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The Impact of Sport Psychology Education on the Attitudes and
Behaviour of Physiotherapists

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Life Sciences

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ABSTRACT

The occurrence of a sports injury can have both physiological and psychological implications for the athlete. Traditionally the treatment of the injured athlete has focused on the physiological aspects, but increasingly the psychological aspects are also being considered. This thesis examines the educational preparation of physiotherapists, key providers of sport injury treatment in the UK, to provide psychological support to the injured athlete. Previous research (e.g. Arvinen-Barrow et al., 2007; Heaney, 2006a) has suggested that whilst physiotherapists recognise the importance of psychological factors in the rehabilitation from sports injury, they often feel unprepared to deliver sport psychology support, and have expressed a desire for further training. The primary aim of this thesis was therefore to examine the influence of sport psychology education on the attitude and behaviour of UK physiotherapists. The thesis comprises four studies. Study 1 investigated the psychology content of UK physiotherapy degree programmes. Study 2 investigated whether those who have previously undertaken sport psychology education demonstrate more positive attitudes and behaviours to sport psychology than those who have not. Study 3 sought to identify the most appropriate content for a sport psychology education package for practicing physiotherapists. Finally, Study 4 evaluated the impact of a sport psychology education intervention on the attitude and behaviour of practicing physiotherapists. It was found that that there were vast inconsistencies in the nature and extent of psychology education in UK physiotherapy degrees and that sport psychology education can have a significant positive impact on the attitudes and behaviours of physiotherapists. It was concluded that more sport psychology education opportunities should be made available to UK physiotherapists and that further research is required to investigate the optimal mode and duration of such opportunities.

ACKNOWLEDGEMENTS

It was my own experiences of injury that initially stimulated my interest in the psychological aspects of injury. As a committed athlete who was lucky enough to train for several years without any notable injuries, the incidence of an injury had a significant impact on my psychological state. As a sport psychologist I had the knowledge and skills to overcome this, but what about others? Were the physiotherapists working with them adequately trained to deal with the psychological aspects of injury? It was these questions that initiated my investigation into the role of sport psychology education for physiotherapists.

This thesis represents a six year journey. During this journey my life has changed significantly – I have become a mother, changed my job role and semi-retired from my sport, but throughout my enthusiasm for this research has remained. I hope that it will have a positive impact on the training of physiotherapists and the experiences of the athletes they support.

There are lots of people I wish to thank for supporting me and playing a significant role in my journey. Without these people this thesis would not have been possible. Firstly, I would like to thank my supervisors Dr. Alison Green, Dr. Claire Rostron and Dr. Natalie Walker who both individually and collectively have been hugely supportive. I would like to thank Alison and Claire for being brave enough in the early stages to take on a research student in a topic area unfamiliar to them. There were many unwilling to take such a step and if they had followed suit I don't think I would be where I am now. Throughout the process their perspective as 'outsiders' to the sport psychology world has been invaluable. I would like to thank Natalie for providing such unwavering subject specific and statistics support throughout the process. Without her input my journey would have been much more treacherous.

Secondly, I would like to thank my work colleagues for their ongoing support. It is not easy undertaking PhD study when you have a full-time job, but my colleagues have helped to ease the difficulty in many ways, most importantly by respecting my study leave and leaving me alone to focus on my PhD on Fridays! My Fridays became sacred and without them my progress would have been much slower.

Last, but certainly not least, I would like to thank my family who have supported me on so many levels throughout my journey, especially Gary and Rosie. Gary for always being supportive no matter what and inspiring me with confidence, and my daughter Rosie for being my inspiration and being there to remind me of the importance of balance and perspective in life.

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List of Abbreviations

AAIS	Attitudes About Imagery Survey
ANOVA	Analysis of Variance
BeSST	Behavioural and Social Sciences Teaching in Medicine
CSP	Chartered Society of Physiotherapy
CPD	Continuing Professional Development
DV	Dependent variable
H ₀	Null hypothesis
HCPC	Health and Care Professions Council
IFSP	International Federation of Sports Physiotherapists
IV	Independent variable
MANOVA	Multivariate Analysis of Variance
NATA	National Athletic Trainers' Association
PIUS	Psychology of Injury Usage Survey
QAA	Quality Assurance Agency
SIRP	Sports Injury Rehabilitation Professional
SPA-R	Sport Psychology Attitudes – Revised
SPB	Sport Psychology Behaviours
SST	Society of Sports Therapists
UCAS	Universities and Colleges Admission Service
UK	United Kingdom
USA	United States of America
WHO	World Health Organisation

CHAPTER 1:

INTRODUCTION AND OVERVIEW

Elements relating to this chapter have been published in:

Walker, N. & Heaney, C. (2013a). Psychological responses to injury: a review and critique of psychological response to injury models. In: Arvinen-Barrow, M. & Walker, N. (eds). *The Psychology of Sport Injury and Rehabilitation* (pp.23-39). London: Routledge.

(see appendix 1a)

Walker, N. & Heaney, C. (2013b). Relaxation techniques in sport injury rehabilitation. In: Arvinen-Barrow, M. & Walker, N. (eds). *The Psychology of Sport Injury and Rehabilitation* (pp.86-102). London: Routledge.

(see appendix 1b)

CHAPTER 1: INTRODUCTION AND OVERVIEW

Injury is a relatively common occurrence in sport that can have a debilitating impact on the injured athlete (Bahr & Holme, 2003; Timpka, Lindqvist, Ekstrand, & Karlsson, 2005). Traditionally sports injury research has mainly focussed on the physical impact of injury. More recently however, research has begun to examine the psychological impact of sports injury (Walker, Thatcher, & Lavalley, 2007). Research that has examined the psychological aspects of sports injury can be broadly split into two categories: (i) research which examines the psychological factors which may predispose an athlete to injury, and (ii) research which examines psychological reactions to injury and their impact on the rehabilitation process. As central figures in the treatment and rehabilitation of injured athletes in the UK this thesis addresses the education and training of physiotherapists in sport psychology. The role of the physiotherapist is most prominent during rehabilitation and therefore the thesis focuses primarily on education and training related to the psychological reactions to injury rather than psychological factors predisposing an athlete to injury, although it is accepted that the two are interlinked (Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998).

1.1 Psychological Reactions to Injury

Research has demonstrated that the occurrence of a sports injury can lead to several negative psychological reactions including feelings of frustration (Bianco, Malo, & Orlick, 1999; Carson & Polman, 2008; Granito Jr, 2001; Johnston & Carroll, 1998a; Pearson & Jones, 1992; Ruddock-Hudson, O'Halloran, & Murphy, 2012; Tracey, 2003), stress (Gould, Udry, Bridges, & Beck, 1997; Newcomer & Perna, 2003), anxiety (Horvath, Birrer, Meyer, Moesch, & Seiler, 2007a; Johnston & Carroll, 1998a; Kleinert, 2002; Leddy, Lambert, & Ogles, 1994; Tracey, 2003), depression (Appaneal, Levine, Perna, & Roh, 2009; Bianco et al., 1999; Carson & Polman, 2008; Granito Jr, 2001; Johnston & Carroll, 1998a; Leddy et al., 1994; Pearson & Jones, 1992; Tracey, 2003), anger

(Carson & Polman, 2008; Granito Jr, 2001; Johnston & Carroll, 1998a; Ruddock-Hudson et al., 2012; Tracey, 2003), confusion (Bianco et al., 1999; Granito Jr, 2001; Pearson & Jones, 1992), low self-esteem (Leddy et al., 1994; Tracey, 2003), disappointment (Bianco et al., 1999), isolation (Granito Jr, 2001; Ruddock-Hudson et al., 2012), boredom (Granito Jr, 2001; Pearson & Jones, 1992), fear (Granito Jr, 2001; Johnston & Carroll, 1998a; Tracey, 2003), guilt (Johnston & Carroll, 1998a), jealousy (Johnston & Carroll, 1998a), and loss (Tracey, 2003). Such negative reactions can potentially impact on rehabilitation behaviour (e.g. adherence to a rehabilitation programme) and outcomes (e.g. recovery time) (De Heredia, Munoz, & Artaza, 2004). Therefore, it has been suggested that sport psychology strategies aimed at addressing these negative emotions may benefit the rehabilitation process as well as benefiting the mental health of the athlete (De Heredia et al., 2004). Consideration of the mental health of the athlete is of the utmost importance as negative reactions to sports injury have, in extreme cases, been linked to suicide attempts (Henderson, 2007; Smith & Milliner, 1994).

Whilst the above highlights negative reactions to injury it is important to note that the occurrence of an injury can sometimes lead to positive reactions (Udry, Gould, Bridges, & Beck, 1997; Wadey, Evans, Evans, & Mitchell, 2011; Wrisberg & Fisher, 2004). For example, an athlete who has been under-performing may welcome an injury and respond with feelings of relief and happiness. Equally, an athlete who initially had negative reactions to injury may in time be able to derive positive consequences from the injury experience such as an enhanced perspective, increased motivation or the development of other skills such as coping strategies (Podlog & Eklund, 2006; Udry et al., 1997; Wadey et al., 2011). Such positive consequences are sometimes referred to as *secondary gain* (Heil, 1993; Taylor & Taylor, 1997). This highlights the changeable nature of psychological reactions to injury and suggests that reactions may change over time. Several researchers have demonstrated temporal effects upon psychological reactions to injury (Albinson & Petrie, 2003; Appaneal et al., 2009; Ardern, Taylor, Feller, & Webster, 2013; Bianco et al., 1999;

Carson & Polman, 2008; Gallagher & Gardener, 2007; Horvath et al., 2007a; Johnston & Carroll, 1998a; Quinn & Fallon, 1999; Striegel, Hedgpeth, & Sowa, 1996; Thatcher, Kerr, Amies, & Day, 2007; Tracey, 2003; Vergeer, 2006). Tracey (2003), for example, in her qualitative study of emotional responses to injury amongst ten student athletes identified that responses changed over time, gradually becoming more positive as time progressed. Similarly, both Horvath et al. (2007) and Appaneal et al. (2009) found that feelings of anxiety and depression gradually decreased over time following injury. It is therefore important that those dealing with injured athletes, such as physiotherapists, recognise the changeable nature of emotional reactions to injury and adapt their treatments and interventions accordingly (Evans, Hardy, Mitchell, & Rees, 2008).

Various models have been proposed to describe and explain athlete's responses to injury (Walker & Heaney, 2013a). Most of these models fit into the broad categories of *grief response* or *cognitive appraisal models*. Grief response models, or stage models as they are sometimes called, assume that injury constitutes a form of loss to the individual (Walker & Heaney, 2013a). They suggest that an athlete will respond to injury in the same way in which people respond to other significant losses, such as the death of a loved one (Brewer, 1994; Evans & Hardy, 1995). This involves progressing through a series of stages. In Kübler-Ross' (1969) grief-response model (Figure 1), which is the most commonly applied in the sport injury psychology literature (Walker et al., 2007), these stages are denial, anger, bargaining, depression and acceptance (Kübler-Ross, 1969). Although the application of grief response models to sports injury is intuitively appealing, there is a lack of empirical evidence to fully support their use (Brewer, 1994; Evans & Hardy, 1995; Walker & Heaney, 2013a; Walker et al., 2007). Whilst support has been found for some elements of grief response models (Walker & Heaney, 2013a) they have been criticised for failing to account for individual differences in responses to injury (Brewer, 1994; Evans & Hardy, 1995; Harris, 2003; Walker et al., 2007). It seems inflexible and over-simplistic to suggest that all injured

athletes, regardless of their previous experiences and circumstances, will react to injury in the same stereotypical way. In practice, some athletes may experience some of the reactions outlined in Kübler-Ross' model, but not necessarily in the sequential order suggested. Additionally, some athletes may not demonstrate any of the reactions outlined in the model at all, for example, an athlete who welcomes the occurrence of an injury to explain a run of underperformance.

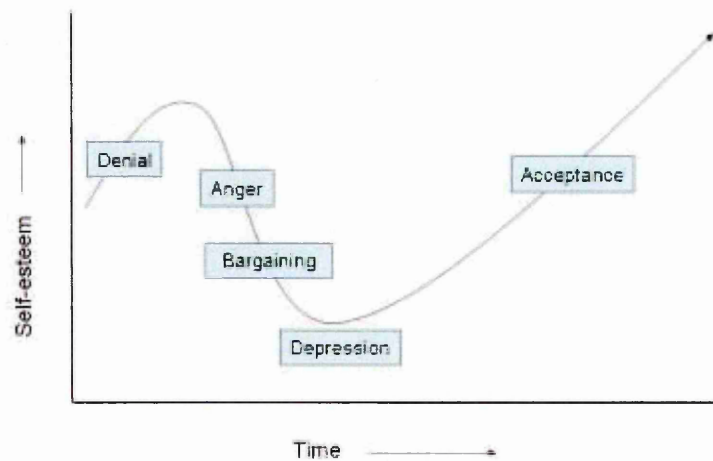


Figure 1: Kübler-Ross' (1969) grief-response model
(Source: http://www.davidthomasmedia.com/learning/gallery/cba/courses/change_mgt1/module2.aspx)

As a result of these limitations cognitive appraisal models (see example in Figure 2) have come to be more widely accepted as models of psychological reaction to injury than grief response models as they allow for individual differences (Brewer, 1994; Evans & Hardy, 1995; Walker et al., 2007). According to cognitive appraisal models, emotional and behavioural responses to injury are dictated by the individual's cognitive appraisal or subjective interpretation of their injury (Brewer, 1994; Evans & Hardy, 1995). This would suggest that two athletes with the same injury could cognitively appraise it in different ways, for example, one could perceive it as a disaster and the other could perceive it as an opportunity to take a break from intensive training (Udry, 1997).

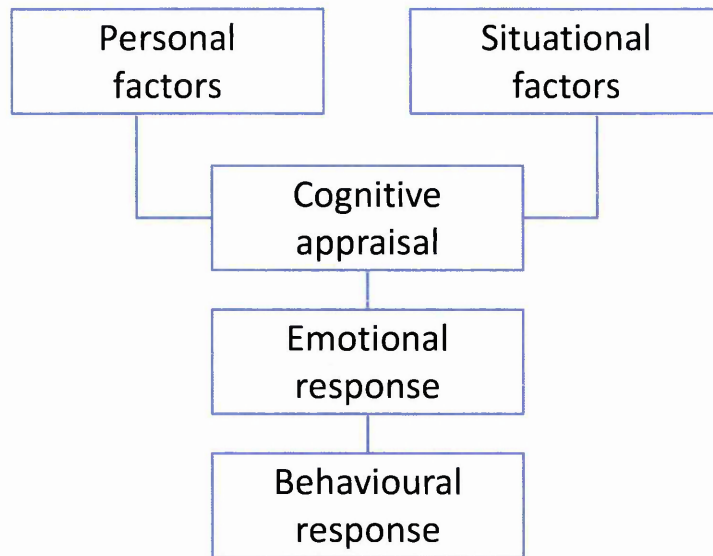


Figure 2: Brewer's (1994) cognitive appraisal model
 (Source: adapted from Brewer, 1994, p.91)

As illustrated in Figure 2, cognitive appraisal is typically thought to be influenced by two variables; personal factors and situational factors (Walker et al., 2007; Wiese-Bjornstal et al., 1998).

Personal factors include dispositional and historical attributes of the individual (Walker et al., 2007) such as injury history, personality characteristics and demographics (Brewer, 1994; Wiese-Bjornstal et al., 1998). Situational factors include sport, social and environmental influences (Wiese-Bjornstal et al., 1998). The influence of the sports medicine team, including the physiotherapist, is considered to be an important social influence (Brewer, 1994; Wiese-Bjornstal et al., 1998). Therefore, it can be said that the physiotherapist has the capacity to influence the individual's cognitive appraisal of their injury and subsequent emotional reactions and behavioural responses. This emphasises the important role of the physiotherapist in psychological as well as physical rehabilitation from injury. Whilst research using cognitive appraisal models is considered to be fairly limited, support does exist for their use (Walker & Heaney, 2013a), however, some have suggested that athlete appraisals are more complex than many cognitive appraisal models suggest (Johnston & Carroll, 1998a).

The integrated model of psychological response to the sport injury rehabilitation process (Figure 3) (Wiese-Bjornstal et al., 1998) is reportedly the most accepted cognitive appraisal model within the sport injury psychology literature (Walker et al., 2007). As well as addressing post-injury factors, this particular model also incorporates pre-injury factors adapted from Andersen and Williams' (1988) model of stress and injury, such as personality and history of stressors (see Figure 3). Whilst the model has been widely accepted in the literature, Walker et al. (2007) suggest that it lacks empirical rigour and excludes several important responses to injury and mediators of these responses. Additionally, they critique the 'dynamic core' of the model and suggest that the relationship between appraisals, emotions, behaviours and recovery outcomes is more complex than the model indicates.

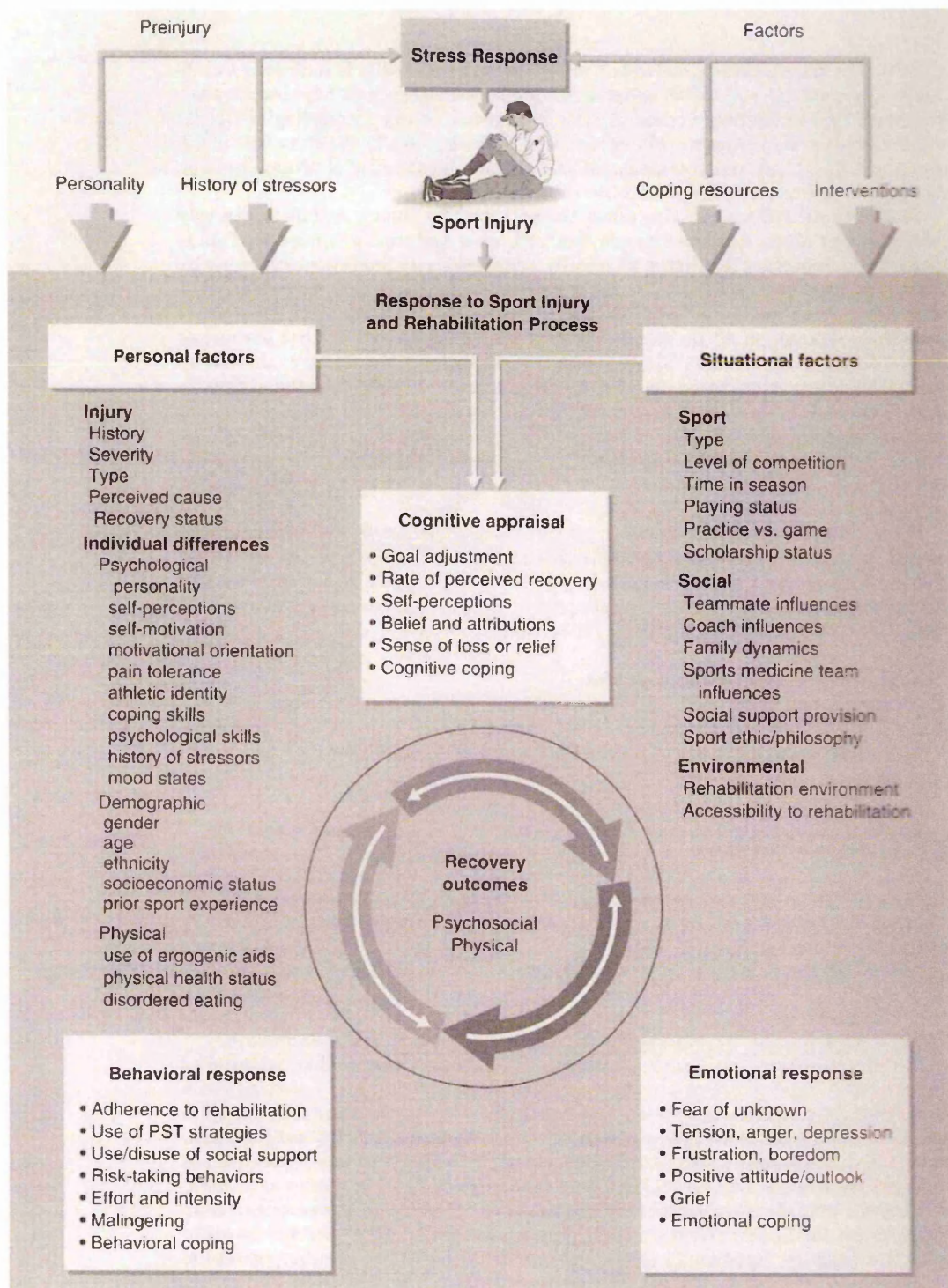


Figure 3: The integrated model of psychological response to the sport injury and rehabilitation process (Wiese-Bjornstal et al., 1998)

Source: Wiese-Bjornstal & Shaffer (1999), p.32. Note: PST = Psychological Skills Training.

Models such as the integrated model of psychological response to the sport injury rehabilitation process have also been criticised for failing to explain *how* psychological factors influence physical sport injury rehabilitation outcomes (Brewer, 2001; Brewer, 2010; Brewer, Andersen, & Van

Raalte, 2002; Horvath, Birrer, Meyer, Moesch, & Seiler, 2007b). Consequently, Brewer et al. (2002) proposed the biopsychosocial model of sport injury rehabilitation (Figure 4), which draws upon the biopsychosocial approach increasingly adopted in physiotherapy and other healthcare professions. This approach suggests that health, illness and injury are best understood in terms of an interaction between biological, psychological and social factors. It has been suggested that a biopsychosocial approach can have a positive impact on patient satisfaction, empowerment and pain management (George, 2008; Green, Jackson, & Klaber Moffett, 2008; Margalit, Glick, Benbassat, & Cohen, 2004). As can be seen in Figure 4, the model comprises numerous variables associated with the sport injury rehabilitation process. The model acknowledges that recovery from sports injury occurs in a complex biological, psychological and social matrix and that the interaction of these complex factors is changeable and dynamic (Andersen, 2007). It therefore offers a broad-based framework for understanding responses to sports injury (Brewer, 2001), however, research directly examining Brewer et al's (2002) model is sparse. There is, however, some support for elements of the model. For example, Brewer (2001) suggested that the correlational relationship seen between emotional reactions to injury and rehabilitation outcomes is consistent with the predictions of the biopsychosocial model, whilst Andersen (2007) has used the 'social/contextual factors' element of the model to examine collaborative relationships during rehabilitation. Others have provided support more indirectly by advocating a biopsychosocial approach to understanding sport injury, without specifically referencing Brewer et al's (2002) model (Wiese-Bjornstal, 2009, 2010). Despite this support, the model does have some limitations. Firstly whilst the model provides explanations for how psychological factors can influence rehabilitation outcomes, it fails to describe the relationships between various psychological factors, particularly in comparison to more psychologically based models (Brewer, 2010; Brewer et al., 2002). Secondly, it has been suggested that even though the model identifies relevant variables and general relationships, it is not a theory and consequently does not provide a comprehensive explanation as to how different components interact to produce different

outcomes (Brewer, 2010; Podlog & Eklund, 2007b; Podlog & Eklund, 2007c). Podlog and Eklund (2007a, 2007b) also criticise the model for failing to indicate which factors are most significant in producing various outcomes and why.

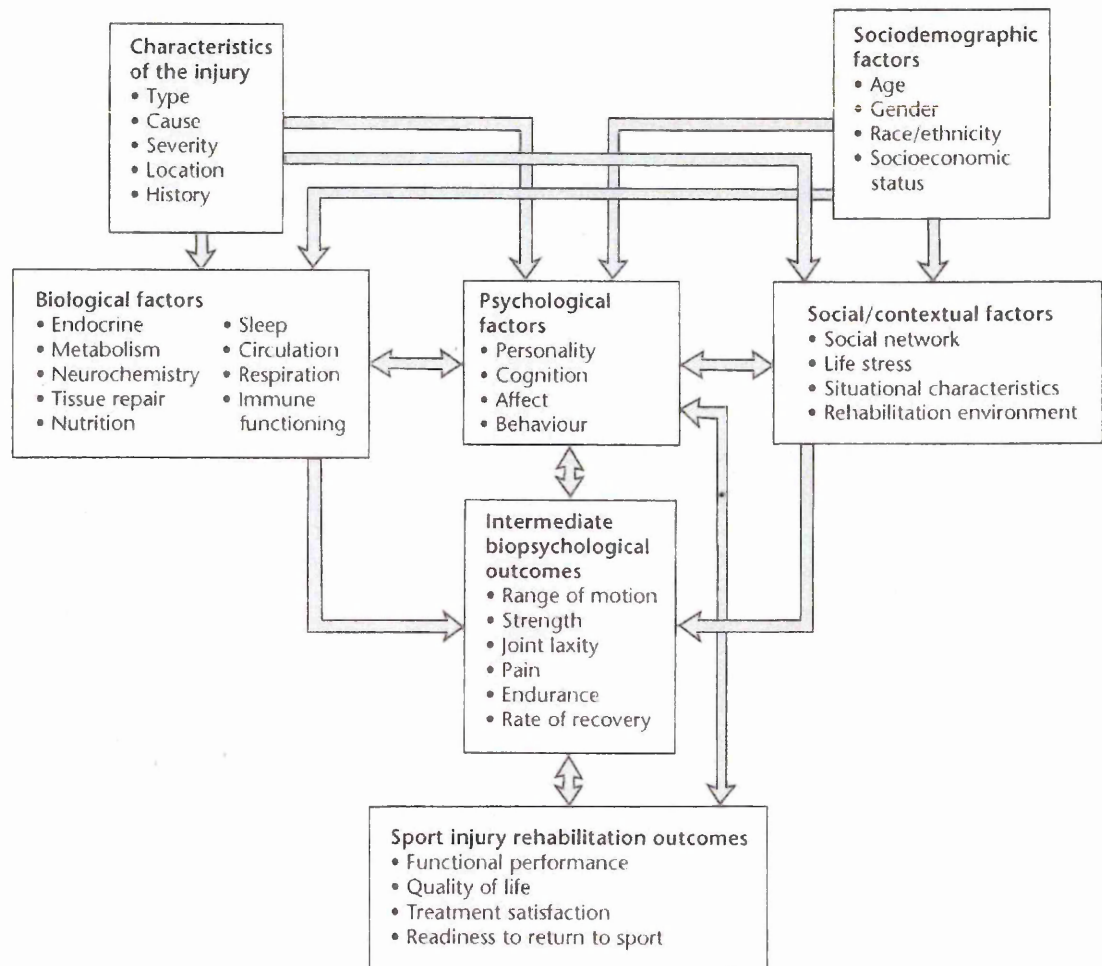


Figure 4: Brewer et al.'s (2002) biopsychosocial model of sport injury rehabilitation (Source: Walker & Heaney 2013a, p.34)

The four models reviewed provide a framework to help those working with injured athletes, such as physiotherapists, understand psychological responses to injury and their potential impact. Given that the occurrence of a sports injury can lead to several negative psychological responses which can impact on rehabilitation behaviour and outcomes, it seems reasonable to assume that sport psychology can be of benefit to the rehabilitation process.

1.2 The Benefits of Sport Psychology During Injury Rehabilitation

In his review of the relationship between psychological factors and rehabilitation outcomes Brewer (2010) identified that whilst the topic area is 'theoretically and empirically underdeveloped' positive outcomes have been linked to a range of sport psychology strategies. Research addressing this area has concluded that sport psychology intervention during sports injury can lead to many positive outcomes including the development of a more positive attitude (Armatas, Chondrou, Yiannakos, Galazoulas, & Velkopoulos, 2007; Driediger, Hall, & Callow, 2006), increased rehabilitation adherence (Armatas et al., 2007; Evans & Hardy, 2002; Levy, Polman, Clough, & McNaughton, 2006; Scherzer et al., 2001), increased concentration (Driediger et al., 2006), enhanced pain management (Beneka et al., 2007; Driediger et al., 2006), increased self-efficacy/confidence (Armatas et al., 2007; Evans & Hardy, 2002; Jevon & O'Donovan, 2000; Magyar & Duda, 2000; Milne, Hall, & Forwell, 2005), increased motivation (Beneka et al., 2007; Jevon & O'Donovan, 2000; Sordoni, Hall, & Forwell, 2000), faster recovery (Brewer, 2010; Ievleva & Orlick, 1991; Quinn & Fallon, 2000), increased mental toughness (Driediger et al., 2006), enhanced sense of control (Gilbourne & Taylor, 1998) and enhanced psychological well-being (Rock & Jones, 2002).

The specific sport psychology interventions that have been shown to benefit injured athletes include imagery (Brewer, 2010; Driediger et al., 2006; Hamson-Utley & Vazquez, 2008; Hare, Evans, & Callow, 2008; Ievleva & Orlick, 1991; Monsma, Mensch, & Farroll, 2009; Schwab Reese, Pittsinger, & Yang, 2012; Sordoni et al., 2000), positive self-talk (Ievleva & Orlick, 1991; Scherzer et al., 2001; Walker & Hudson, 2013), goal-setting (Armatas et al., 2007; Brewer, 2010; Evans & Hardy, 2002; Scherzer et al., 2001; Theodorakis, Beneka, Malliou, & Goudas, 1997), relaxation techniques (Johnson, 2000; Walker & Heaney, 2013b), social support (Bianco, 2001; Bone & Fry, 2006; Clement & Shannon, 2011; Green & Weinberg, 2001; Magyar & Duda, 2000; Mitchell, 2011; Mitchell, Neil, Wadey, & Hanton, 2007; Yang, Peek-Asa, Lowe, Heiden, & Foster, 2010) and

counselling (Brewer, Jeffers, & Petitpas, 1994; Gutkind, 2004; Myers, Peyton, & Jensen, 2004; Rock & Jones, 2002; Schwab Reese et al., 2012). Written emotional disclosure has also been suggested as an effective technique in reducing the stress and mood disturbances associated with sports injury (Mankad & Gordon, 2010; Mankad, Gordon, & Wallman, 2009a, 2009b; Schwab Reese et al., 2012).

The discussion of the benefits of sport psychology during injury leads to the question of who should be delivering sport psychology support to the athlete. Possible providers of sport psychology support during injury include the sport psychologist and the physiotherapist. Physiotherapists have been selected as the focus of this thesis as they are central to the rehabilitation of the injured athlete and potentially have an important role in providing sport psychology support.

1.3 The Role of the Physiotherapist

It has been suggested that the profession of physiotherapy has evolved from being focused predominantly on medical issues to also considering psychological and sociological issues (Wade & de Jong, 2000). Many researchers have indicated the importance of the sports injury rehabilitation professional (e.g. physiotherapist) in aiding psychological recovery from injury (Jevon & Johnston, 2003; Lafferty, Kenyon, & Wright, 2008; Tracey, 2008). In particular, the sports injury rehabilitation professional (SIRP) has frequently been identified as an important provider of social support to the injured athlete (Gutkind, 2004; Robbins & Rosenfeld, 2001; Tracey, 2008). There is a consensus that, due to their frequent contact with the injured athlete, these professionals are ideally placed to provide some level of psychological support to the injured athlete (Kolt, 2000; Lafferty et al., 2008). It has also been suggested that the element of touch between the practitioner and the injured athlete facilitates an environment for the communication of feelings and emotions in relation to injury (Kolt, 2000; Lafferty et al., 2008;

Tracey, 2008). Consequently, Mann et al. (2007) suggest that sports medicine professionals are often the first to become aware of emotional and behavioural problems relating to injury.

Whilst physiotherapists and other SIRPs are ideally placed to provide some degree of psychological support to the injured athlete, it is important to note that research has consistently found that they do not have the training or resources to provide advanced psychological support (Arvinen-Barrow, Hemmings, Weigand, Becker, & Booth, 2007; Arvinen-Barrow, Penny, Hemmings, & Corr, 2010; Jevon & Johnston, 2003; Lafferty et al., 2008). It is generally accepted that such support should be provided by an appropriately qualified sport psychologist specifically trained in the area (Francis, Andersen, & Maley, 2000; Johnston & Carroll, 1998b; Ninedek & Kolt, 2000; Podlog & Eklund, 2007b). Psychological support should perhaps therefore be delivered to the injured athlete through a multi-disciplinary team with the physiotherapist providing 'frontline support' and referring the athlete to the sport psychologist for more advanced or specific support (Clement & Arvinen-Barrow, 2013; Heaney, 2006b; Ninedek & Kolt, 2000). This multi-disciplinary team is also likely to include other support staff important during the injury rehabilitation process such as the coach (Clement & Arvinen-Barrow, 2013; Podlog & Eklund, 2007a; Wiese-Bjornstal & Smith, 1999).

Research examining the attitude and behaviours of SIRPs in relation to sport psychology, whilst covering a wide spectrum of professions across a range of countries, has consistently shown that SIRPs hold a positive attitude towards the role of sport psychology during injury rehabilitation (e.g. Arvinen-Barrow et al., 2007; Heaney, 2006a; Hemming & Povey, 2002; Kamphoff et al., 2010). For example, in their study of 361 chartered physiotherapists in the UK, Arvinen-Barrow et al. (2007) found that the physiotherapists they surveyed felt that athletes were affected psychologically by injury, on average, 83% of the time, reported several psychological factors

distinguishing between those who cope successfully with injury and those who cope less successfully, and highlighted the importance of several psychological skills in injury rehabilitation.

As well as demonstrating an awareness of psychological reactions to sports injury, SIRPs have also indicated an awareness of the importance of sport psychology strategies during rehabilitation.

Studies have revealed that sport injury rehabilitation professionals utilise a range of sport psychology skills and techniques in their interactions with injured performers such as goal-setting (Arvinen-Barrow et al., 2007; Heaney, 2006a; Hemmings & Povey, 2002; Lafferty et al., 2008; Larson, Starkey, & Zaichkowsky, 1996), keeping the athlete involved with the team (Larson et al., 1996), encouraging positive thoughts (Arvinen-Barrow et al., 2007; Heaney, 2006a; Hemmings & Povey, 2002; Larson et al., 1996), encouraging effective communication (Heaney, 2006a) and creating variety in rehabilitation exercises (Arvinen-Barrow et al., 2007; Heaney, 2006a; Hemmings & Povey, 2002; Lafferty et al., 2008; Larson et al., 1996).

Whilst the benefits of sport psychology intervention during injury are well documented and SIRPs do appear to use some sport psychology strategies, it appears that the utilisation of sport psychology, either in terms of direct use by the SIRP or by the SIRP making a referral to a sport psychologist, is not as high as it could be (McKenna, Delaney, & Phillips, 2002). For example, in their qualitative study of ten physiotherapists McKenna et al. (2002) reported that whilst physiotherapists recognised the importance of sport psychology they did not always actively integrate it into their practice. Additionally, within the research in this field there is almost universal agreement that the training of SIRPs in sport psychology is inadequate (Arvinen-Barrow et al., 2010; Ford & Gordon, 1998; Francis et al., 2000; Heaney, 2006a; Hemmings & Povey, 2002; Jevon & Johnston, 2003; Lamba & Crossman, 1997; Larson et al., 1996; Moulton, Molstad, & Turner, 1997; Ninedek & Kolt, 2000; Tracey, 2008; Wiese, Weiss, & Yukelson, 1991). SIRPs have consistently expressed a desire to develop their knowledge of sport psychology theory and

practice (Arvinen-Barrow et al., 2007; Ford & Gordon, 1998; Heaney, 2006a; Lafferty et al., 2008; Moulton et al., 1997; Ninedek & Kolt, 2000).

Whilst SIRPs have a positive attitude towards sport psychology and have integrated some sport psychology into their work with injured athletes, it is clear that there are some gaps in their knowledge and practice. It appears that SIRPs who use sport psychology do so as a result of experiential learning rather than formal learning and as such are often lacking theoretical underpinning to their psychological intervention and are restricted in the interventions they use and the referrals they make (Arvinen-Barrow et al., 2010; Jevon & Johnston, 2003). This coupled with the consistent finding that SIRPs themselves wish to gain more knowledge on the psychological aspects of sports injury indicates the need for more training. Previous studies have inferred that such training would further improve SIRPs' attitudes and behaviour in relation to sport psychology during rehabilitation and consequently improve the athlete's chances of receiving sport psychology intervention that could enhance his/her recovery (Arvinen-Barrow et al., 2007; Arvinen-Barrow et al., 2010; Ford & Gordon, 1998; Francis et al., 2000; Hamson-Utley, Martin, & Walters, 2008; Heaney, 2006a; Hemmings & Povey, 2002; Jevon & Johnston, 2003; Lamba & Crossman, 1997; Moulton et al., 1997; Ninedek & Kolt, 2000; Tracey, 2008; Wiese et al., 1991). However, few studies have explored this, which is why a major objective of this thesis was to investigate the effectiveness and impact of sport psychology training for physiotherapists on attitudes toward sport psychology and sport psychology related behaviour (i.e. use of sport psychology and referral to sport psychologists).

1.4 Aims and Objectives

There exists a reasonably strong body of evidence to show that SIRPs, such as physiotherapists, generally hold a positive attitude towards the role of sport psychology in injury rehabilitation, however, it appears that they lack the education and training in this field to be able to fully utilise

sport psychology in their work with injured athletes. Despite this body of evidence, there appears to be limited research investigating the impact of sport psychology education on the attitudes and behaviour of SIRPs, particularly amongst a UK population. Equally, there is limited recent research examining the nature and extent of psychology training received by physiotherapists the UK. The purpose of this thesis was therefore to examine both of these areas.

The over-arching aim of this research was to examine the influence of sport psychology education on the attitude and behaviour of UK physiotherapists in relation to sport psychology. The research therefore had four primary objectives:

1. to investigate the psychology content of UK university physiotherapy training programmes (Study 1, Chapter 2);
2. to identify whether those who have previously undertaken sport psychology training demonstrate more positive attitudes and behaviours towards sport psychology than those who have not (Study 2, Chapter 3);
3. to identify the most appropriate content for a sport psychology education package for practicing physiotherapists (Study 3, Chapter 4);
4. to investigate the impact of a sport psychology education intervention on the attitude and behaviour of practising physiotherapists (Study 4, Chapter 5).

1.5 Overview of the Thesis

The thesis comprises six chapters as illustrated in Figure 5. The current chapter presents an introduction to and overview of the thesis. Chapters 2 to 5 present the four research studies undertaken for the thesis, whilst Chapter 6 concludes the thesis and discusses the theoretical and applied contributions. A summary of the content of each of these chapters is presented below.

Chapter 2 – Study 1: A mixed method investigation of the psychology content of UK physiotherapy training programmes

Study 1 is an audit of the current psychology content of physiotherapy training programmes in the UK. Before being able to make judgements about the attitudes and behaviours of UK physiotherapists' sport psychology knowledge, it is important to understand their educational background in psychology. As no such national audit had been conducted since 1989 it was necessary to undertake this study as the starting point of the thesis.

Chapter 3 – Study 2: Does previous exposure to sport psychology education influence SIRPs' perceptions and use of sport psychology?

As a primary objective of the thesis was to examine the impact of sport psychology education, it was deemed appropriate for Study 2 to compare the sport psychology related attitudes and behaviours of SIRPs who have previously studied some sport psychology to those who have not. A finding that those who study sport psychology do hold more positive attitudes and behaviours would be indicative of the potential impact of a training course in sport psychology for physiotherapists.

Chapter 4 – Study 3: Sport psychology education for sport injury rehabilitation professionals – A review

Before providing a sport psychology education package to physiotherapists and measuring its impact, which was the ultimate aim of the thesis (Chapter 5), it was necessary to identify the most appropriate content and mode of delivery for a sport psychology education package.

Consequently, Study 3 comprised a review of existing work which makes recommendations with regard to the content and mode of delivery of sport psychology education for physiotherapists or other sports injury rehabilitation professionals. This served to provide the framework of the intervention for Study 4.

Chapter 5 – Study 4: The impact of a sport psychology education intervention on the practice of physiotherapists

Informed by the findings of Study 3, Study 4 evaluated the impact of a sport psychology education package on the attitudes and sport psychology related behaviours on a group of practicing physiotherapists, with the aim of investigating both short-term and long-term effects of the education package.

Chapter 6: General discussion, theoretical and applied contributions, and conclusions

Chapter 6 concludes the thesis by providing a summary of the key findings and their implications, outlining the theoretical and applied contributions of the thesis and considering limitations of the thesis and future research directions.

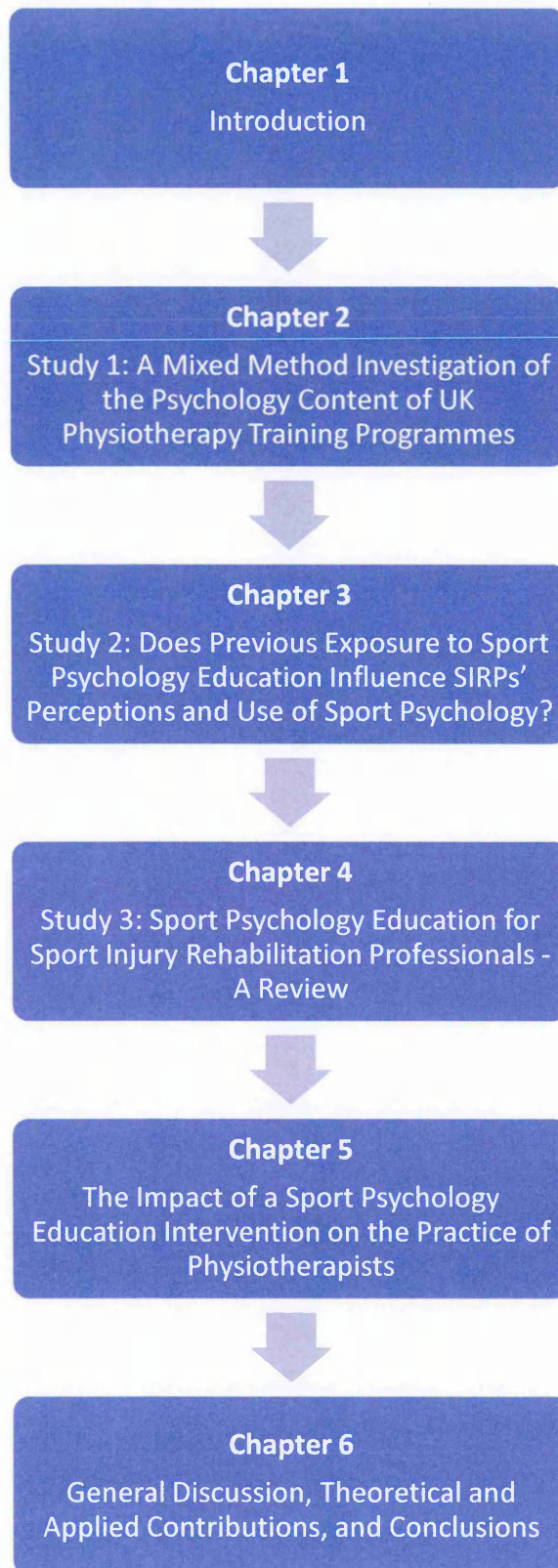


Figure 5: Thesis chapters

1.6 Terminology

Whilst this thesis focuses specifically on the physiotherapist, at times alternative professional titles are used. This section therefore defines the use of such titles within the thesis.

Physiotherapist: The term 'physiotherapist' or 'physiotherapists' is used when specifically referring to individuals qualified in physiotherapy (see Table 1 for a definition of physiotherapy).

There are two main routes to becoming a qualified physiotherapist: (i) the completion of an undergraduate degree in physiotherapy or (ii) the completion of a postgraduate degree in physiotherapy following the completion of a relevant undergraduate degree in another area (NHS Careers, 2015). In the UK the title 'physiotherapist' is protected and can only be used by individuals qualified in physiotherapy and registered with the Health and Care Professions Council (NHS Careers, 2015). As outlined in Table 1, physiotherapy training prepares students to work in a range of settings of which sport is just one.

Sports injury rehabilitation professional (SIRP): SIRP is used as a generic term to collectively refer to those with differing professional titles who rehabilitate injured athletes. Professions included under this term within the thesis are physiotherapists, sports therapists, athletic trainers, physical therapists and athletic therapists. Table 1 provides a definition of each of these professions. These professionals are referred to by their specific titles unless they are being referred to collectively. It is acknowledged that there are other professions involved in the rehabilitation of injured athletes which could be included under this term (e.g. sports rehabilitator, osteopath), but these are not referred to within the thesis.

Sports medicine professional: The term sports medicine professional is used as a broader generic term to collectively refer to SIRPs and others involved in treating a sports injury such as doctors and surgeons. The term is used sparingly within the thesis.

Table 1: Definitions of different sports injury rehabilitation professionals

Profession	Definition
Physiotherapist	Physiotherapy helps restore movement and function when someone is affected by injury, illness or disability. Physiotherapists help people affected by injury, illness or disability through movement and exercise, manual therapy, education and advice. Physiotherapists work in a wide variety of settings including hospitals, private clinics, sports clubs and gyms. (Chartered Society of Physiotherapy, 2013; Sports Injury Clinic, 2012b)
Sports therapist	A sports therapist helps athletes return to full performance after injury. A qualified sports therapist advises on prevention of injuries and can examine, assess and treat injuries, as well as helping with the rehabilitation process. (Sports Injury Clinic, 2012c)
Athletic trainer	Athletic trainers are healthcare professionals who collaborate with physicians. The services provided by athletic trainers comprise prevention, emergency care, clinical diagnosis, therapeutic intervention and rehabilitation of injuries and medical conditions. Typical patients and clients served by athletic trainers include: athletes, individuals with musculoskeletal injuries, and those seeking strength, conditioning, fitness, and performance enhancement. (National Athletic Trainers' Association, 2013)
Physical therapist	Physical therapists help restore function, improve mobility, relieve pain, and prevent or limit permanent physical disabilities of patients suffering from injuries or disease. Patients include individuals with disabling conditions (e.g. low-back pain and arthritis) and those with sports injuries. Some physical therapists treat a wide range of ailments and others specialise, for example, in sports injuries. (Sports Injury Clinic, 2012a)
Athletic therapist	Athletic therapists treat people with sports injuries and musculoskeletal conditions, using techniques such as therapeutic modalities, soft tissue mobilisation, physical reconditioning, and supportive strapping. (Sports Injury Clinic, 2012d)

Note: In the research within this thesis physiotherapists and sports therapists are largely UK and Australasian professions, whilst athletic trainers, athletic therapists and physical therapists are largely North American professions.

CHAPTER 2 – STUDY 1:
**A MIXED METHOD INVESTIGATION OF THE PSYCHOLOGY CONTENT
OF UK PHYSIOTHERAPY TRAINING PROGRAMMES**

A version of this chapter has been published in:

Heaney, C.A., Green, A.J.K., Rostron, C.L. & Walker, N.C. (2012). A qualitative and quantitative investigation of the psychology content of UK physical therapy education programs. *Journal of Physical Therapy Education*, 26(3), 48-56.

(see appendix 2a)

CHAPTER 2 – STUDY 1: A MIXED METHOD INVESTIGATION OF THE PSYCHOLOGY CONTENT OF UK PHYSIOTHERAPY TRAINING PROGRAMMES

2.1 Introduction

Physiotherapists are healthcare professionals involved in the treatment and rehabilitation of a broad range of patients in a variety of settings (e.g. hospitals, clinics, and sports clubs). This means that physiotherapy training and practice needs to cover a diverse spectrum of areas.

Physiotherapy, as suggested by its name, is primarily concerned with the physical condition and has traditionally focused on just the physical aspects of injury and impairment. More recently however, consideration of the psychological condition during treatment has grown in importance within physiotherapy as demonstrated by the following Chartered Society of Physiotherapy (CSP) definition of physiotherapy:

“Physiotherapy is a health care profession concerned with human function and movement and maximising potential. It uses physical approaches to promote, maintain and restore physical, *psychological* and social well-being, taking account of variations in health status” (Chartered Society of Physiotherapy, 2002, p. 19).

Physiotherapy research also recognises the importance of psychology with areas such as the psychological aspects of pain (Abbott, Tyni-Lenné, & Hedlund, 2010; Harland & Lavalley, 2003; Sowden, Hatch, Gray, & Coombs, 2006), cognitive behavioural therapies (Green et al., 2008; Hansen, Daykin, & Lamb; Harding & Williams, 1995b), patient motivation (Middleton, 2004; Miller, Litva, & Gabbay, 2009) and the person-centred approach (Mudge, Stretton, & Kayes, 2014; Woodward-Kron et al., 2012) receiving research attention. This has led to a shift towards greater acceptance of the *biopsychosocial* model (Engel, 1977) in physiotherapy from the more traditional biomedical model (Green et al., 2008). The biopsychosocial model suggests that health and illness

are influenced by a complex interaction between biological, psychological and sociological factors, whilst the biomedical model only recognises the influence of biological factors (Alonso, 2004). This shift towards the biopsychosocial model has been supported by the introduction of the World Health Organisation's (WHO) International Classification of Functioning, Disability and Health, which provides a scientific framework for the application of a biopsychosocial approach (World Health Organisation, 2002). It has been suggested that the adoption of the biopsychosocial model has a positive impact on patient satisfaction, empowerment and pain management (George, 2008; Green et al., 2008; Margalit et al., 2004).

One of the factors that has gone hand in hand with the increased acceptance and adoption of the biopsychosocial model within the physiotherapists treatment of musculoskeletal pain is the concept of 'yellow flags' (Kendall, Linton, & Main, 1997). The 'flag' framework is an internationally used assessment system to guide the management of pain. Flags are essentially risk factors for pain – there are currently five coloured flags (red, yellow, orange, blue and black), and yellow flags indicate psychosocial factors that may be a risk factor for developing chronic pain (Carvalho, 2007). These factors include pain beliefs, psychological distress, an external locus of control and low self-efficacy (Sowden et al., 2006). Within the yellow flags framework it is accepted that the management of psychosocial factors rests with the physiotherapist (Watson, 1999). More serious psychological conditions requiring referral to a specialist are labelled as orange flags, however it is believed that in practice yellow flags are often incorrectly used as a reason not to treat a patient, perhaps due to the limited focus on psychosocial factors in traditional physiotherapy training (Carvalho, 2007). This stance is supported by Green et al. (2008) who suggest that whilst recognition of the biopsychosocial model has grown, physiotherapists often lack the confidence to use a biopsychosocial approach effectively in their practice, perhaps due to inadequacies in their training in this area. Similarly Harland and Lavallee (2003) suggest that information on psychological issues has not been accepted widely enough by physiotherapists to produce any

significant change in practice. Alonso (2004) suggests that the biopsychosocial model struggles to compete with the biomedical model as its application requires greater knowledge (e.g. of psychological influences), time and a different skill set (e.g. enhanced communication skills).

An understanding of psychology is therefore essential for the physiotherapist to be able to adopt a biopsychosocial approach and should form a significant part of any physiotherapy education programme (Baddeley & Bithell, 1989). In their Curriculum Framework document (2002), which was valid at the time of data collection, the CSP, the governing body of physiotherapy in the UK, suggest that physiotherapy students need to develop an awareness of the significance of psychological factors and the impact that these can have on the patient and their response to treatment and consequently the physiotherapist's approach to care and assessment (Chartered Society of Physiotherapy, 2002). The 'illustrative content' suggested by the CSP in this area is summarised in the list below.

- Psychological factors in health and illness
- Group dynamics and working in teams
- Therapeutic relationships
- Psychological dimensions of acute pain, chronic pain and pain management
- Psycho-motor skills

(Chartered Society of Physiotherapy, 2002, p.35)

The CSP Curriculum Framework document also identifies two further aspects of psychology important to the physiotherapist - communication skills and mental health. It should be noted, however, that the 2002 Curriculum Framework document has been replaced by the 'Learning and Development Principles for CSP Accreditation of Qualifying Programmes in Physiotherapy' (Chartered Society of Physiotherapy, 2012) and 'Physiotherapy Framework' (Chartered Society of

Physiotherapy, 2011) documents, neither of which explicitly outline which psychology topics should be covered in physiotherapy training.

Various other documents relating to the training and registration of physiotherapists also incorporate psychological factors. For example, the Quality Assurance Agency (QAA) benchmark statement for physiotherapy has a number of psychology related outcomes (Table 2). Similarly, the standards of proficiency for physiotherapists of the Health and Care Professions Council (HCPC), the body responsible for the statutory regulation of physiotherapists, states that physiotherapists must be competent in a range of areas related both directly and indirectly to psychology, as summarised in Table 3 (Health and Care Professions Council, 2013).

Table 2: Psychology related outcomes in the QAA benchmark statement for physiotherapy (QAA, 2001)

The award holder should be able to:
<ul style="list-style-type: none">• use a range of assessment techniques appropriate to the situation and make provisional identification of relevant determinants of health and physical, <i>psychological</i>, social and cultural needs/problems• demonstrate skill in identifying and recognising the physical, <i>psychological</i> and cultural needs of individuals and communities• demonstrate knowledge and understanding of <i>psychological</i> and social factors that influence an individual in health and illness• demonstrate knowledge of how <i>psychology</i> and sociology can inform an understanding of health, illness and health care in the context of physiotherapy and the incorporation of this knowledge into physiotherapeutic practices• demonstrate knowledge and understanding of the changes that result from physiotherapy, including physiological, structural, <i>behavioural</i> and functional• demonstrate an understanding of the biological, physical and <i>behavioural</i> sciences which underpin physiotherapy• demonstrate understanding of the key concepts of the disciplines that underpin the education and training of all health care professionals, and detailed knowledge of some of these. The latter would include a broad understanding of: the relevance of the social and <i>psychological</i> sciences to health and healthcare• understand the assessment process sufficient to assess a patient safely and effectively taking into account physical, <i>psychological</i> and cultural needs

Table 3: Psychology related competencies included in the Health and Care Profession Council's Standards of Proficiency for Physiotherapists (HCPC, 2013)

<p>Registrant physiotherapists must:</p> <p>5. Be aware of the impact of culture, equality, and diversity on practice 5.2 be able to recognise the need to identify and take account of the physical, <i>psychological</i>, social and cultural needs of individuals and communities</p> <p>8. Be able to communicate effectively 8.1 be able to demonstrate effective and appropriate verbal and non-verbal skills in communicating information, advice, instruction and professional opinion to service users, colleagues and others 8.3 understand how communication skills affect assessment and engagement of service users and how the means of communication should be modified to address and take account of factors such as age, capacity, learning ability and physical ability 8.4 be able to select, move between and use appropriate forms of verbal and non-verbal communication with service users and others 8.5 be aware of the characteristics and consequences of verbal and non-verbal communication and how this can be affected by factors such as age, culture, ethnicity, gender, socio-economic status and spiritual or religious beliefs 8.6 understand the need to provide service users or people acting on their behalf with the information necessary to enable them to make informed decisions 8.7 understand the need to assist the communication needs of service users such as through the use of an appropriate interpreter, wherever possible 8.8 recognise the need to use interpersonal skills to encourage the active participation of service users</p> <p>13. Understand the key concepts of the knowledge base relevant to their profession 13.3 understand the concept of leadership and its application to practice 13.8 understand the following aspects of clinical science: - physiological, structural, <i>behavioural</i> and functional changes that can result from physiotherapy intervention and disease progression 13.9 understand the following aspects of behavioural science: - <i>psychological</i>, social and cultural factors that influence and individual in health and illness, including their responses to the management of their health status and related physiotherapy interventions - how <i>psychology</i>, sociology and cultural diversity inform an understanding of health, illness and health care in the context of physiotherapy and the incorporation of this knowledge into physiotherapy practice - theories of communication relevant to effective interaction with service users, carers, colleagues, managers and other health and social care professionals - theories of team working</p>
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Although UK bodies such as the CSP and HCPC acknowledge that an understanding of psychology is important to effective physiotherapy practice, and research has consistently shown the importance of psychological factors in physiotherapy, there appears to be little known about psychology education within UK physiotherapy programmes and how effective this education is. A literature search failed to find any recent investigations examining the psychology content of UK

programmes. In fact the most recent detailed investigation dates back to twenty-five years ago. In this investigation Baddeley and Bithell (1989) conducted a survey of thirty-one British physiotherapy schools in order to examine the psychology content of their programmes. They found that all of the schools agreed that psychology was relevant in physiotherapy training and that communication/interpersonal skills was the most commonly taught psychology-related topic (Baddeley & Bithell, 1989). However, important topics such as motor control and neuropsychology were found to be infrequently covered (Baddeley & Bithell, 1989). Additionally, inconsistencies were evident between UK physiotherapy schools in the amount, teaching mode and type of psychology content (Baddeley & Bithell, 1989).

Whilst no investigations examining the psychology content of UK programmes have been undertaken since 1989, research undertaken subsequent to this in the 1990s does indicate that psychology has not been fully integrated into the physiotherapy curriculum. Some have suggested that the application of psychology has been sparse in physiotherapy training (Harding & Williams, 1995a) and others have indicated that physiotherapy training does not equip physiotherapists with the necessary skills to assess patients from a psychosocial perspective and have called for enhanced undergraduate and postgraduate training in this area (Watson, 1999). The reasons for this failure of the physiotherapy curriculum to reflect an increased emphasis on psychology are unclear. It would be useful to know whether this has changed in more recent times in line with the increased acceptance of the biopsychosocial model within the field of physiotherapy.

The aim of this investigation was therefore to examine current psychology provision within UK physiotherapy programmes to see if progress has been made. Specifically, the investigation aimed to examine the nature and extent of psychology covered in physiotherapy programmes, the delivery of any psychology content, the assessment of any psychology content, the perceived

importance of psychology in physiotherapy training, and factors influencing psychology provision in physiotherapy programmes.

2.2 Method

Participants

The participants were self-selected representatives from seventeen UK universities running physiotherapy programmes endorsed by the CSP and HCPC. They were self-selected in that each university was asked to select the most appropriate person to participate. The representatives were programme directors, programme leaders or lecturers teaching on the programme. Thirteen of these institutions participated in a telephone interview. The remaining four participants completed an online questionnaire. Since only data relating to the institutions physiotherapy programme was required, no demographic information regarding the institution representatives was collected.

Of the seventeen universities that participated in the study all provide undergraduate physiotherapy programmes. Ten also provide postgraduate pre-registration physiotherapy programmes for students with existing degrees in other areas wishing to train in physiotherapy, and ten provide postgraduate post-registration physiotherapy programmes for students already holding an undergraduate degree in physiotherapy.

Measures

Information regarding the psychology content of physiotherapy programmes was, for the majority of participants, collected through a semi-structured telephone interview. The questions for the interview were developed by the principal investigator and then scrutinised by three psychology specialists, who were all experienced researchers and lecturers, in order to assess their appropriateness, face validity and content validity. This process led to some modification of the

interview questions prior to data collection. As a further method of assessing face and content validity and of assessing item comprehension, the semi-structured interview script was also trialled with one ex-physiotherapy lecturer, resulting in some minor wording and terminology changes prior to data collection. The interview script aimed to obtain information from the interviewees about: the nature, extent, delivery and assessment of any psychology content, the perceived importance of psychology in physiotherapy programmes and factors influencing psychology provision in physiotherapy programmes. A copy of the interview script can be found in appendix 2b.

It should be noted that four participants participated in the study via questionnaire rather than telephone interview. The questionnaire was based on the telephone interview script covering the same areas and questions, with some minor changes to reflect the different medium (appendix 2c). The questionnaire was presented online, since it has been suggested that response rates for online questionnaires are higher than for traditional pen and paper questionnaires and that online questionnaires are returned quicker and with fewer missing responses (Lonsdale, Hodge, & Rose, 2006).

Procedure

All thirty-five institutions listed as running physiotherapy programmes on the CSP and HCPC websites were contacted by letter and invited to participate in the study via telephone interview. Those not responding to the initial request were contacted again approximately six weeks after the initial invitation was sent. In total thirteen institutions agreed to be interviewed (37%). In an attempt to increase the response rate, after the initial interview data had been collected all institutions that had not responded to a request to be interviewed were contacted and asked to complete an online questionnaire instead. This yielded a further four respondents, resulting in a total of seventeen participants (48.6% response rate) which is in line with typical response rates

for this type of research (Baruch, 1999). The seventeen participants represented a diverse range of institutions in terms of geographical location, university type and programme type. The sample can therefore be considered to be representative of physiotherapy programs in the UK. The demographic profile of the thirty-five institutions invited to participate in the study and the seventeen participant institutions were also similar. For example, 51.4% of the institutions invited to participate in the study were classified as 'new' universities (institutions which became universities post-1992 when UK polytechnics were able to become universities) and 52.9% of those who chose to participate were also 'new' universities.

Prior to being questioned all participants, both those being interviewed and those completing the questionnaire, were required to complete an online informed consent form outlining the purpose of the study, benefits of participation, confidentiality procedures and freedom of consent (appendix 2d). Additionally, verbal consent to conduct and record the interview was obtained at the start of each telephone interview. The telephone interviews were conducted using the semi-structured interview questions as a guide. The interviews lasted between 25 and 45 minutes and each was recorded using a digital voice recorder. The interviews were all conducted by the same interviewer, and were transcribed verbatim before being analysed. The online questionnaire utilised the same questions that were used in the semi-structured interview, with some minor changes to reflect the different medium, and was constructed in such a way that rest of the questionnaire was unable to be completed unless consent was given.

The interview and questionnaire data were, where available, supported by written programme information (such as module outlines and programme guides), which were provided either by the interview participants or obtained from public sources (e.g. institution website).

The study adhered to the ethical procedures of the British Psychological Society and the Open University. Since no personal information was collected from the participants, ethical clearance from the Open University Human Participants and Materials Ethics Committee was not required. This was confirmed with the chair of the committee prior to commencing the study.

Data analysis

The study used a concurrent mixed method approach and thus the data analysis involved both quantitative and qualitative methods. The quantitative analysis involved calculating descriptive statistics for questions where numerical data was collected. The qualitative data collected from both the interviews and questionnaires were analysed using the qualitative research software package NVivo. The use of such packages has been suggested to improve the efficiency and rigour of qualitative data analysis (Kelle, 2000; Seale, 2000). All data from the interviews were transcribed verbatim and both the interview transcripts and the completed questionnaires were read several times in order to develop familiarisation before being analysed within NVivo. Such familiarisation is necessary in order to accurately code qualitative data (Gill, 2000). Since the interviews and the questionnaire asked the same questions, the data were analysed together.

The qualitative data were analysed using the content analysis procedures suggested by Cote, Salmela, Baria and Russell (1993), which involved organising the data into “meaning units” (meaningful verbatim segments of text comprehensible by themselves) of raw data and grouping or coding these into similar themes or categories (higher order themes) through an inductive/interpretational approach. The coding of data into higher order themes was continued as far as possible, terminating in ‘general dimensions’ as the highest order themes (Gratton & Jones, 2004; Thomas, Nelson, & Silverman, 2005). An inductive approach stipulates there are no predetermined categories prior to data collection (Cote, Salmela, Baria, & Russell, 1993). Whilst

an inductive approach was used, it is recognised that the use of a semi-structured interview script with pre-determined questions may infer some element of deductive analysis (Dale, 1996).

Trustworthiness, which refers to the overall quality of the results, is an important concept in data analysis (Thomas et al., 2005). Lincoln and Guba (1985) identified four criteria of trustworthiness in qualitative research - credibility (internal validity), transferability (external validity), dependability (reliability) and confirmability (objectivity). Various methods were employed as suggested by Sparkes (1998) to ensure trustworthiness, as described below.

Reliability in qualitative analysis (dependability) can be defined as the degree of agreement or consistency between interpreters in assigning instances to the same category (Bauer, 2000; Silverman, 2000). Therefore, in order to ensure dependability and guard against biases in interpreting the data, it was coded independently by two investigators - the interviewer and another psychology specialist with experience of interviewing and qualitative data analysis. This coding involved the principal investigator undertaking a thematic analysis of the data and then providing the second investigator with the raw data themes with the titles omitted. The second investigator then had the task of scrutinising the thematic analysis and checking that she agreed with the content of the themes and independently applying titles to these themes. The investigators then met to compare and discuss their coding. The use of two investigators to code qualitative data is recommended by Gratton and Jones (2004). At all stages of the coding and grouping into themes, consensus between these two investigators was required. The level of consensus required was set at a minimum of 90%, which is considered to be a very high level of reliability (Bauer, 2000). The level of consensus achieved was actually 100%, with both investigators fully agreeing on the grouping of data under specific themes. There were some very minor semantic differences in the naming of these themes, but the meaning was essentially the same and so agreement as to the title that should be assigned to each theme was quickly

reached. This process helped to ensure that the theme titles adequately represented the words used in the interview transcripts and questionnaires, thus ensuring semantic validity (Bauer, 2000). Triangulation is considered to be important in demonstrating trustworthiness and credibility in qualitative data analysis (Gaskell & Bauer, 2000; Patton, 1990), therefore a process of *peer debriefing*, whereby the investigator presented and explained the coding process and subsequent themes developed to two other psychology specialists, was also undertaken as a further check. This consequently acted as multiple-analyst triangulation (Pitney & Parker, 2009). As a result of this peer debriefing process some amendments were made to the thematic analysis of one of the questions.

Following the completion of the content analysis, *member checks* were undertaken as further credibility and dependability checks (Sparkes, 1998). This involved one of the participants being provided with a copy of their individual results in order to confirm that the analysis was a true reflection of the content and meaning of their interview (Gratton & Jones, 2004; Thomas et al., 2005). This took place approximately six months after the interview. Such checks are considered important in ensuring that participants' perspectives have been accurately captured and interpreted (Lincoln & Guba, 1985; Pitney & Parker, 2009). The participant was in agreement with the analyses and so no modifications of the data were required as a result of the member checks, and no further member checking was deemed necessary.

2.3 Results

Topic areas

All seventeen participants expressed that their physiotherapy programmes contained some element of psychology, which ran through all levels of delivery from undergraduate level 1 (level 4) up to postgraduate level (level 7). When questioned regarding the areas of psychology covered

within this provision answers were diverse, as can be seen in Table 4. It should be noted that this was an open rather than forced choice question.

Table 4: Psychology topic areas covered in UK physiotherapy degrees

Sample Raw Data Themes	Higher Order Themes	General Dimensions
"psychosocial and pathological impact of cardiovascular and/or respiratory conditions on the individual" (University 1)	Psychological impact of conditions (n=12)	Health Psychology
"the potential cognitive, psychological and social implications of musculoskeletal dysfunction" (University 11)		
"addressing the psychological impact of someone on intensive care or of long-term respiratory disease" (University 13)		
"psychology related to health beliefs" (University 5)	Health & behaviour change (n=12)	
"health psychology" (University 6)		
"health models and health behaviours" (University 12)		
"psychological basis of chronic pain" (University 11)	Pain (n=8)	
"physiological and psychological effects of pain" (University 17)		
"awareness of the impact of terminal illness" (University 1)	Terminal illness & death (n=6)	
"psychological, sociological and end of life issues... death and dying, grieving" (University 6)		
"mental health...anxiety and stress" (University 10)	Mental health (n=9)	
"psychological impact of senility, early dementia" (University 11)		
"Mental health...The experience for the patient and experiencing anxiety and also considering things like depression and how to measure it." (University 2)		
"its taught within the framework of the bio-psychosocial model" (University 10)	Bio-psychosocial model (n=3)	
"psychosocial influences on patient decision making" (University 2)		
"patient adherence" (University 15)	Adherence (n=2)	
"dealing with and treating children" (University 15)	Specific health related issues (n=5)	
"palliative care issues" (University 16)		
"psychology related to motivation" (University 5)	Motivation (n=5)	Organisational Psychology
"motivation" (University 7)		
"goal-setting" (University 2)	Goal-setting (n=3)	
"set relevant goals in partnership with clients" (University 14)		
"self-efficacy" (University 7)	Self-efficacy (n=2)	
"principles of group working" (University 2)	Group dynamics (n=3)	
"management of client group" (University 11)		
"critical understanding of psychological processes and the role of emotion in personal effectiveness" (University 14)	Personal effectiveness (n=2)	
"the empowerment of clients" (University 13)	Empowerment (n=2)	
"psychology related to communication" (University 2)	Communication & counselling (n=8)	
"communication skills, verbal, nonverbal" (University 12)		
"then in the 3rd year they have a little bit about attribution theory" (University 9)	Attribution theory (n=1)	
"the role of cognitive behavioural therapy" (University 17)	CBT (n=2)	Cognitive Psychology
"social-cognitive psychology...basic perception, memory and learning" (University 7)	Cognition (n=6)	
"we look at cognitive skills, we look at a bit of cognitive neuro-psychology" (University 11)		
"sport psychology" (University 4)	Sport psychology (n=3)	Sport and Exercise Psychology
"sports psychology" (University 16)		
"a bit on the psychology of exercise" (University 12)	Exercise Psychology (n=4)	
"psychological impact of exercise" (University 6)		
"personality theories" (University 10)	Personality (n=1)	Other

Note: 'n' refers to the number of universities that cited each topic area

Mode of delivery

The psychology provision was delivered predominantly through an integrated approach by the universities questioned. Only four (23.5%) of the universities (universities 4, 7, 10 and 11) had named modules in psychology, the remaining 76.5% stated that they integrated the psychology content into other modules. Of these four universities with named psychology modules, two only had a named module for part of their provision - university 4 had a named module at undergraduate level, but none at postgraduate level, whilst university 11 had a named module at postgraduate level, but none at undergraduate level. The perceived benefits of having an integrated approach, as cited by the participants, were contextual relevance, acceptance by students and the relative importance of psychology (Table 5). The perceived benefits of having named modules were prevention of the psychological aspects being lost amongst other areas and the prevention of psychology being covered at a superficial level (Table 6).

Table 5: The perceived benefits of an integrated approach

Sample Raw Data Themes	Higher Order Themes	General Dimensions
"they're not kind of just getting psychology alone in a little bubble – they're actually getting it in context" (University 1)	Contextual relevance (n=10)	Pro integrated approach
"because we don't give them the label 'you are doing psychology' it comes as part and parcel of being a physiotherapist...it's the job. You don't just turn off psychology. You've got to keep looking at it in every single aspect of physiotherapy" (University 11)		
"we've chosen a more integrated approach, which has the advantage of making it more everyday and something everybody does... it's not an add-on; it's not something you can choose not to engage with" (University 2)		
"the students will learn about the issues in the context in which they work when they go to clinical placement and graduate" (University 4)		
"I think it makes it more realistic in terms of how they're going to use it in practice" (University 6)		
"psychology and related topics are given context and students are able to see the relevance of the subject matter in terms of their own physiotherapy practice" (University 17)	Acceptance by students (n=4)	
"if you had a module, knowing our students, called psychology, they wouldn't turn up to it... they'd be saying, 'we didn't come here to do a psychology degree we came here to do physiotherapy'" (University 12)		
"if you separate it out then you make it a box, you make it an obvious thing, but also you make it part of the course that people can reject" (University 2)		
"if we do start to label it psychology then that may put the students off" (University 4)	Perceived low importance of psychology (n=2)	
"they're not going to be psychologists, they're going to be physiotherapists, do you know what I mean." (University 1)		
"I'm not of the belief that we're training psychologists...You could argue that they may not have a very good understanding of psychology, but they're not here to learn psychology per se" (University 3)		

Table 6: The perceived benefits of named modules in psychology

Sample Raw Data Themes	Higher Order Themes*	General Dimensions
"the physiotherapy world has latched onto the bio-psychosocial model and is covering only small items of it. The psychology content is not integrated thoroughly enough, and has become superficial. The superficial teaching leads to practitioners who are not confident in it and hesitant to fully employ it" (University 7)	Prevents superficial coverage of psychology (n=1)	Pro named modules
"so I think by integrating it, one downside is that it becomes hidden" (University 8)	Prevents psychology from being 'lost' (n=4)	
"I think the danger is that elements of it can get lost so it very much relies on the module leads incorporating that information into the programme" (University 9)		

* Note: In both Tables 5 and 6 'n' refers to the number of universities

Seven (41.2%) of the universities indicated that their psychology provision was underpinned by experiential as opposed to theoretical knowledge (universities 1, 3, 6, 9, 13, 14 and 17). For the purposes of this study psychology provision that involved the teaching of psychological theory was defined as being underpinned by 'theoretical knowledge', whilst psychology provision that did not involve the teaching of any psychological theory was defined as being underpinned by 'experiential knowledge'. Only three (17.6%) universities (universities 5, 7 and 11) stated that their provision was underpinned by theoretical as opposed to experiential knowledge, whilst seven (41.2%) universities (universities 2, 4, 8, 10, 12, 15 and 16) stated that their provision was underpinned by both theoretical and experiential knowledge. All four universities with named modules in psychology indicated that their provision is underpinned by theoretical knowledge, either exclusively or alongside experiential knowledge. In contrast, only 46.2% of the thirteen universities using an exclusively integrated approach in their delivery of psychology content stated that their provision is underpinned by theoretical knowledge. Perceptions as to the pros and cons of theoretical and experiential underpinning are summarised in Table 7.

Table 7: The perceived pros and cons of theoretical and experiential underpinning

Sample Raw Data Themes	Higher Order Themes	General Dimensions
"I feel really strongly about that – that they should have theoretical underpinning because so much of what people do in practice which they think is intuitive or common sense is actually based on psychological theory" (University 10)	Essential to student understanding (n=1)	Pro theoretical/ against experiential
"I think it's very much the fact that we do a very functional type of psychology. It's non-theoretical largely...We encourage that approach rather than a more formal 'this is what psychology is' approach" (University 2)	Contextual relevance (n=3)	Pro experiential/ against theoretical
"one thing that we used to do was try to get psychologists in to talk about psychological theory – well obviously they know the theory far better than I would know the theory, but what it lost was that embedding into the patient experience and the physiotherapists experience" (University 5)		
"physiotherapy students come in often because they're interested in the biomedical, the physical, the injury, the pathophysiology" (University 5)	Student acceptance (n=2)	
"they don't like too much dry theory - they seem to like it being applied" (University 13)		

Note: 'n' refers to the number of universities that cited each higher order theme

Amount of psychology

The participants were asked to estimate what proportion of their entire physiotherapy programme was dedicated to psychology. Fifty-three percent (n=9) were unable to provide an estimate, largely because of the integrated nature of the psychology content (e.g. *"It's impossible to guess, because of the integration"* – University 8). Those who did provide estimates (n=8) were diverse in their answers with estimates ranging hugely from 5% to 80%. However, it should be noted that many of these did indicate that estimating was a difficult task and that their estimates were quite rough. Additionally, the estimates made were dependent upon what the interviewees considered to be psychology (*"If you think very broadly about emotion and motivation, you know not just pathological psychology, but well psychology that's really hard. If I say a figure I'm not sure how useful it will be. It kind of ebbs and flows and it's a very different beast in different areas"* – University 2).

Teaching and assessment

The psychology content of the physiotherapy programmes was reported to be delivered to students through a variety of teaching methods including lectures (n=15), seminars (n=13),

workshops (n=8), practical sessions (n=5), clinical practice (n=4), role play (n=3), presentations (n=2), case studies (n=1), e-learning (n=1), problem-based learning (n=1) and tutorials (n=1). For the majority of universities (88%) the psychology component was considered to be a compulsory part of the physiotherapy programme for students. All universities felt that the psychology components were assessed to some extent and contributed to the final module or award grade. University 5 stated that assessment is essential in order for psychology to be considered as a serious part of the curriculum ("*one thing I do think is really important though is if people are going to take these things as a serious part of their curriculum, is that they're also assessed*"). A variety of assessment methods were professed to be used including case study (n=6), assignments (n=5), clinical placement (n= 4), viva (n=4), report (n=1), exam (n=1) and presentations (n=1). However, it was noted by some participants (n=6) that psychology is rarely assessed as a discrete element; rather as an element within other assessments and consequently forms only a small part of the assessment process in physiotherapy programmes. When questioned on the extent to which the assessment of psychology components contributed to the award as a whole most were unable to estimate due to the integrated nature of psychological components. Four were able to provide estimates and these ranged vastly between 5% and 75%.

Staff

The participants were asked whether they used psychology specialists (i.e. staff trained specifically in psychology) or non-psychology specialists (i.e. physiotherapy staff, with no specific training in psychology) to teach the psychology elements of their programme. Eleven (64.7%) stated that they used non-psychology specialists, one (5.9%) stated that they used psychology specialists, whilst the remaining five (29.4%) reported that they used a mix of both psychology specialists and non-psychology specialists. When those interviewed were questioned on the relative pros and cons of using psychology specialists and non-psychology specialists a range of themes emerged (Table 8). Psychology specialists were preferred due to their greater degree of

subject knowledge and the opportunity for inter-professional learning. In contrast, where physiotherapy specialists were preferred this was due to the perception that psychology specialists lack the ability to provide contextual relevance, whilst physiotherapy professionals can draw upon their clinical experience and act as role models to trainee physiotherapists.

Table 8: The perceived pros and cons of using psychology specialists and non-psychology specialists to teach psychology to physiotherapy students

Sample Raw Data Themes	Higher Order Themes	General Dimensions
"(psychology specialists) have the underlying theoretical knowledge" (University 6)	Greater psychology knowledge (n=2)	Pro using psychology specialists /
"with the psychologists, we're very lucky because they're only on the floor below us and so it's very easy for them to just nip in and do sessions for us...a bit of inter-professional learning" (University 1)	Inter-professional learning (n=1)	Against using non-psychology specialists
"sometimes they say they could do a whole year on this particular topic, but you just want a one-off lecture on it – you know what I mean. So it can be hard to actually get them to narrow it down and look specifically at the issues that are relevant to physiotherapists" (University 1)	Psychology specialists are too theoretical and lack contextual relevance (n=5)	Against using psychology specialists / Pro using physiotherapy specialists
"I think my personal doubts of asking psychologists to do it, unless they are particularly aware of the needs or purpose of a physiotherapy course, I think is, my personal feeling, as soon as you offload a subject to a theorist, it can become very theoretical" (University 13)		
"someone who comes purely from a psychology background wouldn't understand the application" (University 4)		
"just pure psychology in itself isn't useful unless we can work with the students to show them how they can apply it in practice" (University 10)	Physiotherapy staff have clinical experience (n=5)	
"the lecturer has got a clinical experience they can relate it to" (University 13)		
"I think we don't have the underlying theoretical knowledge perhaps, but we've got the experience of application." (University 6)	Physiotherapy role models are needed (n=1)	
"I don't have good physiotherapy role models coming in and saying to the physiotherapy students 'yeah this stuff is really good and it can really help you in this that and the other way', so... if we can have some really psychology savvy physiotherapists out there teaching that would help an awful lot" (University 10)		

Note: 'n' refers to the number of universities that cited each higher order theme

Importance of psychology

There was a strong belief amongst those questioned that psychology is a highly important component of physiotherapy training. When asked to give a rating between one and ten to indicate the importance of psychology in physiotherapy training (where 1 = not very important and 10 = very important) the majority of participants (n=9; 52.9%) gave a high rating (7 or above). Only 1 participant (university 3) gave a low rating (below 4). The remaining seven (41.1%)

participants felt unable to give an accurate numerical rating, but expressed that psychology had high importance. The reasons participants gave for rating psychology as important are summarised in Table 9. The one participant who gave a low rating for the importance of psychology in physiotherapy programmes stated that she did so because she felt that there were more important topics (*“I’m not saying that it’s not important, but I’m saying there are limits on what you can put into a programme and ...there are a lot more important aspects that should be in instead of psychology”*) and that physiotherapists should be taught to make referrals to psychologists (*“we ’re training them to recognise that other people do other things and to refer rather than pretend you know about this”*).

Table 9: Reasons cited for the importance of psychology in physiotherapy training

Sample Raw Data Themes	Higher Order Themes	General Dimensions
“I really try to sell it to them by saying you can’t operate without understanding psychology... just basic practical things psychology can offer them to make them better practitioners” (University 10)	Psychology is essential to effective physiotherapy practice (n=2)	Reasons for perceived importance
“obviously physiotherapists work very much in a holistic way, with the person and not just the physical” (University 4)	Holistic approach (n=5)	
“we like the students to have a holistic approach really towards patient care” (University 12)		
“all of our research now is also suggesting the most effective way to work with people is by treating them holistically really” (University 5)		
“it’s part and parcel of the job – you can’t be a physiotherapist unless you understand what humans are like and how they behave and react to different situations” (University 11)	To understand people and behaviour (n=5)	
“physiotherapy is about people, and psychology helps students to understand how people behave and what motivates them” (University 17)	Informs understanding of illness and disability (n=4)	
“very often psychological and social and other issues are impacting on the patients/person’s ability or disability, so that’s why it’s important to understand those issues” (University 4)		
“patient assessment and management is dependent upon a clear understanding of the psychological implications of illness, disability and impairment” (University 15)		
“I think in physiotherapy practice and education there is much more of acceptance now for practice based around a psycho-social approach to health and well-being rather than a medical model” (University 8)	Acceptance of the bio-psychosocial model (n=1)	

Note: ‘n’ refers to the number of universities that cited each higher order theme

Fifty-nine percent of the participants felt that there was enough psychology in their physiotherapy programmes. Six of the universities were able to give reasons for this and these were wide ranging (Table 10). The remaining forty-one percent felt that there was not enough psychology in

their physiotherapy provision and attributed this to reasons including difficulty fitting it in and a poor understanding of mental health (Table 11). There was no obvious pattern between perceptions as to whether or not there was enough psychology and the estimates made regarding the proportion of psychology in each university's physiotherapy programme, reported earlier.

Table 10: Reasons why it is felt there is enough psychology

Sample Raw Data Themes	Higher Order Themes	General Dimensions
"when we get feedback and module evaluations, we look at what bits they feel are missing, and they never put that they feel they haven't had enough psychology" (University 1)	Student feedback doesn't ask for more psychology (n=1)	There is enough psychology
"if you compare the course that we've got here and the course that I did which I don't think we did any psychology at all. I think the amount that we've got now and the relevance of the information that we give the students is appropriate" (University 12)	There is more psychology then when I did my degree (n=1)	
"I'm clear that they are fit to practice, and I think an element will come across in their clinical practice" (University 3)	They are fit to practice (n=1)	
"in reality I think that there is enough within the confines imposed on us for a pre-registration programme" (University 8)	There is enough within the confines placed on us (n=1)	
"the revisiting within clinical specialities gives the topic relevance" (University 15)	Delivered in an applied context (n=2)	

Table 11: Reasons why it is felt there is not enough psychology

Sample Raw Data Themes	Higher Order Themes	General Dimensions
"no I don't think there's enough – I would like to see more integration into the physiotherapy modules, more connection... And actually sometimes it's my physiotherapy teaching colleagues don't seem confident in psychology" (University 10)	There is not enough integration in all modules (n=1)	There is not enough psychology
"I think the physios definitely need a lot more mental health awareness in their training" (University 10)	Understanding of mental health is not good enough (n=2)	
"different tutors approach this in different ways. 'I wrote this course therefore I am particularly interested in this and this is my interpretation of what the course is and does', but somebody else on another module might not see it quite in the same way" (University 2)	Dependent upon the tutor's interest (n=1)	
"there's more that you could do I think, but there's limiting and reducing time in which to deliver it" (University 2)	Difficult to fit everything in (n=5)	
"it would be most desirable to include more, but there isn't space within the curriculum" (University 17)		
"I think that the answer is probably no – there could always be more, but at what expense I don't know" (University 9)		
"it needs greater emphasis as students have a tendency to want to gloss over it as the biopsychosocial effect rather than the combined force of biological, psychological and social effects" (University 14)	Biopsychosocial effects need greater investigation (n=1)	

Note: In both Tables 10 and 11 'n' refers to the number of universities that cited each higher order theme

Factors influencing psychology content

When questioned regarding which factors dictate the amount of psychology that universities include in their physiotherapy programmes, two key factors emerged – time/space and staff, as can be seen in Table 12. Feelings were mixed as to whether the HCPC and CSP provide enough guidance on the psychology content that should be in physiotherapy programmes. Five of the universities felt that these bodies did provide enough guidance, whilst six felt that they did not. The remaining four universities were unsure on this question. Those who felt that the HCPC and CSP do provide enough guidance indicated that the guidance was sufficiently clear, allowed for liberal interpretation and had a biopsychosocial theme throughout (Table 13). In contrast, those who felt that the HCPC and CSP do not provide enough guidance suggested that the guidance was too vague and that psychology is not really covered (Table 13).

Table 12: Factors that dictate the amount of psychology included in university physiotherapy programmes

Sample Raw Data Themes	Higher Order Themes	General Dimensions
"I think the wider integration, the confidence and kind of background knowledge of the staff which is a bit of a block as well" (University 10)	Staff (n=8)	Factors dictating the amount of psychology
"the specialism of the module leader – that will influence it in that if you've got somebody who's got a big psychological vent than they're going to want to put emphasis more on psychology than perhaps somebody who hasn't" (University 11)		
"I guess staff interest and staff motivation and staff perception. I guess that's the other biggest delimiter" (University 2)		
"superficial teaching leads to practitioners and lecturers who are not confident in it and hesitant to fully employ it" (University 7)		
"availability of expertise" (University 17)		
"the amount of psychology that can go in the programme is affected by the amount of space in the programme" (University 10)	Time/Space (n=12)	
"lack of space in the curriculum... is increasingly true" (University 2)		
"psychology would be an element we would include if we had more time, but time constraints that are the difficulty really" (University 3)		
"just the amount of content that is required in the physiotherapy undergraduate programme" (University 5)		
"the number of skills required – limited space for psychology" (University 7)		
"some topics just lend themselves so well to the psychological side of it... No-one really says that you should have this much psychological input, or even that you should have any. It is very grey" (University 1)	Other (n=4)	
"the predominance of the biomedical model that physiotherapy has been taught" (University 7)		

Note: 'n' refers to the number of universities that cited each higher order theme

Table 13: Do the HCPC and CSP provide enough guidance?

Sample Raw Data Themes	Higher Order Themes	General Dimensions
"I think so in that with both of them it's fairly liberal in your interpretation of their demands" (University 11)	Allow liberal interpretation (n=2)	They do provide enough guidance
"I think the CSP are rather good. In terms of their course requirements they are very clear" (University 2)	Clear guidance (n=3)	
"we do look quite closely as you could imagine at the HCPC and CSP guidelines so I do think that within those that there is an obvious need to be able to interact with the patient –communication skills, respect, the empathy – all of those things are there - for which anyone looking at them would therefore recognise that some understanding of psychology is going to be important. So I feel it's there and it's as clear as it can be" (University 5)		
"I think implicit throughout is this looking at the patient from a bio-psychosocial perspective, so I think that's good" (University 5)	Bio-psychosocial theme throughout (n=1)	
"I think the HCPC, you know their guidelines are loose at the best of times and I think we can include as little or as much as we choose to" (University 1)	Guidelines too loose / vague (n=5)	They don't provide enough guidance
"the professional bodies are doing their best, but have latched onto only small items of the bio-psychological model and the psychology is not integrated enough and is superficial" (University 7)		
"I don't think it's really specific around psychology" (University 8)		
"certainly when you look at the HCPC standards on training, it doesn't sort of come up. It's not a highly important thing" (University 6)	Psychology not really covered (n=3)	
"I suppose the short answer is no – it's not really there. I mean it's coming – the last CSP review of curriculum guidelines had some elements which were related to behaviour, but they sort of shy away from straight psychology prescription" (University 3)		

Note: 'n' refers to the number of universities that cited each higher order theme

Additional comments received

In concluding the interviews, the participants were asked if they had any further comments to make about the psychology content of their physiotherapy programmes. Three of the universities (universities 6, 8 and 10) emphasised the importance of inter-professional learning in the teaching of psychology, and stated that their students were often taught alongside other health professionals including occupational therapists, nurses and social workers. Two of the universities mentioned the Darzi report (Darzi, 2008), a report examining the future development of the NHS. University 2 suggested that the Darzi report could lead to curriculum changes ("*...curriculum changes about disability in the community – that is what we do, that is where we need to be. And really in terms of answering those issues, we needed to change in quite a fundamental way*"), whilst university 8 suggested that there was a mismatch between the contents of the Darzi report

and the drive towards shorter appointments times (*"patients have a shorter amount of time with the therapist, which obviously precludes from anything other than the manual element, including the psychology element. I think in the Darzi report there was a recognition that physiotherapist interaction is potentially quite useful, but there's a drive to hit targets and see patients quickly. So I think there's a mismatch"*).

2.4 Discussion

The aim of this investigation was to examine current psychology provision within UK physiotherapy programmes. Whilst all of the participants involved in the study professed to have some psychology content in the physiotherapy curricula at their institutions and largely agreed that it was important in the education of physiotherapists, it would appear that the nature and extent of psychology provision across UK university physiotherapy programmes is extremely diverse and inconsistent. Such diversity and inconsistency was also reported by Baddeley and Bithell (1989), perhaps indicating that limited progress has been made in standardising the psychology curriculum for physiotherapy students over the last twenty-five years.

Those questioned identified a range of psychology topics covered within their programmes, which largely fell under the umbrella of health psychology, with the psychological impact of conditions and health and behaviour change identified as the most commonly taught topics. These topics obviously have a high degree of relevance to healthcare professionals such as physiotherapists. In 2010 the Behavioural and Social Sciences Teaching in Medicine Psychology Steering Group identified these two areas as important core knowledge in their core curriculum for undergraduate medical education (Bundy et al., 2010). Whilst these guidelines were written primarily for medical education, they do have relevance to physiotherapy education as an allied health profession.

In their study of thirty-one UK universities Baddeley and Bithell (1989) found that communication/interpersonal skills, learning/perception and bereavement were the most commonly taught psychology-related topics in physiotherapy programmes. These topics were all identified in the present study to some extent, but were not ranked quite so highly, perhaps indicating a shift in the psychology content of physiotherapy programmes from the 1980s to present day towards a greater understanding of the importance of the psychological impact of conditions and other aspects of health psychology. This could be reflective of the increased acceptance of the biopsychosocial model within physiotherapy (Green et al., 2008).

There were also some topics identified in the present study that did not feature prominently in Baddeley and Bithell (1989). One of the most notable of these was mental health. Mental health conditions affect a significant proportion of the UK population (Cooper & Bebbington, 2006) and so it is highly possible that physiotherapists may provide treatment to those with such conditions (Chartered Society of Physiotherapy, 2008). It is important that physiotherapists recognise such conditions, as a failure to do so can delay physical recovery (Rose, 2003). It has been suggested that education and training on mental health can improve physiotherapists attitudes towards providing physiotherapy treatment to those with mental health issues (Probst & Peuskens, 2010).

Baddeley and Bithell (1989) reported that important topics such as motor control and neuropsychology were infrequently covered in their study of UK physiotherapy programmes, and this appears to be reflected in the present study where none of those questioned cited these as topics addressed within their programmes. It should however be noted that this was an open question and relied upon the participants' knowledge and perception of what constitutes psychology. It is therefore quite feasible that the participant universities may cover motor control, but may not consider it to be an element of psychology. It is also of note that sport and exercise

psychology was only identified as a topic area taught by seven of the participant universities, providing evidence that physiotherapists' exposure to sport psychology is fairly limited.

The vast majority of participants professed to deliver the psychology content at their institution through an integrated approach, with very few universities having named modules or clearly identifiable segments in psychology within their physiotherapy provision. Bithell (2007) suggests that there is a trend within physiotherapy for greater integration of topics. The key reason cited for this integrated approach was that of contextual relevance; it was largely felt that an integrated approach to the delivery of psychology content would lead to a more applied understanding of the topic. This is an important point as there is often a disparity between knowledge of the subject and the ability to apply this knowledge to benefit patients (Harland & Lavalley, 2003). It has been suggested that the mode of teaching used can influence a student's ability to apply their knowledge of psychology in practice (Green et al., 2008). Clinical workshops and clinical supervision have, for example, been found to be more effective in influencing practice than traditional classroom teaching (Green et al., 2008). The participants in the present study reported using a wide range of teaching methods to deliver their psychology content, including workshops and clinical practice, but lectures were the most commonly cited teaching method reported.

It is beyond the scope of this study to accurately determine whether or not the integrated approach to psychology content delivery is effective, however, it is possible that such an approach could sideline or de-emphasise the importance of psychology in physiotherapy practice.

Kamphoff, Hamson-Utley, Antoine, Thomae and Hoenig (2010) suggest that an integrated approach may have a negative impact on confidence in using psychology. Another concern is that this approach can lead to vast inconsistencies in the volume and quality of psychology taught, both between and within universities, and difficulties in quantifying the amount of psychology covered. In line with this, when questioned regarding the amount of psychology in their

physiotherapy programme, most were unable to provide an estimate and those who did varied greatly with responses ranging from 5-80%. This variance is important to note as there is thought to be a 'dose response' with regard to training in this area, with those receiving more training demonstrating higher levels of competence (Green et al., 2008).

This vast range in estimates of psychology content could well be indicative of the large variability in psychology provision between universities; however it could also be reflective of the participants' differing understanding of what constitutes psychology and difficulties in identifying where psychology is covered. The pattern of wide variability in responses was repeated in the assessment of psychology within physiotherapy programmes, with the vast majority of universities unable to estimate how much psychology contributed to the assessment strategy of their programme and those that did providing estimates varying significantly (range = 5-75%).

Key to a thorough understanding of psychology in an applied context is an understanding of the theoretical underpinning (Cranney et al., 2009; Harris, Demb, & Pastore, 2005; Thompson, 2000). Therefore, it would be reasonable to expect that the psychology content of physiotherapy programmes would contain a strong theoretical underpinning. However, this was not the case for all universities, with forty-one percent of participants indicating that their psychology provision did not contain any theoretical underpinning. This is suggestive of a degree of superficial coverage of psychology amongst these institutions, which could potentially disadvantage students. One way of improving this situation would be for bodies such as the CSP and HCPC to set more prescriptive guidelines in this area. Bithell (2007) suggests that guidance from these bodies on all aspects of physiotherapy curriculum lacks specificity on content and hours of study which inevitably leads to diversity of interpretation between universities. Within the learning outcomes of the participant university's modules and programmes reference was commonly made to the biopsychosocial model, but detailed guidance on its interpretation appears to be lacking. Harland

and Lavalley (2003) suggest that a misunderstanding of the term biopsychosocial is a common issue stating that “although ‘biopsychosocial’ is a familiar phrase, its meaning is often lost in rhetoric or is simply ignored” (p.311). When questioned about whether the CSP and HCPC provide enough guidance on the psychology content of physiotherapy programmes, opinion was divided amongst the participant universities.

One issue that may perpetuate the potentially superficial coverage of psychology within physiotherapy programmes is the knowledge and expertise of the staff teaching it. Sixty-five percent of the universities used non-psychology specialist physiotherapy staff to teach the psychology components, whilst the remaining 35% used either psychology specialists (psychology lecturers or physiotherapy staff with a psychology degree) or a combination of both psychology and non-psychology specialists. In contrast, Baddeley and Bithell (1989) found that only 30% of the universities they surveyed used non-psychology specialist physiotherapy staff to teach the psychology components of their programme. This difference may be reflective of the predominant integrated approach to psychology content seen in the present study, making it more difficult to use psychology specialists as the psychology content is not easy to identify and segment. Using non-psychology specialist physiotherapy staff can have several advantages, as identified by some of the participants, such as being able to draw upon clinical examples and role modelling the importance of psychology to physiotherapy. However, they may lack theoretical knowledge of the subject and therefore be unable to provide students with an adequate theoretical underpinning of the subject.

Some of the participants raised concerns about using psychology specialists, largely in relation to perceptions that these staff would be overly theoretical and lack contextual relevance. This is a reasonable concern; however, the interviews revealed several models of good practice where physiotherapy staff worked with psychology staff to ensure that the teaching had both adequate

theoretical underpinning and grounding in contextually relevant examples. In these cases, the physiotherapy staff sought to further embed this psychology content into their teaching with the students.

In discussing who should be teaching the psychology content of physiotherapy programmes it is important not to automatically assume that physiotherapy staff do not have the prerequisite knowledge and skills to be able to teach psychology to an appropriate level. There exists a number of physiotherapy staff with a very good understanding of psychology, qualified to teach the subject, some examples of whom were interviewed for this study. Indeed the ideal educator is likely one who is highly knowledgeable in both psychology and physiotherapy. However, this level of knowledge will not always be evident, particularly amongst physiotherapy staff who have themselves graduated from physiotherapy programmes where the psychology content is fairly superficial. Having such staff teaching psychology would only serve to exacerbate the problem of superficial coverage.

Significantly, the majority of participants rated psychology as highly important in the training of physiotherapists, stating the need for a holistic approach and an understanding of people and behaviour as the key reasons for this. However, this begs the question as to why its coverage is often very hidden and why such inconsistency remains between universities in the nature and extent of their coverage. One answer to this may lie in the sheer volume of content required to be covered in physiotherapy programmes. Whilst this study is focussed on the psychology content of physiotherapy programmes it is important to note that physiotherapy students have to cover a vast number of other topic areas. When asked what factors dictate the amount of psychology that is covered, time/space in the curriculum was the most commonly cited answer. The second most common answer related to staff; namely the quality, enthusiasm and availability of staff. It

seemed that universities were only able to provide good psychology provision when they had access to staff able to facilitate this, which was not always possible.

Despite this, fifty-nine percent of universities felt that they had enough psychology within their physiotherapy programmes. This highlights the issue of what constitutes enough. Perceptions on this may vary, but physiotherapy students need to have enough understanding of psychology in order to be effective practitioners. They are not training to become psychologists and therefore their knowledge does not need to be as extensive as that of a psychology student, but they do need enough knowledge to be able to address basic issues and to know when a referral to a psychology specialist is required. As Harland and Lavalley (2003) suggest "it is rightly beyond the scope of physiotherapy practice formally to assess and treat specific psychological disorders...it is essential however for clinicians dealing with chronic patients to have a good understanding of the relevant psychological models and assessment available" (p.306).

It is clear that many physiotherapy programmes in the UK provide students with an appropriate grounding in psychology that will positively impact upon their professional practice and that these universities contain strong advocates for psychology amongst their staff. However, this is not always the case and there appears to be great variance in the psychology provision within physiotherapy programmes, which could potentially disadvantage some students. Universities face several challenges in ensuring that students receive an adequate level of psychology education that is consistent with that provided at other institutions. It could be argued that recent developments in physiotherapy pointing towards more community based practice have further increased the need for physiotherapists to have a sound understanding of psychology. As such perhaps more needs to be done to standardise the psychology curriculum within physiotherapy in the UK to ensure that physiotherapy students at different institutions are receiving a similar level of training in psychology.

This investigation has provided a much needed picture of the current provision of psychology within UK physiotherapy programmes, although the predominant integrated nature of psychology content has hindered deeper investigation. Whilst the findings are of note it is important to recognise that they may have been influenced to some extent by the knowledge and perceptions of the university representatives interviewed, even though they were asked to speak from a university perspective rather than their own. Additionally, as the representatives were self-selected, it is possible that those with an interest in psychology were more likely to choose to participate, which could potentially have biased the results.

The most significant finding of this study is that of inconsistency – there are vast inconsistencies between institutions in the content, amount, type and delivery of psychology within physiotherapy programmes. Equally, there appears to be an underlying inconsistency between the cited importance of psychology and the demonstrated importance of psychology through its limited visibility within the curriculum. Further research is needed to examine the impact of current psychology training on professional practice and to identify the specific psychology training needs of physiotherapists. Study 2 (Chapter 3) provides an example of such research, comparing the attitudes and behaviours in relation to sport psychology of those who have received differing experiences of sport psychology education as part of their studies.

CHAPTER 3 – STUDY 2:

**DOES PREVIOUS EXPOSURE TO SPORT PSYCHOLOGY EDUCATION
INFLUENCE SIRPS' PERCEPTIONS AND USE OF SPORT PSYCHOLOGY?**

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3.1 Introduction

There now exists a relatively large body of evidence to suggest that use of sport psychology during sports injury rehabilitation can lead to several positive outcomes (Brewer, 2010) such as those listed in section 1.2 of Chapter 1. Sports injury rehabilitation professionals (SIRPs) are considered to play an important role in ensuring that injured athletes receive sport psychology support and are given the opportunity to experience these positive outcomes (Jevon & Johnston, 2003; Kamphoff, Thomae, & Hamson-Utley, 2013; Lafferty et al., 2008; Tracey, 2008). There is a consensus that, due to their frequent contact with the injured athlete, these professionals are ideally placed to provide some degree of psychological support to the injured athlete (Kolt, 2000; Lafferty et al., 2008) and that the element of touch between the practitioner and the injured athlete may facilitate an environment for the communication of feelings and emotions in relation to injury (Kolt, 2000; Lafferty et al., 2008; Tracey, 2008).

Interest in the role of the SIRP in psychological processes began in the early 1990s with Weise, Weiss and Yukelson's (1991) work being a landmark study. The majority of the research undertaken in this field has been conducted in North America (Clement, Granquist, & Arvinen-Barrow, 2013; Ford & Gordon, 1997, 1998; Hamson-Utley et al., 2008; Kamphoff et al., 2010; Lamba & Crossman, 1997; Larson et al., 1996; Mann, Grana, Indelicato, O'Neill, & George, 2007; Moulton et al., 1997; Tracey, 2008; Washington-Lofgren, Westerman, Sullivan, & Nashman, 2004; Wiese et al., 1991), Australasia (Ford & Gordon, 1997, 1998; Francis et al., 2000; Ninedek & Kolt, 2000) and the UK (Arvinen-Barrow et al., 2007; Arvinen-Barrow et al., 2010; Heaney, 2006a; Hemmings & Povey, 2002; Jevon & Johnston, 2003; Lafferty et al., 2008) and has encompassed various SIRPs including physiotherapists (Arvinen-Barrow et al., 2007; Arvinen-Barrow et al., 2010;

Ford & Gordon, 1997; Francis et al., 2000; Heaney, 2006a; Hemmings & Povey, 2002; Jevon & Johnston, 2003; Lafferty et al., 2008; Lamba & Crossman, 1997; Ninedek & Kolt, 2000), athletic trainers (Clement et al., 2013; Hamson-Utley et al., 2008; Kamphoff et al., 2010; Larson et al., 1996; Moulton et al., 1997; Tracey, 2008; Washington-Lofgren et al., 2004; Wiese et al., 1991), physical therapists (Hamson-Utley et al., 2008; Tracey, 2008) and athletic therapists (Ford & Gordon, 1998).

Whilst research in this field has covered a wide spectrum of professions across a range of countries the general findings have been remarkably similar with SIRPs showing a consistently positive attitude towards the role of sport psychology during injury rehabilitation. For example, in their study of 215 athletic trainers in the USA, Clement et al. (2013) found that the majority of athletic trainers they surveyed felt that athletes were affected psychologically by injury, reported several psychological factors distinguishing between those who cope successfully with injury and those who cope less successfully (e.g. positive attitude and adherence), and highlighted the importance of psychological skills in sports injury rehabilitation.

Studies have revealed that SIRPs utilise a range of sport psychology strategies in their interactions with injured performers. Strategies reportedly utilised include goal-setting (Arvinen-Barrow et al., 2007; Clement et al., 2013; Heaney, 2006a; Hemmings & Povey, 2002; Lafferty et al., 2008; Larson et al., 1996), keeping the athlete involved with the team (Clement et al., 2013; Larson et al., 1996), encouraging positive thoughts (Arvinen-Barrow et al., 2007; Heaney, 2006a; Hemmings & Povey, 2002; Larson et al., 1996), encouraging effective communication (Heaney, 2006a) and creating variety in rehabilitation exercises (Arvinen-Barrow et al., 2007; Clement et al., 2013; Heaney, 2006a; Hemmings & Povey, 2002; Lafferty et al., 2008; Larson et al., 1996). Similarly, SIRPs have rated skills and techniques such as good communication (Clement et al., 2013; Francis et al., 2000; Heaney, 2006a; Lafferty et al., 2008; Larson et al., 1996; Ninedek & Kolt, 2000; Wiese

et al., 1991), effective goal-setting (Clement et al., 2013; Francis et al., 2000; Heaney, 2006a; Hemmings & Povey, 2002; Lafferty et al., 2008; Lamba & Crossman, 1997; Larson et al., 1996; Ninedek & Kolt, 2000; Wiese et al., 1991), positive self-talk (Francis et al., 2000; Heaney, 2006a; Lamba & Crossman, 1997; Larson et al., 1996; Ninedek & Kolt, 2000; Wiese et al., 1991), understanding motivation (Clement et al., 2013; Francis et al., 2000; Heaney, 2006a; Hemmings & Povey, 2002; Larson et al., 1996; Ninedek & Kolt, 2000; Wiese et al., 1991), enhancing self-confidence (Francis et al., 2000; Heaney, 2006a; Larson et al., 1996; Ninedek & Kolt, 2000; Wiese et al., 1991), reducing depression (Francis et al., 2000; Wiese et al., 1991), creating variety in rehabilitation exercises (Heaney, 2006a; Hemmings & Povey, 2002; Lafferty et al., 2008; Larson et al., 1996) and understanding stress/anxiety (Francis et al., 2000; Ninedek & Kolt, 2000; Wiese et al., 1991) as important for professionals in the field to be aware of.

Although this might suggest that SIRPs of various guises recognise the importance of sport psychology and use it accordingly, deeper investigation reveals that this is not quite the case. Firstly, it is important to note that whilst SIRPs generally hold a positive attitude towards sport psychology, this does not always extend to implementation (McKenna et al., 2002). In their qualitative study of ten physiotherapists McKenna et al. (2002) identified a gap between physiotherapists 'knowing' about the need for psychological intervention and 'doing' or providing such intervention. A similar gap has been reported in other studies such as Washington-Lofgren et al. (2004) and may be reflective of SIRPs feeling unprepared for such a role (Moulton et al., 1997; Washington-Lofgren et al., 2004).

Secondly, it would seem that practice is not always consistent with research as there are discrepancies between the types of sport psychology interventions SIRPs favour and research evidence. For example, several studies have reported that whilst the SIRPs they investigated identified stress and anxiety as a common psychological reaction to injury, they did not rate

techniques recognised in the literature as being effective in addressing stress and anxiety, such as imagery and relaxation strategies, particularly highly (Arvinen-Barrow et al., 2007; Clement et al., 2013; Francis et al., 2000; Heaney, 2006a; Larson et al., 1996; Ninedek & Kolt, 2000; Wiese et al., 1991). It has been suggested that this may be a reflection of a lack of knowledge or training relating to such techniques, or a perception that teaching such techniques is beyond the professional role of the SIRP (Arvinen-Barrow et al., 2007; Arvinen-Barrow et al., 2010; Francis et al., 2000; Heaney, 2006a; Larson et al., 1996; Ninedek & Kolt, 2000; Wiese et al., 1991). Many researchers concur with the perception that teaching psychological skills and techniques is beyond the scope of the SIRP and is best delivered by a sport psychologist, who should ideally work alongside the SIRP as part of the sports medicine support team (Clement & Arvinen-Barrow, 2013; Heaney, 2006b; Ninedek & Kolt, 2000; Tracey, 2008; Wiese-Bjornstal & Smith, 1999; Wiese et al., 1991). However, rates of referral to a sport psychologist appear to be relatively low. For example, Clement et al. (2013) found that only 17% of SIRPs they surveyed had ever referred an injured athlete to a sport psychologist.

It would appear that the training and education of SIRPs in the psychological aspects of sports injury is of importance. An interesting finding within the research in this field is that there is almost universal agreement that the training of SIRPs in sport psychology is inadequate (Arvinen-Barrow et al., 2010; Clement et al., 2013; Ford & Gordon, 1998; Francis et al., 2000; Heaney, 2006a; Hemmings & Povey, 2002; Jevon & Johnston, 2003; Lamba & Crossman, 1997; Larson et al., 1996; Moulton et al., 1997; Ninedek & Kolt, 2000; Tracey, 2008; Wiese et al., 1991). SIRPs consistently express a desire to develop their knowledge of sport psychology theory and practice (Arvinen-Barrow et al., 2007; Ford & Gordon, 1998; Heaney, 2006a; Lafferty et al., 2008; Moulton et al., 1997; Ninedek & Kolt, 2000). However, despite this very few studies have investigated the impact of sport psychology training on SIRPs.

One way to evaluate the potential effectiveness of sport psychology education on SIRPs is to compare the attitude or behaviours of a group of professionals who have received such training to a group that have not. This approach was used in a study by Hamson-Utley et al. (2008) who examined the perceptions of athletic trainers and physical therapists in the USA towards the use of psychological skills during sports injury rehabilitation. Athletic trainers are required by the National Athletic Trainer's Association (NATA) to demonstrate competency on the psychological aspects of sports injury, whilst physical therapists are not (Hamson-Utley et al., 2008). It was found that athletic trainers reported more positive attitudes than physical therapists towards the use of psychological skills during sports injury on the majority of survey items (9 out of 15), particularly those which compared a psychological skill with a behavioural outcome (e.g. "setting appropriate rehabilitation goals will help improve the athlete's adherence rate"). These differences were largely related to controlling pain, positive self-talk and goal-setting. Interestingly, there appeared to be no difference between athletic trainers and physical therapists in relation to their attitudes toward mental imagery (Hamson-Utley et al., 2008). The authors attributed this to less knowledge of mental imagery compared to other techniques, which supports the findings of other researchers such as Arvinen-Barrow et al. (2010).

As a consequence of the lack of differences in the use of mental imagery between the two groups of professionals, Hamson-Utley et al. (2008) concluded that they had failed to find support for their hypothesis that athletic trainers would demonstrate a more positive attitude towards sport psychology than physical therapists as a consequence of their formal sport psychology training. However, they did find that both athletic trainers and physical therapists who reported either receiving formal sport psychology training or an intention to undertake such training held more positive attitudes towards sport psychology intervention than those who did not. Although not explicitly stated in Hamson-Utley et al. (2008), it would appear from this that whilst physical therapists are not required to undertake formal training in sport psychology, some of those

included in the study had undertaken such training and this could to some extent explain the lack of differences seen between the two professions on some of the survey items.

Another reason suggested for the lack of differences seen between the two professions on some of the survey items in Hamson-Utley et al.'s (2008) study is the quality of sport psychology training received by athletic trainers. Hamson-Utley et al. (2008) suggest that the training of athletic trainers may increase their knowledge of sport psychology, but fail to address the practical application of sport psychology skills and techniques. Similarly, Cramer-Roh and Perna (2000), Harris, Demb and Pastore (2005) and Stiller-Ostrowski and Ostrowski (2009) suggest that the education of athletic trainers in sport psychology is often insufficient. Athletic trainers themselves have also indicated that they perceive their training in this field to be lacking (Clement et al., 2013; Larson et al., 1996; Moulton et al., 1997; Stiller-Ostrowski & Ostrowski, 2009; Tracey, 2008; Washington-Lofgren et al., 2004).

Hamson-Utley et al.'s (2008) study examined North American SIRPs. To date no similar study has been conducted to examine UK SIRPs and no study has compared different levels of exposure to sport psychology education (e.g. short duration education sessions compared to long duration education sessions). In the UK two key groups responsible for the rehabilitation of injured athletes are physiotherapists and sports therapists. Undergraduate physiotherapy training programmes are preparing students for work in a broad range of settings, of which sport is just one, and consequently training in sports psychology is relatively sparse, as demonstrated in Study 1 (Chapter 2) of this thesis. Neither the CSP nor HCPC require physiotherapy degree programmes to specifically cover any sport psychology. In contrast undergraduate sports therapy training is focussed specifically on the rehabilitation of athletes and therefore provides more opportunity for sport psychology training. The Society of Sports Therapists (SST), which is one of the governing bodies of sports therapy in the UK, indicate that it is a requirement for the degree programmes

they validate to contain an element of sports psychology (Society of Sports Therapists, 2012).

Their 2012 standards of education and training document, which replaced the 2005 competencies and scope for practice document (Society of Sports Therapists, 2005) active at the time of data collection, states that sports therapists must achieve the following sport psychology related learning objectives:

- a) the components of a comprehensive fitness regime and injury and illness prevention programme, including psychological factors in the prevention of injury and illness,
- b) the roles of physical and psychological examination, assessment and screening procedures and protocols in the identification and risk classification of injury and illness,
- c) the role of contemporary testing equipment and accepted test protocols for the measurement of psychological wellbeing in a sport and exercise context,
- d) the administration, planning and implementation of pre-participation physical and psychological examination and screening and the classification of injury risk and illness,
- e) the pathological, physiological and psychological signs and symptoms that may influence the rehabilitation process,
- f) the use of massage and its physiological and psychological effects on exercise, rehabilitation and performance,
- g) the typical psychological and emotional responses to trauma and imposed physical inactivity which may affect the rehabilitation process,
- h) the psychological parameters associated with the rehabilitation process,
- i) the application of sport, exercise and occupational specific rehabilitation programmes to address the psychological impact related to a patient's injury or illness, and
- j) the effects of commonly abused drugs and other substances on the participant's physical and psychological health and performance.

(Society of Sports Therapists, 2012)

The purpose of this study was to compare the sport psychology related attitudes and behaviours of UK SIRPs (physiotherapists and sports therapists) who have studied sport psychology and/or the psychological aspects of sport injury to those who have not. The differentiation between general sport psychology education and the specific study of sport injury psychology was made to acknowledge that sport psychology education that is contextually relevant to physiotherapists (i.e. sport injury psychology) could potentially have a greater impact (Hamson-Utley et al., 2008; Harris et al., 2005). The independent variables (IVs) investigated were level of exposure to sport psychology education and level of exposure to sport injury psychology education, and the dependent variables (DVs) were attitude towards sport psychology, use of sport psychology and rates of referral to a sport psychologist. The hypotheses are stated below. The first three hypotheses relate to exposure to general sport psychology education, whilst the last three relate to exposure to specific sport psychology education on the psychological aspects of sports injury.

Hypotheses

- H₀1: There will be no significant differences in the '*attitude towards sport psychology*' scores between groups of SIRPs who have had varying levels of exposure to sport psychology education.
- H₀2: There will be no significant differences in the '*use of sport psychology*' scores between groups of SIRPs who have had varying levels of exposure to sport psychology education.
- H₀3: There will be no significant differences in the '*rates of referral of an injured athlete to a sport psychologist*' between groups of SIRPs who have had varying levels of exposure to sport psychology education.

In hypotheses one to three above the four groups of SIRPs investigated were those who had: (a) not studied sport psychology, (b) studied 1 or 2 sessions of sport psychology, (c) studied an entire module on sport psychology, or (d) not studied any sport psychology as part of their undergraduate or postgraduate degree.

H₀4: There will be no significant differences in the '*attitude towards sport psychology*' scores between groups of SIRPs who have had varying levels of exposure to sport injury psychology education.

H₀5: There will be no significant differences in the '*use of sport psychology*' scores between groups of SIRPs who have had varying levels of exposure to sport injury psychology education

H₀6: There will be no significant differences in the *rates of referral of an injured athlete to a sport psychologist* between groups of SIRPs who have had varying levels of exposure to sport injury psychology education.

In hypotheses four to six above the three groups of SIRPs investigated were those who had: (a) not studied sport injury psychology, (b) studied sport injury psychology as part of a general session, or (c) studied an entire module on sport injury psychology as part of their undergraduate or postgraduate degree.

3.2 Method

Participants

The participants (n=94) were physiotherapists (n=54) and sports therapists (n=40), qualified to a minimum of undergraduate level, who had been actively working in sport for at least one year

prior to participating in the study (range = 1-34 years, mean = 9.22 years, SD = 7.72 years). Forty-eight of the participants (51%) were qualified to postgraduate level and 46 (49%) were qualified to undergraduate level.

Measures

Information regarding the participants was collected using an online questionnaire (appendix 3a), hosted on a secure, encrypted website which required password access to collect the completed questionnaires. The questionnaire was split into five main sections: (i) welcome and eligibility check, (ii) informed consent, (iii) sport psychology education, training, experience and referral, (iv) assessing the effectiveness of mental skills used as a rehabilitation tool, and (v) use of communication and sport psychology with injured athletes.

Welcome and eligibility check – This opening section of the questionnaire collected information about the profession, qualification level and experience (years of experience and amount of practice in sport) of the participant. Participants who were not physiotherapists or sports therapists qualified to at least undergraduate level with the prerequisite level of experience were prevented from completing the rest of the questionnaire.

Informed consent – The informed consent outlined the purpose of the study, the benefits of participation, confidentiality procedures and freedom of consent. The questionnaire was constructed so that participants were not able to complete the rest of the questionnaire unless they gave their consent to participating in the study.

Sport psychology education, training, experience and referral – This section of the questionnaire was designed specifically for the study and asked participants whether they had undertaken any study of sport psychology as part of their undergraduate or postgraduate training, and if so how

much they had undertaken and whether this study included the psychological aspects of sports injury. The section also collected information about other sport psychology related education activities participants may have undertaken (reading, workshops, conferences, speaking to a psychologist) and asked whether participants had ever referred injured athletes to a sport psychologist. Participants were invited to make additional comments on all aspects of this section of the questionnaire.

Assessing the effectiveness of mental skills used as a rehabilitation tool (attitudes towards sport psychology) – This section of the questionnaire examined participants' attitudes regarding the effectiveness of mental skills during sports injury rehabilitation using the Attitudes About Imagery Survey (AAIS) (Hamson-Utley et al., 2008). The authors of the AAIS gave their consent for the survey to be used in the study. Despite its name the AAIS measures attitudes towards a range of mental skills, not just imagery, and has four subscales: mental imagery (AAIS imagery), positive self talk (AAIS self talk), goal setting (AAIS goal setting) and pain tolerance (AAIS pain tolerance), as well as a total score (AAIS total). The AAIS contains fifteen items in the form of statements about the effectiveness of specific mental skills, which participants are required answer using a seven-point Likert scale ranging from 'strongly disagree' (1) to 'strongly agree' (7). Hamson-Utley et al. (2008) report that the AAIS was developed based on components of the Integrated Model of Response to Sport Injury (Wiese-Bjornstal et al., 1998) and was developed to measure the attitudes of athletic trainers and physical therapists in the USA. Its content validity was assessed by four experts in sport psychology, athletic training and physical therapy, who examined the item wording, relevance and appropriateness (Hamson-Utley et al., 2008). This process resulted in the reduction in the number of items in the survey from seventeen to fifteen, the increase of the Likert scale range from five to seven, and some minor word changes to improve clarity (Hamson-Utley et al., 2008). Test-retest reliability correlations of 0.60 to 0.84 on all fifteen items (all significant at the 0.01 level) were reported by Hamson-Utley et al. (2008). Cronbach alphas were

reported as a further measure of reliability – the mental imagery subscale consisted of eight items ($\alpha = 0.90$), the positive self talk subscale had three items ($\alpha = 0.65$), the goal setting subscale had two items ($\alpha = 0.77$), and the pain tolerance subscale consisted of two items ($\alpha = 0.77$) (Hamson-Utley et al., 2008). Additionally, Cronbach alphas were calculated on the current data set yielding the following results: mental imagery subscale, $\alpha = 0.92$; positive self talk subscale, $\alpha = 0.78$; goal setting subscale, $\alpha = 0.97$; and pain tolerance subscale, $\alpha = 0.89$. Scoring instructions for the AAIS and the possible range of scores for each subscale can be found in appendix 3b. After the AAIS, this section of the questionnaire provided space for participants to make any additional comments.

Use of communication and sport psychology with injured athletes (use of sport psychology) – This section of the questionnaire examined participants' use of sport psychology skills and techniques as part of their work in treating injured sports performers using the Psychology of Injury Usage Survey (PIUS) (Stiller-Ostrowski, Gould, & Covassin, 2009; Stiller, 2008). The authors of the survey gave their consent for it to be used in the study. The PIUS has six subscales: communication (PIUS communication), social support (PIUS social support), motivation (PIUS motivation), attitude and attentiveness (PIUS attention), relationship (PIUS relationship) and sport psychology (PIUS sport psychology), as well as a total score (PIUS total). The PIUS contains thirty-six items in the form of statements about the participants' use of various psychology-related strategies with injured athletes, which are required to be answered using a nine-point Likert scale ranging from 'never' (1) to 'always' (9). Stiller (2008) reports that the PIUS was developed following a critical review of the literature and interviews with injured athletes and athletic trainers in the USA. A group of five experts in athletic training and sport psychology were responsible for ensuring content validity and refining the initial pool of items, and following pilot testing the number of items in the PIUS was reduced from sixty-two to thirty-six (Stiller, 2008). Inter-item reliability coefficients of between 0.72 and 0.89 were reported for the six subscales and the Cronbach alpha coefficients

were reported as follows: the communication subscale consisted of seven items ($\alpha = 0.88$), the social support subscale had six items ($\alpha = 0.71$), the motivation subscale had six items ($\alpha = 0.75$), the attention subscale had four items ($\alpha = 0.66$), the relationship subscale had five items ($\alpha = 0.76$) and the sport psychology subscale consisted of eight items ($\alpha = 0.89$) (Stiller, 2008). Additionally, Cronbach alphas were calculated on the current data set yielding the following results: communication subscale, $\alpha = 0.84$; social support subscale, $\alpha = 0.77$; motivation subscale, $\alpha = 0.82$; attention subscale, $\alpha = 0.68$; relationship subscale, $\alpha = 0.74$ and sport psychology subscale, $\alpha = 0.92$. Scoring instructions for the PIUS and the possible range of scores for each subscale can be found in appendix 3c. After the PIUS, this section of the questionnaire provided space for participants to make additional comments if desired.

Procedure

Sports therapists and physiotherapists were invited to participate in the study through a variety of mechanisms: (i) invitations were placed on relevant online forums and message boards (e.g. PhysioForum), (ii) several professional bodies (e.g. Society of Sports Therapists) were contacted and asked to pass on an invitation to their members, (iii) universities were contacted and asked to pass an invitation on to their alumni and (iv) invitations were emailed directly to physiotherapists and sports therapists whose details appeared in various online directories. The invitations briefly outlined the purpose of the study and what was required from participants and directed participants to the online questionnaire. The invitations also provided contact details for further information and indicated that the study had gained ethical approval.

Those wishing to participate in the study subsequently completed the online questionnaire. Informed consent was obtained from all participants and all correctly completed questionnaires received by the specified deadline were analysed. Ninety-four completed questionnaires were received, fifty-four of whom were physiotherapists and forty of whom were sports therapists.

The study adhered to the ethical procedures of the British Psychological Society and the Open University. Ethical clearance was obtained from the Open University Human Participants and Materials Ethics Committee (Ref: HPMEC/2010/#808/1).

Data analysis

As stated previously, for the purposes of data analysis the independent variables in this study were level of exposure to sport psychology education (x4) and level of exposure to sport injury psychology education (x3). The dependent variables were attitude towards sport psychology (AAIS subscale scores x4 and total score), use of sport psychology (PIUS subscale scores x6 and total score) and rates referral to a sport psychologist. The data were analysed as discussed below.

AAIS and PIUS data

The data from the AAIS and PIUS were analysed using multivariate analysis of variance (MANOVA). It is recommended that MANOVA is used to test for significant differences between multiple groups (three or more) where there is more than one dependent variable (Dancey & Reidy, 2011; Howitt & Cramer, 2011).

Four MANOVA analyses were undertaken on the data. The first MANOVA sought to examine the impact of sport psychology education on the four AAIS questionnaire subscales and thus tested H_01 . The second MANOVA sought to examine the impact of sport psychology education on the six PIUS questionnaire subscales and thus tested H_02 . These MANOVA compared scores on the AAIS and PIUS subscales across four groups: those who had not studied sport psychology, those who had studied one or two sessions of sport psychology, those who had studied an entire module on sport psychology and those who had studied two or more sport psychology modules. Analysis of variance (ANOVA) was used to identify which of the subscales demonstrated significant effects as

suggested by Howitt and Cramer (2011) and Bonferonni post-hoc analyses were used to examine where precisely these significant effects occurred.

The third MANOVA was conducted to examine the effect of specific education on the psychological aspects of sport injury on the four AAIS questionnaire subscales and thus tested H_04 . The final MANOVA was conducted to examine the effect of specific education on the psychological aspects of sport injury on the four PIUS questionnaire subscales and thus tested H_05 . These MANOVA compared three groups: those who had not studied the psychology of sports injury, those who had studied the psychology of sports injury as part of a more general session and those who had studied an entire module on the psychology of injury. Again, ANOVAs and Bonferroni post-hoc tests were used to identify where exactly differences were.

The assumptions of a MANOVA are that the multivariate data are normally distributed and that the variance-covariance matrices are equal (Dancey & Reidy, 2011). Box plots showed that for each MANOVA the data for the dependent variables (AAIS and PIUS subscales) in each condition of the independent variable (group) were approximately normally distributed. Generally the equality of variance-covariance matrices can be assumed when sample sizes are equal (Dancey & Reidy, 2011), but in all four MANOVA the number of participants in each group were unequal, therefore, as recommended by Tabachnick and Fidell (2014) Pillai's criterion was used instead of Wilks' lambda to evaluate multivariate significance.

Referral data

The data collected regarding sport psychologist referral yielded both qualitative and quantitative data. The quantitative data analysis involved calculating referral rates for participants from the various groups and undertaking two chi square tests. The first chi square test was undertaken to test H_03 examine whether any significant differences existed between those who had not studied

sport psychology, those who had studied one or two sessions of sport psychology, those who had studied an entire module on sport psychology and those who had studied two or more sport psychology modules. A second chi square test was undertaken test H_06 to examine whether any significant differences existed between those who had not studied the psychology of sports injury, those who had studied the psychology of sports injury as part of a more general session and those who had studied an entire module on the psychology of injury. Chi square tests were used since the question related to referral generated categorical data. The data met the assumptions of a chi-square test in that it did not involve repeated measures and in the contingency tables no expected values were below five (Field, 2013).

The small amount of qualitative data relating to referral were analysed using the content analysis procedures suggested by Cote et al. (1993), outlined in Chapter 2 (Section 2.2) which involved organising the data into “meaning units” and coding these into higher order themes through an inductive/interpretational approach, terminating in ‘general dimensions’ as the highest order themes (Gratton & Jones, 2004; Thomas et al., 2005).

Other education data

The data collected regarding any other sport psychology education activities that participants may have engaged in were tabulated and the frequency and percentage of participants engaging in each form of activity was calculated. This data was collected to identify the potential impact of other forms of sport psychology education beyond that undertaken at an undergraduate or postgraduate level.

3.3 Results

Sport psychology education

In order to test H₀1 data were collected examining the AAIS scores for participants based on their level of exposure to sport psychology education. The mean scores are shown in Table 14.

Table 14: Mean AAIS scores and standard deviations

		Not studied any sport psychology (n=27)	Studied 1 or 2 sessions of sport psychology (n=27)	Studied an entire module on sport psychology (n=25)	Studied 2 or more sport psychology modules (n=15)
Total	Mean	75.67	80.78	76.16	78.80
	SD	16.94	13.61	20.46	23.73
Imagery	Mean	37.19	39.89	38.08	39.80
	SD	8.91	8.36	10.43	12.91
Goal Setting	Mean	11.62	12.22	11.96	11.93
	SD	3.32	2.64	4.04	3.84
Self -Talk	Mean	15.81	17.30	16.04	16.33
	SD	4.04	2.52	4.75	4.92
Pain	Mean	11.04	11.37	10.08	10.73
	SD	2.95	2.63	3.97	3.26

A MANOVA was undertaken to examine the impact of level of exposure to sport psychology education on the four AAIS subscales. The MANOVA revealed that there was no significant multivariate effect of sport psychology education on the questionnaire scores ($F(12, 267) = 0.777$, $p = 0.674$; Pillai's trace = 0.101). Each of the four questionnaire subscales and the total score was subjected to a further ANOVA. This revealed no significant effects for AAIS total ($F(3, 90) = 0.441$, $p = 0.724$, partial $\eta^2 = 0.014$), AAIS imagery ($F(3, 90) = 0.432$, $p = 0.730$, partial $\eta^2 = 0.014$), AAIS goal setting ($F(3, 90) = 0.134$, $p = 0.940$, partial $\eta^2 = 0.004$), AAIS self talk ($F(3, 90) = 0.698$, $p = 0.556$, partial $\eta^2 = 0.023$) and AAIS pain tolerance ($F(3, 30) = 0.745$, $p = 0.528$, partial $\eta^2 = 0.024$).

In order to test H₀2 data were collected examining the PIUS scores for participants based on their level of exposure to sport psychology education. The mean scores are shown in Table 15.

Table 15: Mean PIUS scores and standard deviations

		Not studied any sport psychology (n=27)	Studied 1 or 2 sessions of sport psychology (n=27)	Studied an entire module on sport psychology (n=25)	Studied 2 or more sport psychology modules (n=15)
Total	Mean	239.81	267.74	270.16	283.87
	SD	30.17	27.42	29.39	32.15
Social Support	Mean	41.96	46.52	46.44	47.80
	SD	6.60	4.56	5.55	5.66
Relationship	Mean	38.59	41.67	40.20	42.33
	SD	4.89	3.17	4.09	3.97
Sport Psychology	Mean	29.70	42.04	42.76	51.93
	SD	13.48	12.93	14.23	14.88
Attention	Mean	30.33	32.89	33.12	32.40
	SD	3.37	2.21	2.77	3.46
Communication	Mean	56.48	59.00	60.12	60.47
	SD	4.72	4.29	3.32	4.27
Motivation	Mean	42.74	45.63	47.52	48.93
	SD	7.04	6.51	5.67	4.37

A MANOVA was undertaken to examine the impact of level of exposure to sport psychology education on the six PIUS questionnaire subscales. The MANOVA revealed that there was a significant multivariate effect of sport psychology education on the questionnaire scores ($F(18, 261) = 2.261, p = 0.003$; Pillai's trace = 0.405). Each of the six questionnaire subscales and the total score was subjected to a further ANOVA. This revealed significant effects for PIUS total ($F(3, 90) = 8.772, p < 0.001$, partial $\eta^2 = 0.226$), PIUS social support ($F(3, 90) = 4.889, p = 0.003$, partial $\eta^2 = 0.140$), PIUS relationship ($F(3, 90) = 3.733, p = 0.014$, partial $\eta^2 = 0.111$), PIUS sport psychology ($F(3, 90) = 9.325, p < 0.001$, partial $\eta^2 = 0.237$), PIUS attention ($F(3, 90) = 4.967, p = 0.003$, partial $\eta^2 = 0.142$), PIUS communication ($F(3, 90) = 4.402, p = 0.006$, partial $\eta^2 = 0.128$) and PIUS motivation ($F(3, 90) = 4.153, p = 0.008$, partial $\eta^2 = 0.122$).

Bonferonni post-hoc analyses were undertaken to identify where specifically these significant effects occurred. On the PIUS total subscale those who did not study sport psychology scored

significantly lower than those who studied one or two sessions (mean difference = 27.926, $p = 0.005$, CI(95%)6.251-49.601), one module (mean difference = 30.345, $p = 0.002$, CI(95%)8.241-52.450) or more than one module (mean difference = 44.052, $p < 0.001$, CI(95%)18.406-69.698). On the PIUS social support subscale those who did not study sport psychology scored significantly lower than those who studied one or two sessions (mean difference = 4.556, $p = 0.023$, CI(95%)0.416-8.695), one module (mean difference = 4.477, $p = 0.031$, CI(95%)0.256-8.698) or more than one module (mean difference = 5.837, $p = 0.011$, CI(95%)0.939-10.735). On the PIUS relationship subscale those who did not study sport psychology scored significantly lower than those who studied one or two sessions (mean difference = 3.074, $p = 0.042$, CI(95%)0.069-6.080) or more than one module (mean difference = 3.741, $p = 0.034$, CI(95%)0.185-7.297). On the PIUS sport psychology subscale those who did not study sport psychology scored significantly lower than those who studied one or two sessions (mean difference = 12.333, $p = 0.008$, CI(95%)2.232-22.434), one module (mean difference = 13.056, $p = 0.006$, CI(95%)2.755-23.357) or more than one module (mean difference = 22.230, $p < 0.001$, CI(95%)10.278-34.181). On the PIUS attention subscale those who did not study sport psychology scored significantly lower than those who studied one or two sessions (mean difference = 2.556, $p = 0.011$, CI(95%)0.401-4.710) or one module (mean difference = 2.787, $p = 0.006$, CI(95%)0.590-4.984). On the PIUS communication subscale those who did not study sport psychology scored significantly lower than those who studied one module (mean difference = 3.639, $p = 0.014$, CI(95%)0.504-6.773) or more than one module (mean difference = 3.985, $p = 0.024$, CI(95%)0.348-7.622). Finally, on the PIUS motivation subscale those who did not study sport psychology scored significantly lower than those who studied one module (mean difference = 4.779, $p = 0.039$, CI(95%)0.158-9.401) or more than one module (mean difference = 6.193, $p = 0.015$, CI(95%)0.830-11.555).

In order to test H_03 referral data were also collected for the four groups of sport psychology education exposure level. The referral rates reported by the members of each of these groups is

summarised in Table 16. A chi-square test was undertaken to establish whether there were any significant differences. There was no significant association between sport psychology education and referral ($\chi^2(3) = 7.09, p = 0.069$).

Table 16: Referral rates by sport psychology education levels

Group	Proportion who have referred an injured athlete to a sport psychologist
Those who have not studied any sport psychology (n=27)	30%
Those who have studied 1 or 2 sessions of sport psychology (n=27)	44%
Those who have studied an entire module on sport psychology (n=25)	64%
Those who have studied two or more sport psychology modules (n=15)	47%

Psychology of sports injury education

To test H₀₄ data were collected examining the AAIS scores for participants based on their level of exposure to sport psychology education specifically relating to the psychological aspects of sports injury. The mean scores are shown in Table 17.

Table 17: Mean AAIS scores and standard deviations

		Not studied any sport injury psychology (n=34)	Studied sport injury psychology as part of a general session (n=41)	Studied an entire module on sport injury psychology (n=19)
Total	Mean	75.41	78.41	80.57
	SD	17.04	18.65	19.43
Imagery	Mean	37.06	39.44	39.63
	SD	8.54	10.54	10.47
Goal Setting	Mean	11.65	11.87	12.58
	SD	3.48	3.21	3.72
Self-Talk	Mean	15.85	16.71	16.63
	SD	4.19	3.86	4.18
Pain	Mean	10.85	10.39	11.74
	SD	3.28	3.18	3.14

A MANOVA was undertaken to examine the impact of level of exposure to education specifically addressing the psychological aspects of sports injury on the four AAIS questionnaire subscales. The MANOVA revealed that there was no significant multivariate effect of psychology of sports injury education on the questionnaire scores ($F(8, 178) = 1.235, p = 0.281$; Pillai's trace = 0.105). Each of the four questionnaire subscales and the total score was subjected to a further ANOVA. This revealed that there were no significant effects for AAIS total ($F(2, 91) = 0.535, p = 0.588$, partial $\eta^2 = 0.012$), AAIS imagery ($F(2, 91) = 0.669, p = 0.515$, partial $\eta^2 = 0.014$), AAIS goal setting ($F(2, 91) = 0.465, p = 0.630$, partial $\eta^2 = 0.010$), AAIS self talk ($F(2, 91) = 0.460, p = 0.633$, partial $\eta^2 = 0.010$) and AAIS pain tolerance ($F(2, 91) = 1.146, p = 0.322$, partial $\eta^2 = 0.025$).

To test H₀₅ data were collected examining the PIUS scores for participants based on their level of exposure to sport psychology education specifically relating to the psychological aspects of sport injury. The mean scores are shown in Table 18.

Table 18: Mean PIUS scores and standard deviations

		Not studied any sport injury psychology (n=34)	Studied sport injury psychology as part of a general session (n=41)	Studied an entire module on sport injury psychology (n=19)
Total	Mean	243.24	270.22	282.47
	SD	28.94	32.09	23.45
Social Support	Mean	42.76	46.32	48.11
	SD	6.37	5.50	4.52
Relationship	Mean	38.59	41.63	41.47
	SD	4.72	3.52	3.86
Sport Psychology	Mean	30.18	44.37	49.47
	SD	13.05	14.22	12.61
Attention	Mean	30.97	32.68	33.05
	SD	3.33	3.16	1.87
Communication	Mean	57.29	58.93	61.26
	SD	4.60	4.60	2.02
Motivation	Mean	43.44	46.29	49.11
	SD	6.72	6.74	3.23

A MANOVA was undertaken to examine the impact of level of exposure to education specifically addressing the psychological aspects of sports injury on the six PIUS questionnaire subscales. The MANOVA revealed that there was a significant multivariate effect of psychology of sports injury education on the questionnaire scores ($F(12, 174) = 3.025, p = 0.001$; Pillai's trace = 0.345). Each of the questionnaire subscales and the total score was subjected to a further ANOVA. Significant effects were seen for PIUS total ($F(2, 91) = 13.074, p < 0.001$, partial $\eta^2 = 0.223$), PIUS social support ($F(2, 91) = 6.390, p = 0.003$, partial $\eta^2 = 0.123$), PIUS relationship ($F(2, 91) = 5.914, p = 0.004$, partial $\eta^2 = 0.115$), PIUS sport psychology ($F(2, 91) = 15.824, p < 0.001$, partial $\eta^2 = 0.258$), PIUS attention ($F(2, 91) = 4.085, p = 0.020$, partial $\eta^2 = 0.082$), PIUS communication ($F(2, 91) = 5.437, p = 0.006$, partial $\eta^2 = 0.107$) and PIUS motivation ($F(2, 91) = 5.291, p = 0.007$, partial $\eta^2 = 0.104$).

Bonferonni post-hoc analyses were undertaken to identify where specifically these significant effects occurred. On the PIUS total subscale those who had not studied the psychology of sports injury at all scored significantly lower than those who had studied it as part of a more general session (mean difference = 26.984, $p < 0.001$, CI(95%)10.343-43.626) or had studied an entire module on the psychology of injury (mean difference = 39.238, $p < 0.001$, CI(95%)18.688-59.788). On the PIUS social support subscale those who had not studied the psychology of sports injury scored significantly lower than those who had studied it as part of a more general session (mean difference = 3.552, $p = 0.024$, CI(95%)0.349-6.755) or had studied an entire module on the psychology of injury (mean difference = 5.341, $p = 0.004$, CI(95%)1.385-9.296). On the PIUS relationship subscale those who had not studied the psychology of sports injury scored significantly lower than those who had studied it as part of a more general session (mean difference = 3.046, $p = 0.005$, CI(95%)0.749-5.343) or had studied an entire module on the psychology of injury (mean difference = 2.885, $p = 0.045$, CI(95%)0.049-5.722). On the PIUS sport psychology subscale those who had not studied the psychology of sports injury scored

significantly lower than those who had studied it as part of a more general session (mean difference = 14.189, $p < 0.001$, CI(95%)6.556-21.822) or had studied an entire module on the psychology of injury (mean difference = 19.297, $p < 0.001$, CI(95%)9.871-28.723). On the PIUS attention subscale those who had not studied the psychology of sports injury scored significantly lower than those who had studied it as part of a more general session (mean difference = 1.712, $p = 0.049$, CI(95%)0.005-3.420). On the PIUS communication subscale those who had not studied the psychology of sports injury scored significantly lower than those who had studied an entire module on the psychology of injury (mean difference = 3.969, $p = 0.004$, CI(95%)1.026-6.913). Finally, on the PIUS motivation subscale those who had not studied the psychology of sports injury scored significantly lower than those who had studied an entire module on the psychology of injury (mean difference = 5.664, $p = 0.006$, CI(95%)1.334-9.995).

In order to test H₀₆ referral data was collected for the three groups of sport injury psychology education exposure level. The referral rates reported by the members of each of these groups is summarised in Table 19. A chi-square test was undertaken to establish whether there were any significant differences. There was a significant association between sport injury psychology education and referral ($\chi^2(2) = 7.12$, $p = 0.029$). This showed that the more sport injury psychology education a SIRP is exposed to the more likely they are to refer to a sport psychologist.

Table 19; Referral rates by psychology of sports injury education levels

Group	Proportion who have referred an injured athlete to a sport psychologist
Those who have not studied any sport injury psychology (n=34)	32%
Those who have studied the sport injury psychology as part of a general session (n=41)	46%
Those who have studied an entire module on sport injury psychology (n=19)	68%

Referral to a sport psychologist - qualitative data

In support of the quantitative data collected to test H₀₃ and H₀₆, qualitative data were also collected by asking participants who had referred an injured athlete to a sport psychologist to outline how frequently they made referrals and whether they found referring athletes to a sport psychologist beneficial. Thirty-six of the participants provided such data, which is summarised in Table 20.

Table 20: Comments on referring injured athletes to a sport psychologist

Sample Raw Data Themes	Higher Order Themes	General Dimensions
Work alongside sports psychologists in elite world class performance team	Multidisciplinary team (n=10)	Comments on referring injured athletes to a sport psychologist
Worked in a multi-disciplinary unit where Sport Psychology was part of the treatment		
Worked with a sports psychologist in a national team and also as part of an institute		
I work with a sports psychologist and refer every athlete to her		
Have worked in elite team where sport psychologist part of management team		
Yes I find it beneficial	Beneficial (n=17)	
It has been very beneficial for confidence lacking and a feeling of detachment from the 'team' in long term injured players		
Majority of patients found it beneficial.		
It's not just beneficial but integral!		
Yes it has been helpful on the occasions that I have referred patients		
I believe it was beneficial.		
All positive experiences.	Not beneficial (n=2)	
Beneficial for players who are struggling to cope or are very frustrated.		
Very complex case still ongoing and despite few months of contact with sport psychologist yet to see any change in players attitudes or beliefs towards his body/injury	Not beneficial (n=2)	
Didn't really help		
Minimal	Frequency of referral – relatively low (n=17)	
Whilst working with GBR athletes very occasionally		
Infrequently		
Only 2 or 3 times during career		
Once or twice only		
Infrequently		
I did once		
Not very often	Frequency of referral – relatively high (n=8)	
Constantly		
A continuous process		
About 4 times per year	Frequency of referral – relatively high (n=8)	
Refer every athlete		
Depends on the job that I had. I regularly referred when I was working in elite sport but not so much now that I work in lower levels more		
Due to not having access rather than not wanting too		
Most of my athletes are not elite so too expensive on top of my fees	Limiting factors (n=5)	
Depended on ease of access		

Other sport psychology education

To address the possibility that sport psychology education experiences other than those held at undergraduate/postgraduate qualification level could impact on attitudes and behaviour in relation to sport psychology, data were collected regarding the other sport psychology education experiences (workshop/course, conference, reading or psychologist) participants may have had. The vast majority (92.6%) of the participants reported that they had undertaken some such activity. As illustrated in Figure 6, speaking to a psychologist (n=69) and reading (n=65) were the most common activities. Of the seven participants (7.4%) who hadn't engaged in any other sport psychology education activities, two were physiotherapists who had not studied sport psychology as part of their degree, and five were sports therapists; three of whom had studied sport psychology as part of their degree and two of whom had not.

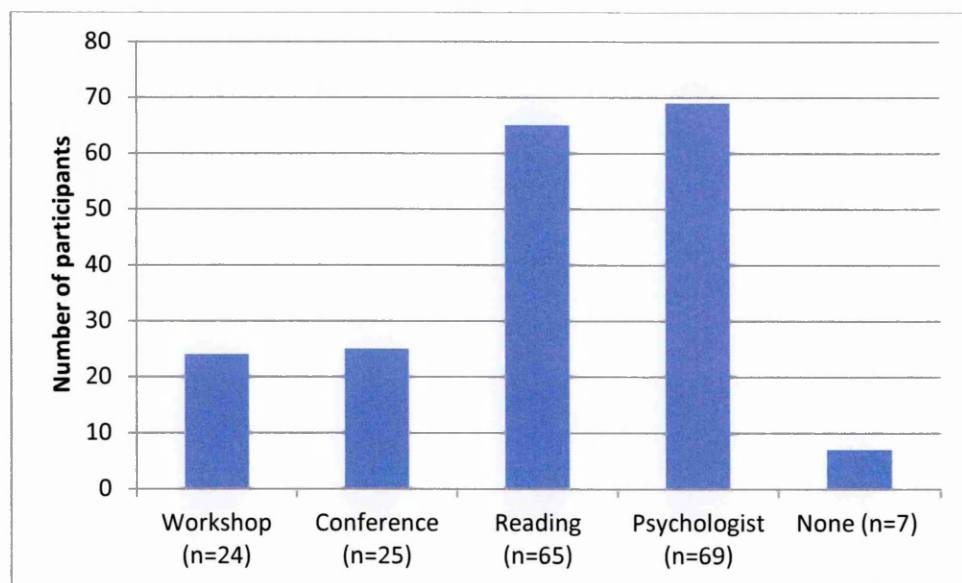


Figure 6: Other sport psychology education activities undertaken
(Note: participants were able to select more than one answer)

3.4 Discussion

The purpose of this study was to compare the sport psychology related attitudes and behaviours of UK SIRPs who had studied sport psychology as part of their undergraduate/postgraduate training to those who had not. For hypothesis 1, the null was accepted as no significant differences were observed in the attitude towards sport psychology between those who had studied sport psychology and those who had not. This partially supports the findings of Hamson-Utley et al. (2008) who only found significant differences between those who had studied sport psychology as part of their training (athletic trainers) and those who had not (physical therapists) on three of the AAIS subscales. In contrast, the null hypothesis was rejected for hypothesis 2 as significant differences in use of sport psychology were seen between those who had studied sport psychology and those who had not, across all subscales of the PIUS and the total PIUS score. For example, those who had not studied sport psychology scored significantly lower on the PIUS (total score) than those who had studied one or two sessions of sport psychology, an entire module on sport psychology and more than one module on sport psychology. These findings indicate that exposure to sport psychology education impacts upon SIRPs use of sport psychology strategies, but not on their attitude towards sport psychology. This would suggest that whilst positive attitudes regarding the psychological aspects of sports injury can be formed in the absence of education, sport psychology education is required in order for SIRPs to make changes to their practice (i.e. sport psychology strategies need to be taught before they can be implemented). This supports previous studies (e.g. Arvinen-Barrow et al., 2007; Heaney, 2006a) which have consistently shown that SIRPs demonstrate a positive attitude towards sport psychology, and studies such as McKenna et al (2002) and Washington-Lofgren et al. (2004) who have indicated that there is often a gap between such positive attitudes and the translation into action (i.e. use of sport psychology strategies).

Similar results were seen with regard to referral with a higher proportion of those who had studied sport psychology making referrals to sport psychologists than those who had not studied sport psychology, although the differences between the referral rates of each group were not significant. As the differences were not significant the null hypothesis was accepted for hypothesis 3. Collectively these results suggest that sport psychology education has a positive impact on the sport psychology related behaviours of SIRPs, thus supporting the findings of various USA based studies such as Clement and Shannon (2009) and Stiller-Ostrowski et al. (2009).

Given the finding that sport psychology education is linked to sport psychology related behaviours, it would be feasible to expect that greater levels of exposure might lead to greater levels of sport psychology related behaviour. Such a dose-response effect has previously been reported in the psychology education of physiotherapists (Green et al., 2008). Whilst there was a general trend for participants who had studied larger amounts of sport psychology to have higher PIUS scores than those who had studied less sport psychology, the differences between those who had studied one or two sessions, one module and more than one module of sport psychology were not significant. This may indicate that shorter duration education modules can be just as effective as longer duration modules.

Whilst sport psychology education is deemed important it is perhaps the specificity and application of that education that is most important (Hamson-Utley et al., 2008; Harris et al., 2005). For example, general sport psychology education may have limited application for a SIRP. In contrast sport psychology education on the psychological aspects of sports injury would be highly relevant to a SIRP. The results revealed that those who had undertaken some study of the psychological aspects of sports injury scored significantly higher on all of the PIUS subscales, including the total score, than those who had studied none. This indicates that specific study of the psychological aspects of sports injury has a positive impact on the use of sport psychology

strategies by SIRPs. The null hypothesis was therefore rejected for hypothesis 5. Whilst those who had studied an entire module on sport injury psychology had higher PIUS scores than those who had studied sport injury psychology as part of a more general session, the difference was not significant, which may provide further support for possibility that shorter duration education modules can be as effective as longer duration modules. Again there were no significant differences seen for attitudes to sport psychology (AAIS scores) in relation to level of exposure to sport psychology, providing further evidence for sport psychology education specifically influencing behaviour rather than attitude and providing support for the null in hypothesis 4.

Those who had studied the psychological aspects of sports injury also demonstrated significantly higher sport psychologist referral rates than those who had not and thus the null was rejected for hypothesis 6. This was in contrast to the findings for general sport psychology education where there were no significant differences evident between groups, indicating that specific sport injury psychology education had a more positive impact on the SIRPs than general sport psychology education. There appeared to be a dose-response effect with regard to referral with those who had studied an entire module on sport injury psychology reporting referral rates 22 percentage points higher than those who had studied the psychology of injury as part of a more general session, providing some support for Green et al. (2008). The qualitative data collected regarding sport psychologist referral revealed some interesting findings. Firstly, the vast majority of respondents reported that referring an athlete to a sport psychologist had been beneficial. However, overall the frequency of referral was relatively low. Access appeared to be a key barrier to making more referrals with those working in multi-disciplinary teams (e.g. in elite sport) appearing to have greater access to sport psychologists. This would suggest that access to sport psychologists needs to be improved and that a multi-disciplinary approach to sports injury rehabilitation should be encouraged in order to maximise rehabilitation opportunities for the injured athlete (Clement & Arvinen-Barrow, 2013).

It cannot be assumed that university education alone is responsible for attitudes and behaviours in relation to sport psychology. Professional experience and other forms of education are likely to influence attitudes and behaviours. Kamphoff et al. (2010) suggest that professional experience may improve attitudes toward sport psychology. It would consequently be reasonable to assume that those with more experience of working as a SIRP, who have had greater opportunity to experience the psychological aspects of sports injury and develop an approach to addressing them, might have higher attitude and behaviour scores in relation to sport psychology than those with less experience. A potential limitation of the study therefore is that participants had a vast range of experience spanning from 1 to 34 years. This large range also created vast differences in the time since any undergraduate/postgraduate sport psychology education was undertaken by participants which leads to potential issues relating to retention of knowledge and recall. Future studies should perhaps therefore compare sport psychology related attitudes and behaviours between groups with varying levels of experience, and investigate the combined effects of sport psychology education and professional experience.

It is important to note that it is probably the quality and nature of experience that is important rather than the length of experience. This was alluded to in some of the qualitative data where those who reported working in elite sport environments appeared to engage more with sport psychology, perhaps due to the opportunities for multidisciplinary working with sport psychologists in this environment. Interestingly the physiotherapists in the group had much more experience in terms of years of practice than the sports therapists (mean of 12.66 years compared to 4.58 years) and tended to have more experience in elite sport than the sports therapists. This is unavoidable given that sports therapy is a relatively new profession, but it does highlight the potential limitation of grouping the two professions together in this study. The initial intention was to compare physiotherapists to sports therapists; however, this was not possible as the two were not distinct in terms of their study of sport psychology. It was expected that sports

therapists would have studied sport psychology, and physiotherapists would not, which proved not to be the case with great variability in the sport psychology education experiences amongst both groups of professions. This indicates that universities do not always adhere to the recommendations of professional bodies such as the CSP, HCPC and SST, or it may indicate that recommendations may have changed since participants undertook their studies. Since the vast majority of physiotherapists who had studied sport psychology did so at a postgraduate rather than undergraduate level it may have been more appropriate to limit the present study to those qualified only to an undergraduate level, however, this may not have been representative of the qualification profiles of physiotherapists working in sport.

Educational experiences outside of a university setting are also likely to impact upon attitudes and behaviours in relation to sport psychology and it is important to acknowledge their impact within this study, particularly as it involves a self-selected participant group. It could be expected that those with an interest in sport psychology would be most likely to volunteer to participate. In line with this, the vast majority of participants (93%), including those who had not studied any sport psychology at university, indicated that they had undertaken some form of voluntary sport psychology education outside of a university setting (reading, workshop, conference or speaking to a sport psychologist), all of which are likely to have an impact on the sport psychology related attitude and behaviours of SIRPs. Those with an interest in sport psychology are likely to hold a positive attitude towards it. This may, in part, explain why significant effects were only seen for sport psychology related behaviours (usage and referral) and not attitudes. It is perhaps feasible to suggest that only those with a positive attitude towards sport psychology would agree to participate in a study of this nature and therefore the capacity for differences in attitudes to be seen between groups is limited. Examination of the AAIS Likert scale (appendix 3a) indicates that a score above four on a question could be indicative of a positive attitude, therefore, given that there are fifteen questions on the AAIS any score above sixty on the total AAIS scale can be

considered to be indicative of a positive attitude towards sport psychology. All groups achieved a mean AAIS score well above sixty indicating that a positive attitude towards sport psychology was prevalent throughout the participant group. Future studies should perhaps try to recruit a broader range of SIRPs, including those with less positive attitudes towards sport psychology. This could be achieved by reducing the emphasis on psychology in the recruitment materials and informed consent form.

This study has provided evidence to suggest that education in sport psychology, particularly psychology of sport injury education, is associated with greater levels of sport psychology related behaviour (usage and referral) amongst SIRPs. Given that previous research has indicated that SIRPs have gaps in their knowledge in this area and have a desire to develop their knowledge (e.g. Heaney, 2006a), the findings of this study indicate that an education intervention could be effective in improving attitudes and behaviours amongst SIRPs. Future studies are required to evaluate the effectiveness of sport psychology education interventions (Study 4) and the optimal content of such interventions (Study 3).

CHAPTER 4 – STUDY 3:
**SPORT PSYCHOLOGY EDUCATION FOR SPORTS INJURY
REHABILITATION PROFESSIONALS – A REVIEW**

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(see appendix 4a)

CHAPTER 4 – STUDY 3: SPORT PSYCHOLOGY EDUCATION FOR SPORTS INJURY REHABILITATION PROFESSIONALS: A REVIEW

4.1 Introduction

Sport psychology support has been identified as being beneficial to sport injury rehabilitation (Armatas et al., 2007; 2004; Levy et al., 2006). As such previous research investigating the attitudes and behaviours of SIRPs has indicated that sport psychology education is likely to have a positive impact on the sport psychology related behaviours and attitudes of SIRPs (Arvinen-Barrow et al., 2007; Hamson-Utley et al., 2008; Heaney, 2006a). However, the nature of such education is clearly important, as a poorly designed education programme with little relevance to its target audience will likely have much less impact than a well designed programme with highly relevant content (Kamphoff et al., 2010). Previous researchers have discussed the appropriate content and mode of education on the psychological aspects of sport injury for SIRPs, but to date no research has reviewed the existing literature. This is necessary in order to help shape and standardise psychology education for SIRPs, which has been found to be inconsistent (Heaney, Green, Rostron, & Walker, 2012). Therefore the purpose of this chapter was to present a review of this work with the aim of identifying the most appropriate content and mode of delivery for a sport psychology education programme that can be utilised in Study 4 (Chapter 5). The review will specifically seek to address the following research questions:

1. What topic areas do researchers suggest should be integrated into the sport psychology education of SIRPs?
2. What topic areas are currently being recommended by professional bodies?
3. What are the findings of research examining the impact of sport psychology education on SIRPs?
4. What do researchers recommend to be the most appropriate mode of delivery for sport psychology education for SIRPs?

4.2 Method

Sources

The strategy used to identify published materials relating to the education and training of SIRPs involved: (1) electronic searches of online databases including SPORTDiscus, PubMed, Academic Search Complete, PsycINFO, PsycARTICLES, MEDLINE, CINAHL, and Google Scholar, (2) checking citations within publications identified through electronic searches, (3) manual searches of key journal titles including *Journal of Sport Rehabilitation*, *The Sport Psychologist*, *Journal of Applied Sport Psychology*, *Psychology of Sport and Exercise*, *Journal of Sport and Exercise Psychology*, *Journal of Athletic Training*, *Physical Therapy in Sport*, *Journal of Medicine and Science in Sport*, *British Journal of Sports Medicine*, and (4) searching the websites of key professional bodies including the Chartered Society of Physiotherapy, Association of Chartered Physiotherapists in Sports and Exercise Medicine, National Athletic Training Association, Sports Therapy Council and Society of Sports Therapists. The following search terms were used when conducting online searches: physiotherapist/physiotherapy and sport(s) psychology; athletic trainer/training and sport(s) psychology; sport(s) therapist/therapy and (sport) psychology; physical therapist/therapy and sport(s) psychology; sports medicine and (sport) psychology; physiotherapist/physiotherapy education; athletic trainer/training education; sport(s) therapist/therapy education; physical therapist/therapy education; sports medicine education; physiotherapist/physiotherapy training; athletic trainer training; sport(s) therapist/therapy training; physical therapist/therapy training; sports medicine training; sports injury psychology; rehabilitation and sport(s) psychology. As some the search terms were quite broad this yielded a vast number of papers (in excess of 1000) of which 36 met the inclusion criteria. The inclusion criteria for publications were that they must include content relating to the education and training of SIRPs relative to one of the four research questions and be in English language and peer reviewed (with the exception of those relating to professional bodies). Since this is a relatively novel area of research, no restrictions were placed on the age of publication.

Procedure

Copies of the publications identified were obtained and assessed for relevance in accordance with the inclusion criteria. Those deemed relevant were then grouped into four key areas relating to the research questions: (1) content recommendations from scientific studies, (2) content recommendations from professional bodies, (3) research which measures the effectiveness of sport psychology education, and (4) research examining the most appropriate mode of sport psychology education. Quality assessment checks were undertaken using a quality assessment checklist (appendix 4b) to ensure that the selected papers (with the exclusion of those related to professional bodies) had an appropriate and rigorous methodology (Smith, 2010). The relevant data from these publications were then extracted, synthesised and content analysis undertaken. The extraction strategy included the use of data extraction forms (appendix 4c) relating to each research question as suggested by Smith (2010).

4.3 Results and Discussion

In total 36 publications were identified that satisfied the inclusion criteria. Of these, 28 related to content recommendations from scientific studies, 3 to content recommendations from professional bodies, 4 to research which provided sport psychology education and measured its effectiveness, and 2 to research examining the most appropriate mode of sport psychology education (1 paper was used in two research question areas, thus the total number of papers is 36 not 37). These are discussed in the following sections addressing each of the four research questions identified in the introduction.

Question 1: What topic areas do researchers suggest should be integrated into the sport psychology education of SIRPs?

Various studies investigating SIRPs' attitudes and behaviours in relation to the role of sport psychology in sports injury rehabilitation have called for enhanced sport psychology education for

these professionals (Arvinen-Barrow et al., 2007; Hamson-Utley et al., 2008; Heaney, 2006a; Tracey, 2008). Often these studies have highlighted particular topic areas that such education should address. Twenty-eight such studies were identified as part of this review and the topics recommended by these are summarised in Table 21. The table comprises topics SIRPs themselves have identified as important for professionals in their field to gain training in, and topics which researchers have identified based on their findings.

Table 21: Topic areas suggested to be important in the education and training of SIRPs

Topic	Level of consensus (number of studies recommended in)
Interpersonal communication	19
Positive self-talk / cognitive restructuring	16
Imagery	15
Goal-setting	14
Listening skills / counselling skills	14
Relaxation techniques	13
Providing/improving social support	13
Athlete referral to a sport psychologist or other practitioner	12
Stress / anxiety / arousal	11
Motivation and adherence	11
Athlete self confidence	10
Concentration / attention	10
Depression	8
Recognising and evaluating psychological reactions to sport injury	7
Emotional control strategies	7
Professional boundaries	6
Creating variety in rehabilitation exercises	6
Behaviour modification	2
Coping behaviours	1
Malingering	1
Pain management strategies	1

Studies used: Arvinen-Barrow et al. (2007), Arvinen-Barrow et al. (2010), Barefield & McCallister (1997), Bone & Fry (2006), Clement & Shannon (2009), Clement & Shannon (2011), Clement, Granquist & Arvinen-Barrow (2013), Cramer Roh & Perna (2000), Ford & Gordon (1993, 1997, 1998), Francis et al. (2000), Gordon et al. (1991), Gordon et al. (1998), Hamson-Utley et al. (2008), Harris et al. (2005), Heaney (2006a, 2006b), Hemmings & Povey (2002), Lafferty et al. (2008), Larson et al. (1996), Moulton et al. (1997), Ninedek & Kolt (2000), Stiller-Ostrowski & Ostrowski (2009), Tracey (2008), Washington-Lofgren et al. (2004), Wiese & Weiss (1987), Wiese et al. (1991).

For studies which used a question asking participants to rate on a Likert scale which skills/techniques, from a given list, it is important for SIRPs to learn, only skills/techniques achieving a mean score of 3 (5-point Likert scale) or 5 (7-point Likert scale) and above are included in the table.

Table 21 shows a reasonably high degree of consistency in perceptions of what should be covered, with 19 of the 21 topic areas being suggested by 6 or more studies. Interpersonal communication was the most commonly cited topic area that SIRPs are believed to need training in (19 studies). The psychological techniques of positive self-talk (16 studies) imagery (15 studies), goal-setting (14 studies) and relaxation (13 studies) were also recommended by a large proportion of the studies, as were counselling skills (14 studies), social support (13 studies) and referral to a sport psychologist (12 studies). It is interesting to note that these topic areas with the highest levels of consistency all relate to practical skills rather than theoretical knowledge. This could be indicative of a perception that practical skills are more important than theoretical knowledge for SIRPs (as appeared to be the case in Study 1 of this thesis), or it could instead reflect a perception that these practical skills must inherently be supported by theoretical knowledge. Since many of the studies involved were focused on wider issues, they often stated topics they thought were important, without any deeper discussion regarding their specific nature and teaching. However, there does appear to be a strong consensus in the literature that any education intervention for SIRPs should be applied or practical in nature (Clement & Shannon, 2009; Hamson-Utley et al., 2008; Heaney, 2006a), using teaching methods such as case studies, role play and reflective practice in order to promote implementation of sport psychology strategies in clinical practice (Clement & Shannon, 2009; Stiller-Ostrowski & Hamson-Utley, 2009).

Interestingly there were four topic areas (pain management strategies, coping behaviours, behaviour modification and malingering) that were only recommended in one or two studies. These topic areas all seem credible and it is possible they did not receive further support because many of the studies were focused on issues beyond recommendations regarding the content of sport psychology education for SIRPs. Additionally terminology may be a factor here. For example, some studies may not have explicitly cited pain management strategies as a topic, but may

consider psychological techniques such as imagery, self-talk and cognitive restructuring as pain management strategies. There was also variability between the studies in how recommended topics were derived. Several studies used forced choice categories, whilst others did not. Those with forced choice categories often used versions of the same questionnaire (e.g. Athletic Training and Sport Psychology Questionnaire, Larson et al., 1996), with similar topic areas, which may have led to more consensus on these topic areas at the expense of some of the topics recommended less frequently in Table 21.

Cramer-Roh and Perna (2000) state that SIRPs need to receive adequate training in the recognition, evaluation and treatment of psychological factors associated with sport injury. In line with this it would seem that the topic areas identified in this review can be grouped into three broad themes: the psychological impact of injury, psychological skills/techniques, and referral.

The most comprehensive suggestion as to what should be covered in sport psychology education, and thus worthy of specific mention, has been provided by Gordon et al. (1998) who proposed a three-year psycho-educational curriculum for SIRPs (Table 22). At each level the proposed curriculum contains four hours of theory based lectures, supported by 100 hours of practical experience and other activities such as role play, peer teaching and interviews. At level 1 the proposed lectures focus on basic counselling skills and the psychological impact of injury (Gordon et al., 1998). At level 2 the content focuses on psychological skills training and referral skills, whilst at level 3 the lectures focus on managing difficult situations and clients (Gordon et al., 1998). This proposed content appears to match with the broad themes identified from Table 21 (the psychological impact of injury, psychological skills/techniques, and referral).

Table 22: Three-year psycho-educational curriculum for sport injury rehabilitation personnel (adapted from Gordon et al., 1998, p.151-152)

Level	Description	Assessment
1	<p><i>Prerequisite: Individuals must have worked with a sports team for at least 1 full season</i></p> <p>Lectures (4 hours): Basic counselling skills and psychological sequelae of injury</p> <p>Role Play (4 hours): Grieving response reactions: denial/shock, anger, bargaining, depression</p> <p>Video Analysis (4 hours): Observation of sports injury rehabilitation professional (SIRP) and analyse both client presentation and strategies used by SIRP</p> <p>Practicum (100 hours): Work with a sport team for a full season</p> <p>TOTAL = 109 HOURS</p>	<p>Written exam (60%)</p> <p>Role play (20%)</p> <p>Video analysis (20%)</p>
2	<p>Lectures (4 hours): Communication and interpersonal skills, goal setting, problem- and emotion-focused coping, cognitive restructuring and positive self-talk, role of social support, knowing limitations, rehabilitation team responsibilities, referral skills</p> <p>Peer Teaching (1 hour/person): Teach a mental skill to peers and undergo peer and instructor review</p> <p>Interview (1 hour): Interview a client/patient and document proposed case management plan</p> <p>Mentor Practicum (25 hours): 1 hour per week for a season observe a mentor in action, keep a log book recording management and critique of 10 case histories</p> <p>Practicum (100 hours): Work with a sport team for a full season</p> <p>TOTAL = 131 HOURS</p>	<p>Written exam (50%)</p> <p>Peer teaching (20%)</p> <p>Interview (10%)</p> <p>Mentor log book (20%)</p>
3	<p>Lectures (4 hours): Managing difficult clients, non-compliance, abusive/angry client, chronic pain, etc</p> <p>Teaching (4 hours): Teaching clients goal setting, positive self-talk, relaxation, imagery</p> <p>Interviews (3 hour): Conduct 3 interviews with real clients (2 will be assessed). Communication and interpersonal skills, identification and handling of the client will be evaluated.</p> <p>Mentor Practicum (50 hours): Mentor to observe 2 hours per week for full season. Keep a log book as for level 2.</p> <p>Practicum (100 hours): Work with a sport team for a full season</p> <p>TOTAL = 161 HOURS</p>	<p>Written exam (40%)</p> <p>Teaching (15%)</p> <p>Interview evaluation (15%)</p> <p>Mentoring evaluation (30%)</p>

Much of the training of SIRPs is governed by professional bodies and so the recommendations of researchers and SIRPs are of limited value unless they are adopted by these bodies. The next section examines the recommendations of such professional bodies and organisations with regard to sport psychology education.

Question 2: What topic areas are currently being recommended by professional bodies?

Various bodies have suggested appropriate content for the sport psychology education of SIRPs of various guises. These either take the form of recommendations for content or required competencies that members or accredited programmes are required to demonstrate. As part of the review process the recommendations of three organisations, who specifically address sport psychology, were reviewed (National Athletic Trainers' Association, Society of Sports Therapists, and International Federation of Sports Physiotherapists) and the findings summarised in Table 23. No published recommendations relating to the content of sport psychology education for SIRPs were found for other bodies.

In the United States of America (USA) the National Athletic Trainers' Association (NATA) require Athletic Training degree programmes to cover 'psychosocial strategies and referral' stating that athletic trainers need to be able to recognise clients exhibiting abnormal social, emotional, and mental behaviours, know when to intervene and refer such individuals, have an appreciation of the role of mental health in injury and rehabilitation and be able to use interventions to optimise rehabilitation (National Athletic Trainers' Association, 2011). The recommended content for this topic is split into three areas in NATAs competencies document: (i) theoretical background, (ii) psychosocial strategies, and (iii) mental health and referral, and is summarised in Table 23. A full version of the competencies can also be found in appendix 4d. Whilst the existence of these competencies is very positive it would appear that there is some variability in their interpretation.

For example, Kamphoff et al. (2010) found that only around half of the athletic training students they surveyed had studied a sport psychology course and that the sport-psychology related competencies are more typically taught across the curriculum rather than in a specific module. Kamphoff et al. (2010) suggest that students who are provided with a specific module are likely to be more confident in integrating sport psychology into their practice.

In the United Kingdom (UK) the Society of Sports Therapists (SST) indicate that it is a requirement for the Sports Therapy degree programmes they validate to cover aspects of sport psychology (Society of Sports Therapists, 2005). Their 2005 competencies and scope of practice document states that sports therapists must have an understanding of various psychology related areas as summarised in Table 23 and provided in full in appendix 4e. This document has now been replaced by the SST standards of education and training (Society of Sports Therapists, 2012), which was unavailable at the time of data collection (the sport psychology related learning objectives from these can be found in Section 3.1 of Chapter 3). Whilst these competencies suggest that sport psychology is covered in all UK Sports Therapy degree programmes, it is important to note that not all universities offering Sports Therapy degrees are affiliated to the SST. According to the SST it collaborates with 19 universities (Society of Sports Therapists, 2013), however, there are currently more than 40 providers of Sports Therapy degree programmes listed on the Universities and Colleges Admission Service (UCAS) website for 2014 entry. Additionally, no data analysing the interpretation and implementation of these competencies by degree providers is available and so the extent of their impact is difficult to assess.

Physiotherapists in the UK are not required, at undergraduate level, to undertake any specific training/education in sport psychology. This is because undergraduate physiotherapy training prepares students for roles in a wide range of settings, of which sport injury is just one. As demonstrated in Chapter 2 (Study 1), whilst organisations such as the HCPC and QAA indicate that

some mainstream psychology should be covered in undergraduate programmes, in practice there is great variability between institutions in their delivery of psychology content. Sports physiotherapy is, however, considered to be a widely recognised specialism within physiotherapy at a postgraduate level (Bulley & Donaghy, 2005a). In recognition of this, the International Federation of Sports Physiotherapists (IFSP) in collaboration with five higher education institutions across Europe set up the Sports Physiotherapy for All project, which was charged with developing sports physiotherapy competencies and standards (Bulley & Donaghy, 2005b). These standards, which recognise sports physiotherapy as a postgraduate level specialism, incorporate several competencies relating to sport psychology as summarised in Table 23 (Bulley et al., 2005). A full version of the competencies is also provided in appendix 4f. Whilst these standards and competencies are extremely positive in that they acknowledge the importance of an understanding of the psychological aspects of sports injury, it remains unclear how widely they have been adopted by postgraduate physiotherapy programmes in the UK. No data could be found that examine whether the standards and competencies have been adopted by universities beyond the five Europe-wide institutions involved in the Sport Physiotherapy for All project.

Table 23: The psychology content recommended by professional bodies
(adapted from National Athletic Trainers' Association (NATA), 2011; Society of Sports Therapists (SST), 2005; Bulley et al., 2005)

	NATA Competencies	SST Competencies	IFSP Competencies
THEORETICAL UNDERPINNING:			
knowledge and understanding of psychological theories and approaches	✓	✓	✓
Psychological / psychosocial influences on the rehabilitation process		✓	✓
basic principles of personality, trait anxiety, locus of control, intrinsic and extrinsic motivation, and patient and social environment interactions	✓		
biopsychosocial / psychological and emotional responses to injury and forced inactivity	✓	✓	✓
psychological factors in the assessment of injury risk and prevention of injury		✓	✓
psychosocial considerations in to return to activity or participation (e.g., motivation, confidence)	✓		
effective interpersonal and cross-cultural communication	✓		✓
understanding of behaviour change	✓		✓
the psychological demands of specific sports and psychosocial influences in different athletic contexts			✓
the psychological effects of massage		✓	
psychological benefits of different types of physical activity and exercise in specific individuals			✓
psychosocial factors affecting optimal performance			✓
PSYCHOSOCIAL INTERVENTIONS:			
social support and psychological and emotional well-being	✓		
psychological skills and techniques (e.g., goal setting, imagery, positive self-talk, and relaxation) that can be used during injury rehabilitation and return to activity	✓		✓
psychosocial factors affecting persistent pain sensation and perception	✓		
sports specific rehabilitation programmes to address psychological problems and deficiencies related to the patients injury / trauma		✓	
REFERRAL AND PROFESSIONAL BOUNDARIES:			
indications and possibilities for referral	✓		✓
basic signs and symptoms of mental health disorders and personal / social conflict	✓		
psychological and sociocultural factors associated with eating disorders	✓		
psychological and sociocultural factors associated with substance misuse / abuse	✓		✓
tensions between sporting interests and the duty of care of the health professional			✓

Note: the SST competencies are much broader and less detailed than the NATA and IFSP competencies.

In addition to the three sets of competencies reviewed (Table 23) from sports injury rehabilitation organisations (NATA, SST and IFSP) there are two further sets of guidance which, whilst not directly related to SIRPs, may indirectly have some application. In 2010 a report was published by the Behavioural and Social Sciences Teaching in Medicine (BeSST) Psychology Steering Group in the UK outlining a core curriculum for psychology in undergraduate medical education (Bundy et al., 2010). Although not specifically related to the training of SIRPs, as allied healthcare professionals the content of this report does have some relevance to the training of SIRPs. The curriculum suggested in the report is divided into four areas (psychology – core knowledge, psychology for professional practice, psychology – contribution to the educational process and psychology topics – postgraduate level only) and can be viewed in appendix 4g.

Also from a medical perspective, six major professional associations in the USA (American College of Sports Medicine, American Academy of Family Physicians, American Academy of Orthopaedic Surgeons, American Medical Society for Sports Medicine, American Orthopaedic Society for Sports Medicine, American Osteopathic Academy of Sports Medicine) developed a consensus statement about the psychological issues surrounding sports injury relevant to the team physician (Herring et al., 2006). The statement identified five areas that the sports team physician should have knowledge of: (i) psychological antecedents of athletic injuries, (ii) psychological issues accompanying athletic injury, (iii) psychological issues of athletic injury rehabilitation, (iv) psychological issues and return-to-play, and (v) referring athletes to mental health providers. A more detailed overview of these areas can be found in appendix 4h. Whilst the guidance from Bundy et al. (2010) and Herring et al. (2006) has not been reviewed in comparison to the other competencies and guidance in Table 23 as it is not written specifically for SIRPs, the areas they highlight may still be relevant to SIRPs and do seem to match with some of the topic areas outlined in Table 23.

As can be seen by the information provided in Table 23 the recommendations for the content of sport psychology education from professional bodies and organisations share some similarities, generally fitting into three broad categories – theoretical underpinning, psychosocial interventions and referral/professional boundaries. These broad categories loosely match with those identified in the previous section (question 1), indicating some consistency between what is being recommended in research findings and what is being recommended by professional bodies, which is a positive finding. However, it should be noted that some of the specific detail and focus under each of these broad categories does at times vary between organisations. Additionally, the organisations provide differing levels of detail on content requirements, making comparison more difficult. For example NATA and the IFSP both have more than 15 sport psychology related competencies, whilst the SST has just 6. To provide clarity on what content is most appropriate it is important to examine the findings of research that has evaluated the impact of sport psychology education.

Question 3: What are the findings of research examining the impact of sport psychology education on SIRPs?

To date only a limited number of studies (four were identified within this review – see Table 24) have delivered a sport psychology education intervention to SIRPs and measured its impact. All of these have examined USA athletic trainer populations and the majority have used student populations. This would suggest that further research is needed examining a broader range of SIRPs, including those who are already qualified, since it has been suggested that those already qualified are also in need of sport psychology training (Arvinen-Barrow et al., 2007; Hamson-Utley et al., 2008; Heaney, 2006a). Those studies that exist do, however, provide a valuable insight into the recommended content of sport psychology education and its effectiveness.

Harris et al. (2005) investigated the impact of a ten week college course examining the psychological impact of injury on 19 athletic training students in the USA. The course required students to meet once a week for a group lecture, and covered the topics listed in Table 24. To evaluate the effectiveness of the course, information regarding the perceptions and attitudes of the students in relation to sport injury psychology was collected pre-course and post-course using questionnaire and interview methods. The post-course data was collected ten to eleven weeks after the course had been completed rather than immediately post-course in order to assess actual changes as opposed to memorisation for assessment purposes (Harris et al., 2005). The questionnaire, developed specifically for the study, measured four constructs; sport influences (perceptions about the stresses related to factors such as the timing of injury in relation to the competitive season, level of competition and financial implications), social influences (the importance athletic trainers place on the quality, type and provider of social support), academic impact (perceptions athletic trainers hold about the academic impact of injury on student athletes) and stress reactions (perceptions of common psychological reactions to injury). It was found that pre to post-course scores were significantly improved on three of these constructs (sport influences, social influences and academic impact), demonstrating that the students developed a greater understanding of the impact that factors such as the timing of injury, coaches' reactions, and team-mates' reactions can have on the injured athletes psychological response to injury and the negative effect injury can have on academic performance amongst student athletes (Harris et al., 2005). No significant differences were identified between the pre and post-course scores for the stress reactions construct. The authors suggested that this was likely due to the students being familiar with such concepts pre-course (Harris et al., 2005). The positive influence of the course was also supported by the interview data, which revealed that the students became more empathetic in their interactions with injured athletes and more skilled in recognising the factors which can influence the level of psychological distress experienced by the injured athlete (Harris et al., 2005). The interviews also identified that the student athletic trainers

saw themselves as a source of social support for the injured athlete and increased their professional self-esteem through the interview process. The authors concluded that the interview data demonstrated that the students 'not only learned but also assimilated and changed their value systems en route to more affective learning' (Harris et al., 2005, p.108). Whilst these results are positive, a key limitation of this study is that it only measures attitudes in relation to sport psychology and not behaviour, therefore the impact of the course on sport psychology related behaviour is unknown. Additionally it used a relatively small participant group, which may make the findings difficult to generalise to the wider SIRP population, and there was no control group, reducing the ability of the study to attribute the findings directly to the sport psychology course.

In contrast, in a similar study, Clement and Shannon (2009) assessed the effectiveness of a sport psychology education intervention on the behaviour of a much larger group of 160 athletic training students from ten institutions towards sport psychology. Students were randomly assigned to either an education intervention group or a control group. The education intervention comprised of a 75 minute workshop covering aspects of sport psychology and its application to athletic training, the content of which is summarised in Table 24 and presented in more detail in appendix 4i. In order to facilitate practical application, the workshop used a problem solving case study approach (Clement & Shannon, 2009). To assess the effectiveness of the workshop attitudes were measured using a modified version of the Sport Psychology Attitudes – Revised (SPA-R) questionnaire (Martin, Kellmann, Lavalley, & Page, 2002) and behaviours were measured using the Sport Psychology Behaviours (SPB) questionnaire, an instrument developed specifically for the study. The SPB questionnaire measured five behaviours: use of sport psychology techniques, talking to a sport psychology consultant, talking to athletes about sport psychology, seeking out information about sport psychology, and referring injured athletes to a sport psychology consultant. Whilst Clement and Shannon (2009) used a panel of experts to establish the face and content validity of the SPB questionnaire and undertook pilot testing, no reliability measures were

undertaken. Attitudes were measured at three points; pre-intervention, immediately post-intervention and six weeks post-intervention, whilst behaviours were measured at two points; pre-intervention and six weeks post-intervention. It was found that those in the education intervention group demonstrated a significant increase in their scores on the 'confidence in sport psychology consulting' subscale of the SPA-R and their total reported use of sport psychology behaviours post-intervention compared to those in the control group (Clement & Shannon, 2009). Specifically, the athletic training students in the intervention group demonstrated significant increases in their use of sport psychology techniques, talking to a sport psychology consultant, talking to athletes about sport psychology and seeking out information about sport psychology. No significant increase was seen in the behaviour of referring an injured athlete to a sport psychology consultant, although the authors suggested that this may be due to a lack of access to a sport psychology consultant. It should also be noted, however, that the workshop did not appear to include any significant content on referral (see Table 24), which is perhaps a consequence of having a short duration workshop. These findings would suggest that the education intervention was effective in improving behaviours in relation to sport injury psychology, however, as the workshop was only 75 minutes long it would be useful to know if longer duration education interventions are more effective, as it has been suggested that by Green (2008) that this is the case, although the findings of Study 2 did not support this.

The impact of a sport injury psychology education intervention on the behaviour of athletic training students was again assessed by Stiller-Ostrowski et al. (2009), but this time using a longer duration education intervention which comprised a six-week programme of two-hour classroom sessions once a week for three weeks, followed by a weekly 30 minutes seminar session for the remaining three weeks (Stiller-Ostrowski et al., 2009). The content of this is summarised in Table 24 and presented in more detail in appendix 4j. Twenty-six students participated in the study, with eleven students undertaking the education intervention and fifteen students forming the

control group which received no sport psychology training. It is not clear what activities the control group engaged in, but it does not appear that they took part in any comparable activity which is perhaps a limitation of the study design. Sport psychology knowledge and skills usage were measured using two questionnaires developed specifically for the study at five points; pre-intervention (baseline), mid-intervention (week 3 of the education intervention), immediately post-intervention (week 6 of the education intervention), seven weeks post-intervention and fourteen weeks post-intervention (Stiller-Ostrowski et al., 2009). It was found that both sport psychology knowledge and skills usage increased in the education intervention group from baseline to immediately post-intervention (Stiller-Ostrowski et al., 2009). A reduction in sport psychology knowledge was evident in the retention measures taken seven and fourteen weeks post-intervention in comparison to the measures taken during (week 3) and immediately after the education intervention (week 6), however, these scores were still well above the baseline scores, indicating that some knowledge had been retained (Stiller-Ostrowski et al., 2009). In contrast, sport psychology skills usage was maintained during the retention period, with student athletic trainers continuing to use sport psychology skills with their injured athletes 14 weeks after the education intervention was completed (Stiller-Ostrowski et al., 2009). These findings indicate that the education intervention was effective in improving sport psychology knowledge and use amongst athletic training students.

A limitation of the three studies discussed so far is that they all have relatively short follow-up periods (6-14 weeks post-intervention) and consequently fail to examine the long term retention of sport psychology education. Additionally, all three of these studies rely on student populations and thus their findings cannot easily be generalised to qualified SIRPs who, as Kamphoff (2010) suggests, are different to students as they are likely to be influenced by their professional experiences. A study by Pero and Sachs (1997) addressed both of these issues. They investigated the impact of a five-hour sport psychology workshop for qualified athletic trainers aimed at

increasing their knowledge of sport psychology. They were particularly interested in the longitudinal effects of the workshop and consequently measured the long term participant retention of the concepts covered in the workshop in the year following the workshop. A sport psychology knowledge test was given to participants: (1) prior to the workshop, (2) immediately post-workshop, (3) 6 months post-workshop and (4) 1 year post workshop. A further questionnaire measuring use of sport psychology was also administered 1 month, 6 months and 1 year after the workshop. The workshop covered the areas listed in Table 24. It was found that sport psychology knowledge significantly improved from pre to immediately post workshop (Pero & Sachs, 1997). Whilst sport psychology knowledge scores decreased slightly six months post- and one year post-workshop, these decreases were not statistically significant (Pero & Sachs, 1997). Additionally, the athletic trainers reported that they were still using a variety of sport psychology techniques presented at the workshop both six months and one year after the workshop (Pero & Sachs, 1997). The authors concluded that the athletic trainers retained a significant amount of sport psychology knowledge from the workshop and were incorporating this into their practice as much as one year after the workshop (Pero & Sachs, 1997).

The content of the sport psychology education interventions used in the four studies discussed in this section (Table 24) link to the findings of question 1 and question 2 of this review. They all contain content that relates to the psychological impact of injury, psychological skills/techniques and referral, thus providing further support for these as themes that should be present in sport psychology education for SIRPs. However, it should be noted that not all of the education interventions explicitly had content that mapped onto each of these themes, perhaps due to restrictions resulting from their structure and duration. The studies reviewed in this section have illustrated that sport psychology education interventions of various modes/durations appear to be effective in improving sport psychology related knowledge and behaviour. Deeper investigation of the most appropriate mode of study/education is addressed in the next section.

Table 24: Intervention studies examining the impact of sport psychology education on SIRPs

	Harris et al. (2005)	Clement & Shannon (2009)	Stiller-Ostrowski et al. (2009)	Pero & Sachs (1997)
Participants	19 athletic training students	160 athletic training students	26 athletic training students	Athletic trainers (number not reported)
Delivery mode and length	10 week college course (weekly group lecture)	75 minute workshop	6 week programme - 3 x 2 hour classroom sessions then 3 x 30min seminar sessions	5 hour workshop
Content*	<ul style="list-style-type: none"> • The rehabilitation process and the sports medicine team • Theories and literature on psychological impact of injury • Common psychological stress reactions resulting from injury • Sport influences on the psychological response to injury • Injury influences on the psychosocial development theory • Personal influences on the psychological response to injury • Social influences on the psychological response to injury. 	<ul style="list-style-type: none"> • What is sport and exercise psychology? • Sport and exercise psychology and athletic training: They can function collaboratively • Sport and exercise psychology and sport injury: The real world • Areas in sport and exercise psychology that can be helpful (confidence, adherence, motivation, anxiety) • Basic principles of relaxation • Basic principles of imagery • Principles of goal setting • Stereotypes and sport psychology. 	<ul style="list-style-type: none"> • 3 key areas (antecedents, emotional reactions, psychology of athletic injury rehabilitation) • Communication • Clarifying expectations (pain as a physical and emotional experience, rehabilitation progression, demands of rehabilitation, expectations of athletic trainers) • Facilitating rehabilitation adherence • Social support • Motivational strategies • Introduction to psychological skills training • Physiological techniques • Cognitive techniques • Self-talk • Imagery • The athletic trainer as a counsellor • Dual-role conflicts • When and how to refer. 	<ul style="list-style-type: none"> • Overview of sport psychology in athletic training • How sport psychology techniques can be used to prevent injury • The use of psychological skills training techniques (e.g., goal setting, imagery, self talk, relaxation) during sport injury rehabilitation.

(Continued overleaf)

	Harris et al. (2005)	Clement & Shannon (2009)	Stiller-Ostrowski et al. (2009)	Pero & Sachs (1997)
What was measured & when	Questionnaires to assess perceptions and attitudes towards sport psychology were completed pre and 11 weeks post the course using a questionnaire designed specifically for the study. Six participants also participated in interviews pre and 10 weeks post the course.	Attitudes were measured using a modified version of the Sport Psychology Attitudes – Revised (SPA-R) questionnaire pre-intervention, immediately post-intervention and 6 weeks post-intervention. Behaviours were measured using the Sport Psychology Behaviours pre-intervention and six weeks post-intervention.	Two questionnaires developed specifically for the study to measure sport psychology knowledge and skills usage were administered pre-intervention (baseline), mid-intervention (week 3), immediately post-intervention (week 6), seven weeks post-intervention and fourteen weeks post-intervention.	A sport psychology knowledge test was given to participants (1) prior to the workshop, (2) immediately post-workshop, (3) 6 months post-workshop and (4) 1 year post-workshop. A further questionnaire measuring use of sport psychology was also administered (1) 1 month, (2) 6 months and (3) 1 year after the workshop.
Key findings	Pre to post-course questionnaire scores were significantly improved on 3 constructs (sport influences, social influences and academic impact), indicating a change in perceptions resulting from the course. Interviews suggested that in response to the course the participants became more empathetic, more skilled in recognising psychological distress and considered themselves a source of social support for the injured athlete.	Those in the education intervention group demonstrated a significant increase in their total reported use of sport psychology behaviours post-intervention compared to those in the control group. Specifically, the participants in the intervention group demonstrated significant increases in their use of sport psychology techniques, talking to a sport psychology consultant, talking to athletes about sport psychology and seeking out information about sport psychology, but demonstrated no improvement in their referral behaviour.	Both sport psychology knowledge and skills usage increased in the education intervention group from baseline to immediately post-intervention. A reduction in sport psychology knowledge was evident at 7 and 14 weeks post-intervention compared to the measures taken during and immediately after the education intervention, although these were still well above the baseline scores. Sport psychology skills usage was maintained during the retention period, with student athletic trainers continuing to use sport psychology skills with their injured athletes 7 and 14 weeks post-intervention.	Sport psychology knowledge significantly improved from pre to immediately post workshop. No significant decreases in knowledge were seen 6 months post and 1 year post workshop. The usage questionnaire showed that participants were still using a variety of sport psychology techniques from the workshop both 6 months and 1 year after the workshop.

* Note that for Clement & Shannon (2009) and Stiller-Ostrowski et al. (2009) additional detail regarding the content of the education intervention has been obtained from the doctoral theses from which the articles have emerged (Clement, 2008; Stiller, 2008)

Question 4: What do researchers recommend to be the most appropriate mode of delivery for sport psychology education for SIRPs?

Having considered the content of sport psychology education packages for SIRPs, it is also important to consider the most appropriate mode of delivery. The ideal mode of delivery is clearly to have sound, applied and consistent coverage of sport psychology integrated into either undergraduate or postgraduate degree programmes (Arvinen-Barrow et al., 2007; Barefield & McCallister, 1997; Cramer Roh & Perna, 2000; Gordon et al., 1998; Heaney, 2006a; Stiller-Ostrowski & Ostrowski, 2009). However, as has been evidenced previously in this thesis, research has shown that a large number of SIRPs are not receiving such training (Arvinen-Barrow et al., 2007; Hamson-Utley et al., 2008; Heaney, 2006a). Therefore, the best way in which to deliver sport psychology education to those who have already qualified needs to be considered.

In deciding the most appropriate mode of delivery for those who are already qualified it is important to consider the views of SIRPs. To date only two studies have surveyed these professionals (Arvinen-Barrow, Hemmings, Becker, & Booth, 2008; Scherzer & Williams, 2008), indicating a need for further research. Scherzer and Williams (2008) described a case where they provided a series of sport psychology education sessions on psychological skills training for athletic training students and graduate athletic trainers over a three week period. Whilst those who attended the sessions reported positive benefits from doing so, they represented just 9% of the eighty-seven people invited to participate in the sessions. Scherzer and Williams (2008) surveyed those who did not attend to identify the reasons for their non-participation. One section of the survey asked the respondents to rank their top three reasons for not attending from a list of six possible reasons. The top three reasons identified were 'study too time consuming', 'too busy with work in the athletic training room' and 'too busy with schoolwork', indicating that time was a significant factor. This was supported by answers to the open-ended question where the respondents were asked to describe in their own words why they failed to participate. Again, time

was the most commonly cited reason (68%), with reasons such as a lack of interest in the subject area (20%) also cited. This would suggest that the length of sport psychology training for SIRPs needs to be considered as well as strategies to make sport psychology training more attractive to SIRPs. When asked what would make them more likely to participate the respondents gave answers that were categorised into four groups; 'if the training was less time consuming/the athletic trainer had more time' (57%), 'if the training was conducted during the off-season' (13%), 'if there was less paperwork involved' (13%) and 'other' (39%), which included responses such as "if I knew more about the benefits of participation" and "not having a family emergency" (Scherzer & Williams, 2008). Scherzer and Williams (2008) concluded that due to the time constraint barriers identified by the athletic trainers, to maximise participation sport psychology training should either be a compulsory integral part of the curriculum or delivered as a single session. There exists a degree of support for a single-session approach. For example, Pero and Sachs (1997) and Clement and Shannon (2009) both successfully used one-day sport psychology workshops to improve sport psychology related knowledge and attitudes amongst SIRPs, whilst Armstrong and Weidner (2010) identified that SIRPs prefer shorter duration, single-day, continuing professional development (CPD) activities. Additionally, Study 2 (Chapter 3) of this thesis found that whilst there was a significant difference in the sport psychology related behaviours of those who had studied sport psychology and those who had not, no significant differences were seen between those who had studied one or two sessions, one module and more than one module of sport psychology.

This finding was supported by Arvinen-Barrow et al. (2008) who surveyed twenty-two delegates at the 2006 Annual Conference of the Association for Chartered Physiotherapists in Sports Medicine in the UK about their preferences for the delivery of sport psychology training. They identified workshops and seminars as the two most preferred modes of delivery; both modes which are typically delivered over one day. Mentoring and coaching, activities which typically do not require

extensive travel, were also identified as attractive delivery options (Arvinen-Barrow et al., 2008). A large proportion of participants (68.2%) indicated that they would be prepared to travel over 50 miles for such training, although it should be noted that the participants were drawn from a sample of people who had travelled to a conference and consequently may not be representative of those who had not made it to the conference. Additionally, 45.5% of the respondents indicated that they would prefer sport psychology training to take place in single intensive training days rather than over multiple days, although 22.7% indicated that they would prefer training to be distributed over an academic year. Time was again an important factor with most participants stating that they could dedicate just one to three days per year to such training (Arvinen-Barrow et al., 2008). Finally, most of the participants felt that professional bodies should be responsible for providing education on the psychological aspects of sports injury.

The findings of these two studies would suggest that a brief education intervention for qualified SIRPs would be more attractive than a longer duration education intervention and would consequently derive greater levels of uptake and adherence. Whilst the physiotherapists in Arvinen-Barrow et al.'s (2008) study expressed a willingness to travel vast distances to receive training in sport psychology it is important to note that time appears to be a significant consideration in the decision to attend education sessions (Arvinen-Barrow et al., 2008; Scherzer & Williams, 2008). Consequently it can be deduced that providing such training via distance learning methods would potentially increase the number of SIRPs able to participate. Various studies have indicated that the flexibility provided by distance learning gives it an advantage over face-to-face learning (St. Pierre, 1998). Distance learning allows students to choose when and where they wish to study and thus opens education up to individuals who may otherwise be unable or reluctant to undertake additional study, such as SIRPs with heavy work demands or those who travel frequently with sports teams. Distance learning is considered to be a viable teaching method for SIRPs. For example, Armstrong and Weidner (2010) identified that home

study courses were a popular mode of continuing education amongst the 427 SIRPs they surveyed. Additionally, whilst not rated as highly as the delivery methods of workshops and seminars, e-learning and distance learning were suggested as viable delivery methods by some of the physiotherapists surveyed by Arvinen-Barrow et al. (2008). It has been suggested that distance learners are also much more adept at applying what they learn to real-life situations (Cunningham, 2010), an important consideration in the training of SIRPs in sport psychology.

Whatever teaching mode is used, learning is believed to be enhanced where opportunities to apply knowledge are provided (Lim & Morris, 2009). Consequently there is a strong consensus that any education intervention for SIRPs should be applied or practical in nature (Clement & Shannon, 2009; Hamson-Utley et al., 2008; Heaney, 2006a; Larson et al., 1996), using teaching methods such as case studies, role play and reflective practice (Clement & Shannon, 2009) in order to promote implementation of sport psychology strategies in clinical practice (Stiller-Ostrowski & Hamson-Utley, 2009).

It has been demonstrated in this section that various modes of sport psychology education have the potential to benefit SIRPs. However, it would appear that education for those who have already qualified and are working in the field would most appropriately be delivered in a package of shorter duration, utilising distance learning modalities.

4.4 Conclusions: Bringing it all together

This review has considered the both the most appropriate mode of delivery for sport psychology education for SIRPs and the most appropriate content. With regard to the most appropriate mode of delivery there is a consensus that applied sport psychology education should be integrated into undergraduate and postgraduate degree programmes. However, as there appears to be a large group of already qualified SIRPs who are deficient in such training, consideration needs to be

given to the provision of sport psychology training for qualified professionals. It appears that to maximise recruitment and adherence amongst these busy professionals, such education needs to be provided in a short duration package, possibly utilising distance learning teaching methods.

With regard to content, this review has detailed a wide range of content suggestions both from scientific research and professional bodies and organisations. Whilst these suggestions/recommendations have varied, there are three broad content areas that have emerged as key topics for the sport psychology education of SIRPs, as summarised in Figure 7. As the figure shows, there is a consensus that the delivery of such content should have a strong applied focus as well as a strong theoretical underpinning.

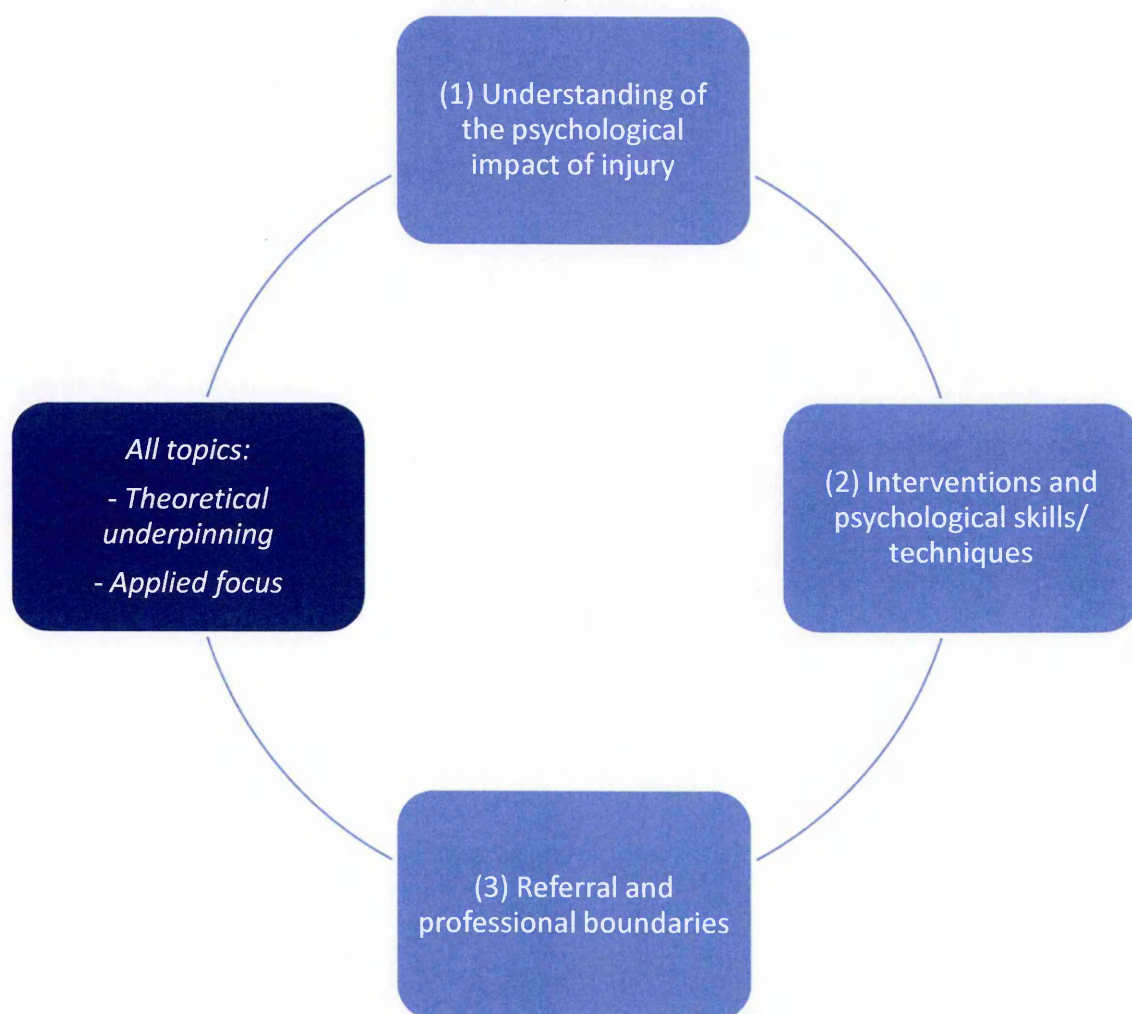


Figure 7: Summary of areas that should be covered in sport psychology education for SIRPs

Firstly, SIRPs need to have an understanding of the psychological impact of injury and its potential influence on the rehabilitation process. Secondly, as well as being aware of the potential impact of psychological factors, SIRPs need to know how to respond and intervene when psychological factors are impeding recovery and well-being. Consequently, sport psychology education in this domain needs to address two broad areas – psychological skills/techniques and referral. SIRPs should receive training on the use of psychological skills/techniques that may benefit rehabilitation from sports injury such as imagery, positive self-talk, goal-setting, relaxation strategies and social support. Such training will provide SIRPs with the basic skills to help their athletes address the psychological aspects of injury. More advanced skills will be required by some athletes, therefore, alongside training on psychological skills/techniques SIRPs need to receive training on professional boundaries, and on how and when to refer an athlete to a sports psychologist or other professional.

This study has provided a review of the existing research examining the content and mode of sport psychology education for SIRPs and has developed a model of recommended content for education programmes. Research in this area is relatively sparse and more is needed, in particular more research is needed to test the impact of sport psychology education on a broad spectrum of SIRPs, including UK SIRPs, which is addressed in Study 4 (Chapter 5).

CHAPTER 5 – STUDY 4:
**THE IMPACT OF A SPORT PSYCHOLOGY EDUCATION INTERVENTION
ON THE PRACTICE OF PHYSIOTHERAPISTS**

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(see appendix 5a)

CHAPTER 5 – STUDY 4: THE IMPACT OF A SPORT PSYCHOLOGY EDUCATION INTERVENTION ON THE PRACTICE OF PHYSIOTHERAPISTS

5.1 Introduction

Whilst the benefits of sport psychology intervention during injury rehabilitation are well documented (e.g. Kamphoff et al., 2013, Arden et al., 2013) it appears that sport psychology is underused by physiotherapists, both in terms of direct use by the physiotherapist or by physiotherapist referral to a sport psychologist (McKenna et al., 2002). Various researchers have consequently suggested that a lack of education and training in this field is a causative factor and have called for further, more structured training in sport psychology for SIRPs such as physiotherapists (Arvinen-Barrow et al., 2010; Heaney, 2006a; Tracey, 2008). It would appear that such training would be well received by SIRPs as previous research has revealed that they consistently express a desire to develop their knowledge of sport psychology theory and practice (Arvinen-Barrow et al., 2007; Clement et al., 2013; Ford & Gordon, 1998; Heaney, 2006a; Lafferty et al., 2008; Moulton et al., 1997; Ninedek & Kolt, 2000).

Research examining a wide spectrum of professionals, including physiotherapists, has revealed that SIRPs consistently show a positive attitude towards the role of sport psychology during injury rehabilitation, demonstrating an awareness of psychological reactions to sports injury and the potential importance of psychological intervention during rehabilitation (Arvinen-Barrow et al., 2007; Ford & Gordon, 1998; Francis et al., 2000; Heaney, 2006a; Hemmings & Povey, 2002; Larson et al., 1996; Ninedek & Kolt, 2000). Whilst this positive attitude would suggest that SIRPs of various guises recognise the importance of sport psychology and use it accordingly, deeper investigation reveals that this is not quite the case.

Firstly, whilst SIRPs generally hold a positive attitude towards sport psychology, this does not always extend to implementation (McKenna et al., 2002). In their qualitative study of ten physiotherapists McKenna et al. (2002) describe a gap between physiotherapists 'knowing' and 'doing':

“...physiotherapists demonstrated 'knowing' about the need for psychological interventions, though it did not extend to 'doing' such intervention.” (McKenna et al., 2002, p.72)

A similar gap has been reported in other studies such as Washington-Lofgren et al. (2004). This gap between knowledge of the importance of sport psychology and the implementation of sport psychology techniques may be reflective of SIRPs feeling unprepared for such a role (Moulton et al., 1997; Washington-Lofgren et al., 2004).

Secondly, it would seem that there are discrepancies between the types of sport psychology interventions SIRPs favour and research evidence. For example, several studies have reported that whilst SIRPs identified stress and anxiety as a common psychological reaction to injury, they did not rate techniques recognised in the literature as being effective in addressing stress and anxiety, such as imagery and relaxation strategies, particularly highly (Arvinen-Barrow et al., 2007; Francis et al., 2000; Heaney, 2006a; Larson et al., 1996; Ninedek & Kolt, 2000; Wiese et al., 1991). It would appear that SIRPs gravitate towards more practical techniques that are motivational in nature such as goal setting (Francis et al., 2000; Lafferty et al., 2008; Lamba & Crossman, 1997; Wiese et al., 1991). This is perhaps indicative of the fact that SIRPs often develop their skills in delivering psychological support through experiential rather than formal learning and lack knowledge or training relating to specific techniques (Arvinen-Barrow et al., 2010; Jevon & Johnston, 2003). It could also be indicative of a perception that delivering sport psychology

support is beyond the professional role of the SIRP (Arvinen-Barrow et al., 2007; Arvinen-Barrow et al., 2010; Francis et al., 2000; Heaney, 2006a; Larson et al., 1996; Ninedek & Kolt, 2000; Wiese et al., 1991).

Many researchers concur with the perception that sport psychology support is beyond the scope of the SIRP and is best delivered by a sport psychologist, who should ideally work alongside the SIRP as part of the sports medicine support team (Heaney, 2006b; Ninedek & Kolt, 2000; Tracey, 2008; Wiese-Bjornstal & Smith, 1999; Wiese et al., 1991). This highlights the important role of referral by the SIRP to a sport psychologist during sports injury rehabilitation. Deficiencies have been noted in both access to and referral to sport psychologists in the research in this field.

In the literature, rates of referral of an injured athlete to a sport psychologist by SIRPs are relatively low. Studies have reported that 16 to 69% of SIRPs have access to an accredited sport psychologist (Arvinen-Barrow et al., 2007; Clement et al., 2013; Heaney, 2006a; Hemmings & Povey, 2002; Larson et al., 1996; Mann et al., 2007). This shows quite wide variability in perceived access. However, this range is slightly distorted by the findings of Heaney (2006a) who reported an access rate of 69%. The remaining studies reported access rates of between 16 and 25% (Arvinen-Barrow et al., 2007; Hemmings & Povey, 2002; Larson et al., 1996; Mann et al., 2007). Heaney (2006a) attributed her differentiated findings in relation to sport psychologist access to the fact that the physiotherapists in her study were working exclusively in professional sport, where sport psychologists are more commonplace. In line with access rates, only 9 to 51% (9 to 24% excluding the findings of Heaney, 2006a) of SIRPs reported making referrals to sport psychologists (Arvinen-Barrow et al., 2007; Clement et al., 2013; Heaney, 2006a; Hemmings & Povey, 2002; Larson et al., 1996). Consequently, many researchers have concluded that education about referral is required and that referral networks need to be developed between SIRPs and

sport psychologists (Arvinen-Barrow et al., 2007; Clement et al., 2013; Francis et al., 2000; Hemmings & Povey, 2002; Larson et al., 1996; Tracey, 2008).

The apparent limited use of sport psychology intervention and referral can perhaps be attributed to a lack of training in this area at an undergraduate level. As demonstrated in Study 1 of this thesis, the psychology education received by UK physiotherapists as part of their undergraduate training varies greatly between institutions and there are inconsistencies in provision. Therefore, post-qualification education in sport psychology could have a positive impact on the attitude and behaviour of physiotherapists. To date, only a small number of published studies have explored the impact of a sport psychology education intervention on the attitude and behaviour of SIRPs. These four studies (Clement & Shannon, 2009; Harris et al., 2005; Pero & Sachs, 1997; Stiller-Ostrowski et al., 2009) have been reviewed in Chapter 4 of this thesis (Study 3), and all reported positive outcomes that indicated that sport psychology education was beneficial. A summary of the findings of these studies can be found in Table 24 of Chapter 4. These four studies exclusively examined North American athletic trainer populations, who were predominantly students. To date no published studies have been identified which have examined UK or physiotherapist populations. Although some parallels can be drawn between athletic trainers and physiotherapists, the differences in their training and professional role suggest that more specific investigation is required of UK physiotherapists. For example, at an undergraduate level athletic trainers are trained to work specifically in a sports setting while physiotherapists are trained to work in a range of settings of which sport is just one.

Whilst few studies examining the impact of sport psychology education on SIRPs exist, research examining the impact of education interventions in populations allied to SIRPs can also provide useful evidence for the potential effectiveness of education interventions. Education interventions have been shown to be successful in influencing attitudes and behaviours amongst

various other health care professions. For example education interventions have been successful amongst groups of medical professionals including nurses (Patterson, Whittington, & Bogg, 2007), nursing students (Frommelt, 2003; Sadow & Ryder, 2008), physicians (Figueiras, Herdeiro, Polonia, & Gestal-Otero, 2006), medical students (Kuhnigk, Strebel, Schilauske, & Jueptner, 2007), and pharmacists (Oparah, Enato, & Eferakeya, 2006). Through their role in treating individuals with illness, injury or disability physiotherapists have similarities to these professions and hence these findings might be applicable to physiotherapists.

Physiotherapists working in sport also have parallels with the sports coach through their regular interaction with athletes. Therefore, research examining the impact of an education intervention on sports coaches may also be applicable to physiotherapists. A study by Zakrajsek and Zizzi (2008) examined the impact of a sport psychology workshop on the attitudes and behaviours of ninety swimming coaches within the framework of the transtheoretical model (Prochaska & DiClemente, 1982), which suggests that individuals pass through five distinct stages in the process of changing their behaviour: pre-contemplation, contemplation, preparation, action and maintenance (Richards-Reed, 1999). They found some support for the workshop with 13.3% of the swimming coaches moving from not thinking about using sport psychology (pre-contemplation stage) to thinking about using sport psychology in the forthcoming season (contemplation stage). They concluded that a brief one-off sport psychology workshop can expect to impact approximately 13-16% of a sample's readiness to change in a positive direction (Zakrajsek & Zizzi, 2008). Whilst only influencing a relatively small percentage of participants, this study along with those relating to health care professionals and athletic trainers provide evidence to suggest that a sport psychology education intervention could have a positive impact on the attitude and behaviour of physiotherapists.

Whilst SIRPs have a positive attitude towards sport psychology and appear to integrate some sport psychology into their work with injured athletes, it is clear that there are gaps in their knowledge and practice. It appears that SIRPs who use sport psychology do so as a result of experiential learning rather than formal learning and as such their use of sport psychology is restricted and often lacks theoretical underpinning (Arvinen-Barrow et al., 2010; Jevon & Johnston, 2003). This coupled with the consistent finding that SIRPs themselves wish to gain more knowledge on the psychological aspects of sports injury indicates a need for more training. Preliminary studies undertaken on North American student athletic trainer populations have shown support for sport psychology education interventions (Clement & Shannon, 2009; Harris et al., 2005; Stiller-Ostrowski et al., 2009) but, as previously stated, no studies have examined physiotherapists in this context and none have been UK based. As mentioned earlier whilst some similarities exist between athletic trainers and physiotherapists, the differences in their training and professional role suggest that more specific investigation is required of UK physiotherapists. In particular, investigation of those who are already qualified is necessary since this group have expressed a desire for further training (e.g. Arvinen-Barrow et al., 2007) and there may be differences in receptivity to learning between student populations and qualified populations (Kamphoff et al., 2010). The purpose of this study was therefore to measure the impact of an online sport psychology education module (independent variable) on the sport psychology related attitudes and behaviours (dependent variables) of qualified sports physiotherapists in the UK. The hypotheses are stated below.

Hypotheses

H₀1: There will be no significant differences in physiotherapists' *attitudes towards sport psychology* before and after (immediately, three months and six months) studying a sport psychology education module.

- H₀2: There will be no significant differences in *physiotherapists' sport psychology related behaviours* before and after (immediately, three months and six months) studying a sport psychology education module.
- H₀3: There will be no significant differences in *attitudes towards sport psychology* between the control group (i.e. physiotherapists who studied a control education module) and the intervention group (i.e. physiotherapists who studied a sport psychology module).
- H₀4: There will be no significant differences in *sport psychology related behaviours* between the control group (i.e. physiotherapists who studied a control education module) and the intervention group (i.e. physiotherapists who studied a sport psychology module).

5.2 Method

Participants

The participants were 135 physiotherapists who responded to an invitation to participate in the study. Of these, 67 were assigned to the intervention (sport psychology education) group and 68 participants were assigned to the control (strength and conditioning education) group. The participants were randomly assigned to the two groups using an online random assignment tool (GraphPad, 2012). Of the 135 physiotherapists, 95 completed all stages of post-module follow-up (44 intervention group and 51 control group) and only data from these participants were analysed.

The intervention group (n=44) comprised 23 males and 21 females and had a mean age of 33.70 years (SD = 8.16). The control group (n=51) comprised 26 males and 25 females and had a mean age of 36.11 years (SD = 8.78). The number of years of experience practicing as a physiotherapist and qualifications held by the participants are summarised in Tables 25 and 26.

Table 25: Experience of the participants

	1-5 years	6-10 years	11-15 years	16-20 years	20+ years
Intervention (Sport Psychology) Group	18 (40.9%)	15 (34.1%)	3 (6.8%)	5 (11.4%)	3 (6.8%)
Control Group	22 (43.1%)	13 (25.5%)	8 (15.7%)	3 (5.9%)	5 (9.8%)

Table 26: Qualifications held by the participants

	BSc Physiotherapy	MSc Physiotherapy	MSc Sports Medicine	Other
Intervention (Sport Psychology) Group	26 (59.1%)	10 (22.7%)	1 (2.3%)	7 (15.9%)
Control Group	36 (70.6%)	8 (15.7%)	3 (5.9%)	4 (7.8%)

Education intervention

Participants in the intervention group studied an online module entitled ‘Sport Psychology for Physiotherapists’, which was designed specifically for the study. This module was split into three units:

1. understanding the psychological impact of sports injury,
2. psychological skills and techniques for injured athletes, and
3. referral and professional boundaries.

The module required approximately 12 hours of study and it was recommended that participants study one unit per week. More detail on the content of the units can be found in appendix 5g. The content was based upon the findings of the research reviewed in Study 3 of this thesis (Chapter 4) examining the recommended content of sport psychology education for SIRPs, which identified three key themes: (1) understanding of the psychological impact of injury, (2) interventions and psychological skills/techniques, and (3) referral and professional boundaries. The module was evaluated by a panel of sport psychology and distance learning experts to ensure its appropriateness.

Participants in the control group studied an online module entitled 'Strength and Conditioning for Physiotherapists', which was similar to the module 'Sport Psychology for Physiotherapists' in terms of structure, length, delivery and assessment, but contained no sport psychology content.

Like the psychology module this module was split into three units:

1. strength and conditioning training principles,
2. aerobic fitness training, and
3. resistance training.

Again the module required approximately 12 hours of study spread over three weeks. Further detail on the content of the module can be found in appendix 5h. Strength and conditioning was selected as a topic for the control module based on feedback from three physiotherapy colleagues who indicated that this would be an attractive topic for sports physiotherapists and thus likely to enhance participant recruitment and adherence.

For both modules participants were required to complete three short online assessments (one per unit), which can be found in appendix 5i. These assessments each comprised four or five short answer questions. Participants on both modules were also invited to participate in a module forum within some of the activities contained in the modules. Those who completed the online assessments were awarded a certificate of completion for the module.

Measures

Questionnaire Package

Data was collected through a questionnaire package (appendices 5c – 5f) completed on four occasions over a six month period (one pre-module and three post-module). The questionnaire package was hosted on a secure, encrypted website which required password access to collect the completed responses. Each questionnaire package was split into three sections: (i) attitudes

towards sport psychology, (ii) use of sport psychology with injured athletes, and (iii) additional information.

Attitudes towards sport psychology – This section of the questionnaire package, which was the same across all four data collection points, examined participants' attitudes regarding the effectiveness of mental skills during sports injury rehabilitation using the Attitudes About Imagery Survey (AAIS) (Hamson-Utley et al., 2008). The authors of the AAIS gave their consent for the survey to be used in this study. The AAIS contains fifteen items in the form of statements about the effectiveness of specific mental skills, which participants are required answer using a seven-point Likert scale ranging from 'strongly disagree' (1) to 'strongly agree' (7). Despite its name the AAIS measures attitudes towards a range of mental skills, not just imagery, and has four subscales: mental imagery (AAIS imagery), positive self talk (AAIS self-talk), goal setting (AAIS goal setting) and pain tolerance (AAIS pain tolerance), as well as a total score (AAIS total). Hamson-Utley et al. (2008) report that the AAIS was developed based on components of the Integrated Model of Response to Sport Injury (Wiese-Bjornstal et al., 1998) and was developed to measure the attitudes of athletic trainers and physical therapists in the USA. Its content validity was assessed by four experts in sport psychology, athletic training and physical therapy, who examined the item wording, relevance and appropriateness (Hamson-Utley et al., 2008). This process resulted in the reduction in the number of items in the survey from seventeen to fifteen, the increase of the Likert scale range from five to seven, and some minor word changes to improve clarity (Hamson-Utley et al., 2008). Test-retest reliability correlations of 0.60 to 0.84 on all fifteen items (all significant at the 0.01 level) were reported by Hamson-Utley et al. (2008). Cronbach alphas were reported as a further measure of reliability – the mental imagery subscale consisted of eight items ($\alpha = 0.90$), the positive self talk subscale had three items ($\alpha = 0.65$), the goal setting subscale had two items ($\alpha = 0.77$), and the pain tolerance subscale consisted of two items ($\alpha = 0.77$) (Hamson-Utley et al., 2008). Additionally, Cronbach alphas were calculated on the

current data set (pre module data set) yielding the following results: mental imagery subscale, $\alpha = 0.81$; positive self talk subscale, $\alpha = 0.29$; goal setting subscale, $\alpha = 0.43$; and pain tolerance subscale, $\alpha = 0.60$. This does not demonstrate a high level of reliability for the positive self-talk and goal setting subscales for this data set. Scoring instructions for the AAIS can be found in appendix 3b. After the AAIS, the questionnaire package provided space for participants to make any additional comments.

Use of sport psychology with injured athletes – This section of the questionnaire package, which was again the same across all four data collection points, examined participants' use of sport psychology skills and techniques as part of their work in treating injured sports performers using the Psychology of Injury Usage Survey (PIUS) (Stiller-Ostrowski et al., 2009; Stiller, 2008). The authors of the survey gave their consent for it to be used in this study. The PIUS contains thirty-six items in the form of statements about the participants' use of various psychology-related strategies with injured athletes, which are required to be answered using a nine-point Likert scale ranging from 'never' (1) to 'always' (9). The PIUS has six subscales: communication (PIUS communication), social support (PIUS social support), motivation (PIUS motivation), attitude and attentiveness (PIUS attention), relationship (PIUS relationship) and sport psychology (PIUS sport psychology), as well as a total score (PIUS total). Stiller (2008) reports that the PIUS was developed following a critical review of the literature and interviews with injured athletes and athletic trainers in the USA. A group of five experts in athletic training and sport psychology were responsible for ensuring content validity and refining the initial pool of items, and following pilot testing the number of items in the PIUS was reduced from sixty-two to thirty-six (Stiller, 2008). Inter-item reliability coefficients of between 0.72 and 0.89 were reported for the six subscales and the Cronbach alpha coefficients were reported as follows: the communication subscale consisted of seven items ($\alpha = 0.88$), the social support subscale had six items ($\alpha = 0.71$), the motivation subscale had six items ($\alpha = 0.75$), the attention subscale had four items ($\alpha = 0.66$), the relationship

subscale had five items ($\alpha = 0.76$) and the sport psychology subscale consisted of eight items ($\alpha = 0.89$) (Stiller, 2008). Additionally, Cronbach alphas were calculated on the current data set (pre module data set) yielding the following results: communication subscale, $\alpha = 0.78$; social support subscale, $\alpha = 0.64$; motivation subscale, $\alpha = 0.83$; attention subscale, $\alpha = 0.61$; relationship subscale, $\alpha = 0.69$ and sport psychology subscale, $\alpha = 0.84$. Scoring instructions for the PIUS can be found in appendix 3c. After the PIUS, there was some space provided in the questionnaire package to make additional comments if desired.

Additional information – This section of the questionnaire package was designed specifically for the study and asked questions which supplemented those asked in the other sections of the questionnaire. The content of this section varied between the four data collection points, but included questions related to demographic information, referral to a sport psychologist, further study activities undertaken, perceived use of sport psychology and perceptions of the module, as summarised in Table 27 below.

Table 27: Summary of the additional information collected in the questionnaire package

Data Collection Point	Question Areas
Pre-module (PRE)	<ul style="list-style-type: none"> • Physiotherapy qualification held • Number of years of experience as a physiotherapist • Referral to a sport psychologist • Work with a strength and conditioning coach • Previous study of sport psychology/strength and conditioning
Immediately post-module (POST1)	<ul style="list-style-type: none"> • 1-10 rating of the module • Module likes/dislikes • Motivation for further study • Referral to a sport psychologist • Perceived use of sport psychology/strength and conditioning
3 months post-module (POST2)	<ul style="list-style-type: none"> • Demographic information (age, gender) • Further study of sport psychology/strength and conditioning • Referral to a sport psychologist • Perceived use of sport psychology/strength and conditioning
6 months post-module (POST3)	<ul style="list-style-type: none"> • Further study of sport psychology/strength and conditioning • Referral to a sport psychologist • Perceived use of sport psychology/strength and conditioning

Module Engagement

In addition to the questionnaire package, data were also collected relating to two measures of module engagement. Firstly, rates of completion of the three assessments on each module were collected. Completion was measured as the number of participants, from those who had undertaken all four data collection points, who had successfully completed all three assessments. Participants were informed prior to commencing study that they would be entitled to a certificate of completion if they successfully completed all assessments. Secondly, rates of participation in each of the module forums were collected. Again, these rates were taken only from those who had completed all four data collection points. Participation in the module forums was defined as where a participant made one or more post during their study of the module.

Procedure

Physiotherapists were invited to participate in the study through an email sent to all physiotherapists whose details appeared on the website of the Association of Chartered Physiotherapists in Sports and Exercise Medicine. The invitation briefly outlined the purpose of the study and what was required from participants. It also provided contact details for further information and indicated that the study had gained ethical approval. Those wishing to participate in the study completed an online informed consent form (appendix 5b).

Participants who had completed the informed consent form were randomly assigned to either the intervention (sport psychology) group or the control group and asked to complete the pre-module version of the questionnaire package (appendix 5c). Upon completing this, participants were given the web address for their specific module and asked to commence study. The participants were given a specified date by which they should complete the module, which was four weeks after the start date. Whilst the suggested study pattern of one unit per week required only three weeks of study, a fourth week was added to provide flexibility. The module materials invited participants to

complete three assessments and participate in the module forum. Data was collected on participants' engagement in these activities. Those successfully completing all three assessments were awarded a certificate of completion.

Immediately following completion of the module, participants were directed to complete the first post-module questionnaire package (POST1, appendix 5d). Participants were then contacted three months after finishing the module and asked to complete a second post-module questionnaire package (POST2, appendix 5e). They were then contacted once more six months after the module to complete the final post-module questionnaire package (POST3, appendix 5f). The retention rates across the four phases of data collection are illustrated in Table 28. Retention was 70% overall (phase one to phase four); the biggest dropout occurred between phases one and two (i.e. participants that did not complete the module) and was most pronounced for the intervention group. Unsolicited feedback from participants suggested that this might be due to the fact that a large number of participants had been attracted by the strength and conditioning (control) module and were disappointed at being assigned to the sport psychology module. In order to address this all participants were informed that they could study the alternative module if they wished to do so after the study was completed. Seventeen participants took this opportunity (14 from the control group and three from the intervention group). Retention rates from phase two onwards were very high, indicating very little dropout amongst those who completed the modules.

Table 28: Participant retention

	Data Collection – Phase 1 (pre)	Data Collection – Phase 2 (immediately post)	Data Collection – Phase 3 (3-months post)	Data Collection – Phase 4 (6-months post)
Intervention group	n = 67	n = 47 (70% retention phase 1 to phase 2)	n = 46 (98% retention phase 2 to phase 3)	n = 44 (96% retention phase 3 to phase 4 / 66% retention phase 1 to phase 4)
Control group	n = 68	n = 55 (81% retention phase 1 to phase 2)	n = 52 (95% retention phase 2 to phase 3)	n = 51 (98% retention phase 3 to phase 4 / 75% retention phase 1 to phase 4)

The study adhered to the ethical procedures of the British Psychological Society and The Open University. Ethical clearance was obtained from the Open University Human Research Ethics Committee (Ref: HREC/2012/1214/Heaney/1).

Data analysis

The study utilised a mixed method design which comprised the analysis of both qualitative and quantitative data. The qualitative data, which related to likes and dislikes about the module studied was analysed using the content analysis procedures suggested by Cote et al. (1993), outlined in Chapter 2 (Section 2.2). This involved organising the data into “meaning units” and grouping these into higher order themes, terminating in ‘general dimensions’ as the highest order themes.

The quantitative data collected within the ‘additional information’ components of the questionnaire packages (relating to perceived use of sport psychology, referral, ratings of the module, motivation for further study and module engagement) were tabulated and frequencies and percentages calculated as appropriate. The AAIS and PIUS data were analysed using ANOVAs. Since the AAIS and PIUS datasets were considered to be unrelated, with one measuring attitudes

and one measuring behaviour, two separate 2 x 4 (group x time) ANOVAs were conducted to test the hypotheses. The first ANOVA analysed total score on the AAIS and thus tested H₀₁ and H₀₃, whilst the second ANOVA analysed total score on the PIUS and thus tested H₀₂ and H₀₄. Each of these was conducted to identify whether there were any significant differences between the intervention and control groups (independent variables) on the questionnaire scores (dependent variables), or any within group differences on the questionnaires over time. As a follow-up to the ANOVAs investigating the total scores, a 2 x 4 (group x time) ANOVA was undertaken on each subscale of the AAIS and PIUS. Where a significant group by time interaction was evident a test of simple effects was undertaken to establish specifically where differences were.

5.3 Results

Perceptions of the module

Data was collected regarding participants' perceptions of the modules. Firstly, immediately following completion of the module (POST1), participants were asked to rate how beneficial they found the module on a scale of 1-10. The ratings given by the participants are summarised in Figure 8. As the group sizes were unequal ratings are illustrated as a percentage in the figure. The sport psychology group had a median and mode score of 8, with 77% of the group giving a score of 7 or above. The control group also had a median and mode score of 8, with 75% of the group giving a score of 7 or above.

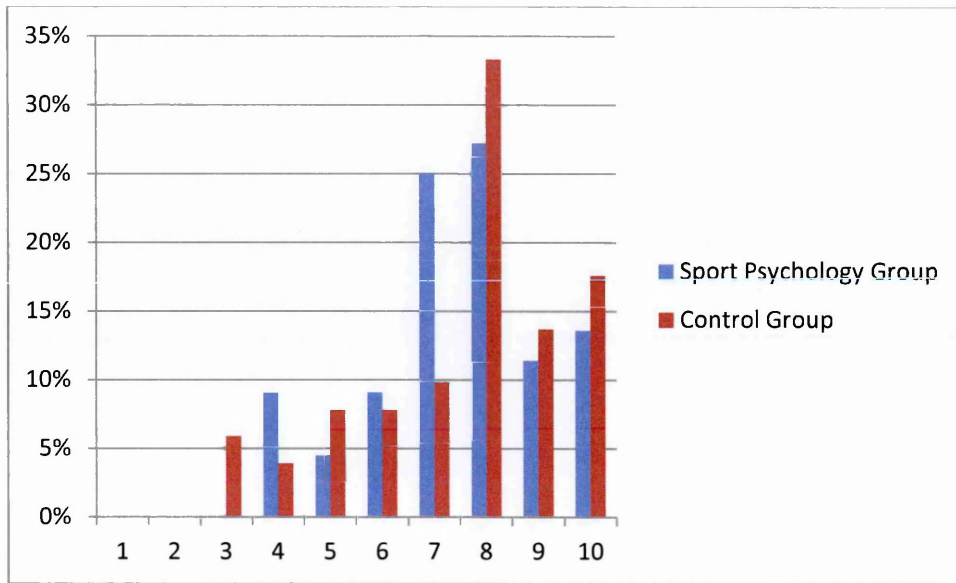


Figure 8: Ratings - sport psychology and control modules

In addition to this, at POST1 participants were asked to state their likes and dislikes about the module they had studied. The findings of the content analysis of this data can be found in Tables 29 to 32.

Table 29: Sport psychology module – likes

Sample Raw Data Themes	Higher Order Themes	General Dimensions
Learning about the Cognitive Appraisal Model was really enjoyable and informative as I was only previously aware of the Kubler-Ross Grief Response Model	Usefulness of specific topics (n=3)	Content
Liked the breakdown of various psychological techniques that I could learn to employ in my own practice	Practical application (n=9)	
Content was applicable to my practise		
Useful information that I can apply in my practice tomorrow		
I found the video and audio clips really usefui	Use of case studies/ video (n=8)	
I liked that the examples are real cases, like Jess Ennis etc		
Videos useful to link with theories		
Has encouraged me to reflect on my practice, especially my inter-personal skills with athletes	Encouraged reflection (n=3)	
The resources list and websites are really rich in information	Links to resources and further reading (n=8)	
Up to date references and good access to further reading		
Links to relevant web pages and info		
I think overall it was interesting to think about injuries in a different way and therefore possibly have a new approach to treatments	General/other (n=2)	
Time flexibility	Time (n=8)	
The pace. The sections were not too much to put me off and I could do it in small bits		
Very good: Studying online - in own time		
The module has allowed discussion and sharing of information by participants through the forum - good way to share and learn from others' experiences	Forum (n=8)	
It was good to be able to read other peoples thoughts through the discussion forum.		
The forum was a good area to gain insight into the experience of others and to flesh out the content of the course with real life examples		
Like: presentation of materials, ease of access (I could access the module when I was away from home without carrying books, papers etc...)	Ease of access/ flexibility (n=7)	Structure
Having the opportunity to access the module online at home allowed it to fit well with my work commitments		
I liked the interactive element of the module	Interactive (n=2)	
Units were very clearly set out	Clarity/ easy to follow (n=11)	
The modules were easy to follow and provided the information clearly and succinctly		
It was clear and concise and allowed me to learn keys points which will be useful for the future		
It was a valuable comprehensive learning resource	General/other (n=9)	
Assessment was relevant to the content of the module		
I enjoyed the content, and the relaxed format of the module		

Table 30: Sport psychology module – dislikes

Sample Raw Data Themes	Higher Order Themes	General Dimensions
I didn't dislike anything, I could have benefitted from slightly more detail on some of the modules	Level/ lack of depth (n=6)	Content
I think the depth of information was lacking at times, although there are some interesting links to other websites in places		
I don't have access to a sports psychologist so the module about how to refer to them was not very applicable to me		
I did not dislike anything about the module other than having to register for a google mail account	Technical issues (n=2)	Structure
Didn't find forum that useful	Forum (n=5)	
Dislikes, the forum, I wasn't happy about divulging my thoughts and experiences when so many of the users were named "unknown". I feel an opportunity to network was also missed because of this.		
It was essentially like reading a book	Other (n=3)	

Table 31: Control module – likes

Sample Raw Data Themes	Higher Order Themes	General Dimensions
Unit 3 very helpful and will change my practise	Usefulness of specific topics (n=11)	Content
The most beneficial aspect of the study to me was the section on plyometric training and in particular the work rest ratio		
I found the testing performance and muscular endurance and strength training sections very helpful.		
The information provided can be applied to everyday practice which is excellent	Practical application/ relevance (n=7)	
I liked the practical application of the module and its specificity to my profession		
I thought the references and web links were especially helpful	Links to resources/further reading (n=12)	
Good links to other resources		
Excellent links to very useful websites and exercise prescription sites		
I also liked all the links and journals for extra reading.	Use of videos (n=7)	
I liked the use of video links to demonstrate the theory		
I liked the video elements of the sections	Assessments (n=3)	
I liked that there were specific tasks / assignments allocated to each section which enabled further self-directed study		
Good refresher of training principles	Good refresher (n=4)	
When questions were asked there were also good explanatory answers	General/other (n=9)	
Comprehensive information regarding different elements of S&C		
It was simplified - good explanations		
Bite size, easy to read and take in information	Layout (n=5)	Structure
Excellent laid out study material		
The layout of the course has given me a framework to put in order the information I already had previously learned from various sources	Flexibility/ease of access (n=12)	
Ability to study in own time, at home, at own pace		
Distance learning was very useful		
I enjoyed being able to access the material in my own time at any time	Forum (n=2)	
Liked the format and flexibility it offered		
The option on using the forum was also very good	Other (n=4)	
The interactive nature of the module		
I liked that there were different approaches to the learning.... text, links to other websites and you tube clips		

Table 32: Control module – dislikes

Sample Raw Data Themes	Higher Order Themes	General Dimensions
I liked the plyometric section but felt that the content and questions could have been more advanced	Level/lack of depth (n=11)	Content
Didn't think there was enough depth in the knowledge for it to improve my knowledge		
I found it quite basic and did not really further enhance my knowledge on the area		
I also feel that the level of theory and questioning could and should be at a higher level		
I liked the use of video links to demonstrate the theory.. I think this could have been used to a greater extent	Not enough application / use of video (n=3)	
I liked going over the basics in planning an exercise/rehab programme. However, I would have liked some more info on the science behind these principles (muscle physiology etc.)	Other (n=4)	
I did not dislike anything really, the last video did not work on module three but that's minor	Technical issues (n=2)	Structure
Only singular posts on forums - no real discussions	Forum (n=2)	
Would have liked more time to read further on the subject	Time constraints (n=4)	
There was a lot of reading and in the same font and colour and I found myself reading but not really taking it in towards the end of each module	Other (n=2)	

Motivation for further study

On completion of the module (POST1), participants were asked if they were motivated to undertake any further study, either formal or informal, related to the topic they had studied. It was found that 79.5% of the intervention (sport psychology) group and 98% of the control group indicated that they were motivated to undertake further study. At three months (POST2) and six months (POST3) post completion they were asked whether they had undertaken any such study since completing the module. At three months post-study only 9.1% of the intervention group stated that they had undertaken any further study. All of these indicated that this was informal study (e.g. reading). At six months post-study this had risen to 15.9% for the intervention group, again almost exclusively relating to informal rather than formal learning. The control group showed higher levels of further study with 29.4% (three months post) and 27.5% (six months post) of participants indicating that they had undertaken further study. In contrast to the intervention group the control group participants had engaged in a mix of formal and informal learning.

Behaviour: Perceived use of sport psychology

In order to test hypothesis 2, participants in the intervention group were asked whether they felt they had used more sport psychology since studying the module. As can be seen from Table 33, this perceived usage was high and relatively consistent across the six month period following the module's completion.

Table 33: Number of participants who felt that they had used more sport psychology in their work since completing the module

	PRE	POST1	POST2	POST3
Sport Psychology Group	n/a	37 (84.1%)	38 (86.4%)	36 (81.8%)

Behaviour: Use of sport psychology – PIUS questionnaire

The mean pre and post (POST1, 2, 3) scores for each group on the six subscales of the PIUS questionnaire and the PIUS total score are summarised in Table 34 and in Figures 9 and 10.

Table 34: Mean PIUS scores and standard deviations

SUBSCALE	GROUP	PRE		POST1		POST2		POST3	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total	Psych	238.91	32.30	263.77	30.85	269.86	28.39	270.23	28.61
	Control	246.27	22.73	263.12	22.88	264.59	24.25	265.02	43.79
Social Support	Psych	42.89	6.19	45.91	5.33	46.84	5.21	46.57	4.92
	Control	43.90	4.33	46.47	4.51	46.43	4.20	46.22	7.76
Relationship	Psych	38.36	5.11	40.18	3.90	40.38	3.67	40.30	3.65
	Control	38.78	4.33	39.57	4.09	40.14	3.86	39.65	6.88
Sport Psych	Psych	30.16	11.91	44.66	13.71	48.70	12.07	48.36	12.12
	Control	33.47	9.23	41.82	10.33	42.12	12.40	44.18	13.23
Attention	Psych	30.41	3.90	31.50	2.77	31.34	2.99	31.91	3.06
	Control	30.98	2.57	31.62	2.11	31.67	2.67	31.57	5.11
Communication	Psych	55.77	4.84	56.68	4.73	57.20	4.48	57.36	4.38
	Control	56.84	4.11	58.10	4.38	58.51	3.37	57.39	9.02
Motivation	Psych	41.31	7.26	44.84	6.16	45.39	6.35	45.73	5.92
	Control	42.29	7.09	45.53	5.64	45.72	6.00	46.02	8.03

Figure 9 shows that both groups (intervention and control) demonstrated an increase in their use of sport psychology strategies, as measured by the PIUS total score, after studying their respective modules. This increase continued for both groups over the six month period following the completion of module, but was more pronounced for the intervention (sport psychology) group. The intervention group had a greater overall improvement with a 31.32 increase in mean total scores from the pre-module measurement to the final measurement six months after the module compared to an improvement of 18.75 in the control group.

In order to examine whether there were significant differences between the two groups (IV) on the PIUS questionnaire (DV) across the four data collection periods (H_04), or any within group differences on the questionnaire (H_02) a 2 x 4 (group x time) mixed ANOVA was undertaken on the PIUS total score. This revealed that there was no significant interaction between time and group ($F(3, 91) = 1.831, p = 0.147, \text{partial } \eta^2 = 0.057$) and no significant main effect for group ($F = 0.036, p = 0.850, \text{partial } \eta^2 < 0.001$). There was, however, a significant main effect for time ($F(3, 91) = 34.193, p < 0.001, \text{partial } \eta^2 = 0.530$).

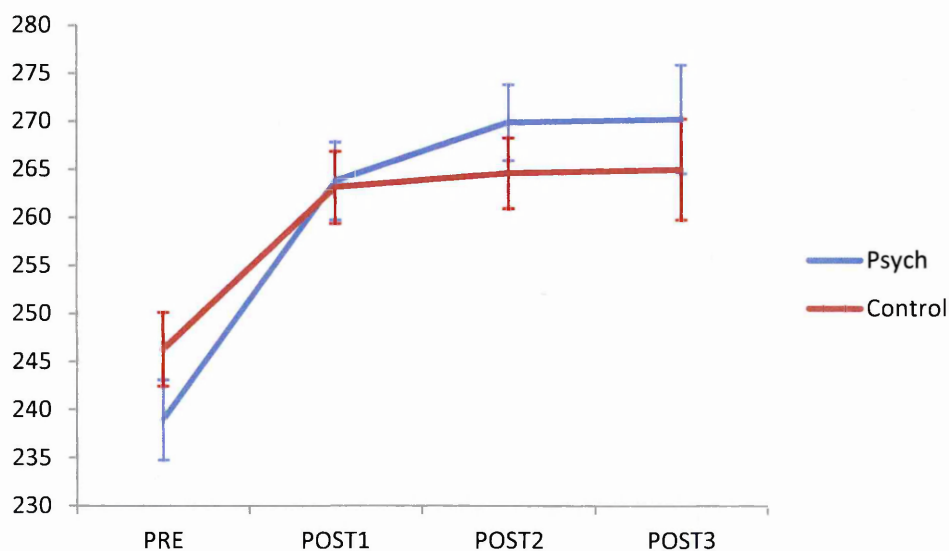


Figure 9: Mean PIUS total scores, with standard error bars
 (Note that a higher score indicates a higher level of use of sport psychology strategies)
 * = significant difference between groups at this time point

In order to examine the impact of education module on the six subscales of the AAIS each was subjected to an ANOVA, the results of which are presented below.

PIUS subscales

Figure 10 shows that on all six subscales of the PIUS both the intervention and control groups showed an increase in their scores immediately after studying their module (POST1), however, this increase was more pronounced for the intervention (sport psychology) group on all subscales except 'communication'. On these five subscales the intervention group had a greater increase in scores from PRE to POST1, with the largest increase seen on the 'sport psychology' subscale, where the intervention group had an increase in mean scores of 14.5, compared to an increase of 8.5 in the control group. Both groups maintained scores that were above pre-module values in the six months following the module on all six subscales, but the intervention group had a larger positive difference between pre-module (PRE) and six month post-module (POST3) scores than the control group on all subscales. The 2 x 4 (group x time) mixed ANOVAs undertaken on each subscale of the PIUS revealed a significant interaction between group and time on the sport psychology subscale. The results of these ANOVAs are summarised in Table 35.

Table 35: Summary of 2x 4 mixed ANOVA results for the 6 PIUS subscales
 Those marked with an asterisk (*) were significant at the 0.05 probability level

Subscale	Time x Group Interaction	Main Effect - Time	Main Effect - Group
Social Support	$F(3, 91) = 0.682, p = 0.565, \text{partial } \eta^2 = 0.022$	$F(3, 91) = 15.800, p < 0.001, \text{partial } \eta^2 = 0.342^*$	$F = 0.058, p = 0.810, \text{partial } \eta^2 = 0.001$
Relationship	$F(3, 91) = 0.855, p = 0.467, \text{partial } \eta^2 = 0.027$	$F(3, 91) = 5.223, p = 0.002, \text{partial } \eta^2 = 0.147^*$	$F = 0.131, p = 0.719, \text{partial } \eta^2 = 0.001$
Sport Psychology	$F(3, 91) = 5.256, p = 0.002, \text{partial } \eta^2 = 0.148^*$	$F(3, 91) = 48.874, p < 0.001, \text{partial } \eta^2 = 0.617^*$	$F = 1.592, p = 0.210, \text{partial } \eta^2 = 0.017$
Attention	$F(3, 91) = 0.451, p = 0.717, \text{partial } \eta^2 = 0.015$	$F(3, 91) = 3.836, p = 0.012, \text{partial } \eta^2 = 0.112^*$	$F = 0.116, p = 0.734, \text{partial } \eta^2 = 0.001$
Communication	$F(3, 91) = 0.387, p = 0.762, \text{partial } \eta^2 = 0.013$	$F(3, 91) = 4.875, p = 0.003, \text{partial } \eta^2 = 0.138^*$	$F = 1.394, p = 0.241, \text{partial } \eta^2 = 0.015$
Motivation	$F(3, 91) = 0.124, p = 0.946, \text{partial } \eta^2 = 0.004$	$F(3, 91) = 18.800, p < 0.001, \text{partial } \eta^2 = 0.383^*$	$F = 0.246, p = 0.621, \text{partial } \eta^2 = 0.003$

In light of the significant interaction between time and group evident in the sport psychology subscale ANOVA, a simple effects analysis was undertaken to identify where the differences lie. This revealed that the PIUS sport psychology subscale scores changed significantly over time for both the intervention (sport psychology) group ($F(3,279) = 57.80, p < 0.001$), and the control group ($F(3,279) = 19.68, p < 0.001$). Of the four data collection points there was only a significant difference between the two groups at one point – three months after the completion of the modules (POST2) ($F(1,93) = 6.83, p = 0.010$).

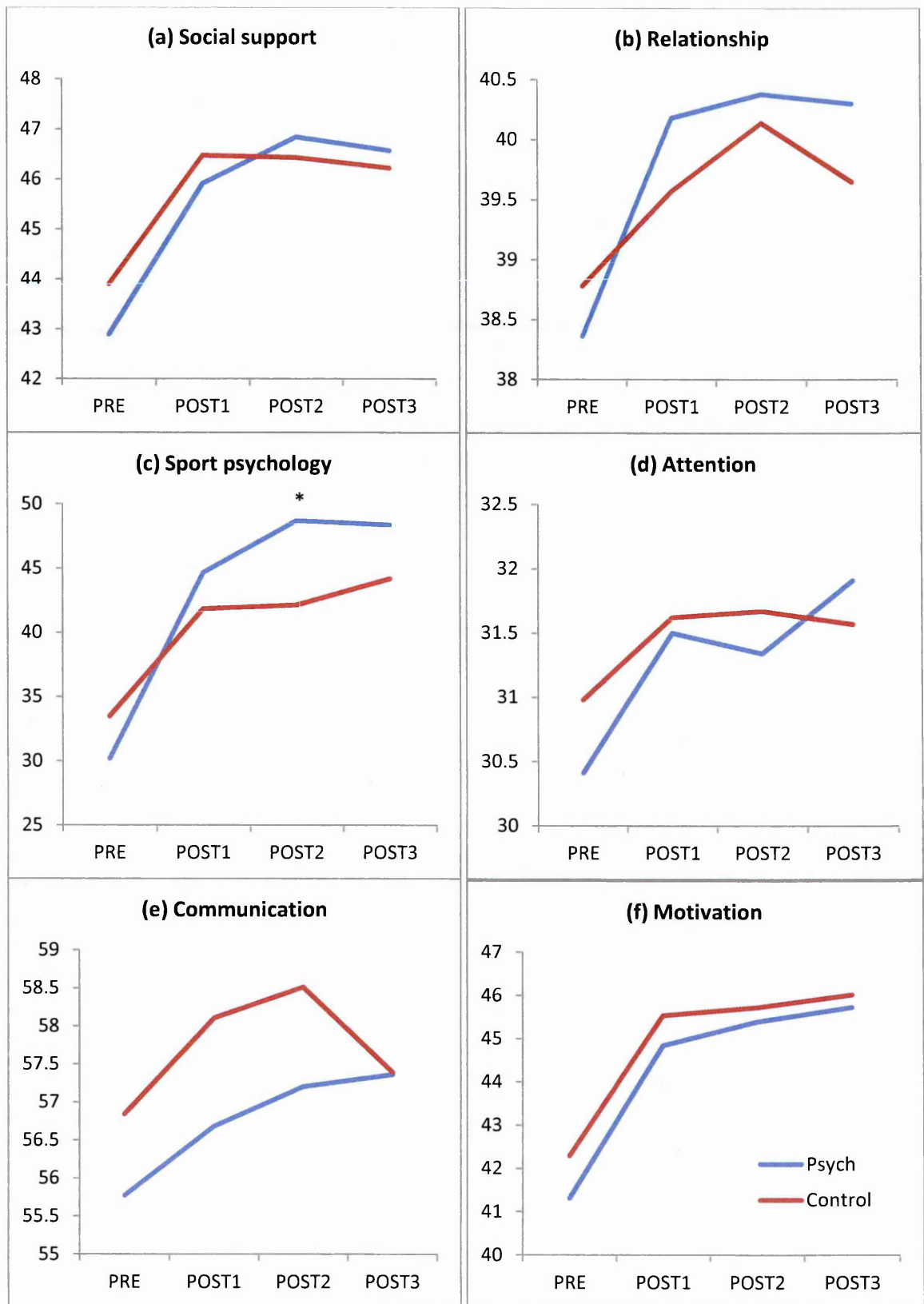


Figure 10: Mean PIUS social support, relationship, sport psychology, attention, communication and motivation subscale scores

(Note that on all subscales a higher score represents a higher level of use)

* = significant difference between groups at this time point

Attitude towards sport psychology

The mean pre and post (POST1, 2, 3) scores for the intervention (sport psychology) and control groups on the four subscales of the AAIS questionnaire and the AAIS total score are summarised in Table 36 below and in Figures 11 and 12.

Table 36: Mean AAIS scores and standard deviations

SUBSCALE	GROUP	PRE		POST1		POST2		POST3	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total	Psych	82.59	8.94	90.66	8.71	88.52	8.18	87.89	10.08
	Control	84.08	8.34	86.84	8.87	86.43	8.51	85.25	15.45
Imagery	Psych	40.05	6.15	45.43	6.62	44.32	6.21	43.41	7.53
	Control	42.14	5.65	43.33	6.35	42.63	6.02	42.27	9.32
Goal Setting	Psych	12.82	1.35	13.18	1.24	12.89	1.22	13.16	1.12
	Control	12.29	1.63	12.88	1.52	12.82	1.31	12.65	2.24
Self - Talk	Psych	17.50	2.23	19.30	1.36	18.61	1.67	18.61	1.87
	Control	17.53	1.98	17.90	2.13	18.10	1.87	17.71	3.15
Pain	Psych	12.23	2.00	12.75	1.83	12.70	1.49	12.70	1.39
	Control	12.11	1.76	12.73	1.46	12.88	1.21	12.63	2.24

Figure 11 shows that both the intervention (sport psychology) and control groups demonstrated an improvement in their attitude towards sport psychology, as measured by the AAIS total score, immediately after studying the module (POST1), although the improvement was more pronounced for the intervention group who studied the sport psychology module. Both groups showed some decline during the six months after the module, however, the control group returned to close to their pre-module scores (a difference of 1.17 between PRE and POST3 scores), whilst the intervention group had continued to stay well above their pre-module scores (a difference of 5.30 between PRE and POST3 scores), indicating a longitudinal effect of the sport psychology module.

In order to examine whether there were significant differences between the two groups (IV) on the AAIS questionnaire (DV) across the four data collection periods (H_03), or any within group

differences on the questionnaire (H_01) a 2 x 4 (group x time) mixed ANOVA was undertaken on the total score of the AAIS. This revealed that there was no significant main effect for group ($F = 1.238, p = 0.269, \text{partial } \eta^2 = 0.013$), however there was a significant main effect for time ($F(3, 91) = 12.210, p < 0.001, \text{partial } \eta^2 = 0.287$) and a significant interaction between time and group ($F(3, 91) = 2.832, p = 0.043, \text{partial } \eta^2 = 0.085$).

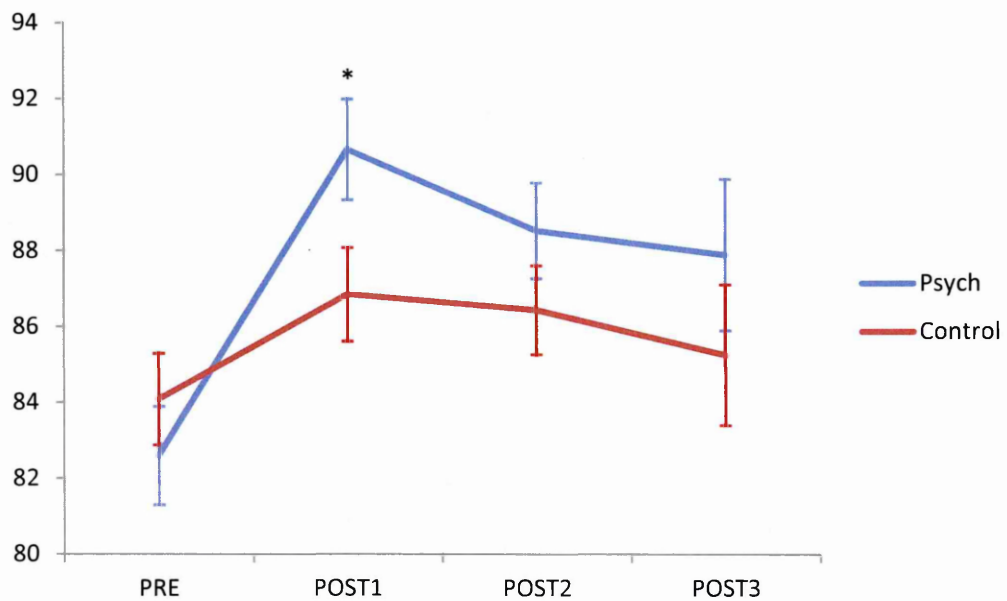


Figure 11: Mean AAIS total scores, with standard error bars
 (Note that a higher score indicates a more positive attitude towards sport psychology)
 * = significant difference between groups at this time point

In light of the significant interaction between time and group evident in the ANOVA, a simple effects analysis was undertaken to identify where the differences lie. This revealed that the AAIS total scores changed significantly over time for the intervention (sport psychology) group ($F(3,279) = 9.71, p < 0.001$), but not for the control group ($F(3,279) = 1.49, p = 0.218$). Of the four data collection points there was only a significant difference between the two groups at one point – immediately following the completion of the modules (POST1) ($F(1,93) = 4.44, p = 0.038$).

In order to examine the impact of education module on the four subscales of the AAIS each was subjected to an ANOVA, the results of which are presented below.

AAIS subscales

Figure 12 shows that on all four subscales both groups showed an increase in their scores immediately after studying the module (POST1), but this increase was more pronounced for the intervention (sport psychology) group on the imagery and self-talk subscales. The intervention group maintained scores that were above pre-module values in the six months following the module on all four subscales, and had a larger positive difference between pre-module (PRE) and six month post-module (POST3) scores than the control group on the imagery (3.36 compared to 0.13) and self-talk (1.11 compared to 0.18) subscales. On the remaining subscales the differences between the pre-module (PRE) and six month post-module (POST3) scores were fairly similar for the intervention and control groups. In line with these observations the 2 x 4 (group x time) mixed ANOVAs undertaken on each subscale of the AAIS revealed a significant interaction between group and time on the imagery and self-talk subscales. The results of these ANOVAs are summarised in Table 37.

Table 37: Summary of 2x 4 mixed ANOVA results for the 4 AAIS subscales
 Those marked with an asterisk (*) were significant at the 0.05 probability level

Subscale	Time x Group Interaction	Main Effect - Time	Main Effect - Group
Imagery	$F(3, 91) = 3.937, p = 0.011, \text{partial } \eta^2 = 0.115^*$	$F(3, 91) = 10.164, p < 0.001, \text{partial } \eta^2 = 0.251^*$	$F = 0.398, p = 0.529, \text{partial } \eta^2 = 0.004$
Goal setting	$F(3, 91) = 0.856, p = 0.467, \text{partial } \eta^2 = 0.027$	$F(3, 91) = 2.726, p = 0.049, \text{partial } \eta^2 = 0.082^*$	$F = 2.343, p = 0.129, \text{partial } \eta^2 = 0.025$
Self-talk	$F(3, 91) = 4.013, p = 0.010, \text{partial } \eta^2 = 0.117^*$	$F(3, 91) = 9.192, p < 0.001, \text{partial } \eta^2 = 0.233^*$	$F = 4.459, p = 0.037, \text{partial } \eta^2 = 0.046^*$
Pain tolerance	$F(3, 91) = 0.291, p = 0.831, \text{partial } \eta^2 = 0.010$	$F(3, 91) = 5.409, p = 0.002, \text{partial } \eta^2 = 0.151^*$	$F = 0.001, p = 0.975, \text{partial } \eta^2 > 0.001$

As significant interactions between time and group were evident in both the imagery and self-talk ANOVAs, simple effects analyses were undertaken to identify where the differences lie. For the imagery subscale this revealed that the AAIS imagery scores changed significantly over time for the intervention (sport psychology) group ($F(3,279) = 10.48, p < 0.001$), but not for the control group ($F(3,279) = 0.64, p = 0.587$). No significant differences were evident between the two groups on any of the four data collection points.

The simple effects analysis for the self-talk subscale revealed that the AAIS self-talk scores changed significantly over time for the intervention (sport psychology) group ($F(3,279) = 9.69, p < 0.001$), but not for the control group ($F(3,279) = 1.23, p = 0.301$). Of the four data collection points there was only a significant difference between the two groups at one point – immediately following the completion of the modules (POST1) ($F(1,93) = 13.96, p < 0.001$).

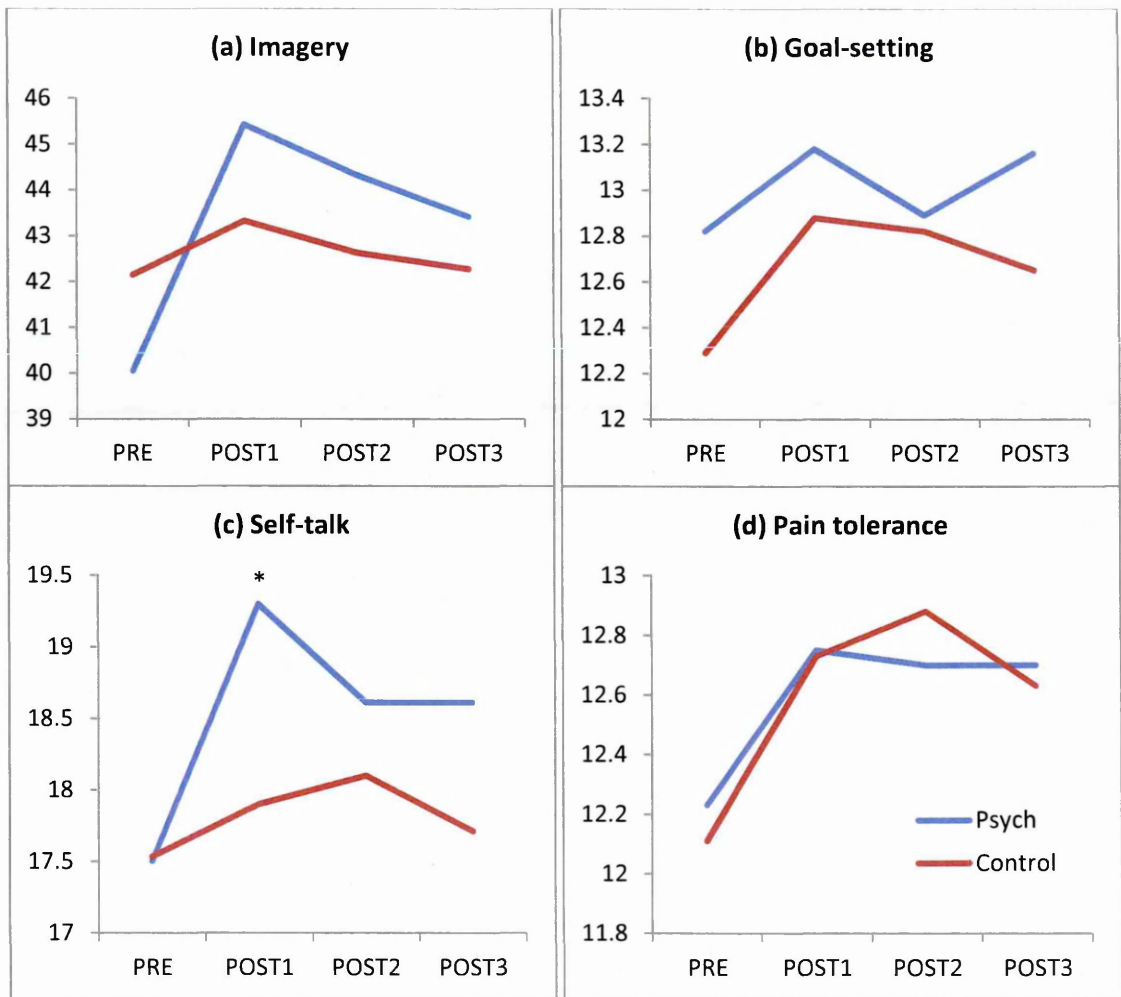


Figure 12: Mean AAIS imagery, goal setting, self-talk and pain