing of the survey

A pilot test of 30 master's students enrolled on the strength and conditioning masters programme at the University of Salford was conducted. The sample population was used for two reasons. Firstly the sample is accessible in that the sample could be invited to partake in person by the course leader, allowing a prompt administration of the instrument. Secondly the sample originates from differing demographics albeit with each member sharing interest and experience of strength and conditioning practice. Consequently, the sample was presumed to be representative of the sampling used for the main study.

The pilot testing highlighted potential concerns with the wording of some of the items, predominantly owing to a lack of understanding regarding specific psychological terms. As a result of the pilot testing the terminology used within the questionnaire was modified. Such examples include changing 'increase arousal' to 'psych-up'. A final concern highlighted in the pilot was that the questionnaire was too long and 'boring' to complete. This was anticipated and subsequent to item reduction in light of measuring and improving the reliability of the survey resulted in the instrument being reduced in length. This will be discussed in the subsequent section concerning measurement reliability.

3.5.4. Survey instrumentation

Self-report inventories as a method of determining psychological traits and behaviours is based upon the assumption that often the best method to find out about an individual is to ask them (Hammond, 2006). Numerous self-report inventories exist with applications in counselling and clinical psychology which examine underlying personality traits based on the hypothesis that behaviour is governed by such traits (Tkachuk et al., 2003). Such instruments include State-Trait Anxiety Inventory (Spielberger et al., 1970), the profile of mood states (McNair et al., 1971), and the 16-PF personality scale (Cattell, 1949). Aside from the measurement of global traits, specific personality constructs have been measured such as the Sport Competition Anxiety Test (Tutko et al., 1969) and the Athletic Motivation Inventory (Martens, 1977). However the use of such personality construct measures is not appropriate when determining a person's behaviours and consequently many psychologists are developing the use of specific measures of behaviour (Hardy et al., 2010b). Such examples include the Test of Performance Strategies (Thomas et al., 1999), The Athletic Coping Skills Inventory (Smith et al., 1995), and the Psychological Skills Inventory for Sport (Mahoney et al., 1987). The measurement of behaviours themselves, rather than the underlying traits presumed to account for such behaviours, has gathered increased interest by the coaching community on the foundation that they are more readily applicable to differentiate successful and unsuccessful athletes and provides support for psychological interventions (Hardy et al., 2010b).

Despite the presence of such validated inventories, these measures address how the person themselves utilises such psychological skills with insufficient focus on the prescription of techniques. Consequently, investigators interested in the practices of practitioners are often required to develop instruments specific to the individual research focus. When measuring the views of physiotherapists on the psychological content of their practice, Hemmings and Povey (2002) amended the Athletic Trainer and Sport Psychology Questionnaire (Larson et al., 1996) to create the Physiotherapist and Sport Psychology Questionnaire (PSPQ). Both instruments were designed to measure the perceptions of practitioners in regard to the frequency in which psychological factors such as occurrences of anger, anxiety and lost concentration by their clients are encountered in the course of their practice. Nonetheless whilst the PSPQ successfully determined the views of practitioner in regard to the psychological aspect of their practice, the disciplines of physiotherapy and strength and conditioning differs sufficiently to warrant the development of a tool specific to the demands of strength and conditioning practice.

Specific to strength and conditioning practice, The Strength and Conditioning Practices of Professional Strength and Conditioning Coaches survey instrument (Ebben & Blackard, 2001; Ebben et al., 2004; Ebben et al., 2005; Simenz et al., 2005; Duehring et al., 2009; Massey et al., 2009) has been developed exploring the practices of coaches within ice hockey, baseball, and American football. The instrument address's the views to the strength and conditioning professional with a focuses on various physical training practices and the implementation of strategies throughout the season. However whilst the paper

is applicable to the strength and conditioning fraternity, the instrument is limited as only the miscellaneous section of "unique aspects" offers scope to examine psychological skill use, consequently such studies have failed to yield data indicating the use of psychological strategies within strength and conditioning practice.

The Strength and Conditioning and Sport Psychology Questionnaire (SCSPQ; Radcliffe, 2013; see Appendix One) was constructed for the present research as there are currently no suitable instruments available to determine the frequency of psychological skills prescribed by strength and conditioning practitioners. The inventory initially consisted of 44 items measuring the frequency of goal setting, imagery, self-talk, mental toughness, attentional control, relaxation, stress management, adherence, activation, self-confidence and ego management.

Activation was selected as a subscale on the basis that anecdotally, within the strength training fraternity, athletes increase their arousal; they psych-up (Tod et al., 2012). Furthermore arousal control has been identified as an important psychological attribute within sport (Thomas et al., 1999), with correlation observed between levels of arousal and force production (Gould et al., 1980; Tenenbaum et al., 1995; Tod et al., 2012).

Adherence was included as typically maintaining athlete's adherence to a structured programme is difficult with many athletes having difficulty in adapting to programmes within Strength and Conditioning (Anderson & Lavallee, 2008).

Furthermore the need for the athlete to adhere to the specific structure and factors prescribed by the strength and conditioning coach is imperative to achieving the specific training objectives (Baechle & Earle, 2008).

Attentional control was included as it was considered a key aspect in cognitive psychology, with up to 80% of sports psychology consultants applying attentional control techniques with their athletes (Gould et al., 1989). Furthermore performance variations have been attributed to the particular attentional strategy which an individual adopts (Gould et al., 1980; Shea & Wulf, 1999; Vance et al., 2004; Ford et al., 2005a; Ford et al., 2005b; Zachry et al., 2005; Marchant et al., 2009; Zentgraf & Munzert, 2009; Lohse et al., 2010; Porter et al., 2010; Wulf et al., 2010).

Goal setting was selected as it is one of the prime factors regarding athletic motivation (Thomas et al., 1999) and adherence to conditioning programmes (Scherzer et al., 2001), with academics advocating such strategies with the use of goal setting being a major determining factor in the success of athletes (Orlick & Partington, 1988; Durand-Bush & Salmela, 2002).

Ego management has been included as the motivational orientation an athlete exhibits has been shown to have direct implications within the strength and conditioning environment (Fry & Fry, 1999; Gilson et al., 2008), with a comparison with others proving detrimental in regard to motivation and maladaptive training and lifestyle strategies (Gilson et al., 2008; Lemma, 2009; Smith et al., 2010).

Imagery was selected as it is regarded as an important cognitive skill within sport (Moran, 2009) which is able to be developed through practice to have direct benefits on strength performance (Wright & Smith, 2009; Lebon et al., 2010) and muscle electromyography (Williams et al., 2010).

Mental toughness has been included as a subscale as it is widely regarded as a vital characteristic of elite athletes with athletic performance correlating with mental toughness (Gould et al., 2002; Jones et al., 2002; Gucciardi et al., 2008; Gucciardi, 2009; Crust & Azadi, 2010). Furthermore mental toughness has been shown to be developed through mental training programmes (Gucciardi et al., 2009b, 2009a).

Relaxation was identified as a subscale pertinent to strength and conditioning as a critical skill in managing arousal levels such as achieving an appropriate level of activation (Pierce et al., 1993; Tenenbaum et al., 1995). Albeit related to activation, following the guidance of Thomas et al., (1999), as demonstrated by the catastrophe theory relationship between performance and arousal (Hardy & Parfitt, 1991) activation and relaxation are separate constructs and worthy of individual subscales.

Self-confidence is regarded as imperative to successful sporting performance (Gilson, 2010) with self-efficacy, the situational specific component of self-confidence, being shown to be modified to benefit strength performance.

(Ness & Patton, 1979; Wells et al., 1993; McNair et al., 1996; Wise & Trunnell, 2001; Wise et al., 2004) and to increase motivation (Jackson, 2010).

Self-talk has previously been shown to be an effective skill in focussing an athlete's attention and increasing motivation (Tod et al., 2009), with benefits in skill acquisition observed (Hardy et al., 2001; Thelwell et al., 2006; Cutton & Landin, 2007). With evidence to suggest that self-talk as a preparatory strategy can benefit force production (Tod et al., 2003).

Stress management was identified a pertinent skill to examine noticeably because of the numerous stressors to which athletes are exposed (Markser, 2011), with elevated stress being responsible for a sudden and acute drop in performance (Hill et al., 2009), athlete burnout (Gustafsson & Skoog, 2012) and increased susceptibility to injury (Hardy, 1992), all of which are pertinent to strength and conditioning practice. In addition to this, Roh and Perna (2000) have suggested that athletic trainers should possess counselling qualities given their role with supporting rehabilitation. Likewise, the strength and conditioner is often requires to provide support through the rehabilitation process (Kontor, 1989; Wathen, 1989).

Responses were on a five-point likert scale from *not at all* to *all the time*. The subscales were composed after a review of literature and wording was validated through expert critique of a sport psychologist and strength and conditioning specialist. The limited expert critique may be considered a limitation. Adopting the template presented by Hemmings and Povey (2002), additional

open-ended questions required the respondents to identify up to five attributes deemed most important to strength and conditioning practice and up to five psychological attributes that are detrimental within Strength and Conditioning. Participants were asked to provide select demographic data including age, duration of experience, accrediting body, and the sports they were predominantly involved in (individual, team or both equally) prior to completing the survey.

3.5.5. Survey instrument validity

Using SPSS 16 (SPSS Inc., Chicago IL), internal consistency of each subscale was measured using Cronbach's Alpha. The reliability criterion was set at >0.6 due to the low number of items within each subscale (Loewenthal, 2001). Subsequent item reduction was conducted to increase internal reliability (DeVellis, 2003). 13 items were removed resulting in a 31 item scale resulting in acceptable internal consistencies (α>0.6) for Goal Setting (0.677), Ego Management (0.679), Imagery (0.684), Relaxation, (0.658), Stress Management (0.608), and Activation (0.675) subscales. Authors have documented the difficulty in achieving acceptable Cronbach's alpha levels with small numbers of items (Loewenthal, 2001; Hardy et al., 2010b), therefore Briggs and Cheek (1986) recommend examining inter-item correlations with mean inter-item correlations ideally between 0.2-0.4. All subscales were deemed to have adequate internal consistency, correlations ranging from 0.227 (attentional control) to 0.427 (imagery and ego management).

3.5.6. Analysis

SPSS 16 (SPSS Inc., Chicago IL) was used to conduct *A posteriori* analysis with appropriate non-parametric tests. Non-Parametric analysis was used as the data failed to satisfy criteria for parametric analysis owing to the wording of the likert scale being subjective and not applicable to interval level measurement, the convenience sampling methods used, and the data not having normal distribution (Hicks, 2004). The Holm-Bonferroni method was utilised to counter family-wise type I error (Holm, 1979) as it is more powerful yet less conservative than the traditional Bonferroni procedure (Simes, 1988; Aickin & Gensler, 1996; Feise, 2002). The debate over the need for multiple comparison corrections is documented with advocates for and against using corrected levels of significance (Feise, 2002). Multiple comparison corrections serve to prevent the family-wise type I error however dispute lies with the apparent extent of the family (Cabin & Mitchell, 2000; Feise, 2002) with the consequences of excessive corrections threatening type II error (Rothman, 1990). For the purpose of the present study a family is termed as a number of comparisons directly relating to a single null hypothesis (Feise, 2002). Statistical power was calculated using G*Power 3 software (Faul et al., 2007).

The Friedman test was used to identify significant differences between different psychological strategies in terms of the frequency of use. Subsequent analysis of difference between the frequencies of skill use was conducted using the Wilcoxon Signed Ranks with a Holm-Bonferroni correction to control for family-wise type I error (Holm, 1979). The pairs were nominated for analysis on the basis of the observed difference in the mean rank scores with the intention to

identify the differences most relevant to the present study on the presumption that larger z–values, effect sizes, and smaller alpha values will lie within other comparisons. The stringency of the criteria to be nominated for analysis was on the basis that excessive comparisons will be detrimental to the adjusted alpha value and risk type II errors. Correlation between subscales was measured using Spearman's rho.

Subjects were then categorised based upon demographic criteria. This included experience, working predominantly with teams or individual athletes, and accrediting body. The Kruskal-Wallis test identified the presence of significant differences between the groups when split by experience, accrediting body, and working with team or individual athletes. Mann-Whitney tests highlighted location of the differences using the Holm-Bonferroni correction.

Open-ended questions asked respondents to list up to five psychological skills critical to their athlete's successful performance and up to five psychological factors which are detrimental to their athlete's performance. The responses were subjected to thematic analysis using NVivo 8 (QSR International Pty Ltd. Version 8, 2008).

3.6. Results

3.6.1. Frequency of use of psychological skills measure using the SCSPQ

The results identify the rank order of the psychological strategies used by strength and conditioning practitioners. To the author's knowledge this is the first study to rank the order of the frequency of use of psychological strategies as perceived by practitioners. This therefore supports the hypothesis that differences exist between the frequencies of use of particular strategies.

Subscale	*Mean*[1]*	*Std dev*	*Mean rank*
Goal Setting	4.21	0.58	8.76
Adherence	3.99	0.72	7.60
Self-Talk	3.89	0.72	7.55
Activation	3.76	0.76	6.75
Stress Management	3.63	0.66	6.20
Attentional Control	3.57	0.62	5.64
Relaxation	3.48	0.67	5.31
Mental Toughness	3.47	0.73	5.50
Self-Confidence	3.45	0.83	5.27
Ego Management	3.25	0.73	4.28
Imagery	3.07	0.78	3.32
Total *[2]	112.44	0.40	
Mean Total of items	3.41	0.40	

Table 3.1 Descriptive mean frequencies of skill use by strength and conditioning specialists with standard deviation. *[1]Rating Scale not at all=1 to all the time=5. *[2]Total skill use minimum possible score=33 –maximum possible score =155.

Descriptive statistics were calculated for the 11 subscales and the total subscale scores (Table 3.1). The Friedman test identified that there were significant differences between psychological skills in terms of frequency of use in the frequency of psychological skill use (x^2=293.053, df=2, p<0.000).

Subsequent pair-wise analysis was performed with pairs selected subjected to the Holm-Bonferroni correction. Six pairs were identified on the basis to identify the smallest significant differences whilst preserving an appropriate significance value.

Thus, after scrutinising the data for apparent mean and mean ranked subscales differences, 6 pairs were identified for *a posteriori* analysis using 1-tailed significant differences existed between goal setting and adherence ($z = -2.678$, $p = 0.004$, $d = 0.38$, Power =0.98), self-talk and activation ($z = -1.728$, $p = 0.042$, $d = 0.17$, power =0.53), activation and attention control ($z = -2.892$, $p = 0.002$, $d = 0.29$, power=0.88), stress management and relaxation ($z = -2.750$, $p = 0.006$, $d = 0.23$, power 0.71), self-confidence and ego management ($z = -2.005$, $p = 0.023$, $d = 0.27$, power =0.83), and imagery and ego management ($z = -2.270$, $p = 0.012$, $d = 0.24$, power=0.75). It must be acknowledged that additional larger differences are assumed to exist between subscales.

3.6.2. Comparison of strategy use between experience levels

When comparing differing demographics, there were significant differences in the frequency of skill use depending on the respondents' experience, thus fulfilling a subsequent aim of the study by identifying differences between demographics relating to skill use. Table 3.2 shows the comparison between the frequencies of psychological skill usage of practitioners with differing levels of experience.

When grouped by experience, 0-4 years (n=33, Age:29.21±8.1 years), 5-9 years (n=34, age:32.8 ±6.1 years), and 10+ years, (n=35, Age:42.5±9.4 years), the Kruskal-Wallis between groups test yielded significant differences in the frequency of use of imagery (x^2=15.293, df=2, p<0.001), attentional control (x^2=6.669, df=2, p=0.036), stress management (x^2=9.327, df=2, p=0.009), self-confidence (x^2=8.746, df=2, p=0.013), and total skill use (x^2=12.927, df=2, p=0.002).

Subscale	*Experience in years*		
	0-4yrs n=33	5-9yrs n=34	10+yrs n=35
Goal Setting	4.04±0.62	4.22±0.61	4.36±4.47
Adherence	3.76±0.80	4.07±0.69	4.12±0.65
Self-Talk	3.84±0.52	3.83±0.90	4.01±0.70
Activation	3.61±0.77	3.69±0.82	3.97±0.64
Stress Management	3.39±0.67	3.60±0.69	3.90±0.55
Attentional Control	3.40±0.63	3.53±0.60	3.77±0.58
Relaxation	3.35±0.68	3.44±0.74	3.65±0.58
Mental Toughness	3.33±0.74	3.58±0.74	3.51±0.54
Self-Confidence	3.11±0.78	3.54±0.87	3.69±0.74
Ego Management	3.17±0.72	3.17±0.74	3.42±0.73
Imagery	2.75±0.67	2.92±0.75	3.49±0.55
Total	106.91±12.83	111.59±13.26	118.49±11.53
Mean Total of items	3.24±0.38	3.38±0.40	3.59±0.35

Table 3.2 Descriptive means ± standard deviation of skill use by strength and conditioning with different levels of experience

Subsequent *a posteriori* analysis using Mann-Whitey with a Holm-Bonferroni corrected significance values identified that the imagery (z = -3.700, p<0.001, d = 1.21, power =0.999), attentional control (z = -2.480, p=0.007, d =

0.61, power =0.78), stress management (z = -2.951, p=0.002, d = 0.83, power= 0.96), self-confidence (z = -2.953, p=0.002, d = 0.76, power =0.92), and total skill used (z = -3.499, p<0.001, d = 0.96, power = 0.99) was significantly greater in the 10+ years group compared to the 0-4 years' experience group.

Self-confidence (z = -2.088, p=0.019, d = 0.52, power = 0.66) was used significantly more by the 5-9 years' experience group than the 0-4 years' experience group.

Imagery (z = -2.828, p=0.003, d= 0.67, power = 0.67), stress management (z = -2.050, p=0.020, d = 0.48, power = 0.60), and total skill use (z = -2.216, p=0.019¸ d = 0.56, power = 0.71) were used significantly more in the 10+ years group compared to the 5-9 years group.

3.6.3. Comparison between respondents' accrediting bodies

In respect to identifying potential differences between accrediting bodies, a subsequent objective of the study was achieved by identifying potential factors relating to the use of psychology within strength and conditioning practice.

Respondents were grouped into categories according to the respective accrediting bodies. These were ASCA (n=36, age: 36.6±10.2 years, experience: 9.22±7.4 years), NSCA (n=24, age: 33.75±9.8 years, experience: 6.58s±5.5 years), both NSCA and ASCA (n=12, age: 35.8±8.3 years, experience: 11.3±6.3 years), and both NSCA and UKSCA (n=20, age: 33.8±11.5 years, experience: 8.0±7.0 years). Using the Kruskal-Wallis test, the results yielded significant

differences between the frequency of total psychological skill use of respondents from different accrediting bodies (x^2= 10.220, df = 3, p=0.017). The Kruskal-Wallis test show that significant differences existed between the frequencies of select psychological skill usage of respondents from different accrediting bodies. Differences existed in the frequency of attentional control strategies (x^2= 10.865, df = 3, *p*=0.12), relaxation strategies (x^2= 10.673, df = 3, p=0.014), stress management strategies (x^2= 8.129, df = 3, p=0.43), and ego management (x^2= 13.351, df = 3, p=0.004).

One-tailed *a posteriori* Mann-Whitney tests with the modified Holm-Bonferroni correction (Holm, 1979) identified differences between the ASCA and the both NSCA and UKSCA groups with ASCA having a greater use of total psychological skill (z= -2.892, *p*=0.002, d = 0.94, power = 0.95), attentional control (z= -2.904, *p*=0.002, d = 0.88, power =0.95), relaxation strategies (z= -2.295, *p*<0.001, d = 1.00, power = 0.97), stress management strategies (z= -2.571, *p*=0.005, d = 0.74, power = 0.82) and ego management strategies (z= -3.153, *p*=0.001, d = 1.01, power = 0.97) than the both NSCA and UKSCA group.

One-tailed *a posteriori* Mann-Whitney test with the modified Holm-Bonferroni correction (Holm, 1979) identified differences marginally missing significance between the ASCA and the NSCA groups with ASCA having a greater total psychological skill (z= -2.348, *p*=0.019, d = 0.61, power = 0.71), with use of greater attentional control strategies (z= -2.323, *p*=0.020, d = 0.59, power =0.70) than the NSCA group.

3.6.4. Psychological factors important to success in Strength and Conditioning

Factors critical to success	*% consensus of respondents*
Motivation	63.37%
Confidence	51.49%
Commitment	48.51%
Focus	38.61%
Mental toughness	32.67%
Positive attitude	23.76%
Goal setting	23.76%
Correct level of concentration	22.77%
Routines and organization	20.79%
Mental rehearsal	18.81%
Comparisons with others	16.83%
Relaxation	16.83%
Review of performance inc feedback	13.86%
Honesty	8.91%
Team ethic	7.92%
Athlete agreed training methods	6.93%
Self-talk	6.93%
Aggression	5.94%
Arousal	5.94%
Enthusiasm	4.95%
Communication	3.96%
Acceptance of challenges	2.97%

Table 3.3 Factors listed as important to the athlete's successful performance and the percentage of respondents stating such factors

Table 3.3 shows the most commonly cited psychological aspects critical to an athletes' success as judged by the sampled practitioners. Respondents highlighted that the most important psychological attributes relevant to strength and conditioning were motivation, confidence and commitment, with 63.37%, 51.49% and 48.51% respectfully of respondents identifying such characteristics as important for success within strength and conditioning. Interestingly given the interest in psyching-up, the lower number of respondents (5.49%) deeming arousal regulation as important is surprising

3.6.5. Psychological factors detrimental to Strength and Conditioning

Factors detrimental to performance	*% consensus of respondents*
Lack of motivation	54.46%
Lack of Confidence	45.54%
Stress and anxiety	32.67%
Ego	31.68%
Not focussed towards training objectives	26.73%
lack of commitment	19.80%
Burnout and depression	15.84%
Negative attitude towards training and competition	14.85%
Inappropriate goal setting	14.85%
Poor planning and organisation	13.86%
Negative social influences	9.90%
Inappropriate use of self-talk	8.91%
Lacking mental toughness	7.92%
Inappropriate levels of arousal	6.93%
Failure to take responsibility for success and failure	5.94%
Confidence level (Over)	5.94%
Lack of belief of training methods	4.95%
Inappropriate feedback	4.95%
Lack of enjoyment	4.95%
Lack of discipline	4.95%
Communication	3.96%
Negative self-image	2.97%
Inappropriate attention focussing	2.97%
Aggression	2.97%
Resistance to change	2.97%
Perfectionism	1.98%

Table 3.4 Factors listed as detrimental to athlete's performance and the percentage of respondents stating such factors

Table 3.4 presents factors considered detrimental to strength and conditioning training by strength and conditioning practitioners. This showed that a lack of motivation, a lack of confidence, stress and anxiety were the most often reported causes of a poor performance with 54.46%, 45.54% and 32.67% respectfully of the respondents stating such issues.

3.7. Discussion

3.7.1. Imbalance in psychological skills and strategies prescribed by practitioners

It is apparent that strength and conditioning coaches utilise and value psychological skills with strength and conditioning practitioners reporting that on average they use all of the strategies measured at least some of the time. Nevertheless there is an imbalance between the usages of particular strategies. This would indicate that it is not understood how particular techniques are implemented within the strength and conditioning environment, or that certain skills are valued more than others. The following section will explore the most used strategies of goal setting and contrast with the least used section of mental imagery and hypothesise reasons for such disparity.

3.7.2. The frequency of goal setting techniques

The strategy that the practitioners perceived to use the most was goal setting (mean 4.21/5 ± 0.58). This was consistent with the existing research showing short-term goals are amongst the most commonly utilised psychological skills in physiotherapy (Hemmings & Povey, 2002; Arvinen-Barrow et al., 2007; Arvinen-Barrow et al., 2010) and in athletic training (Wiese et al., 1991). The use of goal setting has previously demonstrated that practitioners from alternative disciplines value realistic goal setting as a skill that is important to understand (Wiese et al., 1991).

Goal setting is regarded as one of the key aspects of training, impacting a person's motivation (Thomas et al., 1999). Furthermore, and specific to the

present research, goal setting has proved critical to facilitating adherence to conditioning programmes (Scherzer et al., 2001). Unsurprisingly, academics have attributed strategies incorporating goal setting to account for the variation between successful and unsuccessful athletes (Orlick & Partington, 1988; Durand-Bush & Salmela, 2002).

The perceived high use of goal setting is most likely due to the nature of strength and conditioning practice, thus it is a generic psychological skill which crosses disciplines and may be viewed a pre-requisite skill. Strength and conditioning practice requires the use of established targets and physiological benchmarks from which to determine the effectiveness of a training intervention (Ebben & Blackard, 2001). The comparison with benchmarks is readily available and applicable to training environment with interventions providing tangible results such as variations in mass lifted or running velocity providing data accessible to practitioners. The use of simplistic goal setting in which comparisons between current level to those of a pre-determined benchmark indicative of an athlete's standard are likely to be prevalent within strength and conditioning practice.

It is documented that strength and conditioning coaches practicing in North America benchmark athletes on average two times a year (Ebben & Blackard, 2001). The instances of goal setting in the present study indicate that goal setting strategies are used between most of the time and all of the time. The present findings would suggest that over a decade later strength conditioners are

increasingly employing physical benchmarking or that there is the informal administration of goals in addition to the formal benchmarking.

Drawing comparisons between the current findings and previous findings would suggest that goal setting is a fundamental component of strength and conditioning although it is potentially used informally. It is likely that the strength and conditioning practitioners in the present study use a combination of long term goals measured periodically as part of periodised training programmes (Ebben & Blackard, 2001) and the informal use of goal setting within sessions, forming training instruction as a motivational aid. However the exact mechanics are unable to be derived from the present findings and require further in depth exploration to ascertain the mechanics and rationale of the goal setting.

It is probable that the use of simple goals used for the evaluation of training programmes (Ebben & Blackard, 2001) provides the foundation from which goal setting strategies may be shaped through experience, with coaches developing more complex and tailored goal setting strategies as they gain a greater understanding. Indeed it was apparent in the present study that as experience increased, the frequency of goal setting strategies increased, albeit not to a statistically significant level. This finding mirrors observations witnessed in other disciplines for example within sports coaching (Sullivan & Hodge, 1991) and physiotherapy (Jevon & Johnston, 2003) that understanding of psychological interventions are developed through experience rather than formal training.

It is also probable that the increased use of goal setting is dependent upon the strength and conditioning specialists' perception of the previous success using the strategy. Sullivan and Hodge (1991) have previously identified goal setting as a strategy sports coaches in New Zealand have most success utilising. Furthermore due to the reported lack of time to use psychological strategies (Creasy et al., 2009), it is likely that coaches will focus their use of psychological strategies on those perceived as most beneficial to the neglect of other psychological skill sets.

The efficacy of using a particular strategy appears to be critical in predicting a coach's intent to incorporate such a technique. This is reflected in existing research that the use of psychological strategies is largely shaped through experience. The experience of working with clients has been identified as a key information source which provides the strength and conditioning practitioner with the required skills (Tod et al., 2012). Furthermore it has also previously been suggested that the increased experience is manifested in an increased sense of confidence using particular techniques (Tod et al., 2012). This would suggest that the development of strength and conditioning professionals, in particular regarding the use of psychological skills and strategies, are grounded in the incidents they experience. That is, the integration of psychological skills is related to a cyclical relationship, thus, success elicits confidence and accordingly shapes intentions to repeat or even develop strategy use within applied work.

Notwithstanding that efficacy controls a significant function in the utilisation of psychological skills, research has identified that strength coaches do

not perceive personal experiences as the most important source of knowledge (Durell et al., 2003). This is evident with only eight percent of North American collegiate strength and conditioning coaches identifying personal experience as the most important information source, the most frequently stated information source was other coaches (Durell et al., 2003). It is therefore possible that, whilst other coaches are the most valued source of information (Durell et al., 2003) and the integration of a coach mentoring scheme as a development aid has previously been suggested (Tod et al., 2012), the greatest predictor of intentions to use psychological strategies is previous experience. This supports previous qualitative research in which the strength and conditioning practitioners stated that prior experience, before becoming a strength and conditioning specialist, shaped their current behaviour (Tod et al., 2012).

3.7.3. The frequency of mental imagery techniques

The least used strategy was mental imagery (mean 3.07/5 ± 0.4). This mirrors existing literature which has found that imagery was considered unimportant and difficult to prescribe by athletic trainers (Wiese et al., 1991; Hamson-Utley et al., 2008) and underutilised within physiotherapy (Arvinen-Barrow et al., 2007; Arvinen-Barrow et al., 2010). The limited use of imagery is problematic, notably because of the benefits elicited through imagery training towards increased strength (Wright & Smith, 2009; Lebon et al., 2010), electromyography activity (Wilson et al., 2010), technique development (Silbernagel et al., 2007; Olsson et al., 2008), stress regulation (Williams et al., 2010), and programme adherence (Milne et al., 2005) all of which are important factors within the strength and conditioning domain.

The lack of prescribed imagery interventions could be for numerous reasons. Primarily it is possible that there is uncertainty of the applications towards strength and conditioning, either the benefits of imagery interventions or the methods of instructing imagery. This would indicate that the dissemination methods utilised to broadcast the benefits, or the applications, of mental imagery training are insufficient.

The lacking promotion of imagery is supported by the widely documented reason for neglecting psychological skills being a lack of understanding (Ninedek & Kolt, 2000; Hemmings & Povey, 2002; Devonport, 2006; Hamson-Utley et al., 2008; Wilding, 2009; Arvinen-Barrow et al., 2010) with sports coaches and athletes previously reporting that amongst other skills, imagery and visualisation is an area in which they would like more information (Gould et al., 1991). This is possibly due to the complex multidimensional nature of imagery, with various imagery modes being suited to differing objectives as per the applied model of imagery use (Martin et al., 1999). For example cognitive specific imagery is more apt for technique development such as lifting technique, whilst motivational specific imagery may promote exercise adherence to a training programme.

When examining coaches' use of strategies to facilitate their own coaching performance it has been observed that, interestingly, imagery is one of the most frequently used strategies, conversely goal setting is used least (Thelwell et al., 2008). This reversal of strategy prioritisation to that observed in the present study is intriguing. Coaches appear to be able to utilise imagery themselves yet fail to

value the use of goal setting. It was apparent that, when using imagery strategies, coaches from varying disciplines predominantly employed strategies to regulate their own anxiety and emotions and to enable the foreseeing of potential problems. This, despite the small sample (n=13) used in the qualitative study (Thelwell et al., 2008), demonstrated that it appears that coaches have knowledge of imagery. It should be noted that the sample did not contain any coaches identified specifically as strength and conditioning coaches and as such raises difficulties in generalising to specific coaching disciplines. Nonetheless the current investigation provides weight to the current academic viewpoint that imagery is difficult to prescribe despite being used by the coaches.

As confidence in prescribing goal setting strategies, developed through familiarity, was hypothesised as a prime reason for the increased use of goal setting strategies, it is logical to examine the impact efficacy has upon administering lesser used strategies such as mental imagery. The lack of confidence in sport psychology has previously been demonstrated as the largest determining factor shaping a coaches intention to utilise such strategies (Zakrajsek & Zizzi, 2007; Zakrajsek et al., 2011).

Concerning the reciprocal relationship between confidence and intentions to use psychology, it is imperative that interventions are positioned in order for coaches to observe the benefits associated with using psychological strategies. That is, instigating a quantifiable outcome measure associated with the utilisation of psychological strategies would appear to be beneficial to promoting the use of psychology. The difficulty in demonstrating the quantifiable benefits of

psychological skills training has previously been reported as a reason shaping the intentions of coaches to use such strategies (Pain & Harwood, 2004).

It is also likely that despite observing benefits of imagery when self-prescribed (Thelwell et al., 2008) strength and conditioning coaches may consider the prescription of imagery strategies to their athletes out of the realm of their role. This assumption would reflect those observed in athletic training in which the athletic trainer had an awareness of the strategy but did not feel qualified in prescribing such cognitive strategies and deemed it to be the responsibility of the sport psychologist (Wiese et al., 1991).

Furthermore, it has been previously observed that particular cognitive skill sets are unimportant (Francis et al., 2000) and it is likely that the disparity between the frequency of particular psychological skills and strategy use is dependent upon the perception towards the strategy. It is probable that the perceived complex cognitive strategies, for example mental imagery, are perceived to be the responsibility of the psychology-titled professional whereas goal setting techniques are more acceptable as being within the role of the strength and conditioning specialist. Such an attitude has previously been observed within physiotherapy (Ninedek & Kolt, 2000) and athletic training (Hamson-Utley et al., 2008), i.e. that particular cognitive strategies such as mental imagery are unimportant however strategies such as goal setting were viewed as very important.

The resistive attitude may be owing to a number of factors. Firstly it is likely that strength and conditioning coaches simply do not have the required understanding of the application of mental imagery techniques. Therefore sufficient training and opportunities for practical experience should be offered. Coaches may have little confidence in achieving a desired outcome, therefore sufficient supervised experience should be provided with palpable outcome measures highlighted as performance indicators.

A further reason could be that the uses of increasingly complex cognitive strategies such as mental imagery are viewed as being outside the role of the strength and conditioner and within the realm of the sport psychologist, and as such may receive an amount of stigma attached to the use of such skills. Stigma tolerance has previously been documented as a predicting factor of intentions to implement psychological skills (Martin et al., 1997; Martin et al., 2004; Gee, 2010).

The intentions to use particular strategies therefore appear to be shaped through a combination of knowledge of applications and the perceived social acceptance of utilising such skills with respect to both the receptivity of the athletes and the opinion of significant others, for example, fellow coaches or sporting directors. Given that the intentions to use psychological strategies and frequency of use has been hypothesised to relate to previous experience promoted through positive experience the notion that factors are inhibiting the desire to approach psychological skill utilization is problematic and the exact reasons warrant further exploration.

It is possible that cultural acceptance, is an influential factor in a person's intention to use psychological strategies. Similarly, as is the potential barriers of knowledge and athlete acceptance, or rather the amount of control the coach can demonstrate regarding the successful administration of psychological skills training. Regarding the proposed reasons of cultural acceptance and perceived control in successfully implementing psychological strategies it is worthy to discuss this in relation to the Theory of Planned Behaviour as proposed by Ajzen (1991).

The Theory of Planned behaviour assumes three determining factors that account for an individual's intended behaviour. The first factor is *attitude towards the behaviour* and refers to the extent the individual has a favourable judgement towards the behaviour. This could be shaped by the individual's opinion of the effectiveness of psychological skills. The second component is termed *subjective norm*, a social factor referring to the perceived social pressured to execute the behaviour. Within the current example, this is likely to be shaped by a negative stigma towards the use of psychology within strength and conditioning. The third and final component consists of *perceived behavioural control*. This relates to the perceived ease of executing an action and is presumed to be influenced by previous experiences and is interchangeable with the construct of self-efficacy. Within the present context, this could be shaped by a practitioner's previous experience providing the requisite skills to administer psychological skills training programmes as part of strength and conditioning practice. Similarly a threat to behavioural control would be the concept of time and the perception of resources

to allow the integration of psychological skills within a strength and conditioning session

Self-efficacy is grounded in internal cognitive factors regulating an individual's control over a task, whereas behavioural control reflects more general factors. Furthermore researchers have favoured the measure of self-efficacy rather than planned behavioural control (De Vries et al., 1988), and comparisons of theories of planned behaviour and social cognitive theory have demonstrated self-efficacy, rather than perceived behavioural control, to have a direct impact on behaviour (Dzewaltowski et al., 1990). An additional limitation is the normative component. The normative component is regarded as the weakest predictor of behaviour within the model. (Armitage & Conner, 2001). The inclusion of a single global construct presents problems as varying facets of normative behaviour (i.e. descriptive, subjective and moral norms) have been presented to be independently predictive of behaviour (Conner & Armitage, 1998). Nonetheless, the Theory of Planned Behaviour has been demonstrated to account for 27% of variance of behaviour and 39% of the variance of intentions when appraised via literature review and meta-analysis (Armitage & Conner, 2001). As such it provides a foundation from which to explore the detailed reasoning accounting for the utilisation of psychological skills and strategies in strength and conditioning.

Jedlic et al. (2007) concluded that coaches encouraged the use of imagery more frequently with higher level athletes than those competing at a lower level. However the present study failed to yield significant difference in imagery use between coaches working with differing athlete levels. This is possibly owing to

the nature of the discipline; coaches working with athletes in both modes were reported to encourage the use of imagery in a competition setting compared to practice (Jedlic et al., 2007).

An important consideration is the time demands required for the athlete to become adept at using prescribed imagery strategies. Athletes may perceive imagery as an ineffective tool, causing practitioners to have a negative attitude towards the use of imagery, as was observed in a sample undergoing physiotherapy rehabilitation (Francis et al., 2000).

With the strength and conditioning practitioner being concerned with training it is possible that use of imagery, and indeed other psychological strategies, are undervalued and perceived less relevant to training compared to competition. This is reflected in various studies where mental skills have been shown to be used less in training compared to competition (Frey et al., 2003; Taylor et al., 2008). The perceived lack of importance of psychological strategies in practice has been identified previously and serves as a concern that skills are being used less in a practice setting. Durand-Bush and Salmela (2002) have identified that the use of psychological strategies by expert performers are shaped through practice, during daily activities and in conjunction with training activities. This would imply that the strength and conditioner could play a critical role in the development of psychological skills with transfer of psychological skills into competition to compliment physical development.

Thus whilst particular skills can be utilised in training, for example to improve motivation or to facilitate technique acquisition, such skills have direct applications towards competition, with parallels existing concerning the need to focus attention, increase confidence or to regulate anxiety during competition. Consequently, the benefits of being adept at utilising psychological skills in competition is a crucial component of success and as such should be afforded time during practice to refine such skills. Therefore, the regular time spent with the strength and conditioner is a vital time to aid athletes' development of psychological skills.

3.7.4. The frequency of adherence techniques

Unsurprisingly, regarding the demands of maintaining a structured exercise programme with reported difficulties in maintaining adherence and motivation (Anderson & Lavallee, 2008), the strength and conditioning practitioners frequently used strategies to increase athlete's adherence to training. This finding concurs with existing research that the understanding of individuals motivation is an important component of athletic training (Wiese et al., 1991). From the questionnaire wording, it is apparent that the use of athlete-agreed goals is an instrumental method used to facilitate adherence.

The method of modifying goal orientations pertinent to strength and conditioning has been researched, concluding that promoting a mastery goal orientation is a beneficial method of increasing adherence to training (Gilson et al., 2008). Owing to the assumption that strength and conditioning practitioners are using adaptive goal setting to foster a mastery atmosphere, the low frequency

of ego regulation strategies used is surprising. It would be hypothesised that instilling task goals and similarly limiting the use of ego or outcome goals would synchronise within prescribed training, however there is no correlation observed between managing athletes' ego and increasing adherence. This is possibly due to a lack of understanding as to potential strategies to manage athletes' ego and is potentially using positive adaptive strategies naively.

This point is further emphasised by the apparent low consensus in the importance of communication as factor. As such, it appears that practitioners are discussing appropriate goals with their athletes as a method of increasing adherence; however they are neglecting the importance of communication as a strategy. Furthermore, there is a low consensus towards the importance of 'athlete-agreed training methods', despite the frequent use of adherence strategies, which indicates that whilst particular skills are used frequently they may not be perceived as important strategies. This may serve as an indication that practitioners are using psychological strategies founded through experience rather than formal training, or that formal training has an emphasis towards principles of goal setting with limited coverage of additional strategies.

3.7.5. Psychological factors important to success in strength and conditioning

In identifying critical psychological strategies, motivation and confidence were amongst the most important, while correspondingly a lack of confidence and a lack of motivation were the most debilitating factors. The importance of motivation is not surprising and is reflected in existing research in which sport

support staff rate motivation as a very important attribute. Within athletic training (Wiese et al., 1991) and physiotherapy (Francis et al., 2000), therapists consider motivation to range from important to very important as an attribute distinguishing between athletes who cope successfully with injury and those that do not cope successfully. Similarly, high self-esteem is regarded by physiotherapists (Francis et al., 2000) and athletic trainers (Wiese et al., 1991) as important to very important in distinguishing between athletes coping successfully and those who cope less effectively.

Correspondingly, when examining the psychological content of physiotherapists practice, physiotherapists identified strategies to increase athlete motivation and confidence as important areas in which to develop further knowledge (Arvinen-Barrow et al., 2007). However, this is partially refuted in earlier work which stated that understanding athletes' motivation is an important skill to learn, but that enhancing the self-confidence of an athlete is only somewhat important (Hemmings & Povey, 2002). This is somewhat confusing, especially as more recent discussion (Arvinen-Barrow et al., 2007) proclaims that the findings mirror the said previous work (Hemmings & Povey, 2002). However in light of the absence of complete publication of results (Arvinen-Barrow et al., 2007) it is difficult to appraise the extent to which the findings agree.

It is possible that as a psychological attribute, motivation is considered more important than self-confidence. This is also reflected in an observation within New Zealand sports coaching in which individual motivation was considered very important, whereas athlete self-confidence was considered less so

despite often being reported as a problem area within coaching (Sullivan & Hodge, 1991). This was observed in the current research, which identifies a difference in the importance of motivation and confidence, with 63% and 51% respectively of the strength and conditioning practitioner respondents identifying such factors as important.

Although the importance of motivation was reflected in the frequent use of certain strategies such as goal setting and strategies to increase adherence to training, there is an imbalance between the perceived importance and the frequency of use of self-confidence shaping strategies. That is, there are correspondingly frequent uses of goal setting and adherence promoting techniques, but there is a mismatch between the perceived importance of self-confidence and specific confidence boosting techniques. Possible reasons for such a disparity may be either that practitioners feel that confidence is an innate characteristic unable to be modified or that there is lacking knowledge in the techniques to increase self-confidence. Likewise it is possible that the respondents are using confidence promoting strategies that are not included within the survey instrument. The survey instrument focused upon established sources of self-efficacy such as vicarious experiences and past accomplishments, the latter being regarded as the most influential source of self-efficacy (Bandura, 1986, 1997; Wise & Trunnell, 2001). However the use of verbal persuasion received limited coverage within the self-confidence subscale.

The effects of verbal encouragement have previously been shown to be of benefit in lifting performance significantly (McNair et al., 1996), and the use of

‘hustle’ and ‘praise’ have been observed previously within strength and conditioning (Massey et al., 2002). Despite not being observed in the present study, it is therefore probable that practitioners utilise verbal persuasion as a source of increasing confidence, but are not using additional strategies to increase athlete self-confidence.

It should be noted that despite the use of distinct divergent subscales there are likely to be associations between particular subscales, and as such ‘second-tier’ psychological strategies may be used exclusively or in conjunction to develop the facilitate the development of ‘first-tier’ psychological skills (Birrer & Morgan, 2010). This would suggest vigilance regarding the judgement that confidence promoting skills are underutilised. The example in question would be the connection between confidence promoting techniques and self-talk. Although distinct subscales, with both providing adequate reliability measures, self-talk is regarded as a method of facilitating self-confidence. Such self-affirming strategies have been demonstrated to effectively contribute to an individual’s self-efficacy (Hardy et al., 2010a) with specific self-talk intervention packages resulting in increased self-confidence (Thelwell & Greenlees, 2003; Mamassis & Doganis, 2004). The results suggest that self-talk is a strategy promoted frequently by strength and conditioning practitioners; however the mechanics or outcomes associated with the self-talk used are unclear, as is whether it is used as a confidence building strategy. Self-talk could equally be used to increase motivation (Hardy et al., 2010a). This provides evidence for the complex and interrelated use of psychological skills and strategies.

It is clear that strength and conditioning coaches believe confidence is a vital attribute within the strength and conditioning domain, however it is also apparent that coaches do not utilise a broad skill set in addressing reduced confidence, as evidenced by the low ranked confidence strategy subscale. The present study evidenced the frequent use of self-talk, although the exact rationale remains unclear. Coaches have previously been reported as using self-talk themselves to boost their own confidence and motivation (Thelwell et al., 2008). It is therefore plausible that coaches are relaying the skills that they have learnt through their own experience to the athletes that they work with. This would provide a justification as to the discrepancy between frequency and importance. The strength and conditioning practitioner may correctly deem an attribute as important however, may not have the skills, developed experimentally, to facilitate such attributes.

It is intriguing that given the frequency of self-talk promotion, practitioners do not afford a greater level of importance to self-talk. Only 7% of practitioners reported that self-talk was important. This could suggest that self-talk strategies are being promoted with the practitioner naive to the fact that it is a specific psychological strategy. This was similarly observed with goal setting being the most frequently used strategy, however marginally less than a quarter of respondents stated that it was an important strategy. This would add credence to the argument that strength and conditioning professionals are developing their awareness of psychological strategies through the use of informal and experiential learning and not having the skill base to address key psychological factors.

Strength and conditioning coaches rated mental toughness as important, with a third of respondents suggesting that it was an important attribute for athletes to possess. This was reinforced as a lack of mental toughness was also included as a detrimental characteristic. This is consistent with the general consensus held by the media, athletes and coaches that mental toughness in a core requisite for successful performance (Connaughton et al., 2009). Mental toughness is a prominent research area with the present knowledge base suggesting that mental toughness is multidimensional in nature comprising of behavioural, cognitive and affective constructs (Clough & Earle, 2002; Bull et al., 2005; Crust & Clough, 2005). The development of mental toughness is proposed to be long-term, requiring the interaction of various factors (Connaughton et al., 2008b). Such factors comprise the motivational climate, life- and sport-specific experiences and the social network comprising of significant others (Connaughton et al., 2008b).

Elite athletes believe that mental toughness is fostered through the presence of three factors: intrinsic motivation, the use of psychological skills, and social support (Connaughton et al., 2008b; Gucciardi et al., 2009a). This would suggest that in addition to valuing the importance of mental toughness, coaching staff such as the strength and conditioning practitioner could play a role in its development. Nevertheless the short response answers did not provide scope for the exploration of what is considered to be mental toughness within strength and conditioning.

Gucciardi et al. (2009c) researched the impact that coaches can play on the development of mental toughness. Based upon 11 mental toughness characteristics, Gucciardi et al. (2009c) proposed how coaches' actions could facilitate or impede the development of mental toughness. Four prominent themes were proposed that accounted for the proposed strategies used by the coaches to develop toughness. These consisted of coach-athlete relationship, coaching philosophy, specific strategies, and training environment.

Within the theme of *coach-athlete relationship* there was the notion that both trust and established common ground was imperative. This was in addition to the socio-emotional aspect relating to the consideration of cognitive affective components. This involves the coach 'being there' to 'listen to personal problems' with numerous opportunities provided to athletes to discuss issues. It was noted that the development of the athlete-coach relationship was a long term process.

Regarding *coaching philosophy* it was apparent that adopting a person-centred approach was important while acknowledging the athlete as a person rather than solely a team member. A resounding concept is that the coach must be invested in the personal development of the athlete in priority to the coaching success of the athlete. This was emphasised with regard to the promoting the holistic development of a person concerning social and personal growth as well as sporting development.

Specific strategies and techniques were noted for the role played in the development on mental toughness. These examples would include verbal praise,

training diaries and restructuring mistakes as positive opportunities. The *training environment* was in itself considered an important catalyst for mental toughness.

It is also likely that coaches can have an ineffective or debilitative role regarding the development of mental toughness. Coach narratives have previously acknowledged this attitude. One overarching notion was the negative impact caused by having an emphasis on player success and subsequent inferred coach success rather than the development of the player as a whole. This was attributed to the inappropriate use of benchmarking against standards over which the athletes have little control (Gucciardi et al., 2009c). Likewise the fostering of an environment in which the players can progress with minimal effort was suggested to be detrimental to mental toughness development, by lacking player exposure to challenging scenarios, whilst the overambitious expectations possessed by coaches was perceived to be extremely damaging.

A final highly detrimental factor was that of an emphasis of the weaknesses of players. This was not only de-motivating but was proposed to result in a transfixed athlete with a focus on a few specific areas to the detriment of rounded development (Gucciardi et al., 2009c). It is evident that the coaching role is instrumental in fostering mental toughness and likewise the position of the strength and conditioning professional will offer similar opportunities to promote the climate supporting the development of mental toughness.

Thus far, attention has been focussed on strategies which are considered important within strength and conditioning, and examined potential reasons for a disparity between the importance of particular psychological skills and the

frequency of use. It is also pertinent to examine psychological factors which are considered important by a smaller proportion of strength and conditioning coaches. There is a trend that two-way communication may not be valued as being important as would be expected. This is evident with communication and athlete-agreed goals only being identified by 4% and 7% respectfully of the respondents. This may suggest that coaches are adopting an autocratic approach to training with limited discussion with the athletes. Similarly it is possible that coaches lack the knowledge of effective implementation of strategies. This provides an interesting research question and requires exploration and receives detailed qualitative examination at a later stage of the thesis.

This appears problematic as the level of control an athlete has in allocating training goals influences the commitment towards completing the given task (Locke & Latham, 1990) with a greater level of choice resulting in increased commitment. Specific to the importance of confidence within strength and conditioning, prescribed goals are influential in shaping a person's perceived ability and therefore self-efficacy (Locke & Latham, 1990). However, it should be noted that athlete input may result in reduced task difficulty and inferior training progression (Locke & Latham, 1990). The tentative argument for coach-set goals is supported in the weight room setting in which coach-set goals produce greater improvements than athlete-set goals. (Boyce & Wayda, 1994). Nevertheless, choice is regarded a fundamental psychological need which influences well-being and intrinsic motivation, and the concept of autonomy would facilitate the effect of goal setting (Deci & Ryan, 1985).

To date there is little empirical evidence to support this view within the sport setting (Kingston & Wilson, 2010). Nonetheless, the extent to which the athlete has ownership of a particular goal is critical, with a lack of ownership manifesting in reduced commitment and performance (Hall & Kerr, 2001). This would suggest that within strength and conditioning there is the need for increased athlete-coach discussion.

Communication is an important role of the strength and conditioner and one which has been suggested to evolve over time (Tod et al., 2012). Experienced strength and conditioning coaches have identified that a requirement of the successful strength and conditioner is to be able to develop athlete rapport and athlete buy-in regarding the influence it has on commitment and behaviour (Tod et al., 2012). Likewise, it is important to individualise the training interventions with an understanding of the impact the training has on other aspects of the athlete's training and also occasionally listen to athletes wanting to share sensitive and distressing information (Tod et al., 2012). The accepted soft skills, such as communication and developing trust, are said to be developed over time (Tod et al., 2012), and as such may provide an explanation as to why they are ranked low in terms of importance. Tod et al (2012) interviewed strength and conditioning coaches, concluding that 'softer skills' are developed over time. This would suggest that the range of experience levels in the current research may account for the reduced consensus on the importance of such skills. That is to say it is only the more experienced coaches that indicate the importance of such softer skills. It should be noted that this is a hypothetical assumption based on previous research (Tod et al., 2012) and is made in the absence of longitudinal research design.

3.7.6. Psychological factors detrimental to Strength and Conditioning

Thus far, pertinent facilitative skills strategies and attributes have been discussed with regard to what is perceived to be important to strength and conditioning. It is also important to discuss the aspects which are understood to be debilitative by strength and conditioning coaches. This would provide a foundation for identifying relevant psychological strategies to regulate such negative elements.

The factors considered being debilitative to athletes as perceived by the strength and conditioning coaches largely mirror the factors perceived to be facilitative. Thus factors such as low motivation and confidence are equally prevalent. An important observation is the acknowledgement of stress and anxiety as the third most reported factor jeopardising an athlete's development. Within the sport domain, competitive stress and anxiety have received considerable attention, often being cited as the most prominent topic areas (Thomas et al., 2010). Research ordinarily explores the stressors associated with the competitive nature of elite sport and the specific environment (Woodman & Hardy, 2003), however the present study suggests that stress and anxiety may play a critical role within the strength and conditioning setting. This supports early work examining weight room psychology which states that the highly successful athletes are those that are not "overly anxious" (Holloway, 1995 p.59).

Similarly specific to strength training, stressful life events have been demonstrated to significantly influence the rate of strength development (Bartholomew et al., 2008), whilst there are psycho-physiological mechanisms

which account for the relationship between stress and injuries (Roh & Perna, 2000). Physiological factors such as increased muscle tension and narrowing of the attentional field, as well as attentional factors including increased vulnerability to distractions, have been identified as particular stress manifestations accountable to an increased injury susceptibility (Williams, 1996; Williams & Andersen, 1998). This is in addition to reductions in fine motor coordination and reduced joint flexibility (Williams & Roepke, 1993).

At the same time, elevated cortisol hormone levels have been linked to stressful life events with implications such reduced efficiency of exercise recovery and increased skeletal muscle pain (Perna & McDowell, 1995) and the catabolic effect of cortisol (Florini, 1987) resulting in diminishing training adaption and increased likelihood of experiencing overtraining (Perna et al., 1998). Evidently in equipping athletes for sporting performance, stress and its effect on individuals is an important consideration for strength and conditioning practitioners.

Hanton et al.(2008) identified four advanced stress management strategies comprising simulation training, cognitive restructuring, pre-performance routines, and overlearning of skills. Simulation training consists of exposing an individual to many of the external and internal factors experienced during the competitive environment which are typically not present during the training environment. (Hardy, 1996). The object of such is to provide an opportunity to practice in a replicated stressful setting.

Cognitive restructuring is a cognitive-behavioural intervention on the principle that cognitions are vital in predicting behavioural responses. The aim is to replace maladaptive cognitions with more rational thoughts and subsequently regulate stress. Pre-performance routines are structured preparatory plans based upon cognitive and behavioural strategies acted out in preparation for the impending performance.

Finally, overlearning of skills is practicing skills to the standard in which the execution of such skills requires little cognitive attention. Of these four techniques the most successful in regulating performance stress were 'overlearning of skills and cognitive restructuring'. This suggests that the acquisition of a stress-regulation skill set would be beneficial to the strength and conditioning practitioner.

Tod et al. (2012) has previously identified that strength and conditioning coaches occasionally listen to athletes relating stressful events. This parallels with the responsibilities of the athletic trainer. The athletic trainer has various responsibilities similar to those of a strength and conditioning practitioner, such as administration duties, screening and evaluation, and education (Misasi et al., 1996) and often adopts the role of councillor (Roh & Perna, 2000). It is evident that, within training strength and conditioning, practitioners are observing athletes demonstrating behaviour symptomatic of competitive strain which is negatively impacting their performance outcomes. Consequently strategies should be made readily available to allow strength and conditioning practitioners to alleviate athlete stress via either appropriate referral mechanisms or through sufficient

training. It should be noted that in the present study stress management strategies were employed. This is reflective of stress being considered a high ranking detrimental factor yet the specific methods used require further exploration.

3.7.7. Comparison of strategy use between experience levels

When grouping respondents by years of experience, it is evident that psychological skill use increases with experience, with the increase in strategies most apparent between the 10+ group and the 0-4 years' experience group with significant differences present between imagery (3.49 ± 0.55 vs. 2.75 ± 0.67), attentional control 3.77 ± 0.58 vs. 3.40 ± 0.63), stress management (3.90 ± 0.55 vs. 3.30 ± 0.67), self-confidence (3.69 ± 0.74 vs. 3.11 ± 0.78) and global psychological strategy use 118.49 ± 11.53 vs. 106.91 ± 12.83). There are fewer differences in the frequency of psychological skill use between the 0-4 and the 5-9 groups, with the only significant difference being observed in the frequency of self-confidence (3.54 ± 0.87 vs. 3.11 ± 0.78) increasing strategies. More differences were observed between the 5-9 and the 10+ groups with differences observed between imagery (3.49 ± 0.55 vs. 2.92 ± 0.75), stress management 3.90 ± 0.55 vs. 3.60 ±0.69) and global psychological skill use (118.49 ± 11.53 vs. 111.59 ± 13.26).

It is evident that the use of psychological strategies is related to experience. Various reasons could account for this. Firstly it is possible that as previously identified, practitioners develop their skills 'on the job' as observed in physiotherapy and sports coaching (Sullivan & Hodge, 1991; Jevon & Johnston, 2003), and as such gain more experience and confidence in implementing

psychological strategies and consequently prescribe more than their less-experienced counterparts. Secondly strength and conditioning practitioners are required to maintain their respective accreditation. For example the UKSCA, the ASCA, and the NSCA have the Continual Professional Development (CPD) model, the updating procedure, and the Continuing Education Programme respectively.

An accredited practitioner must demonstrate advancement to maintain their accreditation status, usually via documented hours of practice or through attending relevant training (National Strength and Conditioning Association, 2009). As a result practitioners are required to attend training and reflect upon successful and unsuccessful aspects of their practice, thus potentially shaping their applied practice. It should however be noted that the training sessions attended are at the discretion of the practitioner, there is no requirement to attend CPD sessions with an emphasis on psychology per se. Furthermore it has been documented that despite an interest in psychology and an awareness of the benefits of implementing such strategies, few numbers of physiotherapists, similarly having to maintain a CPD record, have attended training concerning the use of psychological strategies (Jevon & Johnston, 2003). The effectiveness of CPD training and procedures concerning the use of psychological strategies, and indeed the sources influencing psychological skills, is an area worthy of further investigation.

When considering the experiential development of coaching styles, Magnusen (2010) contrasted the coaching styles of National Basketball

Association (NBA) coaches with those of university basketball coaches. It was observed that the NBA coaches demonstrated a more democratic approach with increased social support compared to their university counterparts. In supporting their own research, Tod et al, (2012) proposed that this was due to the differing levels of professional experience as a strength and conditioning professional between the two sample groups. The more experienced coaches were less prescriptive, more accommodating of individual differences, and demonstrated greater flexibility within their coaching style (Tod et al., 2012).

Research has demonstrated that due to the changing environmental demands and progressing knowledge base, professional development is a long-term process continuing long after graduation of accreditation (Tod et al., 2012). Consequently coaches must be continually striving to develop techniques and coaching styles to maintain pace with the evolving discipline. What had been demonstrated in the present study is that with increased experience the frequency that psychological skills and strategies are used increases this is supported by the perception of strength and conditioning coaches that with increased experience comes increased coaching effectiveness (Tod et al., 2012).

Recent evidence suggests that the most significant instigators of professional development are practical work experience, mentor support, and professional interactions. This is consistent with the notion that ‘helping professions’ development is greatly fostered by supervision through all its stages (Tod et al., 2012). However as noted by Tod et al. (2012), as a discipline strength

and conditioning is afforded less attention with regard to facilitating supervisory and mentorships than the majority of other helping professions.

3.7.8. Comparison of strategy use between differing accrediting bodies

When drawing comparisons between practitioners accredited from various accrediting bodies the NSCA, UKSCA, and ASCA it is apparent that respondents accredited by the ASCA had a greater global psychological skill and use such skills as imagery, self-talk, attentional control, relaxation, and stress management strategies more than their counterparts accredited by other organisations. Unfortunately, many of the respondents had duel accreditation; consequently the present study cannot differentiate between those accredited by the NSCA and UKSCA. Further research is required to ascertain if a difference exists between the psychological skills and strategy use of those practitioners having been accredited with the UKSCA and those accredited with the NSCA.

There are proposed reasons for the increased use of psychology by practitioners. Firstly it is possible that culture has a pivotal role in the use of psychology with the majority of UKSCA accreditations located in the UK and similarly most ASCA practitioners surveyed being located in Australia. For example Sullivan and Hodge (1991) documented that coaches and athletes from New Zealand considered psychology as very important, devoting on average 12% of their contact time to teaching psychological strategies to their athletes, with some coaches reported to spending up to 30 hours per week teaching psychological strategies, despite 73% of coaches perceiving themselves to have

insufficient knowledge. Conversely, it is apparent that within certain areas of sport in the UK, such as association football, coaches portrayed a negative perception of psychology (Pain & Harwood, 2004).

The disparity between cultures has previously been identified, with athletes from New Zealand being more open with less stigmatisation towards the use of psychology than those observed in the USA and in the UK (Andersen et al., 2004). Indeed, athletes from New Zealand demonstrated a greater positive perception towards using psychology than those athletes from the USA and UK, furthermore Anderson et al (Andersen et al., 2004) identified that 'subjective norms' were predictive of athletes' likelihood to be receptive of psychological skill use suggesting cultural influences shaping the use of psychology. The reduced receptivity toward psychology use may have two implications, firstly it is likely that the strength and conditioning practitioner may share a sceptical perception towards psychology fostered within cultural influences and thus be reluctant to utilise psychological strategies. Secondly it is possible that the athletes' reduced receptivity will reduce the effectiveness of any psychological strategies, resulting in a reduced perception towards the effectives of psychology and subsequent reduced use of particular strategies.

A second potential explanation would be the perceived lack of understanding of the implementation of psychological strategies. This is broadly cited as a major cause inhibiting the use of psychology (Ninedek & Kolt, 2000; Hemmings & Povey, 2002; Devonport, 2006; Hamson-Utley et al., 2008; Wilding, 2009; Arvinen-Barrow et al., 2010). Thus, it is pertinent to examine

differences in educational procedures between various accrediting bodies. The ASCA strength and conditioning coaching course is split into three levels with stage one having a component regarding "modifying training programmes to suit the psychological development of the athlete" (Australian Strength and Conditioning Association, 2012, 2013) with competence measured via direct observation. The NSCA certified strength and conditioning specialist assessment contains multiple choice questions to assess competence in using "sport psychology techniques to enhance the training and/or performance of the athlete". Conversely, there is no apparent assessment of psychological competencies in the UKSCA strength and conditioning practitioner assessment. Thus with the exception of the UKSCA, the ability to use psychological strategies within strength and conditioning is a requirement and as such should indicate those qualified should feel equipped to use such skills. On this foundation is would be expected that the use of strategies is similar between the ASCA and the NSCA, and whilst indeed there is a smaller effect size than when comparing ASCA and dual accreditation NSCA/UKSCA, a noteworthy difference is observed. Consequently, the data suggests that the ASCA accreditation better equips practitioners in the use of psychology compared to the NSCA which in turn encourages such skills more than the UKSCA.

As previously highlighted, a limitation of the present study is that differences between practitioners accredited by the NSCA and by the UKSCA cannot be objectively measured. It has been reported that when exposed to the use of psychological strategies, in turn gaining more understanding, practitioners are more likely to implement such psychological skills (Ford & Gordon, 1998). This

would indicate that strength and conditioning practitioners accredited through the ASCA have increased exposure to psychological strategies through either initial training or through applied practice and maintaining a CPD.

3.8. Limitations of research

It should be noted that the current study had limitations. Importantly, it is noteworthy to highlight that completion of the survey was voluntary; therefore it could be assumed that the findings are biased towards practitioners with an interest in sport psychology and possibly having an increased perception of skill use.

The study was based on the perceptions of the respondents. Consequently, the subjective nature could have caused discrepancies of the rating scale with respondents potentially having different perceptions of time demands.

The self-report survey could present a social desirability bias. Further research should consider using a multidimensional approach with triangulation including observational techniques to verify the responses. Additionally, the survey instrument subscales did not offer scope for assessing specific method of goal setting strategies, the various styles of imagery, or methods of increasing self-confidence.

It was beyond the scope of the present study to identify the quality of the psychological skills and strategies utilised. Whilst it is encouraging that strength and conditioning practitioners are implementing psychological strategies future

studies must address the effectiveness of implementing such strategies. Furthermore, additional research would be well directed to the reasons why particular strategies are implemented or neglected. This would provide important information regarding the training and CPD which strength and conditioning undergo and provide direction for future strategies to promote psychology within Strength and Conditioning.

3.9. Recommendations for practice

The strength and conditioning practitioner is a valued member of the sport support team and, coupled with being in a critical role, should be well-equipped to develop the psychological skills of the athlete, both to facilitate strength and conditioning training, and to offer a valuable environment in which to rehearse assorted psychological strategies in preparation for competition.

Broad ranging literature exists concerning the applications of psychological interventions to strength and conditioning (Holloway, 1994, 1995; Tenenbaum et al., 1995; Wise, 2000; Wise, 2002; Gilson, 2010) however in presenting a foundation for future research demonstrating encouraging findings regarding the use of particular important strategies the present study also highlighted areas in which certain techniques are lacking. Areas identifies as lacking should be addressed through CPD to offer a greater scope of strategies to the strength and conditioner thus benefitting the athletes and the profession as a whole. Practitioners would be well advised to attend sessions to gain confidence in utilising psychological strategies and likewise organisations should make such sessions readily available to attend and endeavour to promote the use of

psychological strategies. Respective CPD programmes should endeavour to promote the use of psychology within the discipline through offering training methods which incorporate the active practice of psychology. Practitioners should whenever possible be given the opportunity to attend active, as opposed to passive, training sessions in which the practitioner is exposed to practical scenarios and role playing situations, as this has many proven benefits, not least providing the practitioner with confidence to implement strategies, and is the approach recommended for athletic trainers (Clement & Shannon, 2009).

It is apparent that a prominent issue concerning the neglect of particular strategies is the lack of exposure to practical examples. It is only through increased exposure that the use of psychological strategies would be increased. strength and conditioning coaches should collaborate with additional support staff and athletes to foster an atmosphere receptive to psychological interventions, liaising with additional support staff including coaches and psychologists where applicable, to facilitate the psychological development of athletes. In order to promote the benefits of psychology strength and conditioning practitioners should incorporate an education phase, regarding the benefits of their prescribes psychological strategies, in line with recommendations regarding psychological skills training (Burton & Raedeke, 2008).

The education should be not only in respect to training improvements but also how psychology can be utilised in competition, and the requirement to practice psychological skills in the same way physical skills are acquired. Strength coaches should recognise the potential influence they could have on the athletes

they support and how they incorporate psychological strategies used in competition.

Ultimately the strength and conditioning fraternity should actively engage with incorporating this untapped resource into practice to further the rapidly expanding discipline of strength and conditioning. Strength and conditioning coaches and organisations should work collaboratively with psychology organisations such as the British Psychological Society or the British Association of Sport and Exercise Sciences to encourage cross discipline professional development events.

CHAPTER FOUR

4. The Psychological strategies included in applied strength and conditioning

4.1. Chapter Overview

In continuation of the earlier chapter (Chapter Three) evidencing that strength and conditioning practitioners utilise psychological skills during their applied practice, albeit to varying extents, this chapter will employ a qualitative approach to further examine the specific psychological skills and strategies used within strength and conditioning.

This will provide the basis by which professional development needs can be addressed and add to the applied sport psychology literature from an under-researched sport domain. This chapter will discuss the prevalent strategies utilised and endeavour to propose a theoretical model of skill use based on the emergent strategies employed by the strength and conditioning practitioner.

4.2. Introduction

A robust evidence base exists exploring psychology within applied practice settings, demonstrating the importance of varying sport psychology interventions within a variety of sporting contexts (Mellalieu & Hanton, 2009). The importance of using such skills is cemented in research into elite performance, in which increased psychological skill use was observed in successful athletes compared to those that are less successful (Weinberg et al., 2000; Gould et al., 2002). Similarly, the importance of psychological skill use in practice and competition has been investigated, with observable benefits when the use of psychological skills were utilised in practice compared to competition alone; performers were more successful when psychological skills were employed in both practice and competition settings (Thomas et al., 1999; Frey et al., 2003). This indicates that psychological skills are required to excel in sport, with the requirements to incorporate such skills into practice as well and competition. Rather than innate personal characterises, psychological skills are able to be developed through both formal setting such as structured sport psychology consultation and practice, and informal settings, including coaches, team mates, and support staff interactions (Durand-Bush & Salmela, 2002; Gould et al., 2002).

Within psychological preparation there is a plethora of research supporting the advantages of utilising psychological strategies. Williams and Krane (1993) reviewed the characteristics of peak performance, concluding that athletes achieve their optimal performance through the use of an array of cognitive behavioural strategies. Such strategies comprised emotional control, arousal control, mental

imagery, goal setting, attentional control and developed performance routines and coping strategies.

Furthermore, drawing comparisons based on achievement, successful Olympians were distinguishable from those unsuccessful with regard to their increased emotional control during practice settings (Taylor et al., 2008). The ability to focus attention and appropriately use imagery techniques was seen to distinguish between successful and unsuccessful athletes, whilst the importance of simulation training was also emphasised (Orlick & Partington, 1987, 1988). Further attributes identified that distinguish successful and unsuccessful elite athletes were the ability to use mental practice techniques to narrow focus and use effective positive self-talk strategies (Gould et al., 1993). There is a widespread understanding that the cognitive behavioural strategies of athletes can affect levels of success (Ungerleider & Jacqueline, 1991; Vernacchia et al., 2000).

Psycho-physiological research has evidenced the benefits of psychological inventions to physiological and biomechanical variables pertinent to strength and conditioning, for example the use of mental imagery strategies which have been utilised to elicit strength gains over a six week period (Lebon et al., 2010), whilst the variation of attentional focussing plays an important role in the electromyography observed and the force produced by muscle (Vance et al., 2004; Marchant et al., 2009). Therefore, it has been suggested that it would be beneficial for strength and conditioning specialists to apply key psychological self-regulatory and self-expectancy theories and concepts such as imagery, goal setting, motivation, and self-talk to their clients individualised programmes

(Holloway, 1994, 1995). Nonetheless, there appears to be a lack of published work evidencing the application of such skills within strength and conditioning.

More recently, Mellalieu and Shearer (2012) suggested that based on the mental skills training approach it would be beneficial to use particular strategies within strength and conditioning. These consisted of goal setting, mental imagery, self-talk and techniques to regulate the activation of athlete. Such approaches align with the self-regulatory techniques identified by Holloway (1994, 1995) and are considered to be the 'big four' of psychological mental skills training techniques used within broader sport psychology (Mellalieu & Shearer, 2012, p. 3). However, despite the consensus of the value of using techniques within sport psychology and the justified value of employing such techniques specifically within the strength and conditioning domain, there is a lack of research purposely examining the particular skills and strategies that are employed by the strength and condition coach.

Recently evidence has been presented that psychological strategies are prescribed by strength and conditioning professionals albeit to differing extents (Radcliffe et al., 2013). Radcliffe et al. (2013) proposed that particular psychological strategies such as goal setting were used extensively, however complex cognitive strategies such as mental imagery were used considerably less. This could imply that, at least within the strength and conditioning community, goal setting is viewed as a generic psychological skill which is readily translated into the practice domain, however it is evident that similar crossover is not observed with strategies such as mental imagery. It may be that the perception of

the skill and the perceived value and application may limit the use of such techniques. Such research is encouraging as it indicates that particular strategies are being utilised, however the quantitative nature of the work presented closed responses, therefore neglecting to provide the practitioners the opportunity to divulge particular techniques or the instances when such techniques are employed which was not included within the initial questionnaire.

A particular limitation of existing quantitative work is that despite endeavouring to measure the most pertinent psychological skills and strategies within training settings it must be acknowledged that broad variation exists with individual differences governing what are perceived to the most pertinent psychological skills (Seiler, 1992). Therefore depending on individual differences, perceptions regarding effectiveness, and sport requirements (Taylor, 1995) there are likely to be differences in the strategies employed.

The current chapter endeavours to utilise qualitative methods to explore the specific techniques applied by the strength and conditioning professional. It is proposed that the skills and behaviours are developed experientially by strength and conditioning practitioners via lived experiences (Tod et al., 2012). This would suggest that the use of a phenomenological approach exploring the lived experiences of practitioners would be the most applicable method to explore the perception and underlying rational for the psychological skill use within the strength and conditioning domain. Furthermore the use of semi-structured interviews will provide scope for the participants themselves to elaborate on key concepts and the use of probes to further encourage the participant to divulge

previously unexplored topic areas in greater detail to establish the specifics associated with the application of psychology within strength and conditioning.

The use of an interpretive approach will offer scope for detailed exploration of the underlying mechanics of psychological skill use and the reasons accounting for variations in the frequency of skill use. In addition the use of qualitative and quantitative methods within a mixed methods research design will provide evidence validity of findings and is considered a valuable, albeit underutilised, approach to studying the perceptions toward psychology (Sullivan & Hodge, 1991; Martin et al., 2001). Furthermore Sullivan and Hodge (1991) advocate that

> *"Only through a multidimensional approach…including in-depth interviews that allow for the acquisition and interpretation of rich qualitative data can more accurate data be obtained" (p.150).*

4.3. Method

4.3.1. Ethical approval

Before commencing the study, the University of Salford Ethical Review Board provided approval for the experimental procedures. Prior to participation all subject received an invitation email containing participant information including clear explanation of the potential benefits and risks associated with the research, how the data will be handled, the dissemination of findings, and voluntary nature of the study. An email contact was provided for the lead investigator should any potential applicants request additional information.

Data was collected face to face in person and using video telecommunication through Skype™ (Skype Communications SARL, Luxembourg). Written consent was obtained from participants interviewed face to face. Individuals partaking via Skype provided verbal, digitally recorded, consent.

4.3.2. Research design

An ideographic approach was adopted where by each individual cases is examined in detail prior to the amalgamation of key concepts resonant across the sample. The approach utilises single semi-structured interviews, transcribed verbatim, which were analysed for key resonant themes using interpretive phenomenological analysis (Smith, 2004).

4.3.3. Interview schedule

The interview schedule was constructed in consideration of the guidelines regarding conducting Interpretive Phenomenological Analysis (Smith & Osborn, 2003; Smith & Eatough, 2012). This led to the semi-structured schedule posing broad and open questions with the use of general questions, for example opening with "Tell me a little about your responsibilities as a strength and conditioning practitioner" with the scope for researcher prompts to maintain the interview narrative within the research objective boundaries (Smith & Osborn, 2003). The interview schedule focused upon two broad areas of perceptions towards psychology and methods to promote the use of psychology (see Appendix Two for full script). Questions regarding whether and how psychology should be promoted were asked late in the scheduled to reduce the possibility of self-report social desirability bias (Nederhof, 1985).

To generate in-depth data, probes were used. The examples of the probes used were repeating the question back, clarifying responses, or asking for practical examples. Care was taken to be non-directive. A written prompt comprising of a rating scale was used to facilitate discussion (see Appendix Three). This involved rating the extent that particular strategies were used. This prompt offered a range of responses within a continuum and a spectrum or scenarios thus -was not deemed to be leading in nature. This closed format was not analysed, but rather shaped a series of questions to explore reasons why psychological strategies are used or not.

As the introduction did not explicitly state the research objectives, so as to prevent response bias, it was important to conclude the interview with an accurate debriefing stating the purpose of the research and how the information would be used. One issue noted during the debriefing was participants requesting information about how other participants responded. The simple response provided was that the data has not yet been analysis and anonymised written reports or publications will be presented upon completion of the study. Upon clarification of the research aims the participants were thanked and the right to withdraw was reiterated.

4.3.4. Interview medium

The interviews were conducted face-to-face in person, face-to-face using Skype and by telephone using Skype. Participants were interviewed either in person or via Skype. Skype is a telecommunication technology that allows for remote face-to-face communication between individuals. However, on occasion the face-to-face features were not available and thus limited to only verbal communication. Nevertheless, research has indicated that telephone interviews have yielded data comparable to that collected face-to-face (Sturges & Hanrahan, 2004), thus Skype was deemed a suitable media through wich to conduct interviews when ‘in-person’ interviews were not feasible. Skype ensured that participants were not excluded on the grounds of location and therefore allowed for international differences in the use of psychology (Radcliffe et al., 2013) to be explored. In all instances, interviews were recorded using a digital voice recorder.

4.3.5. Interview pilot testing

A pilot study of two accredited strength and conditioning specialists working within the United Kingdom was conducted to determine the feasibility of the interviews. The sample was chosen to be representative of the research sample population, i.e. both were accredited and practicing Strength and Conditioning Specialists accredited by the UKSCA and the NSCA. Pilot testing using Skype was not performed due to preserving the sample pool for subsequent data collection however testing and familiarisation trials were performed using the video telecommunication technology prior to data collection. Post pilot testing, modifications were made to the interview schedule. This consisted of a reduction on overall length and the inclusion of probes to encourage elaboration of particular themes.

4.3.6. Participants

From an initial 62 individuals willing to be contacted (contact details provided upon completion of the first stage survey), 18 Participants were recruited for further interview. The present study employed convenience sampling drawn from a previously obtained sample pool initially compiled through purposive sampling. Additional snowball sampling was used as it is regarded as an effective method to enlist potential participants and compatible with the concept of purposive sampling. Participants comprised 17 males and one female. Of these participants, 10 participants were working within the UK, 3 within the USA and 5 within Australia. Each were accredited by the NSCA, the UKSCA, the ASCA, or a combination of dual accreditation. The participants provided a cross section of experience working as strength and conditioning practitioners, ranging from two

years to over 20 years within various sport disciplines. All participants had experience working at a minimum of national level.

4.3.7. Procedure

Interviews were conducted at a mutually-agreed time and location with specific consideration of time zone differences and typically lasted between 40-80 minutes. Data was recorded using digital voice recorder (Olympus, VN-5500PC), and transcribed verbatim. Interviews were conducted over the period commencing October 2011 to January 2012.

The semi-structured interview schedule (Appendix Two) was composed and scrutinised by one specialist from each of the disciplines of psychology and strength and conditioning for content validity. The questions explored the individuals' narrative of their experience being a strength and conditioner. The main purpose of psychology and the perceived importance of psychology within strength and conditioning were questioned as was the individuals' education methods. The methods of skill use and perceived barriers to using psychology were also explored. The questioning was open ended to allow elaboration around personal professional development and to promote participant narrative.

4.3.8. Analysis

The analysis employed interpretive phonological analysis (IPA:Smith & Osborn, 2003) conducted with NVivo 9 (QSR International Pty Ltd., Victoria, Australia) software to identify common themes.

The researcher transcribed all interviews verbatim. Adhering to IPA guidelines (Smith & Osborn, 2003; Smith & Eatough, 2012) the transcripts were read sufficiently to provide an in-depth familiarisation with the data and specific context of the data. Considering specific questions, each transcript was analysed to highlight specific instances within the participants' accounts. During first stage analysis, Nvivo 9 assistive software (QSR International Pty Ltd., Victoria, Australia) was used to extract pertinent notes for the participant narrative. Notes were then compiled to form thematic emergences after which the themes were reviewed for confirmation of understanding within the contexts outlined during the narrative. This procedure was repeated for the remaining transcripts with the application of an evolving 'master template' guided through emerging themes used to focus the analysis (Arvinen-Barrow et al., 2010).

Commonalities were explored between transcripts. This resulted in the development of higher order themes with appropriate supporting quotes identified. In instances where quotes failed to sufficiently evidence themes, the theme was removed from analysis (Arvinen-Barrow et al., 2010).

4.4. Results

The practitioners referred to a wealth of psychological skills and strategies that are used within strength and conditioning. There were 130 references made to the use of specific psychological strategies from 16 of the 18 practitioners. Through thematic clustering, it is evident that a significant emphasis is on the development or maintenance of athlete *self-confidence*. Similarly, albeit to a lesser extent, there is a notable focus on *skill acquisition* and *arousal management*. In addition to this the strength and conditioning practitioners made reference to the manner in which the psychological strategies are applied within the strength and conditioning domain. The results will address two global themes identified; the specific skills used and the methods in which psychology is integrated within strength and conditioning practice.

The emergence of such themes is evidenced by both the frequency of emergences of concepts and also the resonance, the specific individual meaning, on an individual level. Thus whilst core themes may be identified by frequency, themes with deep meaning are also explored on an individual basis. This is an advantage of the IPA approach and in the present example will ensure that, despite not making generalisations, allows the identification of pertinent concepts and accounts for varied individual difference within the unexplored demographic of the subject area. The emergence of such themes is evident in the cluster diagrams demonstrating the prevalence and resonance of specific strategies within overarching themes (Figure 2.2).

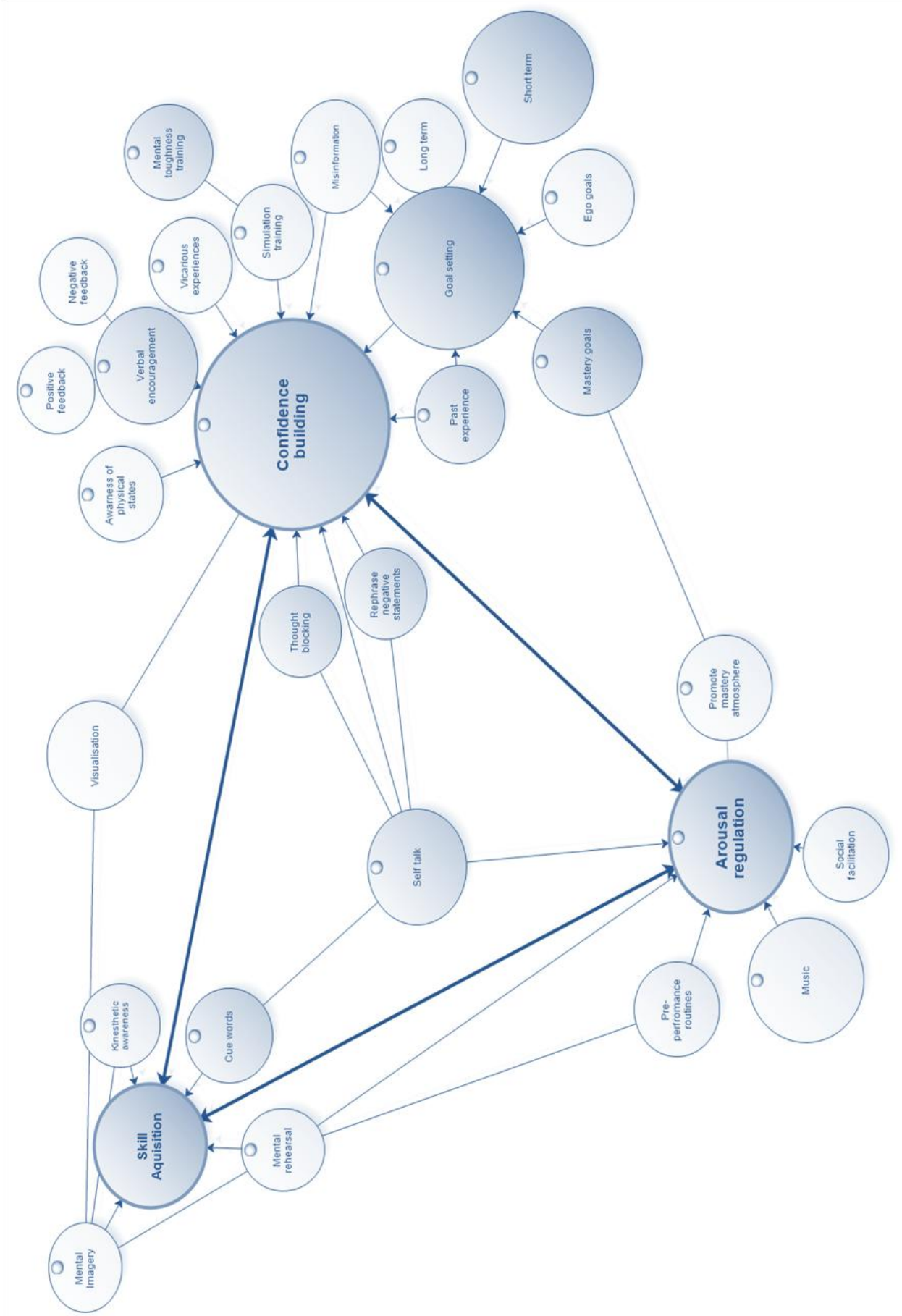

Figure 2.2 Thematic emergences depicting the integration of psychological skills within strength and conditioning. Resonance indicates by size.

Higher order themes	Lower order themes	Sub themes
Confidence	Goal setting	Short term goals
		long term goals
		Athlete agreed goals
		Lack of athlete control
		Mastery orientated goals
		Ego orientated goals
	Emphasising accomplishments	
	Simulation training	
	Learning to fail/managing expectations	Emphasising process/mastery objectives
	Misinformation	
	Verbal Persuasion	Positive feedback
		Negative feedback
	Vicarious experiences	
	Imagined experiences	Visualisation
		Mental imagery
		Mental rehearsal
		Internal perspective
		External perspective
	Self-talk	Rephrase negative thoughts
		Thought blocking
Arousal regulation	Reducing arousal intensity	Mastery goal setting
		Pre-performance routines
		Music
	Increasing Arousal intensity	Social facilitation
		Pre-performance routines
		Music
Skill acquisition	Self-talk	Technical cueing
		Focus attention
	Mental Imagery	
	Kinaesthetic awareness	

Table 4.1 Thematic emergences depicting the most prevalent resonant higher order and lower order themes

4.4.1. Specific strategies employed within strength and conditioning practice

4.4.1.1. Nurturing Confidence

The most prevalent theme that emerged was that of the importance of nurturing a confident athlete. This was predominately via the use of goal setting however application of concepts surrounding self-efficacy emerged. Each of the dominant themes relating to enhancing the confidence of the athlete will be discussed in the subsequent section.

4.4.1.2. Goal setting

Goal setting was evidently the most prevalent and resonant theme within the overarching higher order theme of enhancing athlete confidence. The use of goal setting was most prevalent, with 15 of the 18 respondents referring directly to the use of goal setting or synonyms such as 'target setting'. In addition to the between-participants frequency of occurrence identified (15 of the 18 participants), the use of goal setting received considerable attention within individual narratives. Furthermore the depth of meaning associated with goal setting highlighted the resonance with the emergence of lower order concepts emanating from more general goal setting. For instance the variation of goal proximity, the specificity of goals, and the mastery or ego orientation fostered. The following section of results will evidence the use of goal setting with specific attention afforded to the sub themes constituting goal setting.

Specific emphasis is provided to utilising short-term goals. The formal strategy of goal setting is focused around the use of short-term targets whereas there is an informal attitude towards the inclusion of long-term goals.

> *"The goals that we set would be more short-term although we would discuss longer-term goals with them. But in terms of formalising stuff, the majority of goals will be shorter term goals"*

The concept of differing level of importance, evidenced through formal recognition, indicates that there is a greater importance placed on the use of short-term goals compared to long-term goals. This is also evident in the emphasis of short-term goal setting through the participant narratives. Overall, considerably more prominence exists on the use of more proximal goals compared to long-term objectives. It is also implicit within the quote that there is a requirement for immediate reward as a means to facilitate confidence via numerous opportunities to experience mastery achievement.

This is especially evident when providing frequent senses of achievement when shaping the development of complex technical skills.

> *"Yeah they're pretty good. We keep reminding the athletes of those [short-term goals] so they've always got them in their mind and they know what they want to achieve and we know the stepping-stones towards that."*

Aligned with self-efficacy theory (Bandura, 1986), short-term goal setting provides frequent opportunities to experience achievement (Hall & Byrne, 1988) and consequently short-term goal setting can prove a powerful tool in facilitation

the self-confidence of the athlete. In addition to benefiting to athlete self-efficacy frequent goal setting can serve as an effective motivational tool. The use of short-term goal setting was indeed perceived to be a method of increasing the athletes' motivation.

> *"They are usually a bit pissed off, a bit sad, and the world is coming down on them. I got one injured at the moment so it's just giving him smaller goals to keep him motivated."*

It is apparent that the use of goal setting is particularly important within the rehabilitation setting when working with athletes returning from injury. Thus it is important to acknowledge that motivation may be negatively affected by injury and the strength and conditioning coach is aware of this and accordingly manipulates goal proximity.

Burton and Naylor (2002) suggest that goal setting serves as a motivation tool for two prime reasons. Firstly, the goals themselves are a direct motivational strategy by which performance standards govern actions with regard to effort and attention. However, such a viewpoint neglects the cognitive, affective and behavioural responses associated with goal striving (Kingston & Wilson, 2010). Secondly, goals can be viewed as a cognitive driver for participation. This depends on the personal meaning of success and ability, which subsequently shapes behaviours, affects, and cognitions. To expand, individuals engage in activities to demonstrate competence and adopt goals aligned with their own cognitive beliefs as to the requirements to demonstrate achievement in a given

context (Harwood et al., 2000). Consequently, individual difference is an important consideration.

There is evidence that suggests that despite the resonance of goals setting strategies, the effectiveness of such strategies is influenced by individual differences.

> *"I use strength and conditioning goals … Short-term goals, medium- and long-term. Long-term being forever, medium-term being this year and short-term being the next three months. And I do exactly the same for competition, sport competition. So I get to understand where they are with the sport and see if they are target driven."*

It is explicit that there is the awareness of the differing goal proximities and the need to set them. However it is implicit that the vagueness of the term forever may identify a non-uniform understanding of goal proximities across the strength and conditioning community. It is apparent that the practitioner acknowledges that not all athletes may be driven by the same strategy. That suggests that different proximities of goals and the 'meaning' of goals provide varying levels of athlete motivation depending on individual differences. Thus the use of application and effectiveness of goal setting is dependent on both the individual differences and drivers of the athlete and the understanding of varying goal proximities of possessed by the strength and conditioning coach.

The present individual discusses how the goals are individualised and measured against the athletes own ability and therefore within the athletes control (Locke & Latham, 1990) . Such a use of a self-(athlete-) referenced target was

prevalent within the goal setting practices of the strength and conditioning practitioners. As a result, the 'meaning' of the goal, and how it aligns with an individual's achievement motivation, is critical in eliciting a motivational benefit from goal setting.

> *"We go back to things like trusting in the training and we go back to basics back to technique back to skill that way it's something she can concentrate on and she can build confidence from."*

Within strength and conditioning, it has previously been suggested that there are benefits associated with shaping athletes to adopt a task orientation in which the athlete is motivated through mastery of a task with no reference to the performance of peers (Gilson et al., 2008). An individual's goal orientation can influence the motivational advantage of utilising goals. Goal perspectives concern the athletes self-set performance markers in relation to what is perceived to demonstrate accomplishment. Such an achievement goal theory (Nicholls, 1984) suggests that individual are motivated to, either, demonstrate prowess against their own previous performance irrespective of that of others, or to demonstrate competitiveness in direct reference to norms.

Likewise, one coach suggested that in particular instances the use of goal setting might be inhibitive to athletes' development.

> *"Sometimes I'll change the structure of a session so that we don't push such high arousal if I know that in the next 48 hours of the next week there are other places that they should be putting that effort and that energy."*

This is a perception that is polar to those previously identified and suggests that when incorrectly used goal setting can range from ineffective to detrimental. It is apparent that the strength and conditioning coach has a challenging task of finding the appropriate level of difficulty for the goals and gauging the athlete receptivity of goal setting. It is clear that individual differences coupled with changeable training objectives, such as managing fatigue, make the effective use of goal setting a challenge.

> *"For athletes who are the other way, so for those types of athletes I sometimes don't use much goal setting within a S&C setting but then with other athletes that I think need it we will often have some quite clear and distinct targets with you know strength levels lift scores they can reach, you know those sorts of things, we're targeting you know within a couple of weeks or a month or so."*

Furthermore the resonance of misunderstanding of goal setting practice is evident. Thus despite the awareness of the need to modify approaches to account for individual differences and motives, there is confusion regarding the application of psychological strategies; rather the perception exists that instead of modifying goal setting techniques the practitioner modifies the communication style. This may illustrate that the practitioner is one-dimensional in the approach to goal setting and relies on other strategies to modify motivation levels. Thus there is confusion between utilising specific psychological techniques and modifying interpersonal behaviours.

> *"There are targets we are trying to achieve so I guess without using any specific interventions I tailor sessions like what I say to what I think they need to get the best outcome."*

The focus of the goal as well as the proximity were documented, referring to the use of training goals to benefit training outcomes within the session, for example providing a greater adaptive response through a greater workload.

> *"Obviously more games [are] more important than others so we set short terms goals both in terms of what they do in the session and how they approach the session and how much they'd get out of it. Sometimes they'd have to work a little bit harder if you wanted to get a greater adaptive response and sometimes work a bit more on technique and things so I guess it was more managing goals in that sense"*

This typifies the need for goals to be set specific to each individual and flexible to maximise the effectiveness. Thus it is evident that the ability to manage and prioritise goals is an important skill for the strength and conditioning professional.

The coach also adopts the role of providing goals away from the training sessions for example preparation goals. Such preparation process goals are emphasised by one individual referring to the management of nutrition.

> *"Obviously you have got your long-term goals, break them into medium-term and daily actions that you can kind of do. So whether it is making sure you [are] kind of getting the right food into you, whether your nutrition is right, basically giving everything in your training sessions, all the small steps that are going to lead up to eventually getting into that Paralympics squad hopefully. So yeah I do try to break them into smaller steps for people to get there."*

It is apparent that goal setting is being managed concerning processes away from the immediate strength and conditioning environment. This implies the crossover of goal setting as a generic strategy which suggests a reason for the prevalence of such a strategy. That is to say the coaches have developed a greater awareness of the strategy through the numerous opportunities to use goal setting techniques within various contexts and suggested the presence of generic and discipline specific psychological techniques within strength and conditioning.

Another example of the generic use of goal setting concerned the use of goal setting to modify inappropriate lifestyle behaviours.

> *"You want to be really proficient technically and we want to have a good goal in there and you have been at, [local social venue] till 11:30 last night, your goals are not reaching, your goals are out of whack so we will re-evaluate."*

The particular example concerning the use goal setting for behaviour modification offers both explicit and implicit information concerning the use of and effectiveness of goal setting. It is explicit that the strength and conditioning coach is aware and involved in the processes remote to the strength and conditioning training session that may influence performance and are willing to address such factors using goal setting. This evidences the use of goal setting away from the immediate strength and conditioning environment and may suggest that the strength and conditioning coach is becoming a more integrated member of athlete support offering input in factors not directly related to their specific discipline. However, it is implicit within the present quote that the use of goal setting is readily revaluated and may be fleeting and readily adjusted without

establishing goal commitment. Thus the use of inconsistent goal setting is an example of inappropriate goal setting used within strength and conditioning.

An important consideration concerning the application of psychological strategies is the amount of athlete control over the goals that are set. There is evidence that the athlete input in the development of training objectives can range from extremely limited athlete contribution through to a considerable athlete input. Nevertheless, the importance of athlete input when designing goals and programmes is resonant through the practitioner narratives biasing towards the advocation that involving the athlete in the generation of psychological strategies is beneficial for training adherence.

> *"That's going to help their adherence. I have for them and agree goals and set the goals so when they're going to train and how they are going to train and where they are going to train and they just turn up"*

This evidences the notion that although the coach acknowledges the requirement for the use of athlete-agreed goals, the coach is reluctant to truly involve the athlete in the goal setting strategies. Thus an indication of the sub-optimal use of goal setting is that the strength and conditioning coaches are autocratic in setting goals and reluctant to sacrifice control in the goal setting progress. Conversely another coach acknowledges of the importance of athlete constructed goals and sets goals accordingly.

> *"It's more or less sticking with what they want for their goals and asking them what goals are relevant to them."*

The promotion of athlete directed objectives is to provide adherence to the training programme. This is a common consensus amongst the practitioners interviewed however, conversely, one experienced individual comments on how the lack of athlete choice can still bring motivational benefits to training.

> *"They choose nothing I choose the weight and the lift and the number of times. Every time they do that, that is a goal and an achievement and that reinforces the training process. So motivation is based on goal setting and reinforcement So every single set has a weight to be lifted x many reps or a power output to be attained if they are doing power and we give them their goals"*

It is interesting that the particular individual, a very experienced coach working within elite sport, perceives the use of goal setting to be motivating despite the lack of choice provided to the athlete. The lack of choice is acceptable from the coach's perspective and could be indicative of a high level of trust between coach and players in the training. It should be noted that such a view is not universal with such a method neglecting various fundamental psychological needs such as personal choice and autonomy (Deci & Ryan, 1985). Rather the peer competition element is providing a motivational component.

An interesting concept that was not prevalent with regard to frequency however was resonant within individual cases was the concept of the team dynamic and the facilitating role that competitive goal setting within training can provide. It has previously reported that there is a comparative lack of research exploring goal setting with teams compared to individual goals. Nonetheless there is support for the use of team goals with regard to increasing group cohesion and

thus directly impacts performance as a result of improvements in inter-group communication and team satisfaction (Widmeyer & Ducharme, 1997). Team goals have been demonstrated to be the single most important variable affecting task cohesion and the second most important regarding social cohesion (Brawley et al., 1992). The current study did however evidence the use of result posting.

> *"That is we use goal setting for part of motivation. We have goals for every single exercise and major testing exercises there are big goals and benchmarks and we have a white board each week for different positional groups based on bodyweight largely, top three just on a number of different lifts and also the prison bitch [derogatory term for the worst performer] goes up. So it is a contest there to not be last as well. It is a contest to be the top three and also for the bottom three of four not to be last because only the bottom guy goes up."*

Anderson (1988) has previously evidenced the benefit of goal sharing and goal result posting. Within competitive ice hockey, the use of goal setting provided a significant performance benefit over the course of two competitive seasons. Furthermore, within the team environment the use of shared goals and result posting produce a greater benefit than the use of praise (Anderson et al., 1988). The present example identifies key characteristics that influence the effectiveness of results posting notably how goal setting can modify an individual's level of motivation. The strategy addressed the ego orientation of the athletes and enhances such an approach by using paired groups based on similar performance standards. Thus it would appear effective to use competitive goals within training assuming that individual differences are catered for.

It must be noted however that the present example originates from a successful professional team sport in which players are contract bound to attend training sessions, and as such extrinsic motivational sources exist via financial incentives. Nonetheless, the use of individuals' result posting again typifies the interpersonal security within the team setting that what may be perceived as a humiliating act, i.e. the 'prison bitch' title, is acceptable practice by the players. Such an approach would clearly require considerable rapport building between the coach and the players. This would indicate a respect towards the strength and conditioning coach that can only be achieved through experience. It is therefore possible that with increased experience, not only do the frequency of goal setting strategies increase, albeit slightly (Radcliffe et al., 2013), but also the specific methods of employing goal setting techniques increase in variety to optimise the training effectiveness.

4.4.1.3. Emphasising accomplishments

In addition to the specific inclusion of goal setting, there was evidence that strength and conditioning coaches were specifically referencing the athlete's previous accomplishments

> *"To boost someone's confidence? Yeah, well again you are going back to the injuries again, if say they have done a certain weight before you have done this in the past this is nothing. It will be an easy lift, so reverting them back to a previous instance they have had success in and bringing that into the current session would be a good way."*

The use of previous accomplishments aligns strongly with self-efficacy theory. Indeed, past performances are the greatest source of self-efficacy as they are grounded in the athlete's own experience (Bandura, 1986). Various empirical sources support the effect previous experiences have upon self-efficacy (see Short & Ross-Stewart, 2010 for review). Nevertheless the quotation reveals the use of previous accomplishments in relating to injury and it is not evident that identifying the goal difficulty would be at the appropriate level. Thus it is apparent that, whilst again theory is understood to an extent, the specific detail of the application concerning goal modification could be misunderstood.

4.4.1.4. Misinformation

A prime role of the coach in providing opportunities to experience success would be through the use appropriate goal setting as previously discussed. In order to provide a sense of achievement there is evidence that strength and conditioning coaches are utilising misinformation strategies by which the athletes are misinformed as to their actual performance.

> *"Used to train a lot with training partners people who would say 20kilo Olympic bars that you are lifting and then some training sessions would come back through saying they would of loaded it with a 25kilo Olympic bar still doing the same sort of stuff you are lifting it a little bit extra doing very similar reps and then finding out later that you been had [laughs]."*

The reference to false feedback has previously been documented within self-efficacy literature and with particular relevance to strength and conditioning practice. Through the manipulation of goal difficulty, that is, informing the athlete

that they are lifting a lower weight than they actually are and thus the task is perceived as less challenging, the athletes self-efficacy and subsequent lifting performance has been demonstrated to improve (Ness & Patton, 1979; Fitzsimmons et al., 1991; Wells et al., 1993). It should be noted however that caution is warranted when utilising such a strategy, not least because of the danger posed to the trust between athlete and trainer (Bandura, 1997) and also the ethical concerns regarding the potential risk of injury without having true informed consent of the athlete. .

> *"It's great, it's a good feeling that you knew you were stronger than you thought you were. There a little bit of confidence came out of it and increased motivation to come back next time because you knew you were stronger and you had the potential to get more out of it"*

Specifically the current participant makes reference to the use of the strategy on himself and thus suggests that the strategy is formed from the strength and conditioning coaches' personal experience and therefore may not consider the individual differences which would govern the effectiveness of using misinformation.

> *"Yes definitely even it is with the younger guys use the false feedback not so much with the triathlon lot but with the younger kids when we doing sports we say things like 30 seconds of ball skills how many catches can you do sometime we say time starts now but we let them go for 40 seconds so they can get 2 or 3 more catches in gives false feedback and builds confidence, success breeds success."*

The acknowledgement of individual differences suggested that the strategy is dependent upon the naivety of the athlete, specifically referring to the 'younger

guys' thus it possible that interpersonal power dynamics may influence the effectiveness of using such a strategy or rather the use of the strategy is only effective to a point in which the athlete may be sceptical of the coaching practice.

4.4.1.5. Verbal Persuasion

Within the narratives, the importance of verbal persuasion is a resonant theme comprising motivational and confidence enhancing benefits.

> *"Make them focus on what they are actually there for which is good performance it's just to try to from my part not focus on the negative but say actually you are really good at this, this can be improved"*

There is evidence of positive performance feedback and verbal encouragement. This has been observed in previous research (Massey et al., 2002). It is interesting that it is implied that there is a role for criticism within sport however this would be the responsibility of individuals other than the strength and conditioning coach. Thus it is possible that, at least in the current narrative, the strength and conditioning environment is one in which required considerable encouragement and persuasion. Nevertheless, it would appear that such a view is not universal within the strength and conditioning community. Some strength and conditioning practitioners employ negative feedback

> *"I think it, and this is one thing I struggle within the S&C world is that we point out a lot of things that they are doing wrong, that they are not strong enough they are not flexible enough, they are not all these things enough now I think it is absolutely utterly, I don't think it is right"*

It is evident that within the individual's experience, within strength and conditioning practice, there is the tendency to neglect positive reinforcement and focus upon the negative. Whilst it is important to correct techniques it is apparent that specific feedback practices are inconsistent across the strength and conditioning community. Such a perception is important, especially as the debilitating effects of verbal persuasion are more powerful than the facilitative effects brought through persuasive communication (Bandura, 1997). Thus, self-efficacy is more readily damaged through negative information than it is elevated through positive encouragement. For that reason, there must be caution to not emphasis weaknesses during the provision of verbal information.

Nonetheless, it is apparent that the balance between the positive and negative is dependent upon the athlete and that the coach must be competent not only in using various modes of feedback but also in identifying individual differences which would influence the effectiveness of different feedback styles.

> *"In my experience some guys need positive encouragement all the time and reinforcement so they like to be told they have done well other guys respond sometimes where if I tell them they have been doing rubbish they'll sort of up their game in order to prove me wrong so depending on what the athlete is I might say that wasn't very good you did better last week then all of a sudden they sort of maybe try that little bit harder to get it out"*

Such a negative balance is likely to be required whilst interacting with successful athletes. As suggested by Bandura (1997), this is to prevent successful athletes from becoming complacent via easy successes and furthermore an increase in effort is typically exhibited post failure, noticeably within individuals

possessing high self-efficacy (Weinberg et al., 1981). More recently, supporting research has questioned the presumed linear efficacy-performance relationship, and indicated that self-doubt can be facilitative to performance (Woodman et al., 2010). It is therefore likely that with certain individuals, the use of negative feedback may serve to mediate the risk of over-confidence.

4.4.1.6. Simulation Training

An additional strategy used to facilitate confidence was using simulation training. Simulation training is when the specific demands and resultant emotions and cognitions are experienced in practice to prepare for similar instances within competition.

> *"They are racing at 35k's an hour and if there is a break forming we like to get them to practice that they have been separated and they need to get across so what we do is say you have got a 30 second sprint, and in that 30 seconds you need to cover 300 metres, think it 350 meters which averaged out 37 and half kilometres per hour which means they can get across to a gap if there was a gap to form."*

Akin to the short-term goal setting, the use of simulation training is related to self-efficacy theory in that it presents a sense of accomplishment. Within competitive sport, the prime objective is transfer from practice to competitive environments, for both physical skills and psychological skills. It is therefore likely that through matching the physiological and psychological demands of both training and competition settings there are likely to be a greater transfer of skill between the two settings. Notwithstanding self-efficacy being a situational specific construct relating the belief to which a specific task can be successfully

executed (Bandura, 1997), there is support for the generalisation of self-efficacy (Eyal et al., 1995; Wise, 2000). Consequently should sufficient commonalties exist between challenges then there is likely to be a transfer of self-efficacy from the training to the competition.

There is specific reference made to mental toughness training through which athletes are subjected to psychologically challenging scenarios in training.

> *"Another thing we do is we cause fatigue in skills training, deliberately cause fatigue and put them in skills training can put the pressure of fatigue will continue to perform"*

Pertinent to confidence is the concept that self-efficacy associated with coping under stressful situations is transferable (Wise, 2000). It is apparent that the strength and conditioning coach creates situations in which the use of coping skills is required. The following quote epitomises the use of simulation training.

> *"A lot of it is preparation again trust in the training we do a lot of efforts we do a lot of repeats. Mental toughness is a lot of mental rehearsal as well getting them into that situation so when it does come into the races they know they been there before so they have that confidence and the believe that they can hit that pain, carry the pain and be better that the person they are racing against."*

Despite the loose reference to mental rehearsal, it is clear that the strength coach is aware of the need to develop psychological skills in training to transfer into competition and perceives that as a coach they can facilitate this in the environment that they create however it is implicit that despite fostering a

demanding environment little specific guidance is provided as to specific coping strategies.

4.4.1.7. Learning to Fail/Managing expectations

A prevalent theme was the notion that it was important to learn how to fail specifically when performing weightlifting exercises. Thus the norms are established that it is acceptable to not experience success all of the time.

> *"I teach people how to miss lifts I suppose. One because it give you the confidence in saying yeah I might do so when it does actually happen when you get to a certain weight and something goes wrong it's like I've learnt how to do it wrong. If that came as a surprise the that might set you back a bit more I suppose that mental toughness in the gym would be almost seeing it in foresight at some point your athlete is going to be doing some sort of clean."*

The present individual refers to the surprise of failing and the athlete not being prepared to recover from such a failed attempt. This is evidencing the awareness of the coach to mental resilience in which a key component is the ability to recover from setbacks (Jones et al., 2002; Bull et al., 2005; Jones et al., 2007). The training environment is structured in such a manner to allow the athlete to experience setbacks in a controlled manner to allow the development of mental toughness.

> *"Then to then help them understand that that's natural, that's what happens and they shouldn't beat themselves up about it but then ok all your focus in this attempt is to make sure you give it a complete effort bring your focus to the process again rather than the outcome".*

Similarly, in teaching to fail the coach is restructuring the importance to the lift. Thus rather than the outcome of the lift it is the shaping of the process leading to the complete lift that is important. It is acknowledged that the processes required should be emphasised however there is little information as to how technical cues and feedback are used to promote a focus on the processes of the lift. Furthermore despite reducing the stress associated with the task, owing to the modification of the social norms concerning the acceptance of failure, there is little additional appraisal used concerning what can be learnt from the failed attempt.

4.4.1.8. Vicarious Experiences

One instance emerged regarding the specific use of vicarious experiences to increase confidence. Vicarious experiences involve the exposure and attention of an individual to the behaviours of and individual performing similar desired behaviours successfully.

> *"She is a cracking player and then giving her examples from the men's game and saying look at this person look what they did to that seasoned international and they have come through so it could be you. So that's a way of building up their egos."*

Through normative comparisons, the athlete is able to develop self-efficacy expectations despite lacking accomplishments (Short & Ross-Stewart, 2010). Aligned with self-efficacy theory, vicarious experiences are regarded as the second source from which an individual can make self-efficacy judgements (Bandura, 1997). The coach refers to the concept of vicarious experiences, a term

often used interchangeable with modelling. Important to the effectiveness of modelling are four processes; attention, retention, production, and motivation (Bandura, 1997). However, it is unclear as to what strategies, if any, are employed to ensure the athlete attends to and retains the vicarious information. Consequently, questions exist over the effectiveness of using the strategy.

4.4.1.9. Visualisation

It is evident that the coach is aware of the athletes using visualisation and the relationship with confidence, however equally it is clear that there is little input into the style of mental imagery employed rather it is self-selected by the athlete.

> *"I know that a lot of my athletes, to keep their self-confidence up, sometimes use alternative methods where they may do some visualisation work."*

Visualisation is one component of the psychological skill termed mental imagery. Mental imagery encompasses a spectrum of imagined sensory inputs in addition to the imagined visual stimuli with qualified sport psychologist practitioners attempting to foster an imagined holistic sensory experience utilising an increased numbers of imagined sensory and emotional inputs. Originally considered part of vicarious experiences (Bandura, 1986, 1997), imagery has since been considered an independent source of self-efficacy (Short & Ross-Stewart, 2010). However the present example signifies only that the strength and conditioning coach knows that visualisation is being used. It is apparent that there is little evidence of the strength and conditioning coach educating in the use of

imagery and thus the knowledge of the athlete concerning the use of visualisation must have been gained elsewhere.

Alternatively, in identifying a disparity in the education of imagery strategies by strength and conditioning coaches there is evidence that specific imagery techniques, employing multiple imagined senses, are being used and educated by the strength and conditioning coach.

> *"I've tried just some sort of mental relaxation so that before we go out to throw we do some breathing exercises. Do some relaxation exercises and some mental feedback, you know biofeedback type stuff just lying relaxing, visualisation, visualising the throw. Think about where you want to place your left leg, where do you want to place your right leg and I know in certain situations there are people who can feel it and people who can visualise it. And usually it is the people who can feel the throw who are your good throwers not just being able to visualise what they are doing. They feel like they are inside the throw rather than looking at the throw from outside so we talk about that."*

It is evident that the imagery is concerned with the skill execution. This could be categorised as either motivational mastery or cognitive specific imagery (Paivio, 1985; Hall et al., 1998) depending on the emphasis of the imagined experience. The use of imagery receives consistent support regarding specific benefits to self-efficacy (Short et al., 2002; Evans et al., 2004; Callow & Waters, 2005). Early research utilised the Sport Imagery Questionnaire (SIQ; Hall et al., 1998) to explore the specific modes of mental imagery used, for instance motivational general arousal, motivational general mastery motivational specific, cognitive specific, or cognitive general. Such research indicated that multiple modes of imagery elicited confidence gains (Moritz et al., 1996; Callow et al.,

2001; Beauchamp et al., 2002; Short & Short, 2005) however there is little consistency in the optimal imagery mode to promote confidence gains with only motivational general master consistently promoting self-efficacy. As such, it would be apparent the present practitioner is applying appropriate imagery interventions within technical sessions however there are notable inconsistencies in the education of mental imagery by strength and conditioning coaches.

A similar method of imagery is utilised by another coach which clarifies the imagery is emphasising the perfect execution of the skill prior to the actual performance.

> *"So visualization on the bike we get them to use both the outside looking in and the inside looking out and being part of it. So internal and external we give them cue words to focus on when they getting really tight so if their legs are getting hot we again go back to basics we tell them to visualize say clock feet or full circles when they peddling so that they concentrate on that rather than their painful legs the we get them to look from the external to imagine someone that they think has got perfect form like a lot of the guys used to use Lance Armstrong but now they leaning towards guys like Alberto Contador and Mark Cavendish."*

Such an example is typical of motivational general mastery whereby the skill is observed from a 'third person' perspective to be executed to a standard of technically excellent cyclists. Specifically the external perspective of the imagery has been proposed to serve a different functionality to that of an internal (first person) perspective. The external perspective is proposed to be better suited to technical skills in which anatomical positioning is important (White & Hardy, 1995). The above quote also typifies the additional component strategies required to make the use of imagery effective with regard to using cue words to aid

retention and attention of the mental image and aid replication (Bandura, 1997). Utilising such a combination would indicate aptitude in prescribing appropriate mental imagery skills within the present instance.

It is interesting that the examples indicating appropriate use of mental imagery are relating to situations outside of the strength and conditioning environment. Consequently the perceived value of imagery within strength and conditioning is misunderstood by the practitioners and implies that mental imagery is a specific skill and which is not transferred between contexts.

4.4.1.10. Self-talk

The promotion of self-talk strategies was prevalent within the narratives of the strength and conditioning coaches. It was evident that self-talk strategies were used as a means to nurture the confidence of the athletes.

> *"Well it is a conversation you are, in essence, having with yourself more internal conversation having within your own metal state in regards to what you about to implement of what you are about to try out so encouraging positive self-talk. I definitely go by the rule of the 'C' [can't] word I don't want to hear the word, the can't word, I only want to hear the can word. So that is something that we drill into the players that is something that we really want to go for as a positive outlook with regard to that sort of thing."*

The coach refers to the promotion of rephrasing statements within strength and conditioning. Interestingly despite the prevalence of positive self-talk strategies, Van Raalte et al. (1994) previously concluded that rather than positive-self talk benefiting performance, it is the potential for the detrimental effect of negative self-talk which is the concern. This resonates with the current findings

with the emphasis of rephrasing negative statements. It should be noted however that the narratives are based on the practitioners' observations and limit the findings significantly. It is possible that positive self-talk could be occurring at a solely internal level whereas there may have been more instances of overt negative self-talk behaviour.

There is evidence that the coaches are aware of the potential effects of self-talk. This is evident with coaches instructing individuals to use positive statements to prevent attention being focussed on negative thoughts.

> *"I definitely just direct people to not dwell on negative aspects - only positive statements, there is no set formula there is no set words, whatever works for you work of something that you are trying to achieve or is a positive thing for yourself. It's just no negative conversation within the place."*

It is evident that the attentional focussing mechanism can govern self-confidence by inhibiting focus upon cognitions detrimental to confidence. The lacking specificity of self-talk strategies acknowledges the need for individual specific strategies Thus, the use of self-talk may be an important strategy to prevent attention being directed towards maladaptive cognitions. Indeed, the requirement to focus attention is regarded as a commonly cited use of self-talk (Hardy et al., 2001; Hardy et al., 2005b) demonstrating positive effects on concentration (Van Raalte et al., 1994).

The importance of the athlete's belief was important to successful lifting and the promotion of self-affirmation was reported.

"If they don't believe it they are not going to do it and just to say the words strong and powerful and yes, that sort of self-talk or self-affirming talk is important. So every time they have a successful lift that self-talk is being part of is so we just generate more and more of a Pavlovian response. Every time self-talk happens I'm going to get myself a successful outcome of a good lift so we encourage."

Specifically the present individual depicts the cognitive-behavioural strategy relating to the incorrectly termed 'Pavlovian response' in which the self-talk is associated with the successful task execution. This would imply that, in support of established research (Van Raalte et al., 1994; Thomas & Fogarty, 1997), the individuals belief in the benefit of self-talk is a factor in the effectiveness of utilising self-talk strategies.

4.4.2. Arousal regulation - Presence of optimal arousal intensity

Arousal regulation strategies received significant emphasis within the participant narratives with both elevations and reduction strategies described. The importance of regulating arousal is evident throughout, with practitioners indicating that rather than being a linear relationship, there is an optimal point in which arousal intensity facilitates performance.

"Arousal is what people who are unskilled call psych up. We look at the inverted U arousal and skill. The lifts we use for the major strength needs high level of arousal when we lift heavy so we have certain strategies that we use at my club that if someone is lifting maximal effort weights"

It is also evident that strategies are being employed to reduce or elevate arousal. The use of arousal elevating strategies within strength and conditioning

has been a well-researched area (Tenenbaum et al., 1995; Brody et al., 2000; Perkins et al., 2001; Tod et al., 2003; McGuigan et al., 2005; Tod et al., 2005; Gregg & Hall, 2006; Cumming et al., 2007) however as yet there is a lack of consensus regarding the benefits of utilising such a technique. Interestingly it is implied that, across the strength and conditioning professional field, there are inconsistencies in practice. The specific reference to the "unskilled" and "psych-up" indicates that there are strength and conditioning practitioners who are only aware of the need to elevate arousal and it is only the skilled coaches who are aware of the need for downwards regulation. The notion that the ability to regulate an arousal both up and down is a distinguishing factor between skilled and unskilled strength and conditioning coaches evidences the resonance of the theme within strength and conditioning.

Initially the equivocal results of existing research are surprising given the significant attention offered to 'Psych-up' within the narratives. However the fact that that the practitioners are moderating arousal rather than simply elevating suggest that there is an optimal level of arousal depending on the activity

> *"You don't learn that fine motor skill like throwing if you go nuts, you can't so I talk about throwing motivation and football motivation take it down, let's be little bit more calmer, let's be a little bit more methodical with the approach an little bit more thoughtful. Don't just go nuts in motivation because when you go nuts in motivation that technique can, not always but it can get out of whack so the timing of the throw becomes a problem so we got get ourselves, reign ourselves back in to throwing motivation rather than football motivation"*

The above example uses arousal and motivation interchangeably and notes the different types, or levels, of arousal required for different behaviours. For example it is suggested that when conducting simple actions the facilitating effect arousal has upon anaerobic power can benefit performance, for example jump height (Parfitt et al., 1995). However, inhibitory factors associated with elevated arousal such as muscular tension (Noteboom et al., 2001) and movement co-ordination (Oxendine, 1970) may negate the benefits of the increased anaerobic power. At an implicit level the term "go nuts" suggested that, despite the understanding of appropriate levels of arousal, the use of arousal regulation strategies is unstructured and devised by the athletes themselves with little specific technical input from the coaches.

4.4.2.1. Reducing arousal intensity

There was evidence that the coaches are instructing the athletes to utilise behavioural strategies to reduce the anxiety of competing.

> *"We use the arousal control in the respect to basically just letting them concentrate on their own body at that point in time and going back into their own body go into breathing techniques we use a two-hand techniques a lot and sometimes we use the five breath technique."*

The above quote emphasises the importance of the role the strength and conditioning coach fulfils in the competitive environment as well as the training environment. It is worth noting however that the use of the "we" could be indicative of providing a supporting role and the skill may be instigated by other coaching staff. Nonetheless, it is evident that there are applied behavioural

strategies utilised, such as the use of breathing techniques. The reference to going back into their body is likely to be a reference to the centring strategy utilising diaphragmatic breathing. Equally, the quotation evidences the use of cognitive strategies in the use of mental imagery although it is unclear regarding whether the imagery is used to elicit reduction in arousal or to increase arousal.

> *"We like them to soak up the atmosphere and realise that they here for an event but when it comes time to visualise which is usually about, we like to give it about 30min before a race we let them go away just by themselves to listen to some – not big heavy music it's more everyone got their own play lists so they listen to that for a couple of minutes and they come back out and start warming up".*

Similarly, the use of music would appear to be an arousal regulation strategy. It is pertinent to note the individual differences highlighted with the music selection. The particular individual refers to techniques which can be used to elevate or reduce arousal levels, however provides little input into the direction of the arousal change. It is also pertinent that in managing the activation of the athletes, the role of the strength and conditioning practitioners extends outside of the strength and conditioning setting and into the competitive arena. This suggests that there may be limited crossover of arousal regulations strategies from competition to practice.

Promote a mastery environment

Although not directly referred to, the use of goal setting is considered a regulatory strategy with regard to reducing training stress. Goal setting was widely reported to be centred on mastery goals in which the individual athlete

appraises performance against self-referenced targets. One such example did reference the effect of goal focus has upon the performance.

> *"Occasionally someone gets too hyped up if it's a new weight they go up more and then they get over aroused and their technique falls apart and we have to bring them back so we bring the weight back and concentrate on technique that gave success, you know chest up body tight just my cues and stuff like that. It's rare because we don't let it happen because we train safe all the way through so we are reinforcing all the same processes all the way through. But occasionally."*

The present example characterises the emphasis on the technical execution and movement form, termed process goals, rather than the actual performance outcome of the lift, thus termed performance goals (Kingston & Wilson, 2010). The emphasis towards the process goals has been reported to benefit performance over a season long intervention, with improvements attributed to factors such as increased self-efficacy and a greater control of cognitive anxiety (Kingston & Hardy, 1997).

> *"So again if you take weightlifting as an example, when an athlete is learning to weight lift if they are very focussed on the outcome goal of getting the bar from the floor to above their head than they will tend to lose the mechanics of the lift."*

Through focussing attention on the technical mechanics of the lift there is an emphasis on processes that would likely reduce the goal importance and subsequently be less stress provoking (Thomas et al., 2010). Whilst not universally established, the mechanism responsible for the reduced performance

stress is hypothesised to be owing to the level of control the individual can possess over the outcome of the performance (Jones & Hanton, 1996).

Pre-performance routines

There was evidence for the use of pre-performance routines prior to skill execution. The present example emphasises the use of cognitive and behavioural preparatory strategies in which the athletes are instructed to perform both breathing and visualisation strategies to regulate arousal intensity.

> *"I've tried just some sort of mental relaxation so that before we go out to throw we do some breathing exercises. Do some relaxation exercises and some mental feedback, you know biofeedback type stuff just lying relaxing, visualisation, visualising the throw. Think about where you want to place your left leg, where do you want to place your right leg and I know in certain situations there are people who can feel it and people who can visualise it. And usually it is the people who can feel the throw who are your good throwers not just being able to visualise what they are doing. They feel like they are inside the throw rather than looking at the throw from outside so we talk about that."*

It is pertinent to, again, note that the present individual provided an example relating to a competitive situation working in a technical role rather than specific within the strength and conditioning. Thus although it is encouraging that pre-performance routines are used, it is indicative that such techniques are either undervalued within strength and conditioning practice or that the there is a misunderstanding of how to apply such techniques with the specific strength and condition environment, again indicating a lack of crossover into the strength training environment. Pre-performance routines have been suggested to benefit performance through regulating arousal to the optimal threshold and focussing the

athletes attention to the relevant cues associated with the skill execution (Weinberg & Williams, 1998; Bertollo et al., 2009). The present example typifies how such requirements are achieved through cognitive, bodily, and behavioural interventions.

Modifying training environment

There was the suggestion that the physical training environment can be modified to reduce the stress experienced by the athlete

> *"It's usually asking the athlete is there anything we need to change in the environment at this specific time, you know what, can we put the squat rack outside in the sun. Or it's a wet and gloomy day in London is there any chance we can just get a couple of posters of Sydney on the wall while I do my weights. You know it might be something as simple as that."*

> *"The ideas they would suggest would be along the lines of what would make the athlete as relaxed as possible so the environment they are about to go into or what needs to be done to maybe change their environment."*

Organisational stressors in elite sport have received attention in which a reoccurring theme is the training environment (Woodman & Hardy, 2001; Fletcher & Hanton, 2003; Mellalieu et al., 2009). Specifically the monotonous and boring nature of training (Woodman & Hardy, 2001; Fletcher & Hanton, 2003) is regarded as a concern for athletes. It is therefore pertinent to highlight the simple measures in which the strength and conditioning coaches are endeavouring to adjust the training environment in line with the preferences of the athletes. Through removing environmental stressors, the possibility of such stressors triggering an anxiety response or other maladaptive behaviour is reduced.

Music

There is evidence to suggest that the strength and conditioning coaches are utilising music to manage levels of arousal. This can consist of reducing arousal and then, through modifying the type of music, increase activation to the appropriate level at the appropriate time.

> *"We live 60km from [city], what we have, over the years, encouraged our teams to the iPod™ so they have a selection of relaxing music that they would play in the bus on their way to the event and when they are warming up when they almost ready to compete on the track or field event if they feel that more arousing music is what they used to, that's the time to put on your arousing music, what we have found in the past that they are all putting on the arousal music at the beginning of the bus trip so by the time they got half way to the event they are already exhausted and worn out because they have been so aroused since they got on the bus."*

The regulatory properties of music are less well-examined than those of a stimulatory nature within sport. However, music has been shown to manipulate emotional states to alleviate anxiety and result in a relaxed state (Bishop et al., 2007). Such a mechanism for regulating arousal is hypothesised to be aligned with Rajeski's (1985) Parallel Processing Model through which attentional capacity is switched to the music stimulus and thus away from anxiety provoking cues. Music has previously been demonstrated to enable the athlete to disassociate away from unpleasant sensations, in particular at low work intensities (Copeland & Franks, 1991). Again the quote is promising in that the strength and conditioning coach is aware that music can be used to regulate activation, however the example provided typifies that, as in many cases, music is a strategy reserved for

competitive performance. Furthermore the use of the term "we" could imply that the support team promote the use of music rather than the strength and conditioning coach.

> *"It's pretty much pre-game arousal that I was referring to. Competition arousal, we use music and the calm approach, just have a quiet morning before, we want you to be up there with optimal arousal levels as you run out on to the field"*

4.4.2.2. Elevating arousal intensity

Modifying training environment

There is evidence that the practitioners are manipulating the training environment to manipulate the levels of arousal that the athlete may face.

> *"I think to psych them up if you are going to attempt a personal best in the gym the music stops and it is like all eyes on you and it sort of heightens you up a little bit so that is a way we sort of spike arousal perhaps. It's an interesting way of going about it but it is like lights are on you almost."*

> *"..whilst they are doing lifting they have 100% focus of everyone in that gym is watching and cheering them on and creating noise and giving them the basic arousal cues like come on, yeah strong, not technical cues, I give the technical cues, they give the arousal cues so they bang weight and make noise and stomp their feet and clap so we regulate arousal, especial at maximal lifts.."*

The audience effect is a well-established concept in which the presence of others influences the arousal experiences by the individual (Zajonc, 1965). Typically, in the presence of others, performance is facilitated should the task be well-learned, yet inhibits performance should the skill be difficult (Zajonc, 1965;

Strauss, 2002). However, the effect of the audience is likely to interact with the achievement goals of the athlete. To elaborate, individuals define competence with regard to a standard of evaluation which can be measured in relation to the critical perceptions of others (Elliot & Murayama, 2008).

Two prime achievement goals exist in which individuals exhibit either a performance approach or a performances avoidance goal. Therefore, with regard to the arousal tone, arousal may increase due to the presence of others however manifest as either increased anxiety or increased excitement. The direction of the emotional tone has previously elicited differences in performance in which excitement significantly benefited performance compared to anxiety (Perkins et al., 2001). Such awareness would be necessary for coaches to possess when utilising social facilitation tactics, especially when learning complex skills.

Pre-performance routines

Evident as a method of reducing arousal and focussing attention, preparatory routines were also reported to elevate levels of arousal during training.

> *"Yeah in the gym the use arousal states I'd say is a little bit different to what they would do competitively so again particularly with skiers: it's quite a technical sport so levels of arousal, optimal arousal for the athletes varies quite considerably and they will work with the technical coach on pre-race strategies to try and target that a little bit more but for me in the gym they're trying to push big numbers and it high states of arousal that we are trying to achieve so in terms of pre-lift routines we want to spend quite a lot of time trying to target different rates or different arousal levels we'd be using a bit of self-talk, music, we're shouting, raising their voice that sort of thing to increase those arousal states."*

Such a strategy was justified by the practitioner as there was the need to lift heavy weights, indicative that during lower intensity exercises such a psych-up strategy may not be employed, and that there is an appropriate time at which to utilise 'psych-up' strategies. The integration of self-talk, music, and behaviour indicative of a state of high arousal evidences a set of cognitive-behavioural arousal regulating techniques to elevate arousal intensity. It is unfortunate as there is little elaboration on the specific function of the self-talk, specifically, as a prime function of preparatory strategies is to focus attention and regulate arousal intensity (Weinberg & Williams, 1998; Bertollo et al., 2009). The present example also demonstrates the varying responsibilities of the athlete support staff with the context specific preparatory routines prescribed by different personnel.

Music

There was evidence that the strength and conditioning coaches are using music within training and in preparation for performances. The use of music was this time used to elevate levels of arousal during training.

> *"In terms of pre-lift routines we want to spend quite a lot of time trying to target different rates or different arousal levels we'd be using a bit of self-talk, music, we shouting raising their voice that sort of thing to increase those arousal states."*

Music has previously been credited with the ability to alter psychomotor activation, serving as either a stimulant or sedative (Karageorghis & Terry, 1997). Such psych-up strategies have long been endorsed by reviewers, however equivocal experimental conclusions exist, predominantly due to the idiosyncratic nature of music preference (Karageorghis & Terry, 1997).

Nonetheless assuming the presence of the combination of the right music and personal characteristics, arousal control is key motivational quality within the conceptual framework to predict motivational responses (Karageorghis et al., 1999). This is evident in qualitative study of athletes who have noted increased activation and improved affective states in athletes owing to music (Bishop et al., 2007; Priest & Karageorghis, 2008). Pertinent to strength and conditioning, the effect of pre-task music has been reported to increase grip strength (Pearce, 1981) and muscle power output (Chtourou et al., 2012).

It is also evident that music is being used in conjunction with other psychological strategies

> *"We also use a bit of music but we tend not to let the guys walk around the space like the transitional area with iPod™ in. We like them to soak up the atmosphere and realise that they here for an event but when it comes time to visualise which is usually about, we like to give it about 30min before a race we let them go away just by themselves to listen to some – not big heavy music it's more everyone got their own play lists so they listen to that for a couple of minutes and they come back out and start warming up."*

Such an example supports previous work in which the use of music has been suggested to aid the use of mental imagery, thus serving as a valuable pre-competitive routine (Karageorghis & Terry, 1997). Furthermore, the use of music has been found to increase the effectiveness of imagery strategies when performing a strength endurance task compared to the use of mental imagery alone (Karageorghis & Lee, 2001) .

It is interesting to note the contrast in the settings from which examples of elevating and reducing arousal emerge. It appears that there is more resonance concerning increasing activation within strength and conditioning settings than reducing activation. Thus it is apparent that within strength and conditioning there is the notion that arousal needs to be increased. This could be due to two factors, the increased preparatory activation associated with competition is likely to be greater than that observed in practice or the specific activities within strength and conditioning require increased arousal compared to those used in other athletic domains.

4.4.3. Skill Acquisition

The narratives of the strength and conditioning coaches revealed that of the strategies used, there was an emphasis on attentional focussing strategies to aid skill acquisition. This comprised of the use of self-talk to provide technical cuing, the use of mental imagery as mental rehearsal, and an emergent theme was the use of strategies to improve the kinaesthetic awareness of the athlete.

Self-talk

Despite self-talk being heavily used for motivational and confidence purposes, there is evidence to suggest that self-talk is being employed as a behavioural mechanism to shape technical skill execution. This includes the use of self-talk to for technical cuing.

> *"So it's more to embed coaching cues a little bit so if I find there is something in their back squat maybe I really want them to focus on their core so making sure they're strong through there, so rather than*

me saying it over and over is to get them to say it so they know what their one technical or their one cue during that lift would be to switch core on. To make sure you know I kind of find it helps it sink in more; they might get sick of my own voice so I like to use self-talk for that."

The present example uses self-talk cues to emphasise the correct movement pattern and muscle coordination patterns. The use of such a strategy to regulate technique and skill acquisition is in agreement with the emphasis which sport coaches place on technical execution (Hardy et al., 2010a). However such behavioural functions of self-talk are relatively under explored within the academic setting (Hardy et al., 2010a). Nonetheless technical cue words have been effective in facilitating motor skill acquisition (Anderson et al., 1999; Landin & Hebert, 1999). It should be noted that evidence exists suggesting that technical execution would be improved through the use of cues to focus attention externally with regard to both power output, improved muscle activation efficiency, and movement economy (Zachry et al., 2005; Wulf et al., 2010). The additional cues are thought to promote conscious interference to the determent of automaticity when executing the skill (Wulf & Prinz, 2001) .

"So we have key cues that we use on a lot of exercises, so a back press can be chest up, body tight blast off the chest drive with the arms we give them those cues and then as the bar is coming down we will say "blast" on the way up say drive to your eyes, eyes, eyes, eyes, and obviously blast at the bottom, explode. So if we can get them to focus on those thinks but one think at a time or one or two key things"

The present example supports the notion of instilling an external focus of attention using cue words. Such an approach utilises individual words that are representative of the movement kinetics such as "blast" that is associated with

rapid and forceful movement. Such an example is indicative that coaches are not providing excessive instruction regarding desired movement coordination, rather, using cues which associate with the desired kinetic outcome. Noticeably the use of reduced cues was regarded as beneficial when refining the athlete's technique.

> *"So if we can get them to focus on those thinks but one think at a time or one or two key things. Whatever they need to do. And just focus on what is important and away from what is not important."*

Such an approach is particularly relevant when shaping a skill, as according to human performance models of information processing (Anshel, 1990) there is a limited capacity to attend to information and as such coaching information should be limited to emphasis only the most important elements to avoid the danger of "paralysis by analysis" (Anshel, 1990, p. 73). Such examples have previously been evidenced by which the addition of supplementary technical instruction has failed to facilitate (Hodges & Lee, 1999) and inhibit skill execution (Wulf & Weigelt, 1997).

Imagery as a pre-performance routine

The use of visualisation received attention in which mental imagery techniques are integrated into a pre-performance routine.

> *"Visualising the throw. Think about where you want to place your left leg, where do you want to place your right leg and I know [that] in certain situations there are people who can feel it and people who can visualise it. And usually it is the people who can feel the throw who are your good throwers not just being able to visualise what they are doing. They feel like they are inside the throw rather than looking at the throw from outside so we talk about that."*

The use of mental imagery aligns with attentional focussing theory that states the individuals must deliberately concentrate on the desired outcome or the required processes (Moran, 2010). This preparatory strategy is likely to direct the attention towards the relevant cues required for successful skill execution. Such a hypothesis exists in support of the use of mental imagery to focus attention (Weinberg & Gould, 2010a).

The use of mental rehearsal is thought to influence motor performance through the concept that the performer can rehearse the temporal and special characteristics of an action and position task relevant cues associated with critical moments through the execution of the action (Feltz & Landers, 1983). Further support for employing preparatory imagery strategy exists with regard to the proposition that imagery using an external perspective and modelling provide essentially the same information relevant to motor programme generation (White & Hardy, 1995).

Kinaesthetic awareness

There was emphasis provided to the use of kinaesthetic indicators or performance when developing skills; that is the muscular and proprioceptive feedback associated with becoming more adept at the skill execution.

> *"Technique. Whether it feels good and should feel the sweet spot. So you feel the spring it is not a grind it should be fluid."*

During skill acquisition, the knowledge of performance provided by intrinsic feedback, in this case kinaesthetic awareness of the movement, is a valuable source of information from which to shape motor programmes. The strength and conditioning coach suggests that in addition to broadly used augmented feedback the athletes are encouraged to attend to the intrinsic feedback gained from performing an action. The use of knowledge of performance has previously been demonstrated to benefit skilled execution compared to knowledge of results (Zubiaur et al., 1999), however such findings are equivocal, noticeably when the task demands require increased cognitive input in relation to physical input or lack enduring benefits (Viitasalo et al., 2001; Mononen et al., 2003).

4.4.4. Integrating psychological strategies into strength and conditioning training

Whilst the particular strategies that strength and conditioning coaches utilise have been explored it is pertinent to examine the methods that coaches use to integrate psychological strategies into practice.

4.4.4.1. Within strength and conditioning training sessions

It is apparent that the majority of participants (10/19), thus the dominant emergent theme, indicated that they integrate the psychological strategies within strength and conditioning training sessions. This appears to take two positions, either a purposeful blocked-out period during the training session or an unstructured spontaneous approach.

This is the indication that during strength and conditioning sessions there is a structured educational phase that is then reinforced during physical strength and conditioning training.

> *"We'll spend some time I guess a little bit of blocked out time initially where we talk a little bit about the psychological cues that we are wanting to introduce in the same that we would introduce a training session with agility and talk about the aims and the goals of the session we try and integrate it into the physical side so a lot of concentration, like during the warm up for example"*

It is worth noting the development of the psychological skills and the opportunity provided to practice the skills during a warm up rather than even during the training itself. In this case, this demonstrates the need for the psychological skills to be developed in a progressive manner. Such an educational phase followed by an applied acquisition and practice phase loosely aligns with the principles of effective psychological skills training (Weinberg & Gould, 2010b).

This particular respondent typifies the responses of other coaches suggesting that the use of psychological strategies are used predominantly in an unstructured manor within the strength and conditioning physical session, as and when they are needed.

> *"I'd see that as a little bit more of the psychological side coming into effect you know pre-lift routines those kinds of things, using visualisation and self-talk, it's all integrated rather than being a separate session"*

The scope to practice psychological skills is encouraging; however the *ad hoc* nature of the psychological skills would suggest that the limited attention is afforded to the development of psychological skills within strength and conditioning.

Making particular reference to the educational stage of psychological skill development, one individual eluded to the spontaneous manner in which sessions targeting psychological development occur.

> *"I don't think I have any educational sessions but you know I am quite happy to sit and chat in the middle of a session or you know at the right time my practice will always be in a session but I am not unhappy if I don't do a lot physical training in that session."*

The quotation summarises the unstructured and informal approach to applying psychological skills within training, but also acknowledges the value of psychology within strength and conditioning to the point of sacrificing physical training. The extent to which such an approach caters for the reinforcement of psychological skill use in practice is unclear and evidences a polar approach to the systematic development of psychological strategies.

Two individuals specifically identified that it could be beneficial to integrate psychological strategies within the warm up during a conditioning session.

> *"So the reason I mentioned the warm up is the warm up is a period of time where you can't train them you can say do these skills in a warm up so you come up and say do lunges, so you are teaching them to lunge so you are teaching them movement skills if in that environment you can come up with some way of hiding mental skills within that*

environment then you are on to a winner because you are hiding mental skills. It's not like you are saying go away and spend half an hour at home on mental skills it's integrated in and you are doing it with it so that would possibly be a future direction."

The individual critically refers to the fact that during the warm-up, physical training does not occur, and as such would be the appropriate time to integrate psychological strategies. This also demonstrates that psychological techniques are not valued enough to be used during the training session as this could detract from the time available for physical training. Equally, there is the notion that athletes are unreceptive to psychology and consequently strategies have to be 'hidden' during the session. However, the value of integration of psychological skills in training is identified. This would support established research that states that psychological strategies used in practice are transferable to competition (Gould et al., 2002; Frey et al., 2003; Taylor et al., 2008) and implies that there may be a benefit incorporating psychological strategies in physical training rather than solely mental practice removed from the physical training session.

4.4.4.2. Dedicated session

The narratives suggest the perception that in order to develop the required skill, time is required in addition to, and away from, the strength and conditioning environment.

"That might be away from the sport itself so you can really sort of tap into your thought processes over it so you are completely out of the environment or maybe it would work even better when you are, if we could set up a station where they could do that there I'm not sure which one would be better or worse, I think anything is better than nothing"

This notion would support previous finding examining the development of expert athletic performance (Durand-Bush & Salmela, 2002). Such findings have indicated that in addition to structured mental preparation, athletes must also engage in psychological strategies during everyday activity to reflect on measures to maximise sport performance. However, the coach is unaware of the specific strategies to promote such an approach away from strength and conditioning in an organised manner and simply concedes that "anything is better than nothing".

There is evidence that there are individuals who are utilising dedicated sessions to facilitate the psychological skills of the athletes.

> *"It would be a dedicated sit down session. Then the next one would be a goal setting session where we like I say go into the long term, medium term and daily actions that they can do so it would be half an hour of maybe one session that we could go thorough certain goals and targets that they want to achieve."*

Such an approach is less common than the use psychological strategies as an integrated part of strength and conditioning training. Nonetheless, it is evident that the specific strategy is likely to influence the method of integrating psychological skills either as a standalone protected session or integrated within the physical training session.

For example, it is evident that coaches are integrating specific attentional focussing techniques and motivational approaches within the strength and conditioning session.

"Well in the way I do it is not separate. I give them motivation, goal setting reinforcement, it's just in our sessions, we teach players how to cue and give the cues, technical cues to their training partners"

Conversely, when devising training goals, coaches are adopting a devoted session that is removed from the strength and conditioning training.

"If I was going to implement the goal setting that would be a separate session at the beginning of the pre-season

Furthermore, specific cognitive strategies are also used during sessions but are separated from the physical aspect of the training.

"The self-regulatory and the cognitive function stuff that would be separate from the physical stuff, you know you might do that at the when you have finished."

This would suggest two factors, firstly the psychological aspect is undervalued in comparison to the physical component as it is only addressed once the physical work is completed The second evident factor is that in distinguishing the two approaches the practitioner appears to be attempting to equip the athletes with psychological skills yet does not appreciate the application of such skills within strength and conditioning.

4.4.4.3. Athlete involvement with processes

The extent that athlete involvement is included in the administration of psychological skills was a reoccurring theme providing ranging viewpoints, albeit biased towards providing the athlete with choice when devising psychological strategies. The narratives provide evidence that the athlete input can range from extremely limited athlete input through to a considerable contribution. Nevertheless, throughout the narratives there is an emerging theme that involving the athlete in the generation of psychological strategies is beneficial for training adherence.

> *"It's usually a number of questions that I fire out to them so they actually take ownership on how they wish to do it themselves. I don't say "hey, look you have got to get your arousal down" because that's telling them something and most people won't respond to someone telling them something"*
>
> *"It's more or less sticking with what they want for their goals and asking them what goals are relevant to them"*

Intrinsic motivation is fundamental to promoting athletes to develop psychological skills and strategies. Specifically, Self Determination Theory (Deci & Ryan, 2008) suggests the psychological need for personal autonomy. Therefore, the sense of initiative when devising training requirements is fundamental in providing the intrinsic motivational requirements to engage with the training programme.

With reference to the lack of athlete involvement with the decision making process, there is evidence suggesting that the perception exists that the use of psychology is synonymous with good coaching practice.

"I mean I find it hard to answer that question because I don't sort of feel I am using psychology in quotation marks, just I feel like I am coaching and you know I just feel that coaching well is with reference to the consideration as to the psychology to your athlete."

This notion is both encouraging and perturbing. Firstly it is positive that the coaching of the athlete caters for the consideration of psychological factors however the lack of athlete involvement in the division of psychological strategies and the rationale as to why particular technique are utilised may be neglecting critical personal needs (Deci & Ryan, 2008). Conversely, without the information detailing the reasons for adopting psychological skills there appears to be a lack of emphasis on developing an athlete's appreciation of the importance to develop psychological skills in a range of environments.

Furthermore, it is evident that coaches are withholding information to suggest the use of psychology; instead, the coaches integrate psychological strategies without the athlete associating the use of psychology within strength and conditioning training.

"And that rather than psych being explicit within those settings that it is implicit that it is included as part of behaviour and that the athlete isn't necessarily aware that we are doing this for our psych, or we are doing that about our arousal, or we are doing goal setting that actually they are just good behavioural practices that are imbedded in the S and C"

Such an approach would suggest that the perception exists amongst some coaches that it would be detrimental for athletes to be aware that they are

engaging with sport psychology practices within strength and conditioning settings. This notion would align with the concept that athletes exhibit a negative attitude towards with the use of psychology (Anderson et al., 2004; Martin et al., 2004). Therefore, the coaches endeavour to integrate psychology into training covertly without recognisable association between the strength and conditioning training and psychological interventions. Such an approach would negate the risk of strategy rejection based up negative stigmatism however would also neglect the benefits associated with the personal autonomy of the athlete (Deci & Ryan, 2008).

Concerning the involvement of the athletes in the development of mental strategies, the narratives of the strength and conditioning coaches suggest that such discussions occur in two ways. Coaches are engaging athletes in the discussion making process with the athletes in a structured and premeditated method.

> *"It would be a dedicated sit down session."*
>
> *"…that would be a separate session at the beginning of the pre-season…"*

Alternatively, strength and conditioning coaches engage using informal sporadic and spontaneous discussion.

> *"Not really only through discussion. Again a lot of it to me is an education a lot of them are using these psychological skills without them realising so whether I use the terminology as self-talk or just have a discussion about internalising certain messages to motivate or to clear their minds or what have you then it is more of an informal*

conversation rather than saying you know this is a particular skill that your using and I want to measure the benefit its giving you."

The use of athlete dialogue to promote internal motivation appears to be governed by the drive to address a concern in the immediate time frame rather than as part of a structured process. A structured process is inherent to the principles of psychological skill training (Weinberg & Gould, 2010b) and consequently the athletes may not receive the support from the strength and conditioning coach that is required to allow the acquisition of psychological skills.

4.5. Discussion

The present chapter endeavoured to ascertain the range of psychological skills and strategies that are being employed by strength and conditioning practitioners and explore the methods of integrating psychological techniques into the athletes training regime. It was apparent, via the use of thematic clustering, that the strength and conditioning coaches directed attention to three main areas. These comprise nurturing confidence, regulating arousal, and strategies to facilitate skill acquisition. Whilst not to distract from the qualitative and naturalistic nature of the chapter it is significant to identify that of the major themes, facilitating self-confidence was the most prevalent within the narratives of the coaches.

The perceived importance of self-confidence to strength and conditioning has previously been documented, with strength and conditioning practitioners regarding the motivation and self-confidence of athletes as most important characteristics (Radcliffe et al., 2012; Radcliffe et al., 2013). The current research would endorse such a view and it is unsurprising that the strategies perceived to be the most important received the greatest emphasis regarding the prescription of psychological strategies. Despite the consensus regarding the importance of a skill and the resonance of strategies to facilitate that skill, there are inconsistencies between the results. Specifically the use of strategies to develop self-confidence has previously been documented as ranking low in comparison to other strategies, receiving only moderate use (Radcliffe et al., 2012; Radcliffe et al., 2013).

Previously the disparity between the perceived importance of self-confidence and the frequency of usage of strategies to facilitate self-confidence was accounted for by the Strength and Conditioning and Sport Psychology Questionnaire (Radcliffe et al., 2012) in which the self-confidence subscale failed to totally address the broad ranging techniques that can be employed to develop athlete confidence. Additional possible reasons which may be hypothesised to account for the mismatch between the importance of self-confidence and the frequency of strategies to promote self confidence exist. It is possible that there was potential that the belief existed that self-confidence may be an enduring trait unaffected by application of strategies, or that there is insufficient knowledge regarding strategies to develop athletes' self-confidence.

The present study would suggest that one possible reason for the previous disparity would be the narrow focus of the Strength and Conditioning and Sport Psychology Questionnaire as when thematically grouped, based upon the context in which strategies were used, there was a wealth of strategies utilised to facilitate self-confidence that were indeed broader than those accounted for in the previous investigation. A further reason to account for the difference in results would be the fact that earlier research (Radcliffe et al., 2012) measured self-confidence and particular strategies such as goal setting as distinct, albeit related, constructs. Such vigilance in drawing conclusions from only quantitative methods has previously been discussed (Chapter Three). This instance in itself supports the importance of mixed methods design using both qualitative and quantitative research methods.

Within the present study, goal setting received considerable attention within the participant narratives. The current qualitative study, with scope to include context on the analysis, suggested that the manner in which goal setting is used would imply that goal setting is a key strategy used to facilitate the global construct of self-confidence. As a psychological strategy, goal setting is prevalent both within the present series of investigations (Chapter 3; Radcliffe et al., 2012; Radcliffe et al., 2013) and in the wider literature. For example, research has demonstrated that short-term goals are amongst the most commonly utilised psychological strategies in athletic training (Wiese et al., 1991) and physiotherapy (Hemmings & Povey, 2002; Arvinen-Barrow et al., 2007; Arvinen-Barrow et al., 2010), whilst the academic community suggest variations in goal setting strategies can account for athletic performance differences (Orlick & Partington, 1988; Durand-Bush & Salmela, 2002).

Previous investigations (Chapter Three) hypothesised that despite goal setting being a fundamental element of strength and conditioning, the use was informal in nature. It was suggested that it was likely that the strength and conditioning practitioners used a combination of long-term goals measured periodically as part of periodised training programme (Ebben & Blackard, 2001), with more informal short-term goal setting within sessions to serve as an aid to attentional focussing and motivation. The current investigation supported the predicted volume of goal setting however; the mechanics were predominantly centred on short-term goal setting with a more informal approach to the use of long-term goals, thus refuting the previous hypothesis.

Work has previously identified that long- and short-term goals used in conjunction resulted in a better performance than would occur should either strategy be used singularly (Locke & Latham, 1985). This was predominantly owing to the vague nature of the long-term goals providing little motivational impact within the here and now (Weinberg, 1994). Despite the widespread support for the effectiveness of goal setting compared to no goals, or a simplistic 'do your best' goal (Tenenbaum et al., 1991), there is a relative paucity of literature examining the optimal mechanism for integrating short and long term goal setting strategies (Kingston & Wilson, 2010).

Advantages of proximal goal setting relate to the increased controllability of short-term goals in which modifications can be made to ensure that the goal difficulty is appropriately challenging, whilst distal goals provide a direction in which to strive, however, motivational impact is governed by the incorporation of short-term goals (Hall & Byrne, 1988; Locke & Latham, 1990; Kingston & Wilson, 2010). The benefits of short-term goals are suggested to be related to the extent that proximal goals serve as an effective feedback tool which offer frequent opportunities for participants to sense achievement (Hall & Byrne, 1988). Such a suggestion aligns with the mechanics of self-efficacy, that previous accomplishments are the greatest moderator of athlete's self-efficacy (Bandura, 1986). Equally, comparisons with distant aspirations have the ability to destabilise self-efficacy and motivation should the disparity between the goal and the current level be perceived as failure or insufficient process (Hall & Kerr, 2001).

A comparison between the present investigation and earlier research concerns the use of mental imagery. Previous research has identified that mental imagery is neglected in relation to other psychological strategies (Arvinen-Barrow et al., 2007; Arvinen-Barrow et al., 2010; Radcliffe et al., 2012; Radcliffe et al., 2013). However, the present study demonstrated that strength and conditioning coaches are proposing utilising mental imagery techniques to benefit both athlete confidence and skill development and execution. It should be noted that despite being ranked low in previous studies with regard to other strategies, mental imagery strategies were still utilised a moderate amount (Radcliffe et al., 2012; Radcliffe et al., 2013). Reasons for the infrequent use of imagery strategies have been suggested to be a lack of perceived importance and difficulty in prescription of strategies (Wiese et al., 1991; Hamson-Utley et al., 2008). However, despite limited references to kinaesthetic 'feeling' were noted, imagery references were predominantly focussed on the visual component of imagery. Such an approach would indicate that there is still a considerable lack of understanding regarding the application of mental imagery.

The difficulty in prescribing mental imagery strategies is reflected in the current study in the misunderstanding of what constitutes mental imagery. That is it was apparent that practitioners were, with a few exceptions, utilising only the visualisation component of mental imagery. Thus it is likely that as well as difficulty in prescribing mental imagery techniques, the lack of knowledge would render such techniques ineffective and therefore reduce the likelihood of the practitioner pursuing such an approach as observed in the previous quantitative chapter.

An emphasis on the use of arousal inducing strategies was expected due to the fact that many athletes attempt to elevate arousal levels prior to lifting (Tod et al., 2005); strength benefits from employing arousal inducing strategies are observed (Shelton & Mahoney, 1978; Weinberg et al., 1980a; Tynes & McFatter, 1987; Tod et al., 2005). However, it was evident that an optimal level of arousal existed, beyond which performance would deteriorate. Consequently, strategies were reported to both elevate and reduce levels of arousal. The prominence of arousal regulation strategies, whilst expected does not reflect previous findings (Chapter Three) in which only a small consensus of strength and conditioning practitioners reported that 'arousal' was important. Interestingly, the need to relax was regarded as important by a larger proportion of practitioners (Chapter 3; Radcliffe et al., 2013) whilst the detrimental factor of inappropriate arousal was similarly documented (Chapter 3; Radcliffe et al., 2013). This would imply that rather than simple elevation of arousal, the practitioners perceive it is important to tune arousal to the appropriate level specific to the task and the individual. This notion was supported by the description of techniques to both reduce and increase levels of arousal.

The final prominent higher order theme was the use of strategies to aid in the acquisition of skill. This comprised instructional self-talk, mental imagery, and emphasis of kinaesthetic awareness. The use of such strategies fulfils key roles in the skill acquisition process. When learning and executing a skill there is a proposed finite attentional capacity that can be afforded to external and internal cues, therefore, preparatory strategies are important in focussing attention towards

the cues most relevant for the task execution. The use of effective attentional strategies can reduce the time taken to learn new skills (McClements & Sanderson, 1998). One reason is that self-talk and preparatory imagery could serve as strategies to facilitate prior identification of the most pertinent task relevant cues. According to the schema theory (Schmidt, 1975), motor behaviour is shaped by a memory trace of the stored motor programme, the image of acting.

It is possible that through using mental imagery techniques, the recall or the correct image of acting can be improved (McClements & Sanderson, 1998). However, through only subconscious control, or adopting an external focus of attention, skill execution and, pertinent to strength training, muscular strength and power is often improved (Wulf & Prinz, 2001; Wulf et al., 2010). Indeed autonomous execution of skill is indicative of expert skills performance (Csikszentmihalyi, 1990; Thomas et al., 1999).

In developing autonomous actions, it is important that the athlete develop awareness of what the movement should feel like. Termed the image of action (Schmidt, 1975), this motor image governs the extent to which immediate fine adjustments can be made to movement characteristics. In developing the image of action, it is important that the athlete is able to provide self-reinforcement of what the movement should feel like. Such specific feedback, the knowledge of performance, is based on kinaesthetic feedback (McClements & Sanderson, 1998). It is therefore encouraging that strength and conditioning coaches are employing strategies to direct attention to the kinaesthesis of the movement

however, the consensus offered little evidence of the widespread use of strategies to aid in motor skill acquisition.

The large emphasis on cognitive-behavioural strategies to promote confidence and regulate arousal is indicative that cognitive-behavioural strategies are important within strength and conditioning practice. It is however interesting that a relative paucity of skill acquisition strategies were presented. Such a lack of psychological strategies to facilitate in skill acquisition is surprising, not least because one of the prime responsibilities of the strength and conditioning professional is the teaching of exercise technique (National Strength and Conditioning Association, 2009). Furthermore, strength and conditioning coaches have been documented to spend the majority of their time teaching correct techniques (Brooks et al., 2000) and providing instruction during performances (Gallo & De Marco, 2008).

It is interesting that within the present study there is an apparent under-representation of skill acquisition strategies. It may be that with the apparent focus on the psychological constructs of confidence and motivation of the athlete (Radcliffe et al., 2013), the strength and conditioning coaches in the present study were more aware of specific techniques to influence confidence. Similarly, the regulation of arousal, often termed 'psyching up' (Shelton & Mahoney, 1978; Tynes & McFatter, 1987; Tenenbaum et al., 1995; Tod et al., 2003), is by name association a psychological factor. It is therefore possible that the majority of the practitioners will not have associated skill development as a psychological factor within strength and conditioning and thus naively withheld information. Such a

conclusion would indicate that there is a lack of understanding regarding the total role psychology can play within strength and conditioning. Additionally it is possible that a lack of understanding around the mechanics of skill acquisition, which go beyond the use of basic use of instruction, would provide greater scope to develop the instructional skill set of the strength and conditioning coach and is an area worth of focussing coach development programmes.

The broad range of strategies employed by practitioners who are representative of a large cross section of the strength and conditioning community would propose the question of what has shaped the coaches' use of such strategies. It could be suggested that such a broad use of psychological skills is indicative of predominantly experiential learning rather than formal education. That is to propose that the varied scenarios experienced throughout the career would result in the development of varied approached to cater for such differing situations. Existing qualitative research has identified that the changing environment in which strength and conditioning coaches work has resulted in the need for career-long development to meet the changing demands associated with strength and conditioning, with personal experiences being fundamental in the acquisition of skills (Tod et al., 2012). Other disciplines have evidenced an increased understanding of psychological skills with increased experience rather than formal instruction (Sullivan & Hodge, 1991; Jevon & Johnston, 2003). Similarly, as stated earlier (Chapter Three) it is likely that the integration of psychological strategies are governed by the extent success is experienced in implementing such skills (Creasy et al., 2009). Subsequent work will analyse the

specific sources of information which provide the knowledge and understanding to enable strength and conditioning coaches to integrate psychological strategies.

The range of strategies used by the practitioners is indicative of a cognitive-behavioural approach. The thematic clustering of strategies is indicative of a triadic model that guides the application of sport psychology within strength and conditioning. Thus, the key concepts within strength and conditioning practice appear to relate to the need to regulate arousal, the importance of shaping confident athletes, and, albeit to a lesser extent, the use of attentional focussing techniques to facilitate skill acquisition. It is pertinent to highlight such a triadic cognitive-behavioural model with scope to guide professional development towards the specific areas. The particular relevance of such areas is supported within the rather limited Psychology chapter within the *Essentials of Strength and Conditioning* (Baechle & Earle, 2008), in which emphasis is provided to arousal regulation, motivation, and attentional focussing (Hatfield & Brody, 2008) and more recently, and extensively, in the text specifically detailing the use of psychological skills training within strength and conditioning (Mellalieu & Shearer, 2012). It is therefore particularly pertinent to reinforce such concepts within the development of strength and conditioning practitioners. Such development programmes could be in the guise of case studies or using simulated scenarios that could provide inexperienced practitioners with focussed experiences to develop discipline specific skill sets.

The present chapter has contributed to the existing literature to explore the most prevalent psychological strategies employed by strength and conditioning

practitioners. The chapter has also offered critical appraisal of the techniques in comparisons with established mental training reviews. As suggested by Tod et al. (2012) it is only when the characteristics of effective coaches are known can assistance be provided to developing strength and conditioning curriculum. This present investigation provides important evidence to assist in the development of such training programmes.

Whilst the present chapter has evidenced the presence of a cognitive-behavioural approach to psychological interventions within strength and conditioning, it is important to consider that the importance to be flexible in meeting the individual training needs (Tod et al., 2012). Nevertheless, the present chapter has potential benefits for the strength and conditioning community through providing direction towards a suitable skill set for the coach practitioner to possess.

When examining the specific psychological strategies it was important to explore how specific strategies are integrated into strength and conditioning. This approach included the specific timing of psychological interventions and the level of athlete input in development of applicable psychological strategies. The involvement of the athlete in the decision making process is a critical component with regard to motivational consequences, especially pertinent as motivation is regarded as the most important of all psychological constructs within strength and conditioning (Radcliffe et al., 2013).

Fundamental to the intrinsic motivation of the athlete is the extent to which the individual experiences personal autonomy (Deci & Ryan, 2008). Thus, according to the Cognitive Evaluation Theory (Deci & Ryan, 1985) there is the need to provide an internal incentive, that is, that individuals perform an action that is within personal control and not governed by external factors. Termed the locus of causality (Deci & Ryan, 1985), an individual is motivated when they execute an action on the basis of *wanting to* rather than *having to*. Athlete involvement at the early stage of identifying psychological strategies is therefore important in instigating facilitative level of intrinsic motivation.

Such an awareness of the need to include the athlete in the planning stages of psychological strategies is encouraging, with a bias toward the inclusion of the athlete rather than developing and prescribing strategies independent of athlete input. It is apparent that the instances when the athlete is not party to psychological techniques and the associated rationale for such strategies is owing to the perception that the athlete would respond negatively to the inclusion of psychology. Such an observation has been noted previously (Anderson et al., 2004; Martin et al., 2004) and is indicative that in particular instances within strength and conditioning a stigma still exists.

The timing of the integration of psychological strategies was explored in relation to the strength and conditioning training session. Two themes emerged suggesting that psychological interventions occurred either during the strength and conditioning session or in a dedicated separate session. Concerning the integration of psychology within a conditioning session, it was apparent that there

were two approaches, either a purposeful defined period during the session or an unstructured and spontaneous approach.

The spontaneous integration of psychology within sessions was prevalent amongst coaches, indicating an unstructured view towards applying psychological strategies within strength and conditioning. Such an approach is polar to the recommended systematic education and acquisition of psychological skills and as such is likely to be a sub-optimal approach. Nevertheless the application of psychological skills during training is encouraging with regard to the association between skills use in practice and skill use during competition (Gould et al., 2002; Frey et al., 2003; Taylor et al., 2008). The spontaneous inclusion of psychology is likely to be due to the lack of time available with the athlete. With demanding time constraints, it is likely that the physical training takes precedence. A second potential reason would comprise the perceptions of the practitioners and the myth the psychological skills can be quickly acquired and provide quick fix solutions.

Whilst the emphasis was on the spontaneous inclusion of strategies, a selection of respondents indicated the use of purposeful sessions distinct from the training setting. This approach would be useful in the early stages of psychological skill acquisition as attention can be provided to the development of skill without the potential for distractions during the strength training environment prior to application and practice of the skills within the training setting.

An interesting observation concerning the methods of including psychological skills training was that particular skills were introduced away from

the training session, yet others were introduced during the strength and conditioning setting. This would indicate that particular skills are suited to being integrated during the training session whilst others may be better suited to be introduced away from the training setting, for example, goal setting was the most used strategy away from the training environment.

It is noteworthy to suggest that as goal setting was the most frequently utilised technique (Radcliffe et al., 2013) coaches have greater awareness of utilising goal setting techniques in a variety of settings whilst the incorporation of other techniques are still in relative infancy. Consequently, the coaches may be naive as how particular techniques can be introduced or promoted away from the immediate physical conditioning setting. This chapter highlights the need for professional development work to be provided to develop the awareness of the use of psychological interventions within the applied strength and conditioning environment.

4.6. Recommendations for practice

The present chapter has identified key areas pertinent to the development of integrating psychological skills within the skill set of the strength and conditioning practitioner. These are summarised as follows:

- Education programmes should focus attention on developing the awareness of strategies to develop confidence, regulate arousal and facilitate skill acquisition.
- Similarly training is required to educate and demonstrate methods in which psychological skills should be implemented either within a training session or introduced and reviewed away from the specific strength and conditioning training session.

CHAPTER FIVE

5. A qualitative analysis of the psychological responsibilities of strength and conditioning practitioners and the perceived importance of psychology of strength and conditioning practitioners

5.1. Chapter overview

The previous chapters (Chapters Three and Four) identified that specific psychological skills were utilised more than others and also identified that the strength and conditioning practitioners lacked in the understanding of the application of psychological skills and strategies, yet were attempting to utilise such strategies. The present chapter employed a qualitative approach, using semi-structured interviews of the strength and conditioning practitioners and interpretive phenomenological analysis to examine the perceived role and responsibilities of the practitioners. Furthermore, despite the apparent lack of requisite skills and also the preference of particular psychological strategies (Radcliffe et al., 2013), this chapter examines the perceived importance and the main purpose of psychology from the strength and conditioners' perspective. This chapter will also endeavour to ascertain from where the provisions of psychological support originates within the athlete support and coaching team to ascertain the influence that the strength and conditioner has on the psychological support and interventions of the athlete.

5.2. Introduction

The role of the strength and conditioning practitioner is a recently developed and increasingly complex one. The role comprises various responsibilities ranging from adopting suitable advanced training methods through to logistics and organisation (Massey et al., 2002; Massey et al., 2004; Massey et al., 2009). Contemporary work has explored the responsibilities of the practicing strength and conditioning professional in observing the development of role responsibilities as practitioners' progress through their careers (Tod et al., 2012). It is suggested that as a 'helping profession' (p. 858) strength and conditioning practitioners should use more 'softer skills' (p. 855) appreciating the client-practitioner relationship in which coaches have been observed to adopt a counselling perspective in addition to their responsibilities (Tod et al., 2012).

Despite the evident importance of psychological techniques within strength and conditioning, literature associated with applied interventions is scarce. Recent work (Radcliffe et al., 2012) endeavoured to both quantify the psychological skill use in terms of frequency and also in terms of psychological characteristics deemed to be facilitative or debilitative to athlete performance. The work concluded that psychological skills are utilised, but to varying extents with a greater utilisation of specific interventions such as goal setting compared to lesser-used skills such as mental imagery. The work also observed that there was consensus amongst strength and conditioning coaches regarding the importance of confidence and motivation.

Quantitative research is valuable in quantifying the frequency in to which practitioners are utilising psychological strategies. However, the research is limited in exploring psychology directed at the role and responsibilities of the strength and conditioning professional. Equally, the quantitative approach provides little scope for determining the perceived importance and main role of psychology within strength and conditioning. Thus another methodological approach is required to explore the reasons and deeper understanding of psychology within strength and conditioning.

To explore practitioners understanding at a deeper level, a phenomenological approach will be used to examine the roles which may be implicit within the narratives and omitted using different methodological approaches such as content analysis. Thus the use of interpretive phenomenological analysis will allow the exploration of deep and underlying responsibilities of the strength and conditioner which may only emerge at an implicit level. Furthermore the use of interpretive phenomenological analysis is well suited to the current research questions owing to the notion that many responsibilities acquired via the experience of the practitioner. The analysis will explore such lived experiences which formulate the perceived role requirements possessed by strength and conditioning practitioners.

As a strength and conditioning specialist progresses through their career various roles and responsibilities are adopted (Tod et al., 2012). Particular responsibilities are often regarded as miscellaneous within the strength and conditioning specialist repertoire, if reported at all (Ebben & Blackard, 2001;

Ebben et al., 2004; Ebben et al., 2005; Simenz et al., 2005; Duehring et al., 2009; Massey et al., 2009). As a result, notwithstanding the need for "softer skills" (Tod et al., 2012, p. 855), little is known regarding the specific psychology-related responsibilities of the strength and conditioning specialist.

Variation exists on the precise responsibilities of the strength and conditioning professional with regard to psychological skills. For example only the criteria for the certified strength and conditioning exam states the requirement of *"psychological skills to enhance training and/or performance of the athlete"* (National Strength and Conditioning Association, 2009, p. 26) whilst other pathways to recognised status fail to clarify of the role of psychology within applied strength and conditioning work.

When exploring the inclusion of psychological skills and strategies with regard to facilitating the development of strength and conditioning as a discipline, it is important to examine the underlying motives shaping and individuals drive to incorporate such skills. For instance despite the requirement outlined by the NSCA (2009), the main purpose of sport psychology within strength and conditioning is yet to be understood from a practitioner's perspective. It is only when the fundamental purpose of psychology is identified that the universal psychology specific roles be defined. The purpose of this chapter is to provide the required clarity on the roles and responsibilities of accredited strength and conditioning practitioners.

Academic interest in the perceptions of various disciplines towards psychology, research has focused on quantitative research methods such as survey design (Brewer et al., 1994; Ford & Gordon, 1998; Ninedek & Kolt, 2000; Hemmings & Povey, 2002; Arvinen-Barrow et al., 2007; Hamson-Utley et al., 2008; Arvinen-Barrow et al., 2010), with few studies using qualitative methods of semi structured interviews (Orlick & Partington, 1988; Dunn & Holt, 2003; Devonport, 2006; Arvinen-Barrow et al., 2010).

The volume discrepancy between qualitative and quantitative research is surprising given that qualitative research explores in-depth and underlying perceptions towards psychology and would serve as providing an explanation of the frequency and the specific context in which psychological strategies are employed. To date the only qualitative research into psychology use within strength and conditioning has been using observation (Massey et al., 2002; Gallo & De Marco, 2008). For instance Gallo and De Marco (2008) identified that coaching behaviours with an emphasis on instruction and feeback mechanisms were modifiable while Massey et al. (2002) concluded that a prevalent strategy was verbal encouragment, termed hustle. Such observational studies provide little insight into the specific psychological interventions, the rationale behind them, or the perceptions of the practitioners themselves. Despite evidencing that coaching behaviour can be modified the existing qualitative research offers little more than data concerning predetermined communication strategies and fails to examine the underlying rationale to account for the use of psychology within strength and conditioning. Therefore in line with the suggestion that the research can serve as a foundation to improve the profession and more research is required (Massey et al.,

2002), this study aims to explore further the specific psychological responsibilities of the strength and conditioning practitioner.

The aim of the present chapter is to adopt an interpretive phenomenological approach (Smith & Osborn, 2003) to explore strength and conditioning practitioners' personal experiences of using psychology within applied practice. Such an approach has previously been successfully used to examine the perceptions of physiotherapists towards psychology exploring real life experiences of applying psychological interventions (Arvinen-Barrow et al., 2010). This will consist of identifying trends that propose why psychology is important within strength and conditioning, and exploring the adopted roles of the strength and conditioning coach in integrating a psychological perspective into applied practice.

5.3. Method

The method followed the same protocol and the same participants as previously described in Chapter Four that is exploring the presence of themes aligned with the objectives of the current chapter using the same data set yielded from the same interviews as used in Chapter Four.

5.4. Results

5.4.1. Results Overview

The analysis provided a broad range of topic areas that are pertinent to explore with regard to the use of psychology within strength and conditioning. The areas comprised the perceived role responsibilities of the strength and conditioning practitioner and the individuals responsible for the provision of psychology. The main purpose of psychology was documented and also the perceived importance of psychology within strength and conditioning.

5.4.2. The responsibilities of the strength and conditioning practitioner

Notwithstanding the logistical and physical training tasks, the psychological responsibilities of the strength and conditioning professional demonstrated the ranging and complex nature of the role. Over half (61%) of the respondents reported that their position as a strength and conditioning professional required additional psychology-orientated responsibilities. A variety of roles emerged at both an explicit level and at the implicit level within the narratives. Each of the resonant emergent roles pertinent to the discipline of psychology will be addressed in turn in the subsequent results section.

5.4.2.1. Provide emotional support

It was apparent that the strength and conditioning professionals believed that they fulfilled a counselling role through which they would provide emotional support to the athletes that they worked with. Three experienced coaches

documented the perception that the strength and conditioning coach can provide emotional support:

> *"Sometimes they can get so focussed on just one thing, their performance, they forget that they are human beings and they have got a whole life and sometimes I just make them realise you know what ok you have messed up there but get the whole picture of what you are doing."*

The practitioner believed that they have a role that extends beyond the physical training of the athlete and that they can take responsibility of the psychological well-being of the athlete with regard to other aspects of the athlete's life. Such a notion aligns with the concept of developing soft skills (Tod et al., 2012) and that the strength and conditioning coach perceived their role to extend to providing emotional support to athletes.

> *"Some of them come and they start crying because they have got no one else to talk to. You need to be able to relate and understand [and] be compassionate to that person to make them understand that it is not all about that. Be almost a counsellor, that's really important."*

There is indication that a counsellor is a specific role, however the strength and conditioning coach believed their behaviours could be viewed as counselling. This again morrors the work of Tod et al. (2012) which suggests that with experience the strength and conditioning coach adopts the role of coach with athletes seeking an individual with whom to share sensitive information. It was apparent that the relationship built between the athletes and the strength and conditioning coach can result in the perceived use of the strength and conditioning

practitioner as a counsellor or to provide emotional support with regard to aspects unrelated to the specific strength and conditioning environment.

> *"Probably I am here. Because you always get the athletes that don't make the England squad and they ring you up and you have to say something so yeah they'll come to you with it."*

It is also implicit that in some cases this is a reluctant role whereby the practitioner feels that they have to say something. It is likely that such confidence in fulfilling the role is aligned with the experience of the strength and conditioning coach. As has been previously stated the ability to provide an informal counselling service is governed by the experience of the coach (Tod et al., 2012) This could indicate that they are unaware of how to fulfil that role and also that they are unaware of the need to refer the person to a more appropriately qualified individual. It is possible that the strength and conditioning training environment serves to enable the athlete to disassociate away from stressful situations and consequently the environment itself may be conducive to the strength and conditioning coach being perceived to be able to offer emotional support.

> *"I am fed up I just split up with my boyfriend" and in situations like that normally what I say is that any outside stressor like that, athletics is a really interesting side issue for stress, because the minute you step the over the door to the weight room, set your foot inside of the circle that is you time. That is something you can do for you. Nobody else can influence that, just you, so spend that hour bettering you, forget it, and leave it out the door."*

It is clear that the perceptions of the strength and conditioning coaches are different. It is evident that there is the adopted responsibility of providing emotional support which is often unrelated to strength and conditioning, however there is a lack of evidence to support the notion that practitioners are providing a true counselling service and a misperception of counselling practice is evident.

The role of the strength and conditioner is clearly complex in which responsibilities are being adopted that are removed from the physical preparation of athletes. The counselling discipline is specialised and separate from that of psychological skills training and indicates that a selection of practitioners perceive that they are able to use additional so-called soft-skills (Tod et al., 2012) whilst there is the misperception that they can offer a service akin to counselling. It is clear that in addition to the misunderstanding of counselling being merely emotional support rather than as a standalone specialist discipline, there is the temptation to cross role boundaries and practice outside of the competencies of the accredited strength and conditioning professional, with the exception of one counselling qualified strength and conditioning practitioner.

It was equally implicit that in providing emotional support, there was uncertainty regarding referral. Indeed the implicit reluctance would suggest the omission of a clear referral system or that it is the responsibility of the strength and conditioning practitioner. This identifies important areas for professional development in positioning referral mechanisms and educating in the ethical boundaries within professions.

5.4.2.2. Mentor

In addition to the complex role of acting as a counsellor, two coaches recall instances in which they have adopted 'softer skills' in a mentoring role of the athlete during a challenging situation.

> *"Got a young footballer she's a cracking kid. She's playing in a team where there is a seasoned international, a world class player, so I sat down with her and was like where am I going with this, what am I trying to do?. She was like I am not going to get in the team because this person is ahead of me so I tried to build her ego up a bit and make her feel a lot better about herself and get her to think about the positives in her performance. She is a cracking player and then giving her examples from the men's game and saying look at this person look what they did to that seasoned international and they have come through so it could be you."*

It is clear that the strength and conditioning practitioner is afforded the opportunity to work with players away from the team environment. Equally there is evidence of role ambiguity with the use of psychological interventions which are unrelated to the specific strength and conditioning objectives. There is the notion that by working in an environment removed from the team setting the practitioner is able to address athletes on an individual basis. This provides opportunity for engagement is psychological issues for example the use of vicarious modelling (Bandura, 1997) to elevate confidence levels. The strength and conditioning practitioner is offering a supportive role in addition to the physical preparation of the athlete in which the support is often grounded on the coaches own previous experiences.

> *"Again I wouldn't say there is anything ground breaking in that just literally have a conversation in that trying to get their side of the story*

trying to put over some perspective from what my experience has been."

The practitioner adopts a mentoring approach; in relating their experiences to those of the athlete it is emphasising the importance of two-way communication. However, despite the use of the two-way communication it is apparent that, at an implicit level, there is a devaluation of the use of effective communication.

There is also indication of the value that practitioners can offer with the availability of the one to one training environment detached from the goals of the team coach. There is a perception that strength and conditioning staff may perceive the role of other staff to be working at solely a team level and neglecting individuals within the team. Existing research has identified that a distinguishing factor between experienced and lesser experienced coaches is the ability to build a positive rapport with the client (Tod et al., 2012). Thus, this potential misperception may account for the strength and conditioner adopting a mentoring role in which they work on an individual basis with athletes. It is possible that the misperception of the strength and conditioning coach, especially when removed from the team organisation, results in them trying to fulfil roles outside of their primary responsibilities.

"And I also give them a task of in training, and bearing in mind your sport specific coach wouldn't have this conversation with her because your sport specific coach is perhaps happy with the person who is on the team whereas I am just working with this individual so I am saying you need to get next to this person in training and do everything they do but better. And she has responded really well to that."

Again, in this instance the perspective of the strength and conditioning coach is centred on individual development. This suggests the instrumental role possessed by the strength and conditioning coach in facilitating the progress of players who are perceived to be neglected within the team setting. This implies the important motivational role of the strength and conditioner adopting a mentoring position. In addition to demonstrating the importance of the strength and conditioning coach as a motivator it is evident that there may be confusion on role conflicts between coaching staff and suggest the need for increased collaboration between coaches and strength and conditioning specialists.

5.4.2.3. Shape team dynamics

One individual recited an occasion that stated that the strength and conditioning coach could play an influential role in shaping the mentality of the team.

> *"The beginning of the off season an example was when I first got out to where I am at in January with volleyball it was my first interaction with the team was with weightlifting and what I actually decided to do was do circuit training for about two weeks. The circuit training was time based and it was just one thing, onto the next, onto the next, and the big thing I stressed to the girls when I was there was that I am using this to see who is the leader, who is going rise up, and see who can push through hard times and stuff like that."*

It is evident that beyond the physiological conditioning of the players the strength and conditioning coach can create an environment through which team mentality can be shaped. The coach sees the diverse role functions and it is

evident that they want to have more responsibility for shaping and influencing team dynamics. A second individual recited an occasion when he was informed that it is the role of the strength coach to help shape team mentality.

> *"I know that it is important and now that I think about it I do remember talking to one of the head football strength coaches that I worked with and he mentioned to me that the role of the strength coach is also that mentality of the team how aggressive they are in the weight room and how that applies on the football field so I mean that might be something I want to keep in the back of my mind. I've always kept that in the back of my mind too."*

It is therefore evident that the strength and conditioner is positioned to offer individual support as well as the opportunity to foster a productive team environment. However this would also suggest that the strength and conditioner is crossing boundaries and addressing psychological strategies that are used during the competitive environment in addition to the strength and conditioning setting, again this indicates a level of role ambiguity in the psychological practices of the strength and conditioning coach.

5.4.2.4. Develop a 'rounded athlete'

In addition to providing emotional support, one coach related to the requirement of psychological skills to support rounded development of the athlete.

> *"I think that's an important part of the strength and conditioning coach's' job you know you're not just there to get them to lift more you're developing an all-round athlete and that includes psychological training"*

It is clear that the role of the strength and conditioning practitioner is important in creating an athlete that possesses a spectrum of skills in addition to those specific to strength and conditioning. This indicates that the strength and conditioning coach perceives their role to extend beyond that of the traditional physical preparation for sport performance and that they are required to work towards equipping the athletes with psychological skills.

5.4.2.5. Receive and relay information

Two of the 18 practitioners stated that they fulfil the need of both the athlete and other coaches to receive information. The strength and conditioning practitioner identifies how the role results in working to relay information for the athlete to other support staff and similarly from the support staff through the athlete.

> *"I think I mean a percentage of the S and C coaches I know are glad to use it and maybe along the lines of instead of having another person in there maybe allowing let's say the sport psych to come in and watch a couple of sessions whereas the S and C coach can deliver the athlete because has got a higher rapport with that athlete. Yeah so it's like a message system you could say"*

The coach perceives that they are able to develop a strong rapport with the athlete which positions them well to receive and relay information from the coach to the athletes and *vice versa*. Again the ability to develop athlete trust is viewed a crucial skill developed through the career of the strength and conditioning coach (Tod et al., 2012)

"We don't have a full time psychologist with the team so again a lot of the bits and pieces we're kind of doing ourselves and we communicate regularly on things we use in training."

"We sort of communicate back and forth on ways we're going to talk to him and deal with him, he's still a very young lad, he's only 14 so getting across to him that his development is long term."

Similarly, the relay of information from a sport psychologist is a responsibility of a number of the practitioners. It is likely that when delivered by a non-sport psychology-titled professional such as the strength and conditioning practitioner, who has a greater rapport with the athlete, there is an increased receptivity to psychology interventions and thus increasing the potential opportunity for psychological interventions. This is likely owing to the stigma associated with seeing the support of psychology tilted professionals (Van Raalte et al., 1990; Linder et al., 1991; Van Raalte et al., 1992; Martin, 2005; Zakrajsek and Zizzi, 2007; Zakrajsek et al., 2011). This also serves to illustrate the importance of observing the behaviour of the athlete to allow the effective conveying of information to allow other athlete support to make appropriate recommendations.

The importance to conveying information is evident however, an additional communicative responsibility has been alluded to.

"I think from a conditioning perspective from my role because I am not necessarily involve with selection"

"I am kind of a sounding board for guys; I am a little bit neutral in that respect so they will often engage with me. It's more being a sounding board because they know there will be no repercussions from kind of a neutral person they are talking to almost just talk to

them from a common sense perspective potentially play devil's advocate if needed lot of that is just to rationalise what their thoughts are to try you know get them to understand."

The strength and conditioning coach indicates a reluctance to be involved with the selection process, to the extent that there is a fear of engagement. Therefore the practitioner is removed from the team selection process and as a result, athletes will feel more comfortable sounding thoughts to the strength and conditioning coach. Thus appearing impartial is clearly important in gaining the respect of the athlete and places the practitioner in a valuable position to offer psychological support should the requisite competencies exist. Indeed the team setting, potentially fraught complex social dynamics and increased performance related incentives are documented as a source of conflicts within the team (Olusoga et al., 2009). Thus the removed position, when combined with the practitioner's ability to develop a positive relationship positions the strength and conditioning coach effectively to implement psychological strategies should the requisite knowledge exist.

5.4.2.6. Provide support in the absence of a Psychologist

One individual explicitly stated the role the strength and conditioner adopts in the absence of a psychologist.

"It's very important, depending on if they have got a sport psychologist that could get into that then use techniques to get them back on the pitch. Then maybe not as much, but a lot of athletes don't tend to have that kind of support, so as an S&C coach it kind of lands on you to be able to provide that psychological information and techniques to get them back onto the pitch. So in that instance I suppose it would be really important."

In the absence of a sport psychologist the strength and conditioning coach has the opportunity to practice psychological interventions. It is evident that the strength and conditioner is required to provide psychological skills in the absence of the sport psychologist. However it is apparent that this is a role adopted in the absence of the psychologist and, depending on perceived competencies, the coach may demonstrate a reluctance to provide psychological skills training should the psychologist be present.

The adopted roles of the strength and conditioning coach appear to be shaped by the position they adopt within the coaching organisational structure. Strength and conditioning coaches have frequent contact with the athlete often away from the pressures associated with team selection (Olusoga et al., 2009). This results in the facilitation of a positive report between athlete and practitioner. Thus, the strength and conditioning coach is in a valuable position to promote the use of psychological skills due to the frequency of athlete contact and generation of rapport. Nevertheless, it must be noted that whilst the position in the club provides opportunity this should not lead to the application of psychological interventions should the practitioner not have the required competencies.

5.4.3. Key contributors of psychology support

Over 50% of the participants indicated that there was a key individual who offered psychological support. These consisted of the head coach, psychologist or the strength and conditioning coach. The majority indicated that it was the coaching staff, such as technical coaches or head coaches that were the greatest

provider of psychological skills it was evident that the coaches' position within the organisation structure and relationship with the athletes was a determining factor rather than any formal accreditation.

> *"The head coach is almost like a father figure to a lot of the guys. Our team is very young professionally their average age is 22 and he was the coach 4, 5 years ago when they were 17, 18 so he have been with them for a lot of that. Those that have played in the squad for 4 or 5 years already so it's like a second father figure to them, so he definitely offers the most support to them. That is part of his role the mentoring."*

It alludes to the notion that rather than the prescribed role responsibilities that an individual has, it is the adopted social position within the team that influences the use of psychology within sport. Having a perceived paternal role affords the greatest opportunity for providing emotional support. It is evident that this is grounded in the relationship developed over time and the athlete's perception of who can provide a surrogate nurturing role. Again it would appear vital to develop rapport with the athletes (Tod et al., 2012).

It is evident that with regard to social support the prescribed role does not necessarily result in an increased use of psychology. Rather the position may allow supportive behaviours be perceived as being nurturing:

> *"It would probably be the technical coach I would say. Because the technical coach would know technical stuff but also tactics so I think you have got to distinct these two ways. If you think of psychological support purely focussed on performance then it would be technical coach but if you think it is psychological support focussed on athlete development as a whole you would probably say everyone, depending on how much contact time you have with them you can have a*

significant influence. I know my athletes come in here four or five times a week because that is what they do, but they only train with the technical coach twice a week. I know can have a big influence on them regards their development."

The distinction is made as to the type of psychological provision. Distinctions are made between sport performance and personal developmental psychology suggesting that different personnel are better equipped to provide particular modes of psychological support. The head coach is likely to have the greatest influence due to having the knowledge to provide specific performance-related skills, however the provision of support is not limited to that which the technical coach can provide. It is evident that the support team can play a valuable role in developing the athlete with the contact time being a determining factor.

The strength and conditioning coach who has a greater contact time than the general or technical coach can play a critical role in the holistic development of the athlete. For instance it is through experience that important interpersonal skills are developed (Arvinen-Barrow et al., 2010; Tod et al., 2012) Equally the quote typified the imbalance in the perceived importance of psychological interventions between competition and practice settings with the head coach said to provide more performance related interventions relating to the skills required in competition. Whereas the strength and conditioning coach failed to identify that there are performance-related psychological interventions pertinent to strength and conditioning.

The concept that the provision of psychological skills is the responsibility of the sport coach is evident. It is apparent that the strength and conditioning coach is reluctant to undermine the role of the head coach.

> *"Personally I think that you can and that could play an important role personally however I kind of look the way practice is that I don't really think it's my role to talk too much about the way an athlete competes because I think that is the role of the sport coach. I wouldn't kind of I wouldn't really feel comfortable getting into too much of an in-depth conversation with the psychology of the way that that athlete competes having said that I do hope that in the weight room they are developing performance skills which are helpful for them when they get into the competitive arena."*

This is indicative that there is the potential for role conflict should the strength and conditioning practitioner implement psychological skills. Reasons for this may relate to the perception of key members of the coaching staff who have authority over coaching directives (Pain & Harwood, 2004; Zakrajsek and Zizzi, 2007; Zizzi et al., 2009; Zakrajsek et al., 2011). Thus conflict could arise should authoritative staff members not perceived psychological support strategies to be an efficient training method.

In relation to competence, there is the indication that the strength and conditioning practitioner does not feel that they are as proficient employing psychological techniques compared the perceived aptitude of the sport coach. Perceived confidence in the ability to effectively implement psychological interventions has previously been identified as a barrier to the use of psychology (Sullivan and Hodge, 1991). This is an indication that there are role boundaries as to who is positioned to offer psychological support as mirrored in athletic training

where practitioners believed the prescription of psychological strategies to be outside their professional remit (Stiller-Ostrowski & Ostroewski, 2009). However such a view is not universal:

> *"I'd say it's down to the technical coaches really or if there is a manager the person who gives them the skill side of things. So they [the athletes] have to have confidence to do the skill rather than having confidence to run at a certain speed, or jump at a certain height."*

The nature of the coaching objective appears to direct towards who has the responsibility to provide psychological skills. One individual stated that within the physical conditioning domain there is not the requirement of psychological strategies as would be are present when focussing on skill acquisition.

There is apparent conflict in who is deemed the most suitable person to provide psychological skills training to athletes.

> *"I would probably say the S and C coach does because they have probably come up through a sport science background and they have witnessed that aspect of psychology. The others may do things psychologically that they have not necessarily read but they know that it is something that works or it is something that they did when they played the game or the sport. And the rehab as well I don't think they go through much psychological training, I might be wrong, they might in terms of injury and recovery, but I'd say the main bulk is the S and C coach because they have had the experience of it."*

There is support that the strength and conditioner may feel that they are best equipped to provide psychological skills training due to their formal training and development. It is evident that the education background and underpinning

knowledge gained in formal education has resulted in the opportunity for psychological interventions despite not being formally qualified to practice psychology.

It was also identified that the sport psychologist is the main provider of psychological skills and implied that the use of role boundaries is inconsistent within the discipline. One individual indicates caution that without sufficient training the use of psychological techniques may be debilitative to the athletes:

> *"I think that, I would hope that most of the people you are working with are aware that they have an impact on the mentality of their athletes. I think I am probably a bit too aware of it and certainly there are practitioners that you work with who are less aware. I mean I guess the main person who would be prescribing like mental skills and strategies to an athlete is the sport psychologist."*

It is evident therefore that the perceived efficacy in providing psychological skill contributes to the strength and conditioning coaches intention to use psychological factors that they do not feel qualified to utilise psychological techniques.

Equally, the sport psychologist is the main provider when there is limited contact between the strength and conditioning practitioner and the athletes.

> *"I've never done those before again probably because of the minimal contact with the players and certainly when I was working on my placement at the English Institute of Sport they had a team of sport psychologists that I'm sure dealt with all these things anyway. In my own experience as a coach it's not something that I've necessarily had to really do much of myself but again as my responsibilities increase,*

as I progress through my career, I guess it's something that I would end up using at some stage especially where they haven't got that additional sport psychology support in place."

The responsibly lies with the psychologist when working within an institution, which suggests that when there is a psychologist available the implementation of psychological strategies is the sole responsibility of the psychologist. This is more likely within national programmes but may not be present at lower levels. The presence of an available psychologist causes the transfer of all responsibility to the psychology-titled professional. The sentiment of presumption emanating from the present example would also suggest that there is a lack of communication between the psychologist and strength and conditioning professional. There is the indication that psychology is used increasingly more through career progression, indicating that only through increased experience will practitioners implement psychological strategies (tod et al., 2012). Regarding professional development, there is the indication that there is an extrinsic factor limiting the use of psychology and the cause of the reduced responsibility is likely to be contributing the lack of psychological techniques employed by the strength and conditioning professional.

5.4.4. The main purpose of psychological support

The large majority (15/18) of the participants suggested that there was a predominant purpose to using psychological strategies within strength and conditioning practice. The prime resonant theme was the use of psychological skills and strategies to improve competitive performance.

"Yeah quite a lot of the athletes I work with don't see themselves as elite athletes and the environment they step into I demand that they are elite athletes so there is a disconnect between how they perceive themselves and how I perceive them and what them to be perceived. The big thing that we do is to change their mindset to well I'm actually important I am an individual who is a performer at the highest standard whereas they just think of themselves as a bit of a squash player. And they come in and they are alright at squash and so [using] self-talk I tell them they are special and that what they do is really good and that's why they are working with me and I am here to help them."

It is evident that confidence and self-belief is important. There was also an emphasis on the transfer of psychological skills from the practice setting to the competition setting. The importance of utilising psychological skills in practice and competition is evident as the combined use has been identified as a determining factor distinguishing between levels of sporting achievement (Thomas et al., 1999: Frey et al., 2003). Furthermore, it is apparent that the strength and conditioning environment affords the opportunity to develop skills that are transferable into competitive performances.

"I think the main purpose of psychology within S and C; I mean there are probably two ways we can look at it. We are trying to get these athletes ready to perform. It's interesting where psychology fits in. Is it a separate entity? Does it come under the Strength and Conditioning banner? I guess the main thing with the mental side of things within the gym is we're just building an athlete so they can perform the best at those exercises that they are currently attempting so that is transferable into a real game situation. I just think that, it is a difficult question as well because I think that what you are trying to do in the gym is to help them have a clear concise mind that they are confident within their bodies so they can deliver on the field."

The purpose of psychology within strength and conditioning can be multifaceted. There is the notion that improving confidence is important to be able to perform within the specific strength and conditioning environment as reflected in existing empirical research (Silbernagel et al., 2007) however it is also emerging that an important role is to emphasis the development within strength and conditioning training to facilitate confidence in the competitive setting through both mastery achievements (Pensgaard & Roberts, 2002) and developing body image related self–esteem. Indeed the role of the coach has been suggested as vital in creating the opportunity for master experiences to facilitate self-confidence (Pensgaard & Roberts, 2002).

This demonstrates that the coach perceives the efficacy developed through the training to be transferable to the competitive domain and indicates that the challenging and potentially threatening training protocols allow for the development of mental toughness (Connaughton et al., 2008a).

> *"I see when I am coaching and designing programmes it's all about transfer training so everything I'm doing should be having a positive impact on what the athlete is doing in their sport. That goes for the biomechanics of the movement, physiology, and psychology as well. If we can integrate some of the psychological aspects they need to use when they are on the hill if we can do that in the gym as well then we are going to get a little bit more crossover and transfer. Some of the athletes will spend time doing visualisation sessions so they will spend half an hour by themselves working on visualisation and I find if we can get some crossover from what they are doing in the gym so maybe we talk about visualising the lift before they do it as well. They get much more crossover so I see it as that kind of transferring or making the skills transferrable so it what they're doing when they perform."*

This further verified the importance of the use of psychological skills. The coach states that the role is multidisciplinary, factoring various strands of sport science. The coach does not perceive that they are providing only the physical conditioning aspect, rather they are providing an environment to integrate various components required to prepare the competitor. Thus, in addition to implementing strategies specific to facilitating the execution of training drills, the coaches acknowledged the transfer of the psychological skills acquired in training with the skills necessitated within the competition setting. The notion of skill transfer is overarching within the narratives, with the strength and conditioning domain providing the opportunity to develop both physical skills and psychological skills. However, there is a resounding emphasis that the main purpose of psychology is the development of the athlete's confidence.

> *"I have not seen an awful lot of coaches use a particular strategy. You know you can see people use their voice to motivate people in the weight room but I think one of the things that happens, and it is almost like a side, a secondary thing, that is really important is the building of confidence through weight training. It is amazing to see somebody's skill develop in the weight room and carry on into the field and they have got that self-confidence from what they have been doing in the weight room and I don't know if very many strength coaches actually set out to do that but that is definitely what we do."*

It is apparent that development of self-confidence may be viewed as a by-product of training, albeit a valuable derivative. The effect of the accomplishments within the controlled strength and conditioning setting provides a transferable self-efficacy into the competitive environment. Nevertheless the importance of the coach in fostering such an environment must not be overlooked (Pensgaard & Roberts, 2002). There is an apparent naivety surrounding the use of

psychological skills and strategies that psychological skills just develop as a by-product of the training environment without being specifically targeted. This provides an insight into the importance of managing the training environment to elicit psychological developments.

There is evidence that the strength and conditioning practitioner is aware of the need to develop the athlete self-concept in addition to individual psychological techniques.

> *"Probably the improved self-esteem but the improvement in the person perception of self-worth where they are using psychology that is the biggest thing than I would use it for. They believe in themselves and then when they start to believe in themselves a lot more the results start to speak for themselves."*

This appears to go beyond the specific task-efficacy developed and suggests the role of strength and conditioning practitioner in developing an athlete's self-concept. The strength and conditioning domain appears to provide the opportunity to develop the sense of self-worth. This indicates that the inclusion of psychological skills within strength and conditioning could be to develop a rounded athlete rather in addition to the development of individual techniques.

This is further emphasised in that the strength and conditioning environment can provide the opportunity to develop the athlete's confidence.

> *"Just that I think that athletes can present with like a lack of confidence in some areas like not necessarily and or rarely to do with the level of performance of their sport. But then they're kind of being*

unconfident in other areas and that you can use the weight room as a means to empower them."

This demonstrates that the coach is able to manipulate and utilise the weights room as a strategy to develop the athlete's self-concept and confidence (Pensgaard & Roberts, 2002) with relation to areas not directly related to sport performance. For instance it may indicate the transfer of confidence developed via mastery experience may be transferable to broader contexts outside of the strength and conditioning environment. This demonstrated an awareness of the importance of developing an athlete's self-concept and the factors that underpin performance.

5.4.5. The importance of psychology

The practitioners acknowledged the importance of psychology within strength and conditioning. There is clear overlap with respondents recognising the performance benefits of using psychology such as allowing athletes to train harder and the transfer into competition. There is also attention given to the specific importance of the strength and conditioning professional being able to provide psychological support. One individual referred to the role of the strength and conditioning specialist being that of a coach:

"I think that S&C is coaching and coaching is a large part psychology driven so I would view psychology or the psychology of athletes as being very important to the process of S&C."

This suggests psychology is important in disciplines that are focussed around the coaching of the athlete. Furthermore, Brooks et al. (2000) have suggested that a strength and conditioning specialist is primarily a coach with a range of interpersonal responsibilities consisting of social and emotional responsibilities. This would also suggest that environments that are not athlete-centred do not require the same emphasis on using psychological strategies. It is apparent that the perceptions of the practitioner to the contextual requirements of strength and conditioning are likely to shape intentions to adopt a psychological perspective to training.

Another individual proposed the fluid and adaptive role that a strength and conditioning practitioner adopts is akin to an art rather than a science.

> *"I think it is extremely important, much more important than I initially would have thought. I think for me I tend to sway more to things I think like incorrectly that you can measure things that I assume think are obvious like factual far as we can tell are factual like physiological biomechanical where you have got a clear right or wrong answer depending on what we know is actually true.*
>
> *"It wasn't until started at the [national organisation] actually that the coach at the time who I was working with... erm... how did he put it, basically strength and conditioning coaching is as much an art as it is a science so he's effectively saying you can have all these theories and great ideas in the world. If you can't communicate that effectively with the athletes or get them up for doing it and keep the moral high during the sessions then it doesn't really matter because if they don't respond to you, your coaching cues your games that you play with them in order to like bring out the best.*

It is evident that the strength and conditioning practitioner considers psychology to be a required skill to be able to effectively coach and instruct. This

epitomises the importance of the ability to adopt an individual centred coaching approach. Despite being grounded in the principles of other disciplines such as the hard sciences of biomechanics and physiology, the importance of psychology is in having the appropriate interpersonal skills to relay key information in an accessible and effective manner, therefore amalgamating the core sciences of biomechanics, physiology and psychology. However it is apparent that such a perception is developed with experience and it is initially the more quantifiable hard sciences that are perceived to be important.

> *"Psychology was something that I never really appreciated as much in my sport science degree which is why I didn't do it in third year but that's probably quite naive of me because I guess psychology on a daily basis is used much more than any of those other areas in all different circumstances"*

It is also evident that in the use of psychology may be undervalued in early training with preference given to other, more easily, quantifiable disciplines. This suggested that as a practitioner gains more experience, the perceived importance of psychology is increased.

A resonant theme concerning the importance of psychology is the role of creating athlete engagement.

> *"The most important thing is that it comes intrinsically from the athlete but some of that is created. If not then they are not going to engage."*
>
> *"It's massive because it gets them not only to engage with the programme, it make the programme more productive so they get*

physical enhancement but they are also getting an edge somewhere else in their game."

Athlete engagement is created through the expression of strong interpersonal skills.

"You need to be able to relate and understand be compassionate to that person. Make them understand that it is not all about that, be almost a counsellor that's really important. Make them tough you say you know what you come in here you are going to train hard. This is the problem S and C coaches tend to do that quite a lot but I feel you have to earn the right to do it. That's the problem so if you just go up to an athlete that you don't know and say come on work hard, bla bla bla work hard, work hard, he looks at you and think I can't be arsed and they are not going to come back."

Despite the misperception of the specific and specialised role of a counsellor, it is clear that an important role of sport psychology within strength and conditioning is to equip the practitioner with the interpersonal skills to effectively work with the client (Tod et al., 2012). The role of developing a client rapport is critical, without which the lack of engagement is likely to have a negative influence on the training outcomes. The process of creating athlete rapport appears to be lengthy, in which the strength practitioner must earn the right to elicit maximum effort out of the athlete. It is therefore likely that personality dispositions of the practitioner can govern the effectiveness of applied strength and conditioning practice.

One emerging theme concerning the importance of strength and conditioning practitioners possessing an awareness of psychological principles was the unavailability of psychologically-titled professionals.

> *"It's very important, depending on if they have got a sport psychologist that could get into that then use techniques to get them back on the pitch then maybe not as much, but a lot of athletes don't tend to have that kind of support, so as a S&C coach it kind of lands on you to be able to provide that psychological information and techniques to get them back onto the pitch. So in that instance I suppose it would be really important."*

It is evident that the individual strength and conditioning specialist believes that it is their responsibility to provide services neglected elsewhere within the athlete support. An interesting observation would be that as "strength and conditioning coach it lands on you". That is to say that it the reluctant responsibility of the strength and conditioning coach because of the lack of input from other support staff. This may suggest that the practitioner believes that they have a more flexible role than other support staff with regard to providing psychological input. Likewise it also assumes that, amongst athlete support staff, reluctance exists to provide psychological strategies.

> *"Some of them come and they start crying because they have got no one else to talk to you need to be able to relate and understand be compassionate to that person make them understand that it is not all about that…"*

Similarly, the strength and conditioning coach might be sought out as the athletes' preferred provider of direct emotional support. In this instance, the

strength and conditioning environment or indeed the practitioner themselves would appear be the most open environment in which to address personal concerns.

Likewise, it is possible that the strength and conditioning environment is facilitative to the use of psychological strategies, as this environment provides the athlete with most contact with support staff.

> *"I think S&C coaches should have a tool box that helps them work with a psychologist that helps them implement on a regular basis because the S&C coach sees them more regularly than a psych does the S&C coach can help implement on a regular basis where the strategies and processes the psychologist thinks will be a benefit come competition time or an ongoing basis but that it is not the role delineation of the S&C coach. I don't know if that has gone off track there."*

Indeed the present individual suggests that as an informal role requirement, they would benefit from a specific set of strategies to serve as the link between the psychologist and the athletes due to the regularity of contact. This is to say that the strength and conditioning practitioner is often logistically better positioned to provide psychological support assuming the presence of appropriate understanding and knowledge. This is an important observation as Weinberg and Gould (2010a) have previously suggested that coaches should be well positioned to relay information from the psychologist to the client.

A key concept highlighted was the ability to create the rounded athlete and be fully aware of the potential stressors associated with strength and conditioning and competition.

> *"Because you are a person who understands individuals and you in a way and you are understanding some of the strategies then I think it can be absolutely incredibly important. Because once again we are not talking about, yes we talked about the aim of a goal of a programme, but I can achieve that aim of a goal of a programme in two weeks I can put my athletes I can make them depressed and devalued as an individual and make them stronger but what is the point of that. You can achieve the goal but you should achieve it the way you create a rounded healthy person, a healthy individual."*

The strength and conditioning practitioner appreciated the importance of creating a rounded athlete and the influence that they can have on doing so. The ability to develop athletes goes beyond the physical readying of an athlete for competition, and the current individual perceives their role to extend to creating a "healthy individual" who is physically and emotionally prepared. This would relate to the understanding of interpersonal skills which is developed vie the experiences of the coach both within the strength and conditioning environment and also via lived experience unrelated to the profession (Tod et al., 2012). It is also apparent that the ability to develop a rounded athlete is not shaped through any specific individual techniques, rather it is inherent in the interpersonal behaviours demonstrated by the practitioner (Tod et al., 2012). The emphasis that exists is the awareness of the psychological problems which may emerge through strength and conditioning training, the potential control that the practitioner has when working with athletes, and that the potential for psychological and emotional issues must be addressed when creating programmes and engaging with the athlete.

5.5. Discussion

5.5.1. The purpose of psychology

In support of the previous chapter, the results of the current study indicate that the strength and conditioning coaches value the use of sport psychology, as indicated by the broad range of themes indicating the importance of psychology to strength and conditioning. The themes proposed as evidence for the importance of psychology included the unsurprising notion of using psychology to allow athletes to train harder and that psychological skills and constructs developed during training are transferrable into the competition domain.

The notion that skills are transferred between training and competition domains is a significant observation as the implication of psychological skill use in practice and competition has been investigated with observable benefits when the use of psychological skills were utilised in practice compared to competition alone (Thomas et al., 1999; Frey et al., 2003). The incorporation of psychological skill in both practice and competition was observed to differentiate between medallists and non-medallist Olympians in the 2000 Olympic games (Taylor et al., 2008), whilst the use of psychological techniques in training was found to be linked to the most successful performers in both the 1984 Olympic Games (Orlick & Partington, 1988) and touring golf professionals (McCaffrey & Orlick, 1989).

The practitioners' view that identified that psychological constructs, particularly aggression, are transferable from the training room to the playing field suggests the awareness that in addition to physiological transfer between conditioning and competitive settings there is also transfer of psychological

factors. Such transfer of psychological constructs between training and competition domains would suggest that there is the scope for applying psychological skills training within the strength and conditioning environment to benefit both training and competitive performance. Psychological skills training refers to the use of techniques and strategies intended to develop mental skills that aid performance (Vealey, 1994). The premise exists that psychological skills can be learnt and developed through practice (Vealey, 1994), whilst physical practice provides the opportunity to evolve and refine psychological skills and strategies (Sullivan & Hodge, 1991).

The practitioners' viewpoints go beyond the immediate focus of improving physical training and subsequent transfer of training benefits, both psychological and physical, into competition. There is evidence that psychology is important with regard to the athlete-coach relationship. The importance of psychological skills was mentioned concerning coaching with the premise that strength and conditioning practice should be considered of a coaching profession rather than as an unambiguous science. It was suggested that the use of psychological skills is instrumental in creating a coaching environment. This is akin to the findings of Tod et al. (2012) which emphasises the importance of interpersonal skills and the ability to gain the trust and develop rapport with the athletes as being critical skills of the successful strength and conditioning coach as was emergent within the current interpretive phenomenological analysis. It is clear that the use of psychological strategies afford the practitioners the ability to exhibit interpersonal skills rather than simply prescribing interventions. Such 'softer skills' (Tod et al., 2012, p. 855) or the notion that strength and

conditioning is an "art rather than a science" has previously been identified as an awareness that is gained through practical experience.

It is fundamental that whilst grounded in scientific theory based on the hard sciences of psychology and biomechanics the aptitude of the strength and conditioning coach is dependent on the ability to disseminate underpinning information in a style accessible and engaging to the athlete. It is also clear that this viewpoint has shifted. This perceived relative importance of psychology is evidenced to shift with experience (Tod et al., 2012). The emphasis originally favoured the scientific rational and rigid training methodologies, yet with experience transitioned to be that of an athlete-centred coaching role with a increased interpersonal focus.

In addition to the ability to exhibit effective interpersonal skills, a resonant theme was practitioners requiring an awareness of psychological skills owing to the unavailability of psychology-titled professionals. The difficulty in providing athletes with access to sport psychology personnel is documented with regard to the physical rehabilitation of injured athletes (Larson et al., 1996; Gordon et al., 1998; Ninedek & Kolt, 2000). The difficulty in accessing psychology services from appropriately certified personnel is reiterated by the strength and conditioning coaches. The difficulty in recruiting the services of a sport psychologist is broadly documented, with financial, space, and time constraints identified (Kremer & Marchant, 2002) and cost being the most influential factor (Gould et al., 1989; Voight & Callaghan, 2001).

Key stakeholders may position barriers to the recruitment of sport psychology services due to a misperception towards psychology. Such misperceptions are grounded on a lack of confidence in the effectiveness of psychology, a stigma towards the use of psychology, consultation process expectations, and cultural preferences (Zakrajsek & Zizzi, 2007; Zakrajsek et al., 2011). Such barriers are prohibitive to making the effective use of the services of a sport psychologist and results in the available support staff fulfilling additional responsibilities to varying extents.

A commonly reported role was that the strength and conditioning professional was required to receive and relay information. It was reassuring that in light of a reduced access to a sport psychologist the strength and conditioning coach served as an intermediate between the psychologist and athlete. Weinberg and Gould (2010a) recommend that preferably coaches would receive instruction from psychologists to relay to the athlete and to benefit coaching styles. Benefits of such a communication channel have been evidenced in the athletic training setting (Clement & Shannon, 2009), however are yet to be mirrored within strength and conditioning.

It is evident the strength and conditioning coach may be approached by the athlete to fulfil psychological requirements. This could be for various reasons. Firstly, it is possible that the athlete will possess a negative perception towards a psychologist. Stigmatisation of psychology by athletes historically results in a reluctance to approach a sport psychologist (Martin et al., 2001; Andersen et al., 2004; Martin, 2005). Of particular note, Van Raalte et al. (1992) observed that

there was a preference amongst sports people towards a hypothetical athlete when seeking the services of a coach compared to a psychotherapist within North American collegiate football. Furthermore athletes have previously indicated that they are more receptive to sport psychology when delivered jointly form a psychologist and coaching staff rather than from the psychologist alone (Sullivan & Hodge, 1991). Similarly, Van Raalte et al. (1990) scaled various sport support professionals ranging the extent they were associated with training for sport benefits. Athletes suggested that all psychology-titled professionals provided support outside the sport context. In addition athletes perceived spectators and fellow athletes to possess negative attitudes towards them should the services of such professionals be sought (Linder et al., 1991).

The present data revealed that the strength and conditioning environment provides frequent interactions between both the practitioner and the athlete. This may present an environment which is more receptive to employing psychological techniques without the negative connotations associated with using a psychologist and with the frequent interactions allowing trust and rapport to develop. When rehabilitating the injured athlete, physiotherapists and athletic trainers are best placed to address the psychological component of injury due to the regular athlete contact (Wiese & Weiss, 1987; Wiese et al., 1991; Pearson & Jones, 1992; Gordon et al., 1998). Notwithstanding differing psychological requirements, such findings are applicable to the strength and conditioning setting in which strength and conditioning professional are best placed.

5.5.2. Contributors to Psychology support.

It is suggested that the individual with frequent contact with the athlete is well-suited to provide psychological support (Wiese & Weiss, 1987; Wiese et al., 1991; Pearson & Jones, 1992; Gordon et al., 1998). Previous research has concluded that coaches are the predominant providers of sport psychology to athletes (Sullivan & Hodge, 1991), unfortunately this early work did not differentiate between coaching professions (e.g. distinguishing between strength and conditioning and other roles).

Similar findings to those of Sullivan and Hodge (1991) are mirrored in the present study. Although a small proportion indicated that a psychologist was the key provider, the majority of respondents perceived that either the strength and conditioning coach or the technical or head coach to be main contributor to psychological support. This is problematic from a training standpoint as it was evident that it was the standing within the team which afforded the opportunity to use psychological strategies rather than any recognised training or qualifications. The reasons for such may be attributed to previously identified barriers to employing a sport psychologist (Van Raalte et al., 1990; Linder et al., 1991; Van Raalte et al., 1992; Van Raalte et al., 1996).

It was evident that rather than prescribed responsibilities, the social position within the organisation can result in an emergent provider of psychology. An adopted paternal or maternal role may lead the increased use of psychological strategies with specific regard to managing stress and anxiety. Such a relationship between the athletes and the coach supports the importance of developing rapport

in facilitating psychological techniques and supports previous literature that the athletes respect for the coach, and therefore confidence in their professional competency, is a key determinant affecting the receptivity to psychology (Anderson et al., 2004; Martin, 2005; Zakrajsek & Zizzi, 2007). With regard to the prime determinates that shape intentions and receptivity towards psychology: stigma tolerance, confidence, and cultural preference, it is expected that the ability for the athletes to relate to the provider of psychological support is important. Therefore, it is likely that the coaching staff, already having an established rapport with the athletes, could with appropriate knowledge and experience, be well positioned to utilise psychological skills and strategies with the athletes.

It is apparent that the mode of psychological input is different depending on the position of the support staff. One example distinguished between technical support and general support in which the technical coach was allude to offering more technical strategies whilst the strength and conditioning coach perceived they could have a greater influence on the psychological well-being of the athlete as a result of increased contact frequency. This is an important observation distinguishing between the technical coaching staff and the strength and conditioning coach.

It is evident that the strength and conditioning coach may have a greater contact frequency than the technical coach and is theoretically well placed to offer psychological strategies yet does not feel positioned to offer such input. This may indicate that the strength and conditioning coach may be reluctant to offer psychological support due to a lack of knowledge of psychological strategies

pertinent within strength and conditioning or that there is the misconception that such strategies are less relevant within the strength and conditioning environment. Such a lack of confidence in applying psychological skills and strategies is a widespread reason for neglecting such techniques (Gould et al., 1990b; Howe, 1993; Ninedek & Kolt, 2000; Hemmings & Povey, 2002; Jevon & Johnston, 2003; Devonport, 2006; Hamson-Utley et al., 2008; Wilding, 2009; Arvinen-Barrow et al., 2010).

An alternative explanation for the reluctance of the strength and conditioning coach to use psychological techniques is that it may undermine the perceived responsibilities of the coaches. The strength and conditioning coach may believe that the technical coach is more qualified or simply that they would not be supported to implement psychological strategies. This is reflected in athletic training when the trainers feel that it is outside their role responsibility to provide psychological input (Stiller-Ostrowski & Ostrowski, 2009). The potential for role conflict between support staff could clearly be problematic concerning the integration of sport psychology. This emphasises the importance of effective communication between support staff to maximise the effectiveness of psychological interventions.

It is also apparent that there are instances in which the strength and conditioning coach surrenders any responsibility regarding the use of psychological strategies. The noted generalisation that the head coach can provide psychological skills applicable to all domains in which the athlete operates would indicate a naivety towards the use of context-specific psycho-physiological

strategies that would be pertinent within the strength and conditioning environment.

The ability to create a rounded athlete has been noted as an important benefit of using sport psychology techniques within strength and conditioning. Indeed this is supported by earlier work which demonstrates the importance of developing interpersonal skills (Tod et al., 2012) with interpersonal skills such as effective communication, developing trust, and understanding clients being prevalent within ranging disciplines such as physiotherapy (Ninedek & Kolt, 2000; Jevon & Johnston, 2003; Arvinen-Barrow et al., 2010), athletic training (Wiese et al., 1991; Hamson-Utley et al., 2008), and in strength and conditioning (Tod et al., 2012).

Nonetheless, such studies, while identifying the integration of interpersonal skills within practice, recognise that there is a lack of psychological interventions specific to the contextual demands. For example, within both physical rehabilitation (Francis et al., 2000; Arvinen-Barrow et al., 2007) and strength and conditioning (Radcliffe et al., 2012; Radcliffe et al., 2013) there is a lack of more complex cognitive interventions such as mental imagery. Furthermore, practitioners have previously been reported as unable to identify context specific interventions beneficial to their client athletes (Jevon & Johnston, 2003). Interpersonal skills have been identified to be developed through experience with little formal training (Arvinen-Barrow et al., 2010; Tod et al., 2012). This would indicate that whilst there is the awareness of the importance of psychology within strength and conditioning a lack of knowledge presents

regarding particular strategies and applications that would specifically benefit the strength and conditioning coach. It is clear that, through informal experiential learning interpersonal skills are developed, however further structured education is required to equip practitioners with the competencies and confidence to apply psychological techniques specific to strength and conditioning.

5.5.3. Roles of the strength and conditioning practitioner

The current study contributes to the existing body of knowledge indicating that the coaches' role is dynamic and evolving in which a broad range of adopted role responsibilities are exhibited. It is evident that the role of the strength and conditioning practitioner is a complex one with various additional responsibilities. Numerous explorations into the responsibilities and behaviours of the strength and conditioner exist (Sutherland & Wiley, 1997; Ebben & Blackard, 2001; Durell et al., 2003; Ebben et al., 2004; Ebben et al., 2005; Duehring et al., 2009), however they offer limited insight into the use of psychology. Brooks et al. (2000) emphasised that a strength and conditioning practitioner is primarily a coach with responsibilities to provide social, emotional, and physical development. The focus of the current investigation was concerned with the psychological responsibilities the practitioner demonstrates.

The present study revealed that strength and conditioning practitioners considered that the role required psychology orientated responsibilities. However such a view was not universal, with some practitioners referencing specific role boundaries while others highlighted that there were role conflicts as to where the responsibility for psychological support originated. This evidences the need for

greater communication internally within sporting organisations to ascertain where responsibility exists and the presence of referral networks. Furthermore, the blurred role boundaries underscore the need for educational intervention to ensure ethical responsibilities are understood within the discipline.

There was reference made to the unique position that the strength and conditioning practitioner holds. There was the indication that the strength and conditioning practitioner often works in an environment removed from the immediate team setting that is often governed by social dynamics and performance related incentives which can often result in conflicts within the team (Olusoga et al., 2009). There was the notion that within the team setting, governed by team selection stressors, there is a paucity of athlete-centred attention. The removed position of the strength and conditioning professional presents an environment in which an athlete-centred approach can be facilitated. With frequent athlete contact, yet distinct from other coaching staff, the strength and conditioner may be well placed to serve as a mentor and work with the client on an individual basis to foster psychological and physical development detached from the stressors associated with team setting.

The premise existed that such an individualised athlete-centred approach would benefit the athlete in terms of both physical and psychological development. Indeed, in creating a sense of athletic accomplishment and optimism, the risk of athlete burnout is reduced (Gustafsson & Skoog, 2012). Optimism can be developed via appropriate goal setting, encouraging a sense of control and confidence (Gustafsson & Skoog, 2012). The strength and

conditioning domain is a prime environment through which to develop optimism through which there is a high level of internal control associated with completing training goals.

Experienced strength and conditioning practitioners have been observed to be more readily able to work at an individual level catering for the athlete's physical and psychological development (Tod et al., 2012). The ability to develop a positive rapport with the client was a prime quality acknowledged by experienced practitioners (Tod et al., 2012). Through the work of Tod et al. (2012), it is apparent that as strength practitioners gather experience, there is also an increased awareness of interpersonal skills in addition to the established training responsibilities of the practitioner. It is important to note that such examples were evident when the practitioner had the opportunity to work on an individual one-to-one basis. Practitioners working within a team setting are responsible for numerous athletes at a given time may not be afforded such an occasion to adopt such a mentoring role. In addressing the psychological need of the athlete, the strength and conditioning professional is a valuable asset to the athlete support team. Not least because the need to "manage athletes psychologically" is a significant stressor experienced by elite coaches (Olusoga et al., 2009, p. 452) and the contribution from additional sources could lessen the burden through working collaboratively to address such athlete requirements.

A selection of respondents suggested that they adopt a counselling role in which they were required to address problems lying outside the strength and conditioning environment. It should be emphasised that predominantly more

experienced strength and conditioning coaches suggested such a role. Tod (2012) noted that, with increased experience, the coach occasionally assumes a role in which the athlete shares sensitive information.

Notwithstanding the integration of diverse roles which have been shown to be an effective characteristic for coaches to acquire in strength and conditioning (Tod et al., 2012) and North American collegiate athletics (Martinez, 2004) the adoption of such responsibilities poses an ethical question. The sport community has questioned the location of the theoretical ethical boundary (Wilson et al., 2009; Zizzi et al., 2009). This is pertinent as the appropriate level of qualification and training has been previously queried by Athletic Directors (Wilson et al., 2009).

Sport psychology is a discipline in its own right with the title of Sport and Exercise Psychologist receiving protected status within the United Kingdom (Health Care Professions Council, 2012). Receiving considerable training and assessment to become a certified sport psychologist, it is obvious that there are instances requiring the experience and intervention of appropriately licensed practitioners which go beyond the competencies of the sport coach (Andersen et al., 2001; Hack, 2005; McCann, 2005). In such instances, the appropriate referral network should be to the psychology-titled professional, as is the case in physiotherapy (Hemmings & Povey, 2002). Assuming the current growth of strength and conditioning as a discipline, an understanding of the ethical boundary and limitations of the practitioners' competency would be an important consideration as would an understanding of appropriate referral networks. Thus,

in line with recommendations within physiotherapy (Ninedek & Kolt, 2000), it should be clear that without appropriate training a coach should not be expect to apply specialised interventions which would be considered to be responsibility of psychology-titled professionals. This is a point worth emphasising as the present study revealed that despite no evidence of formal psychology study, practitioners were attempting to employ specific psychological interventions within their practice.

There have been steps forward in defining competence and suggesting who is qualified to educate athletes regarding their psychological skills, however whilst it is the responsibility of the psychologist to offer counselling and even attend to clinical issues (Andersen et al., 2001; McCann, 2005), the use of psychological performance enhancement skills offers a blurred boundary with questions as to who is qualified to administer such skills (Zizzi et al., 2009). This is further exacerbated as no guidelines exist as to the application of mental skills within coaching (Zizzi et al., 2009).

The requirement to use 'psychological skills' to enhance performance is a role responsibility of strength and conditioning specialists accredited by the NSCA (National Strength and Conditioning Association, 2009). However, such lack of clarity in the role description is problematic. This is mirrored in other disciplines, such as sport coaching, athletic training, and physiotherapy, whereby leading organisations state that particular skill sets should be learned, however do not require the use of skills within the published role responsibilities (Zizzi et al., 2009). Conversely, other organisations state that only those licensed as

psychologists are able to provide psychological support to their athletes (Zizzi et al., 2009). However, this would prohibit the support personnel, for example coaching and rehabilitation professionals, with the greatest contact with the athlete from implementing psychological skills (Zizzi et al., 2009).

Whilst clear definitions must distinguish between psychological skills training, more general interpersonal attributes, and more clinical skills of counselling, the question is posed as to whether coaches can use mental skills training if they have had no formal training (Zizzi et al., 2009). There is an indication that without sufficient training detrimental outcomes may arise and result in negative misconceptions towards psychology. The potential problems associated with untrained professionals approaching mental skills consist of offering a 'canned' approach in which individual differences are neglected, having insufficient range of skills to provide suitable interventions, along with the insufficient awareness of the appropriate time to administer interventions, and lacking the pedagogical knowledge to communicate and rationalise the use of such skills with athletes (Orlick & Partington, 1987; Danish et al., 1993; Hardy, 1996; Tod & Anderson, 2005). Such harmful outcomes would negatively influence the likelihood of applying psychological strategies.

Concerning the increasing demand for psychological skills training (Weinberg & Gould, 2010a) and the unrealistic view that solely qualified psychology titled professions provide psychological skills (Danish & Hale, 1981), with appropriate role clarification, other support staff could be involved with teaching of psychological skills (Zizzi et al., 2009). This is evident within athletic

training (Wiese & Weiss, 1987; Wiese et al., 1991; Brewer et al., 1994; Ford & Gordon, 1998; Cramer & Perna, 2000), physiotherapy (Francis et al., 2000; Hemmings & Povey, 2002; Jevon & Johnston, 2003; Arvinen-Barrow et al., 2007; Hamson-Utley et al., 2008; Arvinen-Barrow et al., 2010), and sport coaching (Gould et al., 2002). This would be especially important concerning the financial and logistical barriers to employing a psychologist (Kremer & Marchant, 2002; Pain & Harwood, 2004) resulting in athletes being unable to receive the professional services of a sport psychology consultant.

5.6. Recommendations for practice

The present research highlights key recommendations for the strength and conditioning discipline:

- Sport psychologists are currently underutilised due to misinterpretations of the competencies of some practitioners. Strength and conditioning practitioners are providing more psychology support than they are qualified for.
- There is a current lack of continuing professional development opportunities specifically targeting the use of psychology. Such sessions should endeavour to address ethical boundaries and referral mechanisms.
- Clear role descriptors must be created to establish the psychological responsibilities of the practitioners and accordingly assessed within respective accreditation qualifications.

CHAPTER SIX

6. The origin of the psychologically orientated knowledge base within strength and conditioning and barriers to the inclusion of psychology

6.1. Chapter overview

Previous chapters ascertained the use of psychology within strength and conditioning and indeed suggest that a broad range of techniques have been employed. The current chapter endeavours to explore what has shaped the use of psychology within strength and conditioning, and how the practitioners have acquired their knowledge base. Chapters Three and Four, have furthermore identified variations in the frequency of psychological techniques usage. The present study will examine the sources which comprise the knowledge base from which strength and conditioning coaches apply psychological interventions. In addition this chapter will identify barriers to the use of psychology within strength and conditioning. Finally the perceptions of the strength and conditioning coaches will be examined to provide suggestions regarding what changes are required to promote psychology within the strength and conditioning community.

6.2. Introduction

The previous series of studies have identified that there is a broad range of psychological skills and strategies employed within strength and conditioning. The varying methods employed by practitioners would propose the question of what has directed the use of such strategies.

The extent to which particular psychological skills are employed appears to be grounded in the practitioner's level of experience, with lesser experienced practitioners employing such strategies less frequently (Radcliffe et al., 2013). Such reasons were that the practitioner developed their skills within their role rather than through any formal instruction. This mirrored existing work within physiotherapy and sports coaching (Sullivan & Hodge, 1991; Jevon & Johnston, 2003). Furthermore, within strength and conditioning, experiential learning has been demonstrated as a method by which coaches refined coaching styles and behaviours (Tod et al., 2012).

It could be suggested that the wide-ranging methods observed in Chapter Four are indeed symptomatic of predominantly experiential learning. That is to hypothesise that the varied situations experienced throughout the career would necessitate differing problem-solving approaches and consequently result in the development of varied approached to cater for such differing situations. Established research identified that the evolutionary nature of the strength and conditioning domain necessitates constant development throughout the career to meet the to the changing demands associated with strength and conditioning (Tod et al., 2012). Furthermore as suggested by Creasy et al. (2009), it is likely that the intention to employ psychological strategies is governed by previous successful experiences utilising psychological techniques.

Despite the proposal of experience accounting for variation in skill use, an interesting observation was the imbalance between the frequency of skill usage

and the perceived importance of psychological skills. For example, self-confidence was deemed to be vital within strength and conditioning however was only moderately ranked in terms of frequency of use (Radcliffe et al., 2012; Radcliffe et al., 2013). Furthermore, as suggested in Chapter Four, there was an underutilisation of particular attentional focussing and practice schedules strategies associated with skill acquisition. Such a disparity between the frequencies of strategies usage despite the apparent importance of incorporating such techniques is intriguing and warrants further research.

The apparent neglect of certain techniques has resulted in the proposition that within certain areas, strength and conditioning coaches lack sufficient knowledge to administer applicable psychological strategies. Lack of sufficient understanding is a commonly presented argument for neglecting psychological skill use (Ninedek & Kolt, 2000; Hemmings & Povey, 2002; Devonport, 2006; Hamson-Utley et al., 2008; Wilding, 2009; Arvinen-Barrow et al., 2010).

Differences in the accrediting body that the practitioner is affiliated to appear to account for variation in the frequency of skill use. Such reasons could be attributed to cultural factors concerning social norms and the acceptance of psychological strategies or the preparation offered by the accrediting bodies (Radcliffe et al., 2013). The role of stigma tolerance has been researched relating to sport psychology (Martin et al., 1997; Martin et al., 2004; Gee, 2010) and cultural variance has previously been observed with regard to perceptions towards psychology (Anderson et al., 2004; Martin et al., 2004).

Potential reasons appear to align with the theory of planned behaviour (Ajzen, 1991). Such a theory dictates that attitudes towards the behaviour, social acceptance and behavioural control impact upon an individual's motivation to action a behaviour. This has led to the hypothesis of varying barriers to promoting psychological skills such as sufficient knowledge, logistical constraints, and the perceptions of others however the speculation is supported only by literature review concerning different professional domains.

Previous work has merely offered insight into the quantifiable frequency of psychological skill utilisation within training and suggested that the presence of role boundaries and a lack of knowledge were potential limiting factors. Little attention has been afforded to the rationale surrounding the frequency of skill use by strength and conditioning practitioners. Equally, minimal emphasis has been given to the critical aspect of the perceived importance of psychological skills.

In promoting the field of sport psychology, it is important to evaluate barriers to the use of psychological skills and strategies with a view to addressing and removing such barriers to facilitate the integration of psychology within a triadic strength and conditioning model comprising foundations of physiology, biomechanics, and psychology. Such barriers are as yet merely hypothesised based on established literature from differing professional domains and require further detailed exploration. It is anticipated that the exploration of reasons for neglect will promote strategies to foster the development of psychology within strength and conditioning. Furthermore, through evaluating the psychological skills knowledge base available to the practicing strength and conditioner, and

indeed the perceived prime objective of employing psychological techniques, organisational bodies will be quipped to target specific professional development opportunities.

The aim of the current research is to adopt a qualitative approach to explore the reasons that account for the use of psychological skills within strength and conditioning. This will examine the experiences which have shaped the use of psychology and formed the knowledge base which informs the application of sport psychology techniques. Similarly the barriers to integrating psychological strategies will be examined with the intention to propose recommendations of methods to promote the use of psychology within the strength and conditioning environment. A phenomenological approach is adopted owing to the presumption that the perceptions and consequently behaviours are shaped via lived experiences (Tod et al., 2012). Such an approach will allow the in depth exploration regarding the perception which govern the intentions to employ psychological strategies within the applied setting.

6.3. Method

The method followed the same protocol and the same participants as previously described in Chapter Four that is exploring the presence of themes aligned with the objectives of the current chapter using the same data set yielded from the same interviews as used in Chapter Four.

6.4. Results

6.4.1. Results overview

The study examined the concepts which emerged in the narratives concerning the sources of information on which the application of psychological strategies is based and also explored the factors which may contribute to the neglect of psychology within strength and conditioning. Finally the perspectives of the practitioners regarding what are needed to facilitate the use of psychology within strength and conditioning was analysed.

6.4.2. The psychology knowledge base

The results indicated that a range of sources provided strength and conditioning practitioners with the knowledge base to apply key psychological strategies within their applied practice. Exploring thematic emergencies it was evident that the most prevalent information source was the practitioners past experience.

6.4.2.1. Past experience

It was apparent that the most common source of information was acquired through the practitioner's own experience.

> *"I think as I started to, you know, develop as a coach that's where I'd first of all start that kind of maybe steers the first thing that you try with an athlete and then over time I have had to solve problems and develop other techniques."*

It is evident that the individual believed that ability to use psychological skills and strategies was acquired through the interaction with athletes. The

reference to problem solving would imply the need to address issues within the training setting and it is through the perceived success in addressing such problems that the practitioner gains in confidence to employ additional techniques.

It is also clear that whilst experience gained as a strength and conditioning coach contribute, it is also experiences gained prior to becoming a practitioner that add to the knowledge base.

> *"Used to train a lot with training partners people who would say 20kilo Olympic bars that you are lifting and then some training sessions would come back through saying they would of loaded it with a 25kilo Olympic bar still doing the same sort of stuff you are lifting it a little bit extra doing very similar reps and then finding out later that you been had"*

There was evidence that the willingness to use psychological techniques was shaped by the effect that the strength and conditioning coach had experiences by applying such strategies to themselves.

> *"Yeah I have, its more, I have done them myself, I have tried them out myself and I have given them out to certain athletes and certain clients in the gym as well."*

> *"I think its experience. When I was an athlete myself I had a lot of problems because of confidence. Confidence being one, and the other one being probably nervous tension. You know I was very, I wanted to do so well when I was throwing that I was blocking myself from it and there is a really good psychologist that was at the university ... and one of the things that he told me was you have got to fake it until you make it when you put your hand across your body when you throw and that hand is shaking instead of thinking oh go my hand is shaking*

I have got to control this think great, good, my hand is shaking, I can throw far because I am full of adrenaline and so keep telling yourself that, and if you keep telling yourself enough it becomes real. And that really helped me"

The basis of including a psychological intervention is governed by the past experience in which the strength and conditioning coach has experienced the benefits of employing such techniques to their own performance. The 'what works for me could work for them' attitude appears prevalent. Such findings link closely with the notion that, knowledge of strength and conditioning coaches is developer experientially within and away from the strength and conditioning environment (Tod et al., 2012). Furthermore confidence in psychology is a important factor influencing intentions to use psychological interventions with those experiencing the use of interventions first hand having an increased willingness to prescribe strategies (Gould et al., 1991; Martin et al., 2004; Zakrajsek & Zizzi, 2007)

It is apparent that the skills required for facilitating psychological interventions are not able to be developed using the same methods as other sport science disciplines.

"No, that is probably how I would fit Physiology and Biomechanics that plays the largest role in what I do. Psychology, don't get me wrong but psychology isn't something where I would work from that basis of looking at the textbook and trying to apply the theory. It is more the way of what you see in front of you to the way you get X, Y, Z. No, how you do that because I haven't done the theory behind it might be wrong in terms of what the text book says, and I might be wrong in what I am doing, but that is the way I decided to do it and figure it out that way so it would be to the answer based on what we continually do rather than interpreting."

It is interesting that there is a lack of importance in following established protocols and that the notion that what is learnt through practice is more valuable than what is learnt from a text book. This may suggest the under-appreciation of psychology as a distinct scientific discipline or a misunderstanding of the established principles of psychological interventions. The individual distinguished between the disciplines of psychology and biomechanics. This would suggest that the mode of sport science support guides the methods to which the skill is developed. The specific distinction between the disciplines of physiology and biomechanics to psychology with more emphasis on interpersonal skills would indicate that it is only through the experiencing the interpersonal interaction that the skills can be developed and the individual differences of the athlete, and indeed the coach, provides numerous variables to limit the suitability to learning through textbook review (Tod et al., 2012). The following quote reiterates such a stance:

> *"Very much so. I mean obviously you learn things in theory, whichever branch of sport science it is, but it doesn't necessarily transfer to the situation you're in, it does in some circumstances but in others it's a little bit more difficult"*

It is clear that whilst the underpinning theory can be gained through formal learning methods, the individual variation and varying situations make it challenging to rigidly apply theory to practice. Rather it is the continual and gradual exposure to a variety of different situations which shapes the application of psychological techniques.

6.4.2.2. Personal reflection

Advancing the theme of experiential learning there was evidence indicating that a proportion of the practitioners were consciously reflecting upon their practice.

> *"I am very self-reflective thinking this thing is not there this thing is not there you know you have to work on that myself"*

The present individual alluded to the use of appraisal and reflection of past behaviours. Such a reflective style carried importance that the individual suggested the incorporation of a reflective practice within broader strength and conditioning practitioner development strategies. Cushion et al. (2003) propose that whilst it is the informal experience which can shape coaching behaviour, it is also the interpretation of the experiences which provide important information concerning the development of coaching skills. It is therefore likely that the use of reflection, either formal or informal, could provide structure to the interpretation of experiences in a favourable manner to shape perceptions and future coaching behaviour.

6.4.2.3. Formal education

Formal education was a source of information for the strength and conditioning coaches. Such methods included training within higher and further education and specific training courses however it should be noted formal education was considerably less prevalent that learning via past experiences.

> *"I would probably say formal training is the biggest thing, I actually got my undergraduate at, I actually got two degrees at undergraduate, exercise science and sport psychology with an emphasis on coaching. So I actually do use a lot of that and I have been using it more this semester for this last couple of years more than I have in the past and to be honest the reason behind that and I know exactly why is I'm also teaching part time here at the college and I am teaching sport psychology. So it is one of those things that I get to teach it more and it re-emphasises my strategies and makes me think a little bit more about how I use my team with my athletes and I kind of change things a little here and there as I teach it more and more re-familiarise myself with the stuff."*

Undergraduate education has provided the foundation to which the individual can apply psychological strategies, however an important observation is that whilst the education may provide the foundation knowledge it is through the further exploration of the subject through teaching responsibilities which has provided the incentive to utilise psychological strategies within applied practice. It is therefore possible that the undergraduate course alone fails to provide either sufficient incentive of sufficient understanding to apply techniques within applied practice.

It is clear that although formal education can provide foundational knowledge, the understanding to apply and refine techniques is shaped by practical experience.

"I would say it has definitely come from a pinch of formal training however I think just from general experience of people's reactions to you know what you have done in the past and what has been a good outcome in relation to with someone and being oh I will just change it for next time and stuff like that. You hear about some models that you can regulate off from university psychology subjects whatever and you apply them to a point but with your own personal touch of empathy as well."

The on-going feedback through self-evaluation appears to provide the confidence to apply psychological skills and strategies. It is evident that the formal education would not provide the same level of information as the feedback gained through experiential processes. It appears that the formal education insufficiently provides the practitioners with the skills to cater for individual differences and variable scenarios.

6.4.2.4. Interactions with coaches

Aside from formal education and experiential development of knowledge there are informal strategies which strength and conditioning coaches are using to further understand psychology. One such strategy was through discussion with other coaches.

"Just getting out there and really getting my hands dirty with every team I have been involved with and asking a lot of questions."

"would go to a team that I think has the best psych programme going anywhere in Australia and I would ring them up and ask to speak to the head coach and have series of questions like you have in front of you and ask him for half an hour of his time so I could actually improve my skills."

It is evident that for the practitioner that values psychological skills, liaising with a more experienced individual is an important strategy. Such an approach does however require the coach to already possess sufficient motivation to approach other coaches and as a result this approach is only likely when sufficient incentive is present through valuing the use of psychological interventions. When examining the development of strength and conditioning coaches, Tod et al., (2012) identifies that interactions with colleagues is an important information sources for the coach.

6.4.2.5. Mentor

Rather than seeking out information, other coaches can also provide information through the mentorship of strength and conditioning coaches.

> *"Well he is my employer at another gym that we both run, it's like another thing that we do on the side so he employs me there and he is always showing me those things. If I like something, then I like it you know. It not like he was pushing them on me, I look at it with an open mind and see how it could work he's just shown me those two options. So I run it myself."*

The role of the mentor is important in imparting knowledge regarding the application of psychological strategies. The frequency of contact appears to be beneficial with numerous opportunities to observe demonstrations of techniques. Rather than prescribing a specific strategy, the mentor provides a range of applications which can then be used as changing scenarios dictate. As such, whilst the experienced coach is increasing the skill repertoire of the lesser experienced practitioner, the strength and conditioning practitioner is still learning via

experience as to the specific application of skills depending upon individualised situations (Tod., 2012).

6.4.2.6. Peer observation

It is further evident that the observation of peers working within the profession can contribute to the practitioner's knowledge base.

> *"I mainly got the idea from a strength coach at [a North American university] when I was there. The reason why she decided to do it was because the soccer team at the time was having team issues. ... So it worked out pretty well, she liked it, I liked it when I was helping them out and basically stole it from her and it's been working very well."*

The present example suggests that the observation of a particular technique was a valuable learning experience for the practitioner. It is likely that the observation serves two key functions. Firstly, the application of the strategy is able to be observed in practice to demonstrate how and when the strategy can be applied. Secondly the vicarious aspect of observing the use of psychological techniques is likely to modify the practitioner's intentions to use psychological strategies themselves, both because of increased self-efficacy using skills due to the vicarious effect (Bandura, 1997), and through removal of barriers concerning the cultural acceptance of psychology within strength and conditioning (Zakrajsek & Zizzi, 2007; Zakrajsek et al., 2011).

6.4.2.7. Working with psychologists

In addition to observing and interacting with peers, interaction with psychologists was an information source used by some coaches.

> *"One of my early mental coaches … was a psychologist and is a psychologist, I was doing it more in a haphazard way and he taught me how to do it in a more clinical step by step fashion so whilst I was doing technical cuing quite well the reinforcement cueing needed to be fine-tuned to be bit better so I went to see [psychologist]."*

It is clear that the role of the psychologist is to refine the techniques that are being trialled by the strength and conditioning coach. It is suggested that collaborative partnerships are formed between coaching staff and psychologists (Weinberg & Gould, 2010a) to aid the integration of psychological skills thus it is encouraging that the psychologist is viewed as an important information source. Of the practitioners who referred to a sport psychologist as information source, the consensus places the psychologist as an aid to refine and focus specific application rather than introducing new techniques. It would therefore be evident that the practitioners perceive the psychologist to be valuable post-development of foundation applications.

6.4.3. Reasons for the neglect of psychology

In exploring the reasons accounting for the underutilisation of psychological strategies within strength and conditioning, it was evident that the reasons could be attributed to either internal, personally governed beliefs, or external, environmentally governed situations (Figure 6.1).

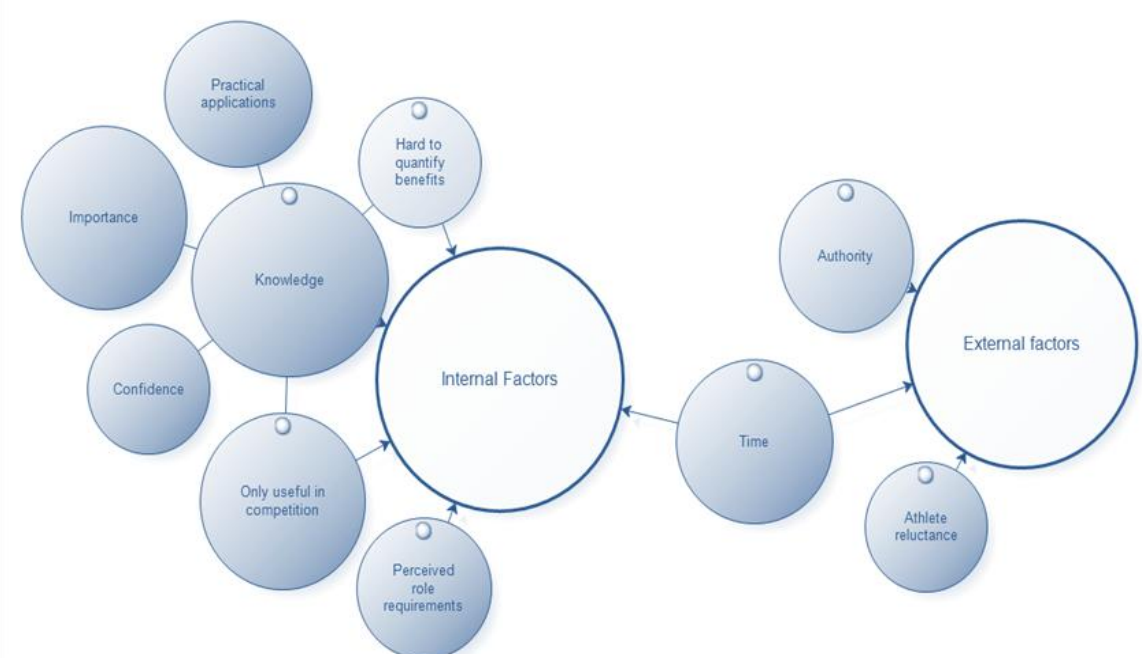

Figure 6.1 Thematic emergences depicting the most prevalent resonant themes indicated via size categorised into internal and external factors.

6.4.3.1. Internal causes

Insufficient knowledge

A prevalent theme was that the practitioners had insufficient knowledge to implement psychological strategies. 66% of practitioners indicated a perceived lack of knowledge limited the use of psychological strategies. It was interesting that there were prime reasons as to why insufficient knowledge could prevent the utilisation of psychological skills and strategies. Such reasons comprise a lack of

knowledge regarding the benefits of using psychology and a lack of understanding of how psychology can be implemented.

A prevalent concept was that psychology skills were perceived as valuable within strength and conditioning; however the coaches failed to have the requisite skill to administer appropriate psychological strategies.

> *"Probably the lack of knowledge of it [psychology] or the lack of techniques to try to implement it."*

> *"I really, probably wouldn't have a clue of even how to start somebody with a mental toughness training."*

> *"Well education again. And because like I say I wouldn't know how to implement a lot of the techniques or even where to start with it so I think if I did know what methods there were and how I could implement that into my training or into that session"*

It is clear that the individual is aware of the importance of specific techniques and significant psychological attributes such as mental toughness, however the individual suggests that there is lacking confidence *"even where to start with it"* and thus the foundation knowledge is lacking to allow the practitioner to initiate strategies within the strength and conditioning setting.

An alternative method in which knowledge governs the intentions to use psychological strategies is regarding the perceived relevance of psychological strategies.

> *"It could be that's looking at it from my perspective. Other people might just be ignorant to the fact that psychology is an important part, especially strong minded people who don't kind of need that psychological training to be positive or to be in a good mind state.*

They can maybe tend to dismiss it and think why can everybody not just do it if you know what I mean. It might just be a bit of ignorance and just dismissing the fact that it is important."

Such an example typifies the notion that there is still insufficient confidence in the effectiveness of psychology within the strength and conditioning community. Specifically, there are individuals which may perceive psychology to be only effective for problem athletes (Ravizza, 1988; Van Raalte et al., 1992; Maniar et al., 2001). As such it is apparent that rather than the perceived lacking effectiveness there may be an underlying reluctance to label an athlete as weak through the use of regulatory techniques. Thus evidencing the presence of a stigma towards psychology (Martin, 2005; Zakrajsek & Zizzi, 2007; Gee, 2010; Zakrajsek et al., 2011) It is possible therefore that either a lack of confidence in both implementation and effectiveness of psychology or an underlying cultural reluctance may negatively impact on intentions to use psychology.

Not relevant within training

Relating to a lack of understanding there was the emphasis by particular individuals that psychology was only useful within the competition setting

"I'd say I wouldn't think it would transfer onto the pitch that much like I say I think it's more the skill they need to be confident on the pitch whereas if you can get all the physical attributes right within the training then that'll become a natural progression onto the pitch so they won't have to think about too much, but depending on the sport as well I suppose, because if your training a weightlifter then they're having to lift a heavy load so it becomes your job as an S&C coach to transfer it over there whereas something like football they don't tend to think about sprinting, it will be an automatic switch on then they will just go so I don't think they need to be psyched up"

There is an emphasis on the use of psychology within the competitive domain but a neglect of psychological strategies within training. There is an apparent misunderstanding regarding psychological skills. For instance, the individual suggests that physical and technical skills can be rehearsed to the point of automaticity within a competitive situation, however on occasions psychological skills are perceived not to be transferable between situations. This is problematic owing not least to the benefits of using psychological interventions in training, but also for benefits of developing skills in practice prior to transfer into competition (Thomas et al., 1999). Furthermore, the notion exists that psychological skills are situation-specific, with the specific example of competitive weightlifting providing the only opportunity for transfer between competition and practice.

An increased bias towards using psychology in competition significantly more than training was a significant knowledge-related theme.

> *"It only comes in when you do some max strength testing or something like that trying to get the best out of them. It is probably more appropriate for them to during competition. That's what I would think"*

There was resonance supporting the notion that psychology is pertinent to competition but is less relevant within the practice and training environment.

> *"I don't think the gym is very stressful for these boys as its just training. They have trained for years and years I think it is the game day which is not my forte which is where most of that psychological stuff will be more beneficial I think."*

One such reason was the perceived lack of stress in practice compared to competition. There is the emerging theme that individuals perceive that psychological skills are relevant to competition. The bias towards use exclusively in competition also signifies the misperception exists that psychological skills are not required to be trained in order to be applied within competitive arenas.

Perceived role requirements

In addition to lacking knowledge and misperceptions concerning the application of psychological strategies, a resounding theme was that the role requirements did not dictate the need for psychological intervention.

> *"I think it depends on personal preferences. I think that the in my perception that there are lots of coaches in the field who kind of work as what you might term service providers. Where there they're quite clinical in just giving a professional opinion as to ok this is the best way to train without really trying to coach their athletes. So I would characterise those practitioners as having less of an emphasis on psychology and then those practitioners who like to coach their athletes are quite heavily psychology dominated."*

> *"You some of the qualifications that are out there for S and C coaches they are very scientifically based and the psychology part of it is not in there at all so you are creating scientist rather than coaches."*

Such examples typify that aside from the perception that it is not the responsibility of the strength and conditioning coach to administer psychological techniques, a view mirrored in athletic training (Stiller-Ostrowski & Ostrowski, 2009). It is possible that the perceived scientific underpinning of the strength and conditioning discipline can result in being incompatible with psychological

strategies. It is evident that the emerging and growing discipline may be perceived as more of a science discipline than a coaching discipline, and as such may neglect interpersonal skills. It is evident that there is emphasis on the isolation of specific fields of sport science in creating an identity of the rapidly emerging discipline, and as such neglecting softer skills and crucially neglecting psychology within a multidisciplinary approach.

In relation to the role requirements there was evidence to suggest that the need for a recognised qualification in psychology was required to utilise psychological strategies.

> *"I'm not a recognised psychologist; I'm not a chartered psychologist so I certainly wouldn't want to advertise myself as being one. I think a lot of the things I have learnt, the theoretical stuff, to kind of justify some of my work. Then there are things that I have learnt that I would have liked to use at some stage. I go back to the conversation about formalising some of the psychological skills and evaluating the skills, not necessarily evaluating that psychological skill but that is something not that I would be able to do. But as yet I can't practice as a psychologist."*

Despite underpinning psychology knowledge there is a reluctance to employ psychological strategies. The perception exists that an ethical line presents which can govern who is qualified to administer such skills and who in unable to offer psychological input. Zizzi et al., (2009) has previously stated that there are limited guidelines as to what psychological interventions can be applied within coaching. This is evident to also be a development area for the strength and conditioning discipline. It appears that there is a considerable amount of caution stemming from the uncertainty of what practices are able to be offered by strength and

conditioning practitioners and what requires specialist input from psychology titled professionals.

The uncertainty of the introduction of psychology by strength and conditioning coaches is emphasised:

> *"No and that is my main view from a strength and conditioning accreditation process if there was an element of use of, knowledge of psychology within that would it then kind of allow strength and conditioning coaches to think they are?"*

The perception of the blurred boundary between the disciplines of strength and conditioning and psychology are resulting in a reluctance to incorporate psychological elements. This is due to the perceived danger of adopting skills which are perceived to be outside the remit of the strength and conditioners and crossing an ethical boundary without having sufficient recognised endorsement to do so.

Concerning role responsibilities there is evidence to suggest that the promotion and integration of psychological skills is not the responsibility of the strength and conditioning coach, rather is the focus of other coaching staff.

> *"Personally I think that you can and that could play an important role personally however I kind of look the way practice is that I don't really think it's my role to talk too much about the way an athlete competes because I think that is the role of the sport coach. I wouldn't kind of, I wouldn't really feel comfortable getting into too much of an in-depth conversation with the psychology of the way that that athlete competes."*

"Practically in my experience no one has ever asked me to get involved in that and I have taken that as implicit that they feel they have got that covered."

"Not really, but again we get on with what we are doing, that's nothing to do with me really."

There is the notion that it is the responsibility of the technical/head coach and as such the strength and conditioning specialist refrains from contributing to the psychological strategies. This may suggest that the position of the strength and conditioning coach is specialised and exclusively tasked with physical development, with little incorporation of psychological strategies. Equally it is clear that although implicitly indicated there are interdisciplinary boundaries which the strength and conditioning coach does not cross again to the neglect of any psychological strategies. It is evident that the role boundaries may arise from the lacking confidence in the ability to use psychological interventions.

Difficulty in quantifying benefits

A factor which appears to influence the intentions to use psychological strategies was the ability to observe the tangible benefits of employing psychological strategies.

"I think for me I tend to sway more to things I think like, incorrectly, that you can measure. Things that I assume think are obvious like factual, as we can tell are factual like physiological, biomechanics, where you have got a clear sort of, well right or wrong answer depending on what we know is actually true. Psychology was something that I never really appreciated"

It is apparent that the ease of quantifying the benefits of psychological interventions was a determining factor in shaping intentions to use psychology as has been observed in association football (Pain & Harwood, 2004). Furthermore there is also the misconception that psychological interventions are unable to be measured using quantitative measures. In a comparison with other sport science disciplines it is clear that there is difficulty in adopting a qualitative approach in order to appraise the value of psychology. Thus the benefits which are challenging to initially observe may cause psychology to be perceived as ineffective and not worthy of the strength and conditioning coaches' investment.

6.4.3.2. External Causes

Lack of time

An oft-cited reason for not using psychological strategies was that there was insufficient time available. Time demands have previously been cited as a prime influence in using psychological interventions within sports coaching (Creasy et al., 2009). Ranging viewpoints emerged concerning the limiting time factors.

> *"Just time. If I had more time I would. I work with a few athletes; if I only had one athlete it would be massive on my agenda. Because I work with lots it is more difficult to prioritise the work load to do that research."*

This would suggest that time is a limiting factor and with increased available time there would be more opportunity to incorporate psychological elements. Interestingly with the reference to research, it would appear that rather than the time associated with applying psychological techniques; it could be the

limited time afforded to educational practices preceding psychological interventions which result in the neglect of psychological strategies.

> *"If I took time out of the session to just talk to people as a group about what we are doing then I'm just not going to have enough time to actually do the physical side which is what both the athletes and the coaches generally perceive as being obviously the more important thing"*

A contributing factor to the lack of time exists with aligning practice to the expectations of coaches and athletes. The reference is made to what significant others regard as important and as such the training sessions are shaped by the perceived expectations of other individuals.

> *"It's hard enough promoting what you're doing in that hour. You're doing all those other things; you're seeing guys that are doing things 6 days a week and then you are trying to get them to do some psychology. One way I put it is I spend time with them, to do extra takes time away from your sessions, ... No if I had more time with them I would do more [physical] training sessions."*

An interesting observation, despite the prevalence of time being a suggested limiting factor, is that should additional time be afforded to the athlete then such additional time would be devoted to increased physical training with little extra emphasis on the integration of psychology. Previously time prioritizations have provided barriers to employing a sport psychologist (Kremer & Marchant, 2002, Pain & Harwood, 2004).

> *"You would try and do more with them physically. There is so much that no matter how much time you are given with them there is more*

to do. So you wouldn't necessarily say right let introduce psychology and take away this session. You are asking for more and more sessions."

It would appear that rather than the time being a major reason, the elaborations of strength and conditioning professionals would indicate that incorporating psychological skill development is perceived to be outside the prime remit of the strength and conditioning professional. Furthermore, although time is observed as a barrier, it is likely that the lacking understanding of the value is a limiting factor. Thus the perceived value of psychology is insufficient to be afforded time during strength and conditioning.

Authority over coaching practice

An evident factor inhibiting the inclusion of psychological practices was the control that is enforced by stakeholders and authoritative senior coaching staff.

"It's not until really the coach accepts what you're doing as a positive that that filters down to the players and they be a bit more compliant and a bit more enthusiastic about the session … I know based on one meeting last week that they've got ideas themselves of how they want things to be done that I don't necessarily agree with."

It is apparent that the head coach has the respect of the players regarding the integration of training strategies and as such may prove a challenge for the inexperienced strength and conditioning specialist to instigate their own ideas.

"I think it always come back to education even if it not so much at the S and C level but at sporting club level. If we could get psychology listed a bit higher and I know it's very hard to do because some of the coaching courses only run for a weekend and they cover eight or nine

modules in a weekend. But if there could be some element where it could be worked into each into those units of psychology might find that the guys will embrace it better and then it won't take so long for someone like me to have to earn trust and build a relationship with the coach because the coach would recognise that psychology's a big part and welcome you in"

The issue of having the approval of the senior coaching staff is apparent and as such provides an additional barrier should the coaching staff or stakeholders be unreceptive towards psychology. As has been observed in English football (Pain & Harwood, 2004), the concept of trust and demonstrating the value of psychology to stakeholders is emerging as an important factor which can govern the use of psychology within strength and conditioning practice.

The control of senior coaches is an inhibiting factor to prevent psychology integration within strength and conditioning.

"Just some of the senior coaches, I don't know why I am sort of the new kid on the block in that sort of organisation. I was just told that simply we are not going to be going down that avenue with this group of players. They just solely saw my role as a physical conditioning coach and it wasn't going to be crossing any other lines. Black and white I was doing the conditioning and that was it."

Conflict exists over the perceived role requirements of the strength and conditioning specialist and the perceived requirements by senior staff. It is apparent that the strength and conditioning coaches are prevented from applying key psychological techniques due to the instructions of senior staff.

Athlete perceptions

In addition to the reluctance of senior decision makers, the perceptions of the athlete client posed a barrier to the use of psychological strategies. The athlete must personally justify the merit of employing psychological principles within their chosen discipline (Brooks & Bull, 2001).

> *"It's perception; it's how it is perceived. Perceived as a classroom activity. And athletes don't like a class room and certainly the psychological support that I have seen has been simply that."*

Perceiving psychology as a theoretical exercise would appear to be negative with regard to promoting the use of psychology within strength and conditioning. Thus it would appear important for any psychological interventions to be field base which, should the requisite knowledge exist, would position the strength and conditioning coach well to implement psychological interventions.

> *"I think it's usually challenging them and threatening them in a way they don't want to be challenged or threatened. Or lets use the word challenge first, and if they are getting challenged some of them find it a threat."*

> *"I just think that a lot of people perceive it as a sign of weakness. That they think there is something wrong inside their heads to be honest. It draws out insecurities in people; you know it's making yourself vulnerable. People don't like to be perceived as vulnerable."*

Equally it is possible that athletes may view psychology and psychological interventions as a threat, and that there is a stigma associated with psychology which manifests in a reluctance to engage in cognitive strategies.

"I would agree with that yeah like a shrink and that's how it is perceived in sport. Definitely one sport, football, springs to mind. It's the only sport where players are chastised for training and other players call them 'busy's' so "oh busy you are" what are you doing that for your busy and footballers like the idea, or it's the culture that they can go onto the pitch, train alright but play on a Saturday and be dead good and that's sort of them,"

The athletes' negative perception towards sport psychology appears to be shaped by the misconception that sport psychology is for athletes with problems and the concept of the negative halo (Linder et al, 1991; Gee, 2010) presents in some cases. Equally, within particular sports there may be cultural influences shaping misperceptions that athletes' believe they are successful and do not require additional psychological techniques. Consequently psychological interventions are perceived to be the reserve of the weak and synonymous with other mental health disciplines (Linder et al, 1991; Gee, 2010).

6.4.4. What changes are required

With regard to the barriers to incorporating elements of psychology to strength and conditioning training, practitioners suggested potential solutions for the removal of such barriers.

6.4.4.1. Education

The most prevalent solution centred on education, both educating the strength and conditioning practitioners but also educating significant others such as coaching staff. This focussed on educating strength and conditioning practitioners

on the specific application of psychological strategies rather than just the underpinning theory.

> *"I guess practical stuff, sort of how you are going to implement them in your sessions a little bit more, showing more the practical side of psychology and how you can implement them in your sessions, everyone is going to be aware of you know visualisation and arousal that's it maybe some of the of the techniques the psychologist would use to implement that. So maybe there could a little bit more from the psychologist side saying this could have a really big benefit to your practicing. Maybe there is a market there for it?"*

The quote iterates that it is the specific applications of psychological interventions which require more education this is akin to earlier research has suggested that education should have a large focus on the practical application of psychological techniques rather than excessively focussing on the underpinning theory (Kolt & Anderson, 2004; Ford and Gordon, 2004). However in providing examples it is evident that there is a shallow understanding of theoretical underpinning, for example referring to visualisation rather than the more complete use of mental imagery.

Equally, there is a requirement to educate significant others to remove some of the misconceptions preventing the application of psychological strategies.

> *"Just for the coaches not necessarily the players but if you could set aside an evening or whenever that the coaches are available to actually become educated themselves in terms of all areas of sport science you know it's still fairly lacking it's not perceived as being as important as physio … if you actually sat the coaches down and went through presentations of how psychology could influence performance positively"*

It is apparent that while it is encouraging that the strength and conditioning practitioner believes that an educational session is required, it is implicit that there is a misconception concerning the amount of time required in educating the value of sport psychology. This could be a limitation that individuals, although acknowledging the need for education, could be reluctant to invest the time in different areas of practice. In addition to educating strength and conditioning practitioners in the practical application of psychological techniques, it was alluded to that a necessary skill was the ability to educate the athlete with regard to the benefits of psychology.

> *"Don't know, bit difficult because you have got to get in front of them so maybe educate the S and C coach to educate the athlete"*

It is evident that there is scepticism of the approach in educating the athlete; this could indicate that the practitioners do not possess the requisite understanding and positive examples to demonstrate the value of psychology. This is a important concept as demonstrating the value of psychology has previously been noted as a problem area for accredited sport psychologists (Pain and Harwoord, 2004). Equally it is apparent that time may be problematic and that the strength and conditioning coach is placed better than other professionals to educate the athletes. Such an approach is important owing to the emerging theme that there is reluctance towards psychology demonstrated by the athletes. Indeed aligning with the practice of psychological skills training, education of the athlete is a critical component in the success of a psychological strategy.

6.4.4.2. Appreciation of the discipline as coaching

There was the suggestion that the perception towards the discipline is required to change to position greater emphasis on the coaching aspect.

> *"Well they have got to realise that coaching has different paths, there is the wrong and the right reps, there is the organisation you know stuff like organising training sessions. Having adequate equipment thinks liked that, and there is a coaching which is consolidating technique or refining technique and modifying out the bad parts they have got to realise that that is the main part of their job. Its technical refinement. Teaching a skill is done once, after you have taught the skill once then you modify it. So you teach a skill once only one opportunity then after that you are modifying skill. So what do you do your whole life as a strength coach, you coach. And they just don't seem to realise this is the most important thing or is equally important because you have got to organise stuff a lot and be efficient planning you know, that is part of it to, planning and organising stuff like that but the day to day thing that I do most is technical cueing and behaviour modification and stuff like that I think people have just got to realise that I what you do. You can write the programmes easy."*

There was emphasis placed on strength and conditioning being regarded as a coaching discipline rather than as a hard science. This is in agreement with Brooks et al. (2000) who state that strength and conditioning should be considered to be a coaching discipline rather than having an overemphasis on the hard science elements to the determent of interpersonal skills developed through experiences (Tod et al., 2012). In promoting an environment receptive to psychology there must be a shift from the scientific perspective to that of a fluid and developing career shaped by interpersonal experiences. Furthermore key psychological strategies associated with behaviour modification and skill

development must be addressed as important attributes for the strength and conditioning coach to effectively work as a coach.

6.4.4.3. Psychology title

With regard to the integration of psychology and the effect of both a negative perception towards psychology and an association with the clinical aspects of other strands of psychology, the proposal was made that the term 'psychology' was a limiting factor.

> *"It is changing over time and again depending on the code of sport and the athletes that are being able to use this, you could say that in some countries it is being used a lot differently now … They have got guys fully qualified that aren't sold a psychs they are sold as performance coaches working alongside, like right alongside, their athletes."*

The association with other psychology disciplines could be negatively impacting the receptivity of the athletes. Such a misperception has previously been identified concerning the analogy of ranging sport and clinical psychology discipline (Linder et al., 1991; Gee, 2010). Therefore, it is suggested to refrain from making psychology references until the perception changes. The negative athlete receptivity may provide a barrier to the integration of psychological skills however the distinction must be made that the example concerns qualified personnel. It is therefore possible that while changing the name of the discipline may make athletes more receptive it does not result in strength and conditioning practitioners being sufficiently qualified to implement psychological

interventions. Thus in limiting the use of terminology care must be taken to not overlook the required skill to implement psychological skills.

6.4.4.4. Continuing professional development suggestions

The respondents offered suggestions concerning what would be, in their experience, effective methods of developing skill in facilitating psychological strategies as part of applied strength and conditioning practice. Most prevalent was the theme that 'hands-on' practical experience was required.

> *"Well I'd like to, as I say if it was applied in a sports surrounding as opposed to just being based in a class room than I would say that would benefit me a lot."*
>
> *"… athlete contact. Not just being taught about it, actually doing it."*
>
> *"I think more towards how to implement strategies yeah I mean in terms of the theory and stuff. The strength and conditioning coaches I know, they read a lot and it wouldn't be beyond them to pick up a psychology book and read some of the theory behind it, but in terms of getting hands on with their athletes and stuff they could introduce with their coaching"*

Emphasis on the practical aspect would suggest that attention should be focused on the practical application with opportunities for interactions with clients rather than on the theoretical aspects of sport psychology (Kolt & Anderson, 2004; Ford and Gordon, 2004). Further elaborations indicated that in addition to the practical experience, a working partnership with an experienced sport psychologist would be beneficial in providing either a mentoring or shadowing function.

"Probably just working with a psych and getting to know them what they do and observing them understanding the hidden secrets of what they do. Unpicking the door and getting in there."

It is clear that there is the perception that there are skills required which are only attainable through experience in the applied field. Similarly the experiences of others gained through their experience appear to be a valuable resource in the guise of a mentor or consultant.

"I guess practical stuff sort of how you are going to implement them in your sessions a little bit more, showing more the practical side of psychology and how you can implement them in your sessions, So maybe there could a little bit more from the psychologist side saying this could have a really big benefit to your practicing. Maybe there is a market there for it?"

The suggestion that there may be a market would imply that a void exists concerning the potential for cross-discipline collaboration between strength and conditioning coaches and qualified psychologists. Furthermore, an important consideration concerns the application of psychological strategies and what instances would correspond to the potential for the application of a particular technique. With a broad and evolving range of scenarios present within strength and conditioning practice (Tod et al., 2012), it would appear that the practical supervision or mentoring would be suited to providing task-specific strategies and suited to promoting a flexible approach to employing psychological skills.

In supporting the need for opportunities for experiential learning there was support for the practice of critical self-reflection as has been identified as important within wider sports coaching (Cushion et al., 2003).

"I would say look to yourself, re-evaluate yourself and make a decision on what can benefit you as a coach what can make coach, or help you coach better what kind of tools do you have in that box that can help you coach better because ultimately and I say this and I say this a lot ultimately that young person comes to you with their hope their dreams their ambitions their Olympic dreams and you better have all the tools in the workshop to help them."

Through the use of reflective practice there is the notion that coaches are able to appraise their current skills and the situations they experience. This would allow the coach to rationalise the need for acquiring specific tools to facilitate strength and conditioning, and also review the application within applied practice and consequently shape practitioner skill development through learning on the job.

In addition to strategies concerning promoting and facilitating experiential learning, emphasis was also placed on the use of workshops.

"I think educational workshops might be a good idea"

The idea that in comparison to other areas of sport science relevant to practice there was a current lack of emphasis on the psychological components of strength and conditioning.

"I don't there are that many CPD (continual professional development) opportunities for S and C coaches that are psych driven. Like I don't have any recollection of seeing the sort of things the coaches do for CPD which is go on a day or a weekend workshop. I don't see those floating around in psychology for S and C coaches.

And I haven't looked but I am not aware of them. And that would be the reason why I think psych CPD is limited for S and C at the minute. There aren't those workshops available."

The idea was proposed that the lack of psychology workshops, in comparison to those supporting the development of other sub-disciplines, may reflect the perceived use of such strategies. As such the lacking emphasis on psychological strategies may be reflected in the perceived lack of importance of relevance within strength and conditioning.

"I think workshops are definitely the most direct. Like if people can see something explicit in a weekend that they can pay and turn up and take something away that is the quick learning opportunity that people tend to take more. Shadowing and those kind of things take a lot of commitment and investment and for a lot of the guys who are working heavy hours like that is difficult for them to be able to do. For a bit of toolbox that they would like to have but they don't see as stopping them doing their job at the moment so they don't see it as imperative but they see it as helpful."

The use of workshops is perceived as being the simplest and most direct source of information, and it is indicated that the workshops provide the quick learning opportunity. However, research has evidenced that workshops often prove ineffective in increasing the prescription of psychological strategies, nor a increased underpinning knowledge (Gould et al., 1990b). There is the notion that there is not the time available to engage with the on-going learning process. This may indicate a misconception that psychological competencies are quickly acquired thus care must be taken to ensure that *"the quick learning opportunities"* are followed up with appropriate support to allow the practitioner to employ psychological interventions within a safe setting

"Oh yes, yeah it think that first point would be the most effective way of doing it but other than that I guess trying to organise something within your club or with other S and C coaches within your area. I mean one of the advantages of me working at the university actually where there is quite a lot of strength and conditioning coaches under one place "

An interesting point concerning the use of workshops was suggested to be the collaborative nature of such events with a number of practicing strength and conditioning coaches able to pool experiences and resources. As such the contribution of various personal experiences within the workshops appears to be a valuable contributor of information, the amalgamation of professional strength and conditioning practitioners serving as an important information source (Tod et al., 2012). This suggests that rather than a specific 'tool box' of skills, it is the shared experience of varied scenarios which is of value (Tod et al., 2012).

6.5. Discussion

The present chapter endeavours to explore three key prime topic areas. These comprised the information sources that provide the psychology knowledge base within strength and conditioning, the factors and barriers which restrict the use of psychological techniques, and what changes are required to promote the use of psychology within applied strength and conditioning practice.

The psychology knowledge base present within strength and conditioning appeared to be shaped by broad-ranging sources, however the most prevalent method of developing psychological applications was through past experience. Tod et al. (2012) have previously suggested that strength and conditioning coaches develop a range of informal interpersonal skills with increased experience. Equally, Arvinen-Barrow et al. (2010) suggested that within physiotherapy there was the indication that knowledge and understanding of psychological strategies was shaped by the experiences of the physiotherapist rather than any formal structured training. The significance of developing awareness of the principles and application of psychology becomes relevant with direct reference to previous work (Chapter 3; Radcliffe et al., 2012; Radcliffe et al., 2013). Such work has shown that more experienced strength and conditioning coaches exhibit a greater frequency of psychological skills applications as part of their prescribed training protocols than their less experienced counterparts.

The importance of experiential learning is clear, with informal education comprising the coaching experience and the observations of others being considered the primary source of knowledge for sports coaches (Gould et al.,

1990a; Gilbert & Trudel, 2001; Cushion et al., 2003; Gilbert & Trudel, 2004). Corresponding findings are evident within the present research with a reliance on the use of experiences, observations, and personal interactions forming the major component of the knowledge base from which to integrate a psychological approach within strength and conditioning practice. Specifically the majority of coaching behaviours developed by the novice coach are developed through interactions within the applied setting (Cushion et al., 2003).

There was also the suggestion that past experiences gained whilst the coaches were themselves competing was an important source of information for the strength and conditioning coaches. Indeed athletes who have received prior exposure to psychological skills and strategies have been shown to present greater confidence in sport psychology and increased intentions to use psychological strategies (Gould et al., 1991; Martin et al., 2004; Zakrajsek & Zizzi, 2007). Despite the opportunity to develop such skills as an athlete themselves, the methods employed are shaped through the cultural influences, for instance coaching attitudes, and are subsequently embodied by the individual (Cushion et al., 2003), therefore future events are interpreted based upon internalised experiences. Consequently previous experiences have far-reaching consequences for the techniques employed whilst working as a strength and conditioning practitioner. Notwithstanding the potential shaping of perceptions from experiences prior to entry into the profession, it has been noted that within sports coaching the most significant information source originates in the practical experiences and observations of coaches irrespective of the entry pathway to coaching (Cushion et al., 2003).

Regarding the methods of acquiring knowledge and understanding, there was the notion that psychological skills were developed in a different manner to the disciplines of exercise physiology and biomechanics. Indeed Zakrajsek et al. (2011) suggest that inexperienced sports coaches bias their development towards the more traditional strands of coaching to the neglect of sport psychology. Such a distinction has implications for the development of appropriate applicable psychological techniques. This also highlights the importance of practical experience when acquiring psychological understanding but evidences a limitation in the structured development practices of strength and conditioning coaches. For instance a predominantly theoretical approach to the learning of sport science sub-disciplines would appear to be poorly aligned with development needs concerning the integration of sport psychology.

An observed criticism of the development practices within coaching has been the notion that insufficient intellectual skills are emphasised to promote independent and creative thinking and problem solving competencies (Jones, 2000). This undesirable outcome is hypothesised to originate in the separation of theoretical learning and practical learning processes and results in deskilling the practitioner with regard to personal interactions and cognitive processes (Jones, 2000; Potrac et al., 2000; Cushion et al., 2003). The separation of required skill sets comprising highly technical skills including biomechanics and exercise physiology, and the more interpersonal skills such as psychology, has resulted in the perception of the strength and conditioning discipline as a science with neglect to the interpersonal interactions fundamental to the coaching process. It is worth noting that aside from formal education, the most frequently accessed source of

information for coaches are scientific journals (Durell et al., 2003), highlighting the emphasis on underpinning scientific literature.

That is not to say however that psychological strategies and interventions are not scientifically grounded. Nevertheless as Cushion et al. (2003) contends, such an emphasis on the acquisition of scientific knowledge is at the cost of the interpersonal skills. This would suggest that for strength and conditioning coaches to be effective, the application of scientific knowledge must be contextualised, governed by personal and environmental differences. However without sufficient practical experience there are lacking opportunities to equip strength and conditioning practitioners with such skills to adopt psychological principles within the coaching domain. Clearly, in order to equip strength and conditioning practitioners with the requisite coaching skills, there must be grounding on personal interaction and sufficient opportunities for experiential learning.

With the proposed benefits of learning experience and indeed the interactions with others it is encouraging that there was emphasis provided to not only the practical experiences of the practitioner but also peer interactions. Such interactions comprised both active interactions through questioning and mentoring processes but also passive interactions such as observations. Similar observations are made within the coaching literature. For example, many of the coaching attitudes and behaviours obtained by the novice coach are thought to be gained via such informal sources (Cushion et al., 2003). It is through such interactions that inexperienced practitioners develop required skills and collective understandings begin to develop within communities (Cushion et al., 2003). Consequently, the

peer interactions exhibit an influence over the cultural norms and attitudes towards psychology within strength and conditionings.

Despite the emphasis on informal strategies there is a relative paucity of attention offered to the use of formal educational strategies such as university training or professional accreditation. Such a relative lack of attention could be indicative of the ineffectiveness of formal pathways in equipping the practitioner with the required psychological skill set. Thus whilst it is apparent that 'on the job' learning is the coaches' preferred method for the development of psychological techniques, the reasons accounting for the lacking focus towards the formal environment are intriguing. Such a lack of emphasis could come about due to the methods employed within formal education.

Clearly the role of the strength and conditioning specialist is multifaceted and complex, and as such challenges are met in incorporating all required elements within the curriculum. Therefore, whilst particular competencies such as knowledge and application of biomechanics and exercise physiology may be gained in comparatively shorter time frames owing to the scientific and discrete nature of such techniques, the development of competence in psychological interventions may take considerably longer due to the numerous and varied scenarios shaped by environmental and interpersonal factors. Thus it is possible that within a compressed time frame not only do practitioners have insufficient time to develop such attributes but similarly they don't have the sufficient opportunity to observe the effectiveness of employing such techniques. Therefore, psychological techniques may be perceived to be of less value and consequently a

reduced confidence in employing particular techniques is presented. The confidence in techniques is a prime component in shaping an individual's intentions to utilise psychological strategies (Anderson et al., 2004; Zakrajsek & Zizzi, 2007; Zakrajsek et al., 2011).

Whilst examining the information sources that comprise the psychological knowledge base has provided a valuable insight, it is important to explore the reasons which impact on the intentions to employ psychological strategies within strength and conditioning. Factors which were thought to account for the reasons why psychology is neglected consisted of both internal and externally governed conditions.

Evidence within this chapter supports the common theme throughout this body of research that suggested that there was a lack of knowledge of psychological strategies which limited the applications. This comprised two strands; firstly an appreciation of the value of psychology within strength and conditioning, but a naivety to the practical applications of psychology and, secondly, a misperception towards the effectiveness of psychology within strength and conditioning. Sullivan and Hodge (1991) have previously concluded that specific to sports coaches practicing within New Zealand, 73% of coaches believed they had insufficient knowledge regarding the application of sport psychology strategies. However, in addition to the findings being limited in terms coach nationality, the findings are also not specific to the specific strength and conditioning discipline.

There was a lack of understanding regarding the benefits of psychology within the strength and conditioning setting. Such a viewpoint is prevalent within sport. In particular there is the misperception that psychology would only prove useful should the athlete have a 'problem' (Ravizza, 1988; Van Raalte et al., 1992; Maniar et al., 2001) and there is little appreciable difference between sport psychology and other psychological disciplines (Pain & Harwood, 2004). It is evident that in particular cases, such a notion exists within strength and conditioning as is reflected in the present research.

Similarly there was the concept that psychological interventions are difficult to measure. Therefore, psychological interventions within strength and conditioning were perceived as ineffective to, either the strength and conditioning coach themselves, or to the senior stake holders who govern the professional practices of the strength and conditioning practitioner. Comparable findings have been evidenced within association football, in which the value of sport psychology was difficult to ascertain by senior personnel owing to challenges in measuring tangible benefits (Pain & Harwood, 2004).

The varying perceptions observed in the current research, which are indicative of either a lack of knowledge of practical applications or an under-appreciation of the value of sport psychology, is mirrored within the confounding results of wider sport psychology literature. For instance research has evidenced the perceived lack of effectiveness of sport psychology interventions (Ravizza, 1988; Van Raalte et al., 1992; Maniar et al., 2001; Pain & Harwood, 2004), yet when exploring the component factors which shape an individual's attitude

towards sport psychology there is evidence that confidence in sport psychology is high within the specific demographics of high school American football (Zakrajsek et al., 2011) and American collegiate swimming (Zakrajsek & Zizzi, 2007). This would suggest that within the specific contexts, coaches exhibit positive perceptions towards the effectiveness of sport psychology. Nevertheless the present research does indicate that there are two distinct knowledge-related barriers areas which must addressed; primarily attitudes towards the effectiveness of sport psychology and also subsequently the practical applications of sport psychology.

The confidence exhibited by the strength and conditioning coach towards psychological applications is vital, not least because practitioner confidence in psychological interventions is the greatest predictor of intentions to employ such techniques (Zakrajsek & Zizzi, 2007). It would be presumed that confidence is fostered by positive previous experiences, and as such it would prove beneficial for practitioners to have opportunities to observe and apply psychological techniques, with emphasis given to measurable benefits (Zakrajsek & Zizzi, 2007).

Sports coaches with less experience have presented a reduced willingness towards psychology than their more experienced peers (Zakrajsek et al., 2011). The reasons for this were accounted for by stigma tolerance, by which the increased occurrences of exposure to psychological interventions, either inadvertently or deliberately, by the more experienced coaches afforded greater opportunities to experience the positive benefits of sport psychology and thus

foster a positive attitude towards it. Similarly there was the notion that inexperienced coaches prioritise their professional development towards the development of technical and tactical skills. Furthermore there is the perspective that without exposure to psychology, inexperienced practitioners are in a state of unconscious incompetence through which they are unaware that that they lack the specific required skills (Zakrajsek et al., 2011). Ultimately, conclusions of the present work and existing literature direct towards the requirement for coaching staff to have greater exposure to psychological strategies.

Whilst not universal, there was the suggestion that psychology was not relevant within the training environment, but is rather the reserve of the competitive domain. The suggestion is aligned with the misperception that psychological strategies are not universally applicable, and are reserved for problem athletes encountering stressful situations. Such a notion is problematic not least because of the proposed importance of psychology within strength and conditioning (Chapter Five) but also because of the scientific rationale for the incorporation of psychology within the training setting. For instance, applying psychological strategies within both competition and practice, rather than exclusively in competition, has resulted in observable benefits to competition and perceived athletic ability (Thomas et al., 1999; Frey et al., 2003).

The notion that psychology is important within the physical training setting is important owing to the influences of mental state can exhibit during physical performance. Consequently, the integration of the psychological and physical must be viewed as a multivariate phenomenon rather than distinct

univariates (Gould et al., 1987a), therefore indicating the importance for coaching staff to possess the knowledge of psychological strategies and applications within diverse situations (Sullivan & Hodge, 1991). During training, an athlete aims to improve performance by practicing to improve transfer into a competitive environment (Frey et al., 2003). The dependence upon cognitive skills in competition suggests that there should be an equivalent use in practice. It is recognised that utilising cognitive techniques in practice, as opposed to exclusively in competitions, prevents detrimental performance resulting from using unfamiliar mental strategies (Weinberg & Williams, 1998). It is evident, therefore, that providing the opportunity to develop and refine psychological skills is vital for the athlete to be successful and consequently increased awareness of the applications within the training environment would be a worthy professional development objective.

An alternative proposal concerning the barriers to the application of sport psychology by strength and conditioning practitioners is the perception that it is not within the role responsibility of the strength and conditioning professional and the reserve of the psychology titled professional. Such a viewpoint presented by a selection of the interviewees could be considered problematic not least because as posed by the National Strength and Conditioning Association, a facet of the strength and conditioning role is to integrate psychological techniques within training (National Strength and Conditioning Association, 2009) whilst Gould et al. (1987a) emphasises the importance for coaches to be aware of interactions of physical and psychological determinant of performance. Nevertheless this does provide evidence that there are role boundaries positioned.

Problematic with such an attitude is the observation, evidenced in previous work (Chapter Five), that the predominant provider of sport psychology is either the strength and conditioning coach or the technical or head coach. As previously discussed, frequent athlete contact places the strength and conditioning coach in an effective position to provide psychological strategies should the requisite understanding of psychological interventions be present. Such a viewpoint is reflected in ranging disciplines (Wiese & Weiss, 1987; Wiese et al., 1991; Pearson & Jones, 1992; Gordon et al., 1998). Further support exists with the observation that sports coaches are the main provider of psychological skills to athletes (Sullivan & Hodge, 1991) with athletes favouring psychological input from coaching staff rather than psychology tilted professionals (Van Raalte et al., 1992). Moreover barriers associated with employing sports psychology titled professionals (Van Raalte et al., 1990; Linder et al., 1991; Van Raalte et al., 1992; Van Raalte et al., 1996) often results in the neglect of psychological skills as part of the athlete's development should alternative providers not be available. The period lapsed between the literature concerning the negative attitude toward sport psychology could suggest that such an attitude is less prevalent, however, it was implicit in the present research that athletes were still reluctant to engage with psychology services.

The strength and conditioning coach may perceive that they do not have sufficient knowledge to implement psychological strategies, however whilst the fact exists that perceived knowledge and understanding is a barrier to sport psychology interventions, it is also apparent that there is an ethical boundary which presents confusion of the responsibilities of the strength and conditioning

professional. Such a perception is supported within athletic training when the trainers deem that psychological input is outside their professional remit (Stiller-Ostrowski & Ostrowski, 2009).

Within the sport community questions have been posed relating to the blurred ethical boundary and what actions are accessible for sports coaches and what training or qualifications are necessary to enable professionals' to offer psychological support (Wilson et al., 2009; Zizzi et al., 2009). This is further exacerbated as limited guidelines address the application of mental skills within coaching (Zizzi et al., 2009). Clearly without sufficient knowledge and understanding, negative outcomes may arise could negatively impact on the likelihood of applying psychological strategies. Indeed, previous exposure and experiences are a prime influence of athletes' perceptions of psychology (Anderson et al., 2004; Martin et al., 2004) which would prove reassuring that strength and conditioning coaches are critical of their own competence in administering cognitive strategies as part of training. However the use of psychology should be promoted by clarifying the location of the ethical boundaries with clear guidance provided by accrediting bodies.

Concerning the increasing demand for psychological skills training (Weinberg & Gould, 2010a) and the unrealistic view that qualified psychology-titled professions provide psychological skills in their entirety (Danish & Hale, 1981), with appropriate role clarification, other support staff could be involved with teaching of psychological skills (Zizzi et al., 2009). This is evident within athletic training (Wiese & Weiss, 1987; Wiese et al., 1991; Brewer et al., 1994;

Ford & Gordon, 1998; Cramer & Perna, 2000), physiotherapy (Francis et al., 2000; Hemmings & Povey, 2002; Jevon & Johnston, 2003; Arvinen-Barrow et al., 2007; Hamson-Utley et al., 2008; Arvinen-Barrow et al., 2010), and sport coaching (Gould et al., 2002). This would be especially important concerning the financial and logistical barriers to employing a psychologist (Kremer & Marchant, 2002; Pain & Harwood, 2004) resulting in athletes being unable to receive the professional services of a sport psychology consultant. It is clear that, with appropriate role descriptors and boundaries positioned, strength and conditioning professionals can provide a valuable service to the athletes they support.

Thus far, predominantly internal factors have been discussed relevant to barriers to implementing cognitive techniques within training. However there was evidence that within the strength and conditioning domain, time availability is a predominant factor regulating the application of psychological skills. There was the concept that there was insufficient time to allow for the use of psychological skills despite the perceived importance of psychology. Similar findings are observed within physiotherapy (Arvinen-Barrow et al., 2010) and sports coaching (Creasy et al., 2009).

Additionally time restrictions are documented within strength and conditioning concerning the addition of extra responsibilities to the already complex role (Massey et al., 2009). It would appear that the demanding role of the strength and conditioning professional is time-poor, resulting in the prioritisation of responsibilities to the neglect of psychological interventions. Furthermore the concept of time restrictions is presented as a reason for not employing a sports

psychologist as this would detract from time afforded to other training requirements as has been observed in earlier research (Kremer & Marchant, 2002; Pain & Harwood, 2004). However such a perception that time is a barrier may be a manifestation of a misperception that psychology is not as effective a field of sport science as other areas.

Although it may initially appear that time is the limiting factor, it is likely that there is a lack of knowledge regarding the benefit of psychological interventions or strategies to integrate such strategies in conjunction to training sessions in a time-effective manner. Such a proposition for the development of strength and conditioning practice aligns with the suggestions of Wilding (2009) in which athletics coaches appreciate the value of applying such skills however lack the understanding of the mechanics of integrating such skills within training sessions.

The authority over coaching practice presents an external barrier to the use of sport psychology strategies by strength and conditioning coaches. There were instances where the practice of the strength and conditioning coach was governed by senior coaches or directors, and consequently the perceptions of senior colleagues appears to regulate the extent to which strength and conditioning coaches integrate and apply psychological principles. Previous research has examined the perception of stake holders and attitudes towards psychology consulting (Ravizza, 1988; Pain & Harwood, 2004; Zakrajsek & Zizzi, 2007; Wilson et al., 2009; Zizzi et al., 2009; Zakrajsek et al., 2011). Notwithstanding that research is focussed on the barriers towards the employment of sport

psychology consultants, with external financial and time barriers, the barriers concerning the perceptions of gatekeepers offer support to the present study and document the origin of such a barriers towards sport psychology.

Lacking confidence in psychological interventions has been observed as one of the greatest moderators of gatekeepers' intentions to employ sport psychologists (Zakrajsek & Zizzi, 2007). It could be presumed that lacking confidence in the ability of the strength and conditioning coach could account or reservations in permitting the integration of sport psychology within strength and conditioning training sessions. Furthermore stakeholders' misperceptions have been observed suggesting that psychology is not relevant. Ravizza (1988) noted the perception that psychology is only useful should an athlete appear vulnerable and consequently not applicable within coaching. Furthermore, more recently, athletic directors have presented the perception the psychological interventions are relevant only to 'problem athletes' (Pain & Harwood, 2004; Wilson et al., 2009). Similarly, there is the indication that psychology is common sense and not worthy of integration within coaching (Kremer & Marchant, 2002; Pain & Harwood, 2004). Evidently work is required to educate the senior staff as to the benefits of psychology.

In addition to the perceived lack of need of psychological skills, despite the perceived value of sport psychology (Wilson et al., 2009; Zakrajsek et al., 2011), sport psychology has previously been documented to be perceived as less important than other performance-related disciplines (Pain & Harwood, 2004; Wilson et al., 2009). Thus, when prioritising the duties of any coaching staff it is

likely that the integration of sport psychology would be neglected in favour of other sub-disciples and consequently guiding the emphasis to the strength and conditioning coach away from integrating psychology based components. Equally, the performance indicator-driven approach which may be adopted by high-ranking gatekeepers presents another problem with preventing strength coaches to use mental skills owing to the difficulty in measuring observable benefits resulting from such interventions, as has previously been observed in association football (Pain & Harwood, 2004). Consequently it is likely that increased value will be placed on strategies with easily measurable outcomes.

The final prevalent barrier to the incorporation of psychology based strategies considers the perception of athletes. The athlete's attitude is critical in influencing intentions to use psychological strategies and to adhere to psychological strategies (Martin et al., 2004) and therefore enabling the inclusion of psychology within strength and conditioning. Nevertheless the mixed athlete receptivity towards psychology observed in the present study is in agreement with previous research examining barriers to psychology.

It is evident that within sport coaching there is a stigma attached to the use of psychology. The present study would suggest that, whilst not universal, negative attitudes still exist that consider sport psychology to be applicable only for athletes with problems. The misconception prevails that sport psychology is synonymous with other mental health professions, for example psychotherapy and clinical psychology (Linder et al., 1991; Gee, 2010).

Stigma tolerance of athletes is broadly regarded as a limiting factor when considering the application of psychological skills (Martin, 2005; Zakrajsek & Zizzi, 2007; Wrisberg et al., 2009; Gee, 2010; Zakrajsek et al., 2011). Moreover fear of ridicule from peers has also been observed to negatively influence athletes' intentions towards sport psychology (Linder et al., 1991). Consequently it is likely that, in particular instances, negative attitudes of athletes are likely to inhibit the effectiveness of any interventions within strength and conditioning deemed to be psychological in nature.

Thus far the present chapter has examined the psychology knowledge base of strength and conditioning coaches and the barriers preventing the use of psychology within strength and conditioning. Such investigations serve as an important prelude to examining what is required to facilitate sport psychology within the strength and conditioning domain. With the apparent barriers concerning application and importance of sport psychology it would be pertinent to address the educational requirements to equip strength and conditioning coaches with the requite skill set.

With reference to the widespread psycho-educational needs of the range of disciplines within sport coaching (Gould et al., 1990a; Sullivan & Hodge, 1991; Gould et al., 1999b; Zakrajsek et al., 2011), athletic training (Ford & Gordon, 1998; Clement & Shannon, 2009), and physiotherapy (Arvinen-Barrow et al., 2007; Hamson-Utley et al., 2008; Arvinen-Barrow et al., 2010), existing literature has examined the curriculum with the specific interest in the application of

psychological strategies. The belief is prevalent that the educational need must be addressed, however despite the recommendation for the inclusion of psychology focussed modules within formal training (Arvinen-Barrow et al., 2007) there is a lack of support for the use of formal education and workshops. Direct comparisons between athletic trainers and physical therapists, with psycho-educational curriculum either compulsory or not depending upon the respective qualifications, have yielded findings to suggest that formal education has negligible benefits for the integration of psychological strategies or the perception of psychology when working with injured athletes (Hamson-Utley et al., 2008).

Specific to sports coaching, there is limited support for a psychological skills workshop with an initial increase in perceptions towards sport psychology, however such benefits were not sustained, and neither were changes in perceptions translated into increased application of psychological strategies (Gould et al., 1990b). Similarly attending a continual professional development programme does not consistently result in a positive change in perceived knowledge (Sullivan & Hodge, 1991; Gould et al., 1999b). However despite the perceived ineffectiveness of professional development workshops it is plausible that rather than not benefiting attendees' knowledge, attendees may become less naive concerning sport psychology and thus increasingly aware of lacking knowledge.

Reasons have been proposed regarding the lacking effectiveness of formal education. Possible reasons echo those observed in the present study. Primarily it

is the lack of a practical component which results in ineffective training programmes. Clement and Shannon (2009) have observed that development courses in psychology for athletic training do not require coursework and should coursework be required there is insufficient emphasis of the practical application of psychological strategies. Similarly, Kolt and Anderson (2004) have previously stated that much greater integration of practical applications is required within training coursework. Further support is provided as Ford and Gordon (1998) have suggested that not only is increased theoretical underpinning required, specifically concerning ethical boundaries, but also the integration of applied practice is imperative. It is noteworthy to clarify that the above instances specifically relate to the athletic training and physiotherapy domains, however it provides an important foundation as to potential pitfalls for proposed development measures. Specific to coaching education, there is also the notion that training programmes required increased elements of practical applications (Gould et al., 1990a; Lyle, 2002). Thus it is clear that a greater incorporation of practical applications of psychology is warranted within the strength and conditioning educational curriculum.

Fundamental to shaping habits, perceptions, and behaviours are previous experiences (Cushion et al., 2003). This aligns with the concept that the most influential informational source for professional development are embedded in past experiences and assistance from professional elders and those serving as mentors (Tod et al., 2012). With the evident importance of previous experience, structured development programmes must optimise the personal experiences of the strength and conditioning coach as a learning device. Examining professional

development trends within strength and conditioning, Tod et al. (2012) contends that the recent rise of the specialised discipline has resulted in professional development pathways being underutilised in comparison to observations from other helping professions for example there is a paucity of supervised experience pathways provided for the strength and conditioning coach. Similarly in amalgamating two of the most efficacious concepts of peer interaction and past experiences, it would be worthwhile to propose a structured mentoring programme as a professional development pathway.

Particularly pertinent to sports coaching, the UK Sport Council consider a close link between coaching practice and mentoring important (UKSportCouncil, 2001). Mentoring programmes are being encouraged with local authorities and national governing bodies employing such schemes for over a decade (Nash, 2003). However, mentoring that is observed within the sport coaching domain is, by and large, unstructured and informal (Cushion et al., 2003). The exception would be the accreditation process to become a *Sport and Exercise Scientist* offered by the British Association of Sport and Exercise Sciences. Such a process pairs aspiring sport scientists with proficient and appropriately qualified professionals. However, reviewing the accreditation processes, pathways to becoming an accredited or certified strength and conditioning coach appears to neglect a formal mentoring structure.

The benefits of mentoring are well documented as an effective development mechanism (Abell et al., 1995; Bloom et al., 1998), with structured and organised mentoring schemes perceived to be the most important component

in the development of sports coaches (Bloom et al., 1995). Furthermore from the early career perspective it is evident that mentoring itself is a skill required for career progression. Indeed, becoming a mentor is regarded as an established aid to career development (Scandura, 1992). Mentoring is beneficial for both parties within the mentorship, with mentors similarly receiving an educational benefit via a vested interest and critical reflection in behaviours of the mentee (Abell et al., 1995). It is, however, important that the mentor adopts a helping role rather than that of an assessor. Specifically the mentor should be positioned to serve as a critical friend to enable collaborative discussion concerning appropriate strategies within training. Being able to receive feedback and support for particular struggles are likely to increase an individual's confidence towards a particular technique, and thus positively influence intentions to apply particular psychological strategies within strength and conditioning (Martin et al., 2004; Martin, 2005; Zakrajsek & Zizzi, 2007; Zakrajsek et al., 2011).

Structured mentoring programmes would be well placed to create a broader skill set for the strength and conditioning professional. Such an increase in the roundness of psychological strategies skill sets possessed by strength and conditioning professionals are important with respect to the neglect of particular techniques previously observed (Chapter 5; Radcliffe et al., 2012; Radcliffe et al., 2013). The role of the mentor may serve an important role in addition to providing supervision of technical applications.

Social stigma has previously been observed to shape attitudes towards sport psychology (Linder et al., 1991; Martin et al., 2004; Martin, 2005; Zakrajsek

& Zizzi, 2007; Zakrajsek et al., 2011). Consequently, working with a mentor in a sufficiently highly regarded position, could potentially shape such reservations towards sport psychology grounded in cultural antecedents. Therefore as suggested by Cushion (2003), it is important for the mentor to hold an established and highly regarded position within the professional hierarchy.

The concept of self-reflection is important, and is identified within the present research and also within broader sports coaching (Cushion et al., 2003). Whilst the present research, and other studies (Cushion et al., 2003; Tod et al., 2012), emphasise the role of significant others and past experience this does however present the risk that observations and behaviours become habitual, and as argued by Cushion (2003), to the extent that behaviour are challenging to recognise, justify, and modify depending on a given scenario. Consequently, whilst past experience and social interactions are important, a mechanism must be positioned to provide coaches with a tool to observe and therefore rationalise their own behaviours and implications within ranging scenarios. Furthermore, Jones et al. (2004) suggest that coaches should question the underpinning assumptions on which practice is based. Critical reflection comprises justifying previous thoughts and actions and importantly how such behaviours and cognitions can influence future scenarios (Fernandez-Balboa, 1997).

It would appear that emphasising previous experiences with critical reflection is a promising solution to promoting sport psychology however the use of reflective practices may take several years to become an established development tool. Furthermore the integration of reflective practice strategies

within the strength and conditioning community would require the active and promoted engagement of highly regarded individuals within the strength and conditioning community possessing the ability to influence lesser experienced practitioners (Schön, 1987).

One proposed solution to the promotion of reflective practice within strength and conditioning considers the assessment methods. Current practical assessments that adhere to a predetermined standard are likely to cause anxiety and furthermore create an insular mentality within coaching (Fernandez-Balboa, 1997). Consequently, whilst it is imperative that a particular standard is achieved to ensure safe and competent practice, a valuable component of assessment would be the integration of personal reflection and peer assessment. Consequently, by self-evaluation and appraising the actions of peers, developing coaches become habituated to providing and receiving critical feedback (Cushion et al., 2003) which results in a "powerful and compelling learning experience" (Fernandez-Balboa, 1997, p. 136). Furthermore it is thought that through engagement with others and critical reflection that a greater emphasis is likely to be placed upon interpersonal skills (Tod et al., 2012) and consequently with time a cultural shift would move the perception of strength and conditioning from a scientific discipline to that of a discipline providing a range of interventions well positions within the ethical boundary.

Significant others possess a considerable amount of control over the use of psychological strategies. For instance, an athlete might perceive negative connotations to result from engaging with sport psychology interventions, or an

athletic director or senior coach may not value, and thus authorise, psychological techniques. Therefore development programmes should aim to engage significant others with specific focus on the benefits of psychology. In the early stages, where possible, it would be beneficial to promote a vicarious effect through presenting examples from within sport of success, relating physical developments to sport psychology. Furthermore it would also be beneficial to endeavour to quantify benefits from the applications of psychology in strength and conditioning practice. As a discipline, strength and conditioning is well suited to quantify the benefits of various interventions as evidenced in a spectrum of research (Fitzsimmons et al., 1991; Wells et al., 1993; Vance et al., 2004; Ford et al., 2005a; Catina, 2009; Marchant et al., 2009; McMahon, 2009; Lebon et al., 2010; Rucci & Tomporowski, 2010; Rymal et al., 2010). Such quantifiable benefits are likely to demonstrate the importance of psychology to athletes and stake holders alike, and practitioners would be well advised to attempt to express benefits of psychological interventions in performance-related measures.

Furthermore concerning the resistance of others regarding the association with other psychology-titled disciplines (Ravizza, 1988; Linder et al., 1991; Van Raalte et al., 1996; Pain & Harwood, 2004), an outreach programme would be beneficial to clarify the varying psychology-related disciplines. In addition to this, as proposed within association football (Pain & Harwood, 2004) and identified within the present research, it would be an effective strategy to refrain for explicitly referring to psychological interventions as psychology. Terms such as mental toughness training or simply performance enhancement strategies may be more applicable should a label be required (Maniar et al., 2001; Martin et al., 2004).

CHAPTER SEVEN

7. The Effects of manipulation of perceived goal difficulty on the execution of the hang power clean

7.1. Chapter Overview

The previous chapters have endeavoured to explore the specific strategies and the associated contexts in which psychology is used. Nevertheless, despite determining the most prevalent strategies within strength and conditioning there are limitations concerning the empirical efficacy of utilising particular psychological techniques. Similarly a barrier to utilising psychological interventions was identified as the difficulty in demonstrating the benefits of the intervention.

The present chapter shifts attention from the strength and conditioning coach to the athlete as a participants to attempt to determine the effectiveness of one prevalent psychological technique which was common in earlier chapters (Chapters Three and Four) specifically concerning the established concepts of confidence, goal setting, and the use of misinformation by practitioners. The chapter utilised the goad-standard performance measure of the maximal lift in one repetition (Baechle et al., 2008) to evidence the tangible benefits the strength and conditioning coach can elicit to an athlete's performance via psychological intervention.

The large range of constructs and practices evidenced throughout the research are beyond the scope of the present study to investigate the effectiveness

however the present chapter contributes to the psychology within strength and conditioning body of knowledge though investigating one particular strategy within the experimental setting. The current chapter determines the influence self-confidence has on the ability to perform a weightlifting movement, namely the hang power clean. It examines the presence of a performance barrier governed by self-confidence and addresses the use of client misinformation as a method to remove such barriers.

7.2. Introduction

Throughout the present body of work a range of psychological strategies has been discussed with ranging levels of understanding identified. Thus far the theses have contributed significantly in identifying barriers to the prescription of psychological strategies within the strength and conditioning environment, one such area being the difficulty in demonstrating tangible benefits from the use psychological interventions.

The gold standard test within strength and conditioning is considered to be the one repetition maximum lift often used to establish the process and training requirements of an athlete (Baechle et al., 2008). However, Gee (2010) contends that performance should be viewed in absolute and relative terms whereby relative performance is regulated by psychological factors. Thus it is pertinent to shift the participant from being the coach to the athlete in order to examine the extent to which objective quantifiable benefits to a ‘goal-standard’ performance measure can be instigated via the administration of psychological interventions.

Almost three decades ago, Biddle (1985) suggested that sport psychology would benefit from a psycho-physiological approach. Within psychological research the use of physiological outcome measures has lent itself to the psycho-physiological approach, apparent with numerous early studies utilising muscular power, strength, and endurance tests as outcome measures (Ikai & Steinhaus, 1961; Vidacek & Wishner, 1972; Weinberg et al., 1980a; Weinberg et al., 1981; Wells et al., 1993). Evidently, there is value to the strength and conditioning community in adopting a psycho-physiological approach within the present thesis. Adopting such an approach would emphasise the role that sport psychology can play within the multidisciplinary strength and conditioning profession, as the use of psychological strategies has been demonstrated to positively influence key variables which the strength and conditioning professional strives to develop, such as power, endurance and strength.

Strength and conditioning professionals strive towards developing resistance training programmes that focus on optimising muscular power development, with significant academic interest in the optimal loading to achieve the greatest training benefit (Kawamori & Haff, 2004; Cormie et al., 2007c; Bevan et al., 2010). For example, the optimal training load for generating peak power has been determined as 80% of 1-RM when performing the power clean (Cormie et al., 2007c) and 70% of 1-RM when using the hang power clean (Kawamori et al., 2005). However, there has been difficulty in establishing the optimal loading between loadings of 60% 1-RM to 80% 1-RM owing to challenges in identifying lacking significant differences in power production observed during the power clean (Comfort et al., 2012), and similarly no

significant differences were observed in power production across loadings ranging from 50% 1-RM to 90% 1-RM during the hang power clean (Kilduff et al., 2007). This would suggest that between 50% and 90% of the individual's maximum hang power clean performance, the physical loading has little influence on maximal power production.

Training should be specific to the demands of the sport whilst systematically and progressively increasing the physiological loads to intensities greater than that to which the athlete is accustomed (Baechle et al., 2008). The objective of strength and power training is to instigate physiological adaptations, however the effort required to bring about physiological adaptations is dependent on psychological components; one such component is self-confidence (Fitzsimmons et al., 1991; Wells et al., 1993; Wise, 2000). This is most commonly operationalised into the specific construct of self-efficacy (Wells et al., 1993). The construct of self-efficacy as conceptualised by Bandura (1986) is defined as the situational-specific belief that one can successfully execute the required actions to successfully complete a challenge, on which past performances accomplishments represent the greatest influence. Consequently, according to the self-efficacy model, athletes' own judgment on the likelihood of success is an instrumental component influencing the ability to maximise training loads and thus maximise physiological adaptations.

Self-efficacy and its effect on sporting performance have received a significant amount of academic interest (Ransom & Wienberg, 1985; Weiss et al., 1989; Wienberg & Jackson, 1990). However there has been less interest specific

to the strength and conditioning domain. Thus far, four studies have demonstrated the effect of manipulating athletes' self-efficacy on weightlifting performance (Ness & Patton, 1979; Fitzsimmons et al., 1991; Wells et al., 1993; McMahon, 2009). In such investigations, when participants perceived the task to be within their capabilities, performance was improved. In effectively identifying the presence of a psychological barrier to weightlifting performance governed by the athletes' own performance expectations, these studies support the hypothesis that athletes can be deceived into improving their performance.

Whilst it is encouraging that acute interventions can influence confidence and therefore weightlifting performance, the existing research has limitations. All studies of the effectiveness of misinformation on weightlifting performance have utilised protocols for testing maximal slow speed strength, specifically the one repetition maximum bench press (Ness & Patton, 1979; Fitzsimmons et al., 1991; Wells et al., 1993) and the three repetition maximum dead lift (McMahon, 2009). Given the focus upon maximizing the efficiency of power training, essentially focussing upon the rapid movement of the system mass comprising the athlete and the loaded bar, it is apparent that examining the effect of misinformation upon performance of a power exercise is pertinent and would be a beneficial and logical progression to further the self-efficacy research domain. The specific exercise in question is the hang power clean, a coordinated whole body movement generating high centre of mass velocity, high ground reaction forces, and high muscular power with kinematics closely replicating movement patterns and physiological demands of numerous sports (Rucci & Tomporowski, 2010).

Striving to increases power output is reported as one of the key objectives within strength and conditioning (Baker, 2001). Thus, owing to the documented importance of kinetic variables and the attempts to ascertain optimal training for maximising muscular power, rate of force development with regard to loading (Cormie et al., 2007c; Cormie & Flanagan, 2008; Bevan et al., 2010), and lifting technique (Comfort et al., 2011), it is surprising that there is a dearth of research examining the influence of psychological interventions of such significant kinetic variables. It would be presumed that owing to the increased vertical ground reaction forces that must be generated required to elevate a heavier mass (Cormie et al., 2007a), the increased effort associated with the increased perceived difficulty of the challenge would result in a greater resultant peak muscular power output.

The current investigation will expand on the findings of the present research which identified that goals setting was prevalent within strength and conditioning (Radcliffe et al., 2012; Radcliffe et al., 2013), however it is largely utilised on a macro level within programme planning (Chapter Four). Consequently there is a limited, albeit acknowledged, use of goal setting at the micro approach, in which goal setting is incorporating at a process level, with specific modification to individual training techniques. In addition it was evident that whilst confidence was critical to success, the integration of strategies to manage self-confidence were used to a lesser extent (Radcliffe et al., 2013). However, further qualitative exploration evidenced that goal setting was a technique closely aligned with confidence. Consequently the subsequent investigation will explore the

manipulation of goal difficulty and perceived expectations on a strength and conditioning exercise.

The aim of this study is to examine the perceived psychological barrier to lifting performance and the role of self-confidence and perceived capability during training using the hang power clean. The study will measure the extent to which misinformation and perceived task difficulty can influence total maximal lifting capability and also how perceived difficulty can result in kinetic variables such as maximal concentric power, maximal vertical ground reaction force and maximal rate of force development.

7.3. Hypotheses

The study hypothesised that:

- There will be a significant increase in the maximal lifting capabilities, measured by one repetition maximum (maximal bar mass lifted in kilograms (1RM)), when the participant is informed that the mass is less than the true mass, thus the perceived task difficulty is reduced
- There will be a significant increase in peak vertical ground reaction force (GRF_{peak}), measured in newtons (N), when the mass is perceived to be heavier that the true mass
- There will be a significant reduction in peak vertical ground reaction force (GRF_{peak}), measured in newtons (N), when the mass is perceived to be lighter than the true mass

- There will be significant increase in the rate of force development, measured in newtons per second (N/s), when the mass is perceived to be heavier that the true mass
- There will be a significant reduction in rate of force development, measured in newtons per second (N/s), when the mass is perceived to be lighter than the true mass
- There will be a significant increase in lifting power, measured in Watts (W), when the mass is perceived to be heavier that the true mass
- There will be a significant reduction in lifting power, measured in Watts (W), when the mass is perceived to be lighter than the true mass

7.4. Method

7.4.1. Ethical Approval

Prior to commencing the study the University of Salford Ethical Review Board provided approval for the experimental procedures. Prior to participation, all subject received an invitation email document containing participant information including a clear explanation of the potential benefits and risks associated with the research, how the data would be handled, the dissemination of findings, and the voluntary nature of the study. An email contact was provided for the lead investigator should any potential applicants request additional information. In addition to this health screening was conducted using participant self-report questionnaires (Appendix Four).

7.5. Research design

The research design employed was a within-subjects repeated-measures experimental design.

7.6. Independent variable

The independent variable was the perceived difficulty of the lift as perceived by the athlete performing the lift. This was manipulated via the use of misinformation to deceive the participant that the load was different to the true loading. The procedure for such is detailed within Chapter Seven.

7.7. Dependent variable

Pertinent to strength and conditioning practice is the generation of muscular power (Baker, 2001) and the need to provide incremental training intensities (Baechle et al., 2008). Thus the research selects the kinetic variable of peak muscular power, peak vertical ground reaction forces, rate of force development and maximum total mass lifted. Such variables are measured via the execution of the hang power clean exercise. This exercise is a coordinated whole body moment generating with kinematics closely replicating movement patterns and physiological demands of numerous sports (Rucci & Tomporowski, 2010). The rationale for such measures is further detailed in Chapter Seven.

7.8. Experimental pilot testing

To ensure the reliability of misinformation strategies, pilot testing was conducted to ascertain the appropriate data collection method and strategies. Owing to the use of forward dynamics to determine kinetic variables from the measurement of ground reaction forces (Hori et al., 2006), it was deemed that accurate data collection could not be achieved by pulling from the floor or the blocks. Thus the hang variant was used as this power clean variation most closely aligns with the power clean regarding technique and force production (Comfort et al., 2011).

Previous studies have occluded the true mass using blankets (McMahon, 2009) however for the present study participant debriefing and manipulation checks suggested that a simple, uniform instruction to enter the lifting platform without focusing on the weight plates was the optimal method. This was done via

informal interviews after the trials were completed during the pilot test. The use of blankets heightened levels of uncertainty and distracted lifting performance. Importantly the pilot testing revealed that the misinformation was detectable when the difference was greater than approximately 10 percent. This caused changes to be made to the extent of the misinformation so all deception was within a 10 percent boundary of the true weight.

7.9. Measure of kinetic variables

All lifting trials were performed with participants stood with both legs on a force plate (Kistler, Model 9286AA, SN 1209740). Participants were allowed to perform the warm up on the platform to serve as a familiarisation period. The force platform was interfaced with a laptop and data was analysed using Bioware (Version 3.22; Kistler Instrument Corporation) to obtain vertical ground reaction forces.

Peak vertical ground reaction forces were determined as the peak vertical ground reaction force observed during the concentric phase of the lift. Rate of force development was determined by dividing the difference between successive vertical ground reaction forces by the elapsed time between data readings (0.001 seconds). The data were smoothed using a moving average window of 400 milliseconds. Peak power was calculated using forward dynamics as this has been demonstrated to be the most reliable techniques for determining muscular power during the hang power clean (Hori et al., 2007).

Velocity of the system mass was determined at each time point during the movement as a product of time and acceleration : $v = \Delta a \cdot \Delta t$ where $\Delta a = a_{(i-1)} - a_{(i)}$ and $\Delta t = t_{(i-1)} - t_{(i)}$. Acceleration ($a$) was determined by dividing the vertical ground reaction forces (F) by the mass of the system (SM) at each time point (i): $a_{(i)} = F_{(i)}/SM$. Acceleration due to gravity was subtracted from the calculated acceleration data to ensure only acceleration from the execution of the lift was used to calculate velocity (Cormie et al., 2007b). Thus force-time data were analysed to determine the power applied to the system centre of mass (body and barbell), with power being calculated as the product of velocity of the system centre of mass and the vertical ground reaction force (Cormie et al., 2007b; Hori et al., 2007).

Such an approach to determining power is valid while measuring movements in which the barbell and the body do not move in parallel, for instance during the variations of the power clean exercise. For example, during the power clean, the bar has a greater displacement and velocity than the centre of mass (McBride et al., 2011). Methods utilising displacement data prove inaccurate when the bar and the body centre of mass move on separate and un-parallel trajectories (Hori et al., 2007). It should be acknowledged that using the force plate method, as in the present research, results in underestimation of power output due to the inability to account for barbell movement which is independent to the movement of the body (Cormie et al., 2007b). Nevertheless, the modalities of measuring power output, for instance derived from bar velocity, or system velocity have advantages depending upon the training objectives of the athlete. For instance throwing athletes and competitive weightlifting athletes would derive the greatest benefit from the data generated from the bar velocity, whereas in the

majority of sports in which training objectives concern the development of lower limb muscular power the optimal method would be derived from calculation incorporating the system mass (McBride et al., 2011).

Despite similarities in loading at which peak power is generated depending on the measurement technique with peak power observed at 90%, 90%, and 80% of 1- RM when measured using the data derived from the displacement of the bar, the body centre of mass, and the system, respectfully (McBride et al., 2011), there are variations in reliability associated with the techniques. For example, increased reliability was observed using the forward dynamics protocol with the system mass compared to that of other protocols (Hori et al., 2007). This was attributed to inconsistent power application to the bar compared to the more consistent application of ground reaction forces to the force platform (Hori et al., 2007).

7.10. Manipulation checks

Owing to the nature of the intervention being dependent upon the participant believing that the information provided is correct regarding the mass of the loaded bar, it is important to determine the validity of the intervention. This was done using manipulation checks to ensure the validity of the testing protocol (Fitzsimmons et al., 1991; Wells et al., 1993). After the final session, participant debriefing was conducted on a one-to-one basis between the researcher and participant. This required the participant to recall details of the study relating to the mass they were asked to lift. After this, participants were informed of the true nature of the study including details of the deception, and informed that they

should respond honestly should they believe the information provided did not correspond to what they believed they were lifting. At this point it was reiterated that participants had the right to withdraw should they wish to.

7.11. Deception and misinformation

In addition to the considerations regarding human participation in research, the present research would involve the use of misinformation and deception of participants. This is an important ethical consideration. The current BPS code of practice states that:

> *"In certain circumstances the aims of the research may be compromised by giving full information prior to data collection. In such cases, it should be made clear that this is the case in the information sheet and the means by which the withheld information will be given at the conclusion of data collection should be specified. The amount of information withheld and the delay in disclosing the withheld information should be kept to the absolute minimum necessary."(British Psychological Society, 2010, p. 18)*

> *"This Code expects all psychologists to seek to supply as full information as possible to those taking part in their research, recognising that if providing all of that information at the start of a person's participation may not be possible for methodological reasons. If the reaction of participants when deception is revealed later in their participation is likely to lead to discomfort, anger or objections from the participants then the deception is inappropriate." (British Psychological Society, 2010, p. 24)*

The research was not deemed to result in discomfort or anger from the participants. Furthermore the participants were informed that there was misinformation involved in the study and were fully debriefed concerning the rationale of the research. Participants were also informed that at any point,

including after the removal of the deception, data could be withdrawn. Ethical approval was granted by the College of Health and Social Care Research Ethics and Governance committee.

7.11.1. Participants

Ten healthy and recreationally active males (age: 25.4 ± 3.7 years; mass: 83.5 ± 6.2 kg; 1-RM: 80.44 ± 10.67 kg) regularly partaking in the power clean, and its derivatives, as a component of the undergraduate programme were recruited from the Undergraduate Sport Science population at the University of Salford. The number of participants was consistent with existing research (Cormie et al., 2007a; Comfort et al., 2011), enlisting 11 and 12 participants to measure variations in kinetic variables when executing the power clean. The age range is typical of that seen in elite and professional sports in which power is an important determinate of success (Hori et al., 2006; Bevan et al., 2010).

Participants were free from illness and injury, which was defined as having no musculoskeletal complaint or symptoms which prevented the participants' typical training routine. In addition prior to participation, participants were screened using a self-report questionnaire and provided informed consent.

Participants were defined as recreationally active having completed a minimum of 30 minutes of exercise a minimum of three times a week. In addition all participants were nearing the completion of the Advanced Strength and Conditioning programme at the University of Salford and had a minimum of two

years practicing the hang power clean activity and were deemed to be proficient by the module instructor.

7.11.2. Procedure

The participants were asked to wear the same footwear on all testing days, refrain from caffeine on the testing day, and refrain from strenuous exercise on both the test day and the preceding day.

Prior to lifting, participants were instructed to follow their typical warm-up routine. Then a task specific warm-up was used prior to the one repetition maximal attempt (Baechle et al., 2008). This comprised using lighter loads which enable the completion of up to ten repetitions. Subsequent conservative increments were made to the load with the agreement of the participant, with a four minute rest between lifting sets. With agreement with the participant and after a rest of four minutes the participant attempted their one repetition maximal lift. Participants were allowed to use any psychological method they would normally use but informed that this should be consistent across all trials. The attempt was deemed successful should the bar loaded with weight plates (Ivanco Olympic bar and weights, San Pedro, CA, USA) transition in one motion from proximal to the knees to stood upright with the bar 'racked' across the front of the clavicle and anterior deltoids (Earle & Baechle, 2008). Subsequent efforts, up to a total of six were allowed, separated by four minute rests, for the participant to achieve their one repetition maximal lift.

Familiarisation trials and all one repetition maximum attempts were completed with the participant standing on the force platform (Kistler, model 9286AA, SN 1209740, Winterthur, Switzerland) sampling at 1000Hz and interfaced with a laptop analysis using Bioware software (Version 5.1.1; Kistler Instrument Corporation) to measure vertical ground reaction forces. Participants were required to repeat the procedure a period of seven days later to allow between-sessions reliability to be measured. Participants' trials were conducted at the same time of day on each trial to prevent time-of-day effects (Wyse et al., 1994).

Peak Ground reaction force, power, and rate of force development were measured using forward dynamics as this has been demonstrated to be the most reliable techniques for determining muscular power during the hang power clean (Hori et al., 2006). Thus force-time data were analysed to determine the power applied to the system of body and barbell with power being calculated as the product of velocity of the system centre of mass and the vertical ground reaction force (Hori et al., 2006).

After a minimum of 48 hours after participating in the prior trial to allow sufficient recovery, participants were then informed that they were repeating the 1-RM test, however the participants were misinformed that the weight was 10% under the true weight. Care was taken to calculate the increments, as to align the true loading of 1RM+10% with the misinformation that that loading was the participants perceived 1-RM. Thus, the load was always within the participants' perceived capability. For instance when progressing towards the maximal attempt

participants were misinformed throughout the progressive trial as to believe they were lifting 10% less than they actually were. The true maximal load observed was recorded.

Finally, after a minimum of 48 hours participants were required to perform counterbalanced conditions of being misinformed that (a) the mass was heavier than the true mass and (b) the mass was lighter than the true mass. This utilised a loading of 80% of the participants' true 1RM. The loading of 80% was chosen as this has been reported to generate the greatest peak power during the power clean (Cormie et al., 2007a; Cormie et al., 2007c), furthermore research has evidenced little effect of the loading between the ranges of 50-90% 1-RM during the hang power clean (Kilduff et al., 2007). Participants were then informed that they would be performing three incremental sub-maximal one repetition trials of 70%, 75%, and 80% in one session, and three trials of 80%, 85%, and 90% in the other session. Thus two sessions whereby, after a warm, up sub-maximal lifts were performed in which the participant lifted the same mass, equating to 80% 1RM. However in one condition the participants believed they were lifting equal to and less than the true mass and in the other session the participant believed they were lifting equal to and above the true mass. The incremental sessions were used rather than randomised order to minimize the risk of participants detecting the misinformation owing to large variations in mass lifted. For instance the difference between 70% and 90% is more readily detectable than a 5% increase. Thus, considering the mean 1-RM of the sample, this 20% range could equate to a range of 16.1 kg

After the final session, participant debriefing was conducted to allow manipulation checks to ensure the validity of the testing protocol (Fitzsimmons et al., 1991; Wells et al., 1993). After which participants were informed of the true nature of the study including details of the deception. At this point it was reiterated that participants had the right to withdraw.

7.11.3. Analysis

Statistical analysis performed using SPSS (version 20.0; IBM Corporation, Armonk, NY, USA). This comprised measuring the reliability of the kinetic variables between each performance of the control tests using intraclass correlation coefficients (ICC). A t-test was employed to determine the presence of significant differences in maximal weight lifted between the control condition and the misinformed 1-RM condition. A one way repeated analysis of variance (ANOVA) with *post hoc* tests employing the bonferroni correction was used to determine differences in the kinetic variables between misinformation conditions. Pearson's correlation was performed to determine the correlation between the perceived loading (task difficulty) and the kinetic variables. For all statistical tests the alpha level was set to $p \leq 0.05$ with appropriate *post hoc* bonferroni corrections. Homogeneity of variance was determined using Mauchley's test of sphericity, effect sizes and statistical power calculations were performed using SPSS (version 20.0; IBM Corporation, Armonk, NY, USA).

7.12. Results

7.12.1. Reliability analysis

Reliability analysis was conducted using intraclass correlation coefficients (ICC). The kinetic variables yielded high between-session reliability scores (peak vertical ground reaction force r=0.913. p<0.001; peak power r=0.757. p=0.012; rate of force development r=0.842. p=0.03). The maximal weight lifted also yielded excellent intraclass reliability scores (r=0.992. p<0.001) indicating stability of both maximal lifting capacity and kinetic variables between testing sessions.

7.12.2. Maximum lifting capability

Maximum lifting capabilities was measured using the paired t-test to determine if significant differences existed between informed and misinformed conditions. The misinformed being the condition in which there was a 10% increase on the perceived loading. The results demonstrate that there was a significant increase (p=0.014) in the maximum weight lifted in the misinformed condition (82 ± 10.7 kg) compared to the control condition (80.4 ± 10.7 kg) with a percentage increase of 1.89% with an absolute difference of 1.55kg.

7.12.3. Kinetic Variables

The descriptive statistics (Table 7.1) demonstrate a trend in the kinetic data when compared to the perceived loading of the bar, despite the true loading of the bar remaining constant.

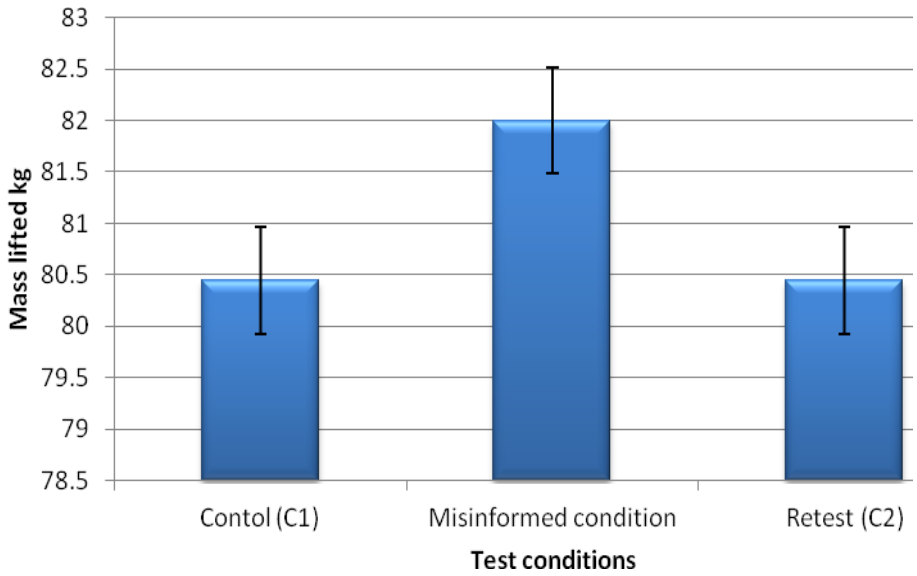

Figure 7.1 The mean maximal mass lifted (kg) for one repetition (1-RM max) generated during informed conditions (Control) and misinformed condition (reduced perceived difficulty)

Perceived loading (%1RM)	Peak Vertical Ground Reaction Force (N)	Peak power (W)	Rate of Force development (N/s)
70%	2827.00 ± 527.92	2912.66 ± 486.75	15600.55 ± 3543.70
75%	2877.68 ± 373.22	3259.56 ± 485.30	15023.16 ± 3792.96
80%	2946.14 ± 340.17	3376.57 ± 394.85	15884.06 ± 4053.04
85%	2931.81 ± 317.84	3546.01 ± 547.56	15678.36 ± 4044.81
90%	3003.15 ± 292.24	3661.30 ± 983.88	17388.23 ± 3524.54

Table 7.1 The mean and standard deviations of the kinetic data (peak vertical ground reaction force; peak power; rate of force development) at different perceived loadings expressed as percentage of establishes 1 repetition maximum (1-RM).

7.12.4. Peak vertical ground reaction force

The presence of significant differences in peak vertical ground reaction force was determined using a repeated-measures ANOVA. This compared conditions in which the participant was misinformed that the mass was less than the true mass. The ANOVA indicated the absence of significant differences ($p>0.05$) in all comparisons. Subsequent ANOVA also revealed no significant differences ($p>0.05$) when comparing conditions in which the participant was misinformed that the mass was greater than the true mass. The ANOVA indicated the absence of significant differences ($p>0.05$) in all comparisons.

Pearson's correlation evidenced the presence of a significant (p=0.006) positive correlation (r=0.954) between perceived loading and peak vertical ground reaction force.

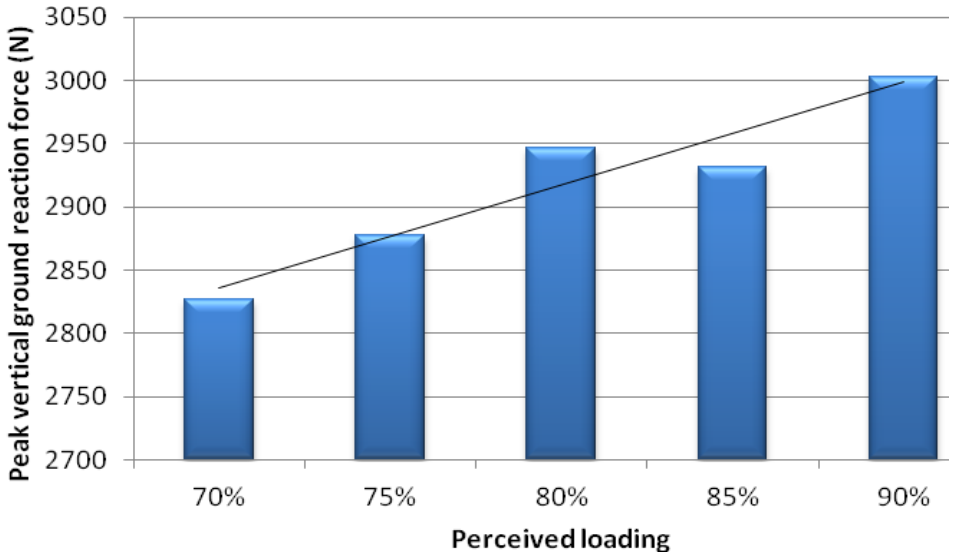

Figure 7.2 The mean peak vertical ground reaction force generated at differing perceived loadings and linear trend line.

7.12.5. Rate of Force development

Variation in the rate of force development was assessed for significance using a repeated measures ANOVA. This compared conditions in which the participant was misinformed that the mass was less than the true mass. The ANOVA indicated the absence of significant differences ($p>0.05$) in all comparisons. A subsequent ANOVA revealed no significant differences ($p>0.05$) when comparing conditions in which the participant was misinformed that the mass was greater than the true mass. The ANOVA indicated the absence of significant differences in all comparisons.

7.12.6. Peak muscular power output

Differences in peak power were compared using a repeated measures ANOVA, with subsequent *post hoc* analysis employing the bonferroni correction. This compared conditions in which the participant was misinformed that the mass was lighter than the true mass. The ANOVA indicated that there was a significant difference in the peak power output when the participant was misinformed ($p=0.004$). Post hoc analysis revealed that significantly less ($p=0.014$) muscular power was generated when the participant perceived they were lifting 10% less (2912.7 ±468.7W) than the true mass compared to when the participant was correctly informed (3376.9±394.9W).

The same test was conducted to establish the presence of significant differences when the perception exists that the mass is greater than the true mass. The repeated measures ANOVA presented no significant differences ($p>0.05$) in peak power when the participant believed that the mass is greater than the true

mass. Pearson's correlation identifies the existence of a significant (p=0.003) positive correlation (r=0.974) between perceived loading and peak power.

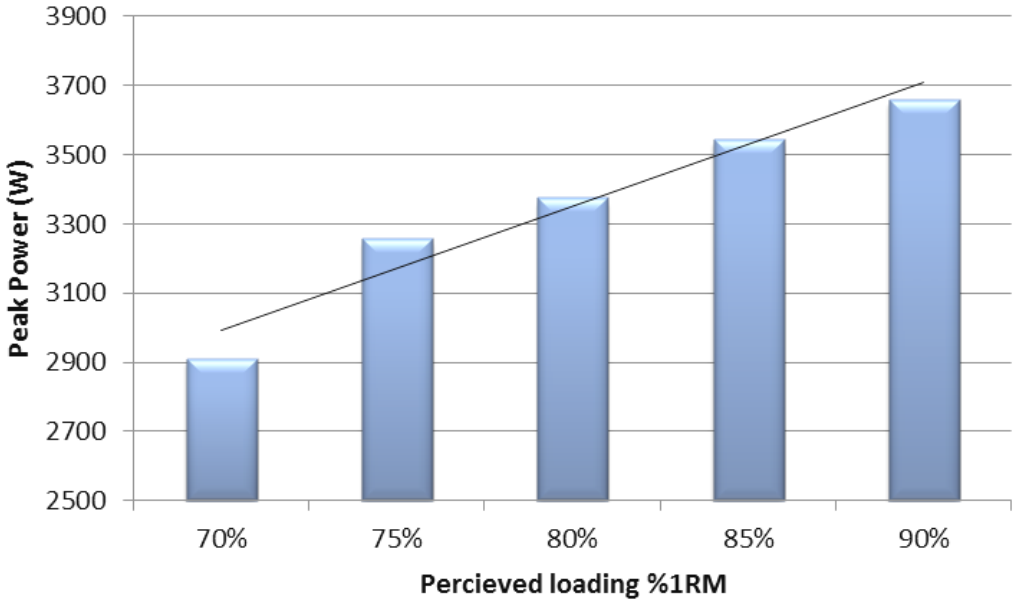

Figure 7.3 The mean peak power generated at differing perceived loadings and linear trend line

7.13. Discussion

The present research identified the existence of a psychological barrier to the successful execution of the hang power clean. This was evident in the significant difference between the mass successfully lifted when the participants were informed that it was within their capabilities, compared to when they were informed of the actual mass. This is consistent with previous research that showed an individual's lifting capacity can be increased by manipulating expectations of performance. (Ness & Patton, 1979; Wells et al., 1993; McMahon, 2009). Thus the present study would suggest the presence of a psychological component which governs physical performance. Indeed it is likely that the performance ceiling is governed by an individual's self-belief in completing the specific lift.

As proposed by Gee (2010), performance should be viewed with regard to both absolute capacity and relative capability; therefore presenting the psycho-physiological argument that absolute performance is dependent upon the physical capacity of an individual, which is in turn, regulated by the psychological component. This would then result in the observed relative capability of the individual. The implication of such an approach would potentially cast doubt over the use of the maximal repetition test as a physiological performance measure owing to the observed fluctuations under the absolute capacity ceiling.

It should be noted that, in real terms, the variation equated to only 1.55 kg or a 1.89% increase. This is considerably less than the 7.27 kg observed in a previous study with a change of 4.8% between informed and misinformed conditions (McMahon, 2009). It is important to consider that the significant

increases observed in the present study are greater than the smallest weight increment within competitive weightlifting and thus could equate to the difference between success and failure during both training and competition.

A potential reason for such a discrepancy in observed findings could be the exercise performed. For example, previous studies have utilised slow movements with a greater emphasis on strength; for example the bench press (Ness & Patton, 1979; Fitzsimmons et al., 1991) and the dead lift (McMahon, 2009). Contrary to previous research the present investigation utilised the hang power clean, a complex and rapid whole body movement generating high levels of power relative to the load. This would suggest that in the present study the relative performance either more closely resembled the absolute capacity or that the relative-absolute discrepancy is governed to a lesser extent by perceived capability when performing complex dynamic movements. It is possible therefore that the execution of the complex movement is limited more so by technical inefficiency than would be observed in research employing simple movements.

It should be noted that the present research had limitations. Potentially the most influential limitation was the lift that was chosen. For instance the movement chosen was the hang power clean. While it was valuable to progress the weightlifting misinformation evidence base incorporating high speed movements, the use of the weightlifting exercise was limited by the available equipment. The most reliable method of determining kinetic variables is through the use of forward dynamics via the measurement of ground reaction forces of the whole system mass (Hori et al., 2006). However although the hang power clean is

an established and effective method of training it meant that the participant began with the mass held suspended off the ground. Thus it is possible that in positioning the barbell in preparation for the lift participants may have detected an imbalance in the informed loading and the true loading. It should be noted that participant debriefing did not reveal that the manipulation was unsuccessful in deceiving the participants. Nevertheless future research would be advised to measure the effect of misinformation on Olympic lift using a sufficiently large apparatus to allow the barbell to be lifted from the ground.

The present research demonstrated the existence of a psychological component influencing the lifting performance. The mediating effect of cognitive variables has been widely documented in a variety of settings. One of the most common mechanisms is self-efficacy. Self-efficacy has been heavily researched in the sport performance domain and it is considered to possess considerable influence on athletic performance (Weinberg et al., 1980b; Bandura, 1986, 1997; Bandura & Locke, 2003; Gernigon & Delloye, 2003). Previous research has manipulated self-efficacy in a variety of ways for example the use of confederates and bogus norms, mental imagery, verbal persuasion, and modelling to demonstrate the correlation between self-efficacy and performance (Feltz et al., 1979; Ness & Patton, 1979; Wells et al., 1993; McNair et al., 1996; Wise & Trunnell, 2001; Wise et al., 2004; Feltz et al., 2008; Woodman et al., 2010). However, counter arguments suggest that self-efficacy is a result of successful actions rather than the cause (Heggestad & Kanfer, 2005). Thus whilst it is widely acknowledged that correlation is present between self-efficacy and performance,

there is disagreement regarding the causal link between them (Feltz & Lirgg, 2001).

The present study utilised previous accomplishments as a tool to modify efficacy expectations. Previous performance accomplishments are regarded as the most influential source of self-efficacy as they are based on the personal mastery experiences of the individual (Bandura, 1997). For instance the performance deception was used to ensure that the task demands were perceived to be within previously demonstrated capabilities. Consequently it is evident that the through the manipulations of efficacy expectations the relative performance can be increased when executing the hang power clean.

In examining the reasons accounting for the smaller effect observed compared to previous research, it is possible that the level of control the individual possesses over the successful execution may be a limiting factor. Bandura (1986) argues that when the previous accomplishment is completed with assistance, there have been repeated failures, or little progress; there is a reduced efficacy effect. Therefore it is possible that the perceived stability of the one repetition maximum performance may be factor contributing a lower efficacy effect. Such a phenomenon has been observed previously in athletic sprinting by which the stability of the previous achievements was observed to moderate self-efficacy and subsequent performance, thus unstable performance accomplishments had less effect on subsequent performance than stable past performance accomplishments (Gernigon & Delloye, 2003). This would suggest

that performance of a complex movement at maximal loadings could result in reduced self-efficacy based upon varied previous achievements.

Consequently, due to the complex nature of the hang power clean in comparison with the relative simple execution of the dead lift or bench press, there would be a greater level of uncertainty that the task could be executed and thus a reduced influence of past accomplishments on self-efficacy and subsequent performance. It is noteworthy that a limitation of the present study is that the past achievements of the experienced participants were not controlled for. As a result, achievements or failure prior to the study commencing could have affected the results of the current study.

The possible variability in past performance of the hang power clean as a mediator for efficacy strength compared to the simple execution of the slow speed lifts is a pertinent consideration and highlights an important concept for the use of misinformation to be an effective tool. That is the awareness of causal attribution and the locus of control, thus it is important to emphasise that the successful execution of the lift is within the control of the athlete. Indeed, Weiner (1985) suggested that causal attribution is a key consideration when addressing efficacy expectations.

A second aim of the current study was to investigate the effect of misinformation on important kinetic variables of the hang power clean. It was hypothesised that as the perceived mass increased so would the effort expended, which was presumed to be expressed in the kinetic variables of power, vertical

ground reaction force and rate of force development. The results yielded few significant findings when performing direct comparisons between groups, with only a significant reduction in power observed when the mass was believed, by the participant, to be 10% lighter that the true mass. This would indicate that within the training environment care must be taken to not misinform the athlete that they are lifting less than they actually are for risk of reducing the training stimulus.

The lack of more significant differences in between-conditions comparisons could be owing to the small percentage variations between groups or the number of participants being insufficient to yield significant results. This is similar to that observed in existing work investigating the optimal loading to generate the greatest power output (Kawamori et al., 2005; Kilduff et al., 2007; Comfort et al., 2012) in such studies differences in power output were observed however were not significant at the p=0.05 level. Thus the evaluation of the power, peak vertical ground reaction forces and the rate of force development generated during the hang power clean may be challenging to establish significant differences due to the complex nature of the movement.

Despite the absence of the expected significant difference at different perceived loadings, significant correlations existed between the magnitude of the power produced and the perceived mass of the bar. As the bar was perceived to be heavier the peak power generated increased. This finding was expected due to the investment of effort which is manifested in greater power production; however

such a finding is counterintuitive to the expectations grounded in the sport confidence theory.

Martens et al. (1990) has proposed the presence of a positive linear relationship between sport confidence and performance which is in agreement with the sport confidence model (Vealey, 2001). It would be expected that, according to the sport confidence model, as perceived mass increased the level of challenge would increase and subsequently result in lower self-efficacy, consequently resulting in reduced performance. This was not observed in the present results. More recently, work has demonstrated that the relationship between confidence and performance is curvilinear (Woodman et al., 2010) while other researchers have documented negative relationships between confidence and performance in shooting (Gould et al., 1987b) and golf performance (Hardy et al., 2004), thus casting doubt on the assumption that there is a linear relationship between task difficulty, confidence and performance.

It is possible that the present research, which only manipulated perceived task difficulty, may not have been sufficient to threaten the self-efficacy of the individual. The effect of the self-efficacy would heighten owing to the regularity of which the experienced athletes successfully lifted the sub maximal loading prior to completing the study. As proposed by Bandura (1986), the stability and control over previous related accomplishments will elevate the effect of self-efficacy. The perceived loading of 90% of the maximum capability was likely to be comfortably within the perceived capabilities of the individual; however, importantly there is more self-doubt associated with the higher loadings compared

to the lower loadings. It is interesting that self-doubt can improve performance only after a self-efficacy threshold has been surpassed, before which detrimental effects on motivation and effort are likely (Bandura, 1997). Consequently it appears that in the present study the required level of self-efficacy has been achieved, yet variable self-doubt moderated by the perceived loading is influencing the lifting performance. This would suggest that there is a minimal level which must be achieved before manipulating the perceived difficulty of the activity.

With specific regard to the notion that increased perceived task demands resulted in increased performance, this supports the review of Feltz and Woods (2009) in determining that the presence of doubt is important within the training environment. Termed preparatory efficacy, such an approach has been documented anecdotally whereby athletes have been influenced to believe they are weaker than their opposition to maintain training effort (Bandura, 1997), however little empirical research exists. Despite not directly measuring self-efficacy The present research contributes the self-efficacy based research in identifying that assuming the presence of set threshold of self-efficacy exists, increased task demands and, presumably, increased self-doubt can benefit performance. Nevertheless future research would be well advised to conduct self-efficacy scales.

Furthermore it is similarly possible that present research evidences the curvilinear or inverse relationship between efficacy and performance. Interestingly, the effect of efficacy has been observed to increase in demanding

situations with increased uncertainty to the extent that self-efficacy became the prime determinant of performance in stressful wrestling situations (Kane et al., 1996). Thus it would be expected that as the perceived difficulty increases, the effort mobilised increases accordingly owing to an element of self-doubt (Bandura & Locke, 2003). This has been evidenced previously using a skipping task (Woodman et al., 2010), however despite a performance increase associated with increased difficulty, the objective measures of effort produced no significant findings. Nevertheless, it should be noted that the authors presented reasons contributing to flaws in the method of assessing effort. The current project supports the increasing body of evidence rejecting a linear model between confidence and performance (Gould et al., 1987b; Vancouver et al., 2001; Vancouver et al., 2002; Hardy et al., 2004).

The current study documented significant correlations in the magnitude of both power and force generation and the perceived mass of the bar despite the true mass remaining constant. This is in agreement with previous research (Burgess & Jones, 1997) that has presented an upward concave curvilinear relationship between perceived effort and the mass of an object. Thus the effort required to elevate the objected increased disproportionately more than the actual mass of the object. However, figure 7.3 is typical of a linear relationship rather than a curvilinear relationship; nonetheless, the present study demonstrates that perceptions alone can influence effort mobilisation.

The present research has addressed the use of goal setting at a micro level. Goal setting is a multi-factorial concept, and thus there are many opportunities for

inconsistencies in the goal setting practice of strength and conditioning coaches. Such an approach is one example of the goals setting approaches that have been employed by the strength and conditioning practitioners interviewed (Chapter Four) in which a range of goal setting approaches were used, but were however limited at the micro or process level. The current experimental project suggests that there is value in the use of specific strategies within strength and conditioning practice. It should be identified that the prevailing concept of goal setting is multifaceted in nature and the present research only evidence the effectiveness of one particular mode of goal setting. In providing an educational requirement identified previously (Chapter Six), specifically quantifiably demonstrating the effectiveness of psychological interventions, future research should endeavour to conduct experimental research within the strength and conditioning setting with quantifiable outcome measures.

Regarding the practical applications of the misinformation intervention, the current investigation has demonstrated that within controlled conditions such an approach is effective in eliciting maximal performance gains. However, a case study would be of value owing to the deceptive nature of strategy. Consequently it is likely that there must be considerable trust between the practitioner and the athlete. This poses risks concerning breaching the trust through deception. Similarly the dilemma would exist for the practitioner as to when to, if at all, reveal the deception. For example, should the athlete successfully execute a lift, it would be beneficial to inform of the improvements as it would expected that self-efficacy would increase based upon previous accomplishments and therefore improve any subsequent performances. This may however impinge on the trust

between the athlete and the practitioners and thus cast doubt on future instructions. Equally, should the athlete fail a lift which they are informed is within the capabilities then the true weight must be disclosed to prevent the participant perceiving a performance decrease. This experimental study has documented the effectiveness of the intervention however such an approach must be used cautiously and infrequently.

In addition to the ethical issue of trust, a pertinent issue which must be highlighted is the potential risk of injury. The present study was conducted in a controlled setting with experienced and competent participants with care taken to ensure that incremental changes ware introduced gradually from a sub maximal level. It would certainly not be recommended to simply add a loading greater than established 1repertition maximum mass without gradually implementing such an intervention through progressive warm up repetitions. The consequences of causing an injury to an athlete through the use of deception, and thus not having the total informed consent of the athlete, could have significant implications with regard to the code of practice for the strength and conditioning coach (National Strength and Conditioning Association, 2009).

It would be worthy of future research to examine the effect when the perceived loading is not confined, to the same extent, within the perceived capabilities, for instance using greater perceived loadings. The present research would direct future researchers to the investigation of a multi-modal model investigating the effect of mobilised effort and the relationship with self-efficacy while performing lifting tasks. Specifically concerning the post execution

feedback, an interesting area for future research would be the role that reduced efficacy can possess within the training environment. For example, the role of doubt has been documented as being beneficial to performance (Feltz & Wood, 2009), thus there is the potential to manipulate feedback and goal difficulty to regulate self-efficacy downwards. Indeed the present research indicated that without specifically measuring participant efficacy, perceived task difficulty can have an impact on performance. It would remain to be seen whether a perceived failed attempt within the practice environment would result in an increased performance for the subsequent attempt. However, Bandura (1997) contends that self-efficacy should be tapered to increase as the competition approaches.

CHAPTER EIGHT

8. Conclusion and recommendations applied for practice and future research

8.1. Chapter overview

The present chapter concludes the thesis, summarising the key findings. The applied relevance of the project is discussed with particular attention afforded to the recommendations for future practice which have emerged. In addition, no single body of work can provide total knowledge, in acknowledging such, the limitations of the previous work are discussed and guidance is provided towards future research projects.

8.2. Summary of the research

The research project commenced with the objective of examining sport psychology within strength and conditioning from the perspective of the strength and conditioning professionals. This umbrella objective was operationalised into component aims to explore ranging facets of psychology use within strength and conditioning.

Chapter Three aimed to quantify the use of psychological skills and strategies by strength and conditioning practitioners, and identify the most important psychological elements specific to the strength and conditioning environment. The chapter identifies that strength and conditioning practitioners perceived that factors such as self-confidence and motivation were very important within strength and conditioning. The chapter was successful in identifying that strength

and conditioning coaches do employ psychological skills and importantly that there is variation in the frequency of psychological strategies usage. In particular the use of goal setting was prevalent whereas the use of more complex cognitive strategies such as mental imagery was promoted significantly less. Furthermore, this work provided an importantly foundation to examine the reasons as to the underlying reasons why particular strategies are employed.

Chapter Four was a continuation of the proceeding work in which a phenomenological approach was employed to explore the use of psychological strategies within strength and conditioning in-depth. This chapter reviewed the thematic emergences of the most resonant strategies and proposed that within strength and condoning practice the use of cognitive behavioural strategies form a triadic approach with emphasis on the improvement of self-confidence of the athlete, the regulation of arousal, and the use of promotion of technical skill acquisition. It was the promotion of psychological interventions to enhance the confidence of the athlete which was the most prevalent concept, specifically the application of goal setting. This provided credence to the previous work which identified the high usage of goal setting and the importance of self-confidence. However, importantly, the qualitative nature of the work afforded the ability to appraise the specific instances of psychological skill use and analyse the understanding of the strength and conditioning professionals concerning psychological interventions. It was evident that a lack of understanding was prevalent concerning the application of psychological skills and strategies; the sporadic and unstructured approach to employing psychological interventions was also visible amongst the strength and conditioning coaches interviewed.

With regard to the sporadic and unorganised approach to psychology by the strength and conditioning professionals, and the indications that psychology interventions are being employed without the requisite understanding that were observed in the present body of work, Chapter Five endeavoured to determine the psychological responsibilities of the strength and conditioning professional. The chapter also aimed to determine the main purpose of psychology within the strength and conditioning environment and where the provision of psychological strategies originates. The chapter revealed inconsistencies in the perceived roles and responsibilities of the strength and conditioning practitioners. This ranged from defined role responsibilities dictating the work of the practitioners to blurred boundaries in which practitioners adopted a range of psychological responsibilities.

There was the perception that the prime role of psychology was to allow the athlete to perform better within the competitive domain. Equally, psychological interventions were perceived as an important component of the athletes' development. Given the perceived importance of psychology, and the noted inconsistencies in the use of psychological strategies, it should be noted that the strength and conditioning professional believed that they were often a major provider of psychological interventions to the athletes.

With consideration of the perceived importance of psychology, the extent that strength and conditioning practitioners believed they are a major provider of psychological strategies, and the emergent notion that there is lacking

understanding of the application of psychology by strength and conditioning practitioners; Chapter Six examined what is limiting the use of psychology and the knowledge base on which strength and conditioning professionals inform their practice. This chapter provided a review of what specific changes are required to better inform the strength and conditioning community about the application of psychology within the strength and conditioning domain. Various factors categorised as either internal or external provided barriers to the use of psychological interventions. These comprised limited time, lack of responsibility within the organisational structure and, most prevalently, the lack of understanding of applications of sport psychology specific to the strength and conditioning domain. Most knowledge had been gained experientially and it was clear that there was a considerable void of continuing professional development opportunities specifically targeted towards the use of psychological interventions by strength and conditioning coaches.

Chapter Seven adopted an experimental approach to determine the effectiveness of a psychological intervention. Specifically misinformation was documented by some practitioners as a goal setting strategy within strength and conditioning. Furthermore, such a strategy was important as an example of goal setting on a process level targeting a specific training intervention. Whereas the majority of other examples were general and indicative of goal setting being a prerequisite and generalisable skill without specific links to training strategies on the micro level. Chapter Seven evidenced the applicability of such strategies in demonstrating quantifiable improvements in outcome measures important to strength and conditioning, specifically mass lifted, and power production after a

misinformation intervention. This work is important in evidencing the effectiveness of one such strategy and provides support for the use of quantifiable performance measures to demonstrate the effectiveness of interventions in promoting the use of psychological skills and strategies within strength and conditioning practice.

The present body of work comprises a series of thematically linked research projects and offers an initial and detailed examination of the use of psychological skills and strategies within strength and conditioning from the perspective of the strength and conditioning coach. The work documented the frequency of psychological skill usage, detailed the specific methods of integrating psychological interventions, and identified factors which contribute to the use of such interventions. It is evident from the research that there is the requirement for increased education concerning the application of psychology within strength and conditioning practice.

8.3. Recommendations for practice

The present research shows that there are inconsistencies in the use of psychological interventions. This was discussed as being due to the generalisable nature of some skills being regarded as almost a prerequisite skill which was able to be developed through the experience of the practitioner. Therefore particular specialist applications for instance mental imagery were neglected. It was evident that, when authorised to include a psychological component, it was the lack of knowledge of particular skills which was a limitation.

The lack of knowledge would suggest that it would be beneficial for strength and conditioning practitioners to be provided with training by appropriately qualified individuals into the inclusion of specific strategies. Such strategies should be centred on the three core themes of developing confidence in athletes, regulating arousal, and techniques to aid skill acquisition. Whilst it would be possible to integrate training into the accreditation process the dominant method of strength and conditioning coaches acquiring knowledge of psychological skills and strategies was via experience and would dictate that continual processes should be in place to reinforce and develop the understanding of psychological interventions. For instance, it was reported that practitioners have developed their knowledge via lived experiences and it is the observation of the benefits of psychological interventions which can govern intentions to employ such strategies. This would suggest the need for a continual programme in which individuals not only attended formal training but also have the opportunity to develop working partnerships with accredited sport psychologists. Thus such a mentoring partnership with a sport psychologist would be a valid recommendation allowing strength and conditioning practitioners to employ particular interventions within their role responsibilities in a regulated environment.

It was clear that for the strength and conditioning professionals there was disparity concerning the role responsibilities and the inclusion of psychology related roles. Thus, should the discipline wish to include psychological responsibilities, greater clarity will be required. For instance, the three accrediting associations included with the current body of work have differing role responsibilities and training procedures. Regarding the protected status of the

sport psychologist title and the highly regulated nature of the discipline, such an approach should be adopted within disciplines seeking to incorporate psychology within the discipline's scope of practice.

Clear guidelines should be issued describing what is within the ethical boundaries of the discipline, these should include particular cognitive behavioural performance-related interventions, presuming the knowledge exists, however distinctions must be made with the practices of other disciplines. In adhering to professional boundaries a key area to focus professional development would be the use of referral mechanisms to refer individuals to appropriately qualified individuals. Thus organisations should equally ensure that appropriately qualified practitioners are available as part of the referral mechanism.

Barriers to the inclusion of psychological interventions were reported as being primarily knowledge-based, however an important theme was that of the perceptions of others, particularly those of senior staff members and athlete clients. In some cases this was the enforcement of clear role boundaries preventing the use of psychology however it was also evident that the perceived value of psychology was underestimated in some cases. This would lead towards an educational programme aimed at targeting sports people informing of the benefits of psychology. Such a task is a challenge, primarily because individuals regulating the practice of the strength and conditioning coach are likely to also be organisational gatekeepers and thus appropriately qualified educators may have difficulty in accessing organisations.

The responsibility to demonstrate the importance of pertinent psychological interventions may be positioned with the strength and conditioning professional. Therefore the creative use of performance related quantitative parameters could be a useful method of demonstrating the benefits of psychology to organisational managers. As demonstrated in the current body of research concerning the experimental study into the application of misinformation, it would be beneficial for strength and conditioning coaches be informed of methods to evaluate the effectiveness of the interventions as part of their training.

Concerning the perceptions of athletes, it is evident that in some cases a misperception exists towards psychology; in particular there are still negative connotations linked to the term psychology. This would firstly suggest that, with the appropriate training, the strength and conditioning professional may be well positioned to apply select interventions with athletes receptivity increasing compared to when administered by a psychologists. Secondly, strength and conditioning coaches should be aware of the possibility that negative perceptions still exist and should reframe from the explicit reference to psychology during training.

8.4. Summary of recommendations

- There is a need for on-going CPD within the strength and conditioning profession
- There is a need for increased psychology inclusion in the strength and conditioning qualifications
- The must be greater ethical clarity concerning perceived responsibilities and role boundaries including referral mechanisms

8.5. Limitations of research

The present research had limitations. Firstly throughout the body of research participants were recruited on a voluntary basis. A convenience sample was used rather than the more robust method of random sampling. This could have resulted in a biased sample as it is likely that the participants had an interest in sport psychology and thus could have presented an increased use of psychological interventions or a more favourable perception towards psychology.

The mixed methods approach is an advantage of the research in which detailed follow up was conducted in support of preceding work. For instance the interpretive phenomenological analysis revealed results mirroring those of the survey, albeit in more detail. However the qualitative phenomenological approach is limited in providing generalisable findings which could be applied to the strength and conditioning community. Nevertheless the emergence of prevalent themes would suggest similarities across participant demographics and indicate that the core themes are similar throughout the strength and conditioning community.

8.6. Future research

A limitation of the research is the use of the survey instrument in Chapter Three. Whilst the internal validity of the tool was established, there was no existing research to provide normative data with which to contrast the frequency of psychological skills and strategy usage. Thus, in determining the relative frequency of psychological skills usage within the strength and conditioning profession there is no comparison to suggest whether this is greater or less than

other disciplines. Therefore, whilst distinguishing between strategies within strength and conditioning, there is no indication of how the frequency of interventions usage compares with that of other disciplines. Such comparisons could be useful in identifying areas of best practice in the promotion of psychology from other disciplines. Future research would be guided towards the replication of the study in which the psychological skills and strategies of professional from differing domains are quantified using the survey instrument.

The current body of work contributes to the currently limited evidence base concerning the use of psychological strategies within strength and conditioning. The present research provides recommendations for future practice regarding professional development considerations. Future research should endeavour to evaluate the effectiveness of such programmes and further inform the development of the discipline. Despite the use of various demographics comprising differing levels of career stages and experience levels, the current research is cross-sectional, and longitudinal studies are required to examine the changing perceptions towards the use of psychology within strength and conditioning. Such a longitudinal approach would be especially relevant in examining the effectiveness of professional development strategies.

A further area of future research concerns the perceptions of athletes within strength and conditioning programme. It was identified that the perceptions of the athletes are a limiting factor to the inclusion of psychological strategies. This is problematic and requires further research to explore the perceptions of athletes towards psychology within the strength and conditioning environment.

8.7. Conclusion

The work within this thesis has expanded the current knowledge within the strength and conditioning field. It is evident that psychological skills are used within strength and conditioning, however considerable inconsistencies exist in the use of psychology. It is apparent that the educational needs are not being met to sufficiently equip the strength and conditioning community to effectively practice psychological interventions. Equally it is evident that there are misunderstandings regarding specific role responsibilities and ethical boundaries. The multi-methods approach provides important recommendations for applied practice and how the discipline can proceed to effectively incorporate psychology as an expanding discipline.

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APPENDICES

Appendix One: The Strength and Conditioning and Sport Psychology Questionnaire - Items and coding

1. I allow my clients to train without having a specific long term objective for competition.

2. I consistently ask my clients to imagine successful past performances before training / competing.

3. I allow my clients to be verbally over critical of previous performances prior to competition.

4. I structure training to include potential distractions that may occur during competition.

5. I use specific physical strategies to help my client to relax prior to and during competition.

6. I attempt to employ strategies that prevent distracting thoughts affecting my clients training.

7. I do not employ strategies to help my athlete cope with sources of stress

8. Training and performance objectives are negotiated and set between myself and my client.

9. I am able to identify when my clients need to relax in order to optimally perform.

10. I use a variety of techniques to regulate the client's activation level when appropriate during training / competition.

11. I review with my client whether they have achieved their specific targets on a regular basis.

12. I allow my client to contribute to the content of their training programme to help them adhere to training programmes.

13. Along with my clients we set specific long term objectives for competition.

14. I try to reduce my clients self criticism prior to important competition.

15. Whilst in training I am aware of a need for my client to vary activation levels in relation to the requirements of the task and encourage this.

16. I am able to notice when my client is distracted during training and quickly get them back on task.

17. I consider high goal difficulty is a necessary aspect of successful Strength and Conditioning training.

18. I am able to identify potential negative sources of stress for my client in training and competition.

19. Managing the athlete's ego is important for optimum performance

20. I recommend that my clients practice energizing to the optimal level required for the best performance in training and competition.

21. I recommend that my clients use positive self talk prior to and during their performance.

22. I consistently ask my client to write down their accomplishments

23. I recommend that my clients imagine a high quality performance technique they are about to perform prior to execution.

24. I teach my clients to understand the positive and negative aspects of ego is important in my work.

25. I set all the training objectives; the athletes don't have any say.

26. I ask my clients to imagine they are watching themselves perform on a video replay following training.

27. After the event I encourage my client /athletes to evaluate what they did well during the performance.

28. I attempt to reduce excessive tension and anxiety with strategies immediately before performing in order to improve performance.

29. I attempt to utilise stress management strategies for stressful situations in training and competition.

30. The training programmes I prescribe contain demands that are outside the clients current comfort zone

31. When necessary, I use strategies to deal effectively with inflated athlete ego.

Coding sheet for the Strength and Conditioning Practitioner and Sport Psychology Questionnaire

1.	Goal Setting	Rev[1]
2.	Imagery	
3.	Self talk	Rev
4.	Attentional Control	
5.	Relaxation	
6.	Attentional Control	
7.	Stress Management	Rev
8.	Adherence	
9.	Relaxation	
10.	Activation	
11.	Goal Setting	
12.	Adherence	
13.	Goal Setting	
14.	Self Talk	
15.	Activation	
16.	Attentional Control	
17.	Mental Toughness	
18.	Stress	
19.	Ego	
20.	Activation	
21.	Self Talk	
22.	Self Confidence	
23.	Imagery	
24.	Ego	
25.	Adherence	Rev
26.	Imagery	
27.	Self Confidence	
28.	Relaxation	
29.	Stress	
30.	Mental Toughness	
31.	Ego	

[1] Indicates a reverse scored question

Removed questions after item reduction

1. I get my clients to remember specific cue words / phrases to trigger and improve their performance / technique.
2. I attempt to deal with setbacks constructively.
3. I notice goal commitments levels tend to change and accept this.
4. I don't expose my client / athlete to examples of good performances of my athletes / clients peers until it is absolutely necessary.
5. I voluntarily expose my client to examples of good performances of my client's peers.
6. I make no attempt to manage and regulate my client's ego
7. I accept that there are times when my client is rather anxious and tense whilst training and competing and don't intervene
8. I am able to stop stressful situations affecting training progress.
9. My client and I agree on goals that are relevant and achievable within each training session.
10. I recommend to my clients that they don't rehearse their routine in their mind before their performance
11. I discuss issues concerning adherence to training with my client when reviewing whether or not training or competition goals are achieved.
12. I have noticed that my athletes are prone to being distracted on a regular basis during competition or practice and accept this.
13. I promote a steady manner through training sessions with little change to the athletes' energy levels.

Coding for removed questions

1.	Self talk	
2.	Mental Toughness	
3.	Mental Toughness	Rev
4.	Self Confidence	Rev
5.	Self Confidence	
6.	Ego	Rev
7.	Relaxation	Rev
8.	Stress Management	
9.	Goal setting	
10.	Imagery	Rev
11.	Adherence	
12.	Attentional Control	Rev
13.	Activation	Rev

Appendix Two: Interview schedule and probes

- Could you tell me about your experience as a strength and conditioner?
    - *How long*
    - *Level of involvement with major sporting bodies*
    - *Level of athletes*
- What has shaped your use of psychology within your practice?
    - *Previous experience*
    - *Training*
- Given your previous training/experience, please could you look at the table and complete by marking on the scale the extent you uses the selected psychological interventions. (see table)
    - *Why do you use this strategy*
    - *Could you give an example*
    - *Why don't you use certain strategies*
- What would you describe as the main purpose of psychology within Strength and Conditioning?
    - *Effective/ineffective strategies*
- How important do you feel the provision of psychological strategies are to you athlete?
    - *Mental/physical discipline*
- How do you include mental strategies in your training?
    - *During S&C/ specific sessions*
- Are there any situations when you think psychology is/has been particularly important?
    - *Examples*
    - *Vary between athletes?*
- How effective do you feel psychological support is to your athletes
- Are there any times when it psychology has seemed ineffective?
    - *Why?*
    - *Has this changed perception towards psychology*
- Does anyone else provide support regarding mental skills to you athlete
    - *Coach – Psychologist – other support staff*
    - *How much*
    - *Who is the main provider*
- Do you believe your athletes are receptive of psychological support
    - *If no why not*
    - *Do you address this view?*
- What would you consider to be the overall view of the Strength and Conditioning community?
    - *Has it changed*
- In your opinion, why are psychological skills underutilised?
    - *Times when could have used but not – why*
- Given the importance of psychological strategies, why do you think it has been neglected in the past?
- What are the major obstacles to Strength and Conditioning practitioners using psychology in their applied practice?
- Should future development programmes incorporate the use of mental training skills?
- Now I would like to ask you some questions about including psychology as part of you continual professional development.
    - *What is required to be accredited*
    - *What is you CDP focus – disciplines (psych, physiology, nutrition...)*
    - *Is the use of psychology required – how*
    - *Would you be willing to devolve you use of psychology.*
        - *Best method to develop*

End

Appendix Three: Prompt for interview

Please mark with an 'X' the extent you use the following strategies, ranging from 'not at all' to 'all the time'.

	Not at all					All the time
Injury setbacks						
Regulating arousal						
Encouraging positive self talk						
Providing stress reduction strategies						
Preventing burnout and overtraining						
Dealing with issues such as adherence to training						
Using goal setting as part of a training programme or to prepare for competition						
Mental toughness training						
Attentional control maintaining the athletes focus						
Dealing with depression						
Regulating the athletes ego						

Appendix Four: PARQ participant screening form

University of Salford
A Greater Manchester University

Tick which type of exercise activity the subject will be participating in:

Maximal exercise ☐ Submaximal exercise ☐ Other ☐…….
(please specify)

1. Personal information

Surname : …… Forename(s) : ……...
Date of birth : ……..... Age : ……..
Height (cm) : ……..… Weight (kg) : …….……

2. Additional information

a. Please state when you last had something to eat / drink……...
b. Tick the box that relates to your present level of activity:
Inactive ☐ moderately active ☐ highly active ☐
c. Give an example of a typical weeks exercise:
……...
d. If you smoke, approximately how many cigarettes do you smoke a day……..

Please note: if you answer YES to any of the following questions, you will be asked to provide a letter from your GP before being allowed to participate in physical activity within the Human Performance Lab.

3.	Are you currently taking any medication that might affect your ability to participate in the test as outlined?	YES	NO
4.	Do you suffer, or have you ever suffered from, cardiovascular disorders? e.g. Chest pain, heart trouble, cholesterol etc.	YES	NO
5.	Do you suffer, or have you ever suffered from, high/low blood pressure?	YES	NO
6.	Has your doctor said that you have a condition and that you should only do physical activity recommended by a doctor?	YES	NO
7.	Have you had a cold or feverish illness in the last 2 weeks?	YES	NO
8.	Do you ever lose balance because of dizziness, or do you ever lose consciousness?	YES	NO

9.	Do you suffer, or have you ever suffered from, respiratory disorders? e.g. Asthma, bronchitis etc.	YES	NO
10.	Are you currently receiving advice from a medical advisor i.e. GP or Physiotherapist **not** to participate in physical activity because of back pain or any musculoskeletal (muscle, joint or bone) problems?	YES	NO
11.	Do you suffer, or have you ever suffered from diabetes?	YES	NO
12.	Do you suffer, or have you ever suffered from epilepsy/seizures?	YES	NO
13.	Do you know of any reason, not mentioned above, why you should not exercise? e.g. Head injury (within 12 months), pregnant or new mother, hangover, eye injury or anything else.	YES	NO

Please note: if you answered YES to any of the above questions, you will be asked to provide a letter from your GP before being allowed to participate in physical activity within the Human Performance Lab.

INFORMED CONSENT

The full details of the test have been explained to me. I am clear about what will be involved and I am aware of the purpose of the test, the potential benefits and the potential risks.

I know that I am not obliged to complete the test. I am free to stop the test at any point and for any reason.

The test results are confidential and will only be communicated to others once the data is fully anonymized, with no identifiable individual data.

I agree that the data being collected can be used within a research project (tick as appropriate) :
Yes ☐ No ☐

Signature of Participant : ..…… Date : ……...

Name of Supervisor : ..……..
Signature of Supervisor : …… Date : ……..…..

If this questionnaire was not completed and countersigned immediately prior to the test, the subject must complete this section.

I certify that none of the above information has changed since I completed this questionnaire.

Signed : ……..…… Date : ……...

Appendix Five: Approach email for interviews

Dear [insert name]

You recently completed a survey regarding your use of psychology within your strength and conditioning practice. Many thanks for your help with this project, interesting results emerged which we are currently aiming to get published in the very near future.

In the survey you indicated that you would be willing to participate in a follow up study and provided an email address. We are currently recruiting for the follow up study which consists of interviews and would greatly appreciate your help.

The interview will be about how you use psychological strategies and the benefits as well as what more you think can be done to improve the effectiveness of using such strategies. The interview would last approximately an hour but you would be able to stop at any point.

As per the survey, the interviews have full approval from the University of Salford ethics committee. The interviews will be tape recorded before being transcribed by myself. You would receive a copy of the transcript to validate prior to any data being analysed and you will be able to recall any information should you wish. All information will be destroyed upon completion of the study and will be held securely within a secure room at the University of Salford (UK).
Thematic analysis will be used to identify common themes and trends within responses; if selected quotes are used anonymity will be assured with pseudonyms used in necessary.

It is hoped that face to face interviews are used; however it is impractical to do so in certain situations. In such cases, for example if you live outside the North of England, would it therefore be possible to use recorded telephone interviews or preferably Skype?

Please respond to this email to indicate interest. In your reply please state if you have access to Skype or if it is better to use telephone interviews.

Should you require more information please don't hesitate to reply.

Once again many thanks for your help with the 1st stage study; I hope you can help with the follow up.

Kind regards,
Jon Radcliffe

Appendix Six: Example approach letter to the strength and conditioning organisations

Jon Radcliffe BSc (Hons)
Directorate of Sport, Exercise & Rehabilitation
Room C701 Allerton Building
School of Health, Sport & Rehabilitation Sciences
Frederick Road Campus
University of Salford
M6 6PU
(+44 / 0)161 295 6610
J.N.Radcliffe@edu.salford.ac.uk

National Strength and Conditioning Association
1885 Bob Johnson Drive,
Colorado Springs,
CO 80906

To Whom It May Concern

My name is Jon Radcliffe; I am currently undertaking my PhD thesis. This contains Doctoral level research into how various psychological skills are used and viewed by strength and conditioning practitioners. The research will explore how accredited practitioners use psychological skills as part of the training programmes they prescribe. I hope you will be able to help.

It is only recently that Strength and Conditioning has been considered a stand-alone discipline. A specialised subject, albeit a descendent from the traditional Exercise Physiology discipline. As such, the basis for prescribed strength and conditioning interventions are founded on research solely within the exercise physiology domain.

Historically, within the UK, Strength and Conditioning Specialists have been practicing as accredited sport scientists as a member of the British Association of Sport and Exercise Scientists (BASES) originating from within a physiological or interdisciplinary perspective. However, the recent introduction of the United Kingdom Strength and Conditioning Association (UKSCA) has provided a separate organisation and alternative pathways to gain accreditation in the specific discipline of Strength and Conditioning.

Researchers consider it would be of benefit for Strength and Conditionings Specialists to apply psychological concepts such as imagery, goal setting, motivation, and self-talk to their clients' individualised programmes. Previously, psychological interventions consisting of relaxation, self-talk, and imagery have been the primary focus of Strength and Conditioning research demonstrating acute effects on performance in a conditioning setting. However, it is apparent that research has neglected to explore the use or effectiveness of a broader variety of applied interventions used by the strength and conditioning profession.

At a recent BASES Strength and Conditioning Special Interest Group (SIG) meeting (September '08), the following points were raised about the under representation of psychology within Strength and Conditioning:

> *"Psychological factors in strength and conditioning seem not well recognised and this may be because:*
>
> 1. *Psychologists do not have the knowledge to apply psychological strategies in useful ways within Strength and Conditioning,*
> 2. *Strength and conditioning professionals do not get an adequate understanding of psychology during their training.*

What are some of the psychological factors that contribute to success in strength and conditioning programmes and how have members learned about them and tried to use them?" Todd (2008)

As yet, no research findings have been published to provide any evidence of how psychological skills and strategies are employed by strength and conditioning practitioners and if they have the necessary competencies to successfully employ them into their work. This study will provide much needed evidence on such matters of professional development and offer direction to the areas which can be developed within Strength and Conditioning practice.

It is anticipated that the findings of the present study will benefit the current members of the Strength and Conditioning fraternity and upcoming members with the ambition to be a part of the Strength and Conditioning community by highlighting areas that may be under-utilised and the reasons why, therefore enabling current and future practitioners to receive training to benefit their practice and continued professional development.

The study will follow a survey design in which Strength and Conditioner Practitioners worldwide will be approached. The survey will be sent to all accredited Strength and Conditioning Practitioners from the UKSCA, BASES, ASCA and with your support the NSCA. The instrument will be in an electronic format enabling the participant to simply complete and submit the questionnaire online. The survey will require participant informed consent and will follow the rigorous confidentiality guidelines set by the University of Salford.

The present study will use a survey instrument constructed by myself, albeit based upon similar, previously validated instruments. The instrument will ask the participants to rate the extent to which they include psychological strategies within the training programmes they prescribe as well as the perceived effectiveness and importance of including a particular skill in a training programme. The study has been granted complete ethical approval from the University of Salford ethics panel.

Upon completion the study, a follow up study will use semi-structured interview techniques explore in-depth responses from a small selected group of participants that completed the survey. These will be conducted by myself in the form of two-way recorded telephone interviews and again comply with the confidentiality guidelines having been granted full ethical clearance by the University of Salford ethics panel.

It is hoped that with the endorsement of the NSCA, participant response rate will be increased, in turn increasing validity of the findings of the study. I hope that you will be able to provide me with access to correspondence details containing an active e-mail address of your accredited strength and conditioning members.

Your participation will be very much appreciated and should you have any questions or comments the lead researcher can be contacted at the above address.

Yours Sincerely,

Jon Radcliffe.

Appendix Seven: Letter to participants

Jon Radcliffe BSc (Hons)
Directorate of Sport, Exercise & Rehabilitation
Room L701 Allerton Building
School of Health, Sport & Rehabilitation Sciences
Frederick Road Campus
University of Salford
M6 6PU
(+44 / 0)161 295 6610
J.N.Radcliffe@pgr.salford.ac.uk

To Whom It May Concern

My name is Jon Radcliffe; I am currently undertaking my PhD thesis. This contains Doctoral level research into how various psychological skills are used and viewed by strength and conditioning practitioners. The research will explore how accredited practitioners use psychological skills as part of the training programmes they prescribe. I hope you will be able to help.

It is only recently that Strength and Conditioning has been considered a stand-alone discipline. A specialised subject, albeit a descendent from the traditional Exercise Physiology discipline. As such, the basis for prescribed strength and conditioning interventions are founded on research solely within the exercise physiology domain.

Researchers consider it would be of benefit for Strength and Conditionings Specialists to apply psychological concepts such as imagery, goal setting, motivation, and self-talk to their clients' individualised programmes. Previously, psychological interventions consisting of relaxation, self-talk, and imagery have been the primary focus of Strength and Conditioning research demonstrating acute effects on performance in a conditioning setting. However, it is apparent that research has neglected to explore the use or effectiveness of a broader variety of applied interventions used by the strength and conditioning profession.

As yet, no research findings have been published to provide any evidence of how psychological skills and strategies are employed by strength and conditioning practitioners and if they have the necessary competencies to successfully employ them into their work. This study will provide much needed evidence on such matters of professional development and offer direction to the areas which can be developed within Strength and Conditioning practice.

It is anticipated that the findings of the present study will benefit the current members of the Strength and Conditioning fraternity and upcoming members with the ambition to be a part of the Strength and Conditioning community by highlighting areas that may be under-utilised and the reasons why, therefore enabling current and future practitioners to receive training to benefit their practice and continued professional development.

The study will follow a nationwide survey design in which all Strength and Conditioner Practitioners in the UK will be approached. The survey will be sent to all accredited Strength and Conditioning Practitioners within the UK. The instrument will be in an electronic format enabling the participant to simply complete and submit the questionnaire online. The survey will require participant informed consent and will follow the rigorous confidentiality guidelines set by the University of Salford.

The present study will use a survey instrument constructed by myself, albeit based upon similar, previously validated instruments. The instrument will ask the participants to rate the extent to which they include psychological strategies within the training programmes they prescribe as well as the perceived effectiveness and importance of including a particular skill in a training programme. The study has been granted complete ethical approval from the University of Salford ethics panel.

Upon completion the study, a follow up study will use semi-structured interview techniques explore in-depth responses from a small selected group of participants that completed the survey. These will be conducted by myself in the form of two-way recorded telephone interviews and again comply with the confidentiality guidelines having been granted full ethical clearance by the University on Salford ethics panel.

The survey is in electronic format and will only require the distribution of an electronic URL link to the questionnaire which is already in place and can be found below. It is hoped that with the endorsement of the British Association of Sport and Exercise Sciences and help provided in electronically distributing the survey instrument, participant response rate will be increased, in turn increasing validity of the findings of the study.

Your support will be very much appreciated and should you have any questions or comments the lead researcher can be contacted at the above address.

Yours Sincerely,

Jon Radcliffe.

Survey link - http://www.survey.bris.ac.uk/salford/s_and_c_prac_psych

Appendix Eight: Informed consent form – Interviews

The use of Psychology within Strength and Conditioning

Name of Researcher - Jon Radcliffe

- Jon Radcliffe, who is a Post-Graduate Research (PhD) student from the Centre for Applied Health and Psychological Research at the University of Salford, has requested my participation in a research study. My involvement in the study and its purpose has been fully explained to me.

- I understand the requirements of the study and my involvement and the possible benefit of my participation in this research

- I have been informed that I will not be compensated for my participation.

- I understand that the results of this research may be published but that my name or identity will not be revealed at any time. All data I provide will be marked as Strictly Private and Confidential. In order to keep my records confidential, Jon Radcliffe will store all information as numbered codes in computer files that will only be available to him.

- Understand that selected quotes that I provided may be published although anonymised.

- I have been informed that any questions I have at any time concerning the research or my participation in it, will be answered by Jon Radcliffe and I can contact him at J.N.Radcliffe@edu.salford.ac.uk

- I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions and these questions have been answered to my satisfaction.

- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and that I can recall the information I provide

- I understand that the interview will be digitally recorded

- I agree to take part in the above study.

_____ _____ _____

Name (Participant) Date Signature

_____ _____ _____

Name of (Researcher) Date Signature

Appendix Nine: Informed consent form – misinformation lifting study

University of Salford
Health, Sport and Rehabilitation Sciences
Centre for Rehabilitation and Human Performance Research
Informed Consent Form

- Jon Radcliffe, who is a Post-Graduate Research (PhD) student from the Centre for Applied Health and Psychological Research at the University of Salford, has requested my participation in a research study. My involvement in the study and its purpose has been fully explained to me.

- My participation in this research will involve me to complete 4 maximal tests on the one repetition hang power clean over the course of 4 weeks. At the start of my training session but after a standard one rep max test warm up I will be required to complete a 1 repetition maximum hang power clean. I will be required to complete a total of four maximal trials as part of the study over a four week period. I will be unaware of the exact maximal weight I attempt but I have been informed it will be around my established one repetition maximal lift.

- I am expected and required to attend the training session in which I will be tested fully hydrated, having maintained my usual nutritional intake and well rested having not performed any heavy training for at least 24 hours preceding my 1 rep max attempt.

- I have been informed that this research does not involve any additional risk that does not occur normally during maximal lifting activity.

- I understand the requirements of the study and my involvement and the possible benefit of my participation in this research

- I have been informed that I will not be compensated for my participation.

- I understand that the results of this research may be published but that my name or identity will not be revealed at any time. All data I provide will be marked as Strictly Private and Confidential. In order to keep my records confidential, Jon Radcliffe will store all information as numbered codes in computer files that will only be available to him.

- I have been informed that any questions I have at any time concerning the research or my participation in it, will be answered by Jon Radcliffe and I can contact him at J.N.Radcliffe@edu.salford.ac.uk

- I have read the above information. I understand the nature, demands, risks, and benefits of the project and I agree to participate in this research. However, I understand that I may withdraw my consent and participation at any time without objection from the researcher.

_____ _____ _____

Name (Participant) Date Signature

_____ _____ _____

Name of (Researcher) Date Signature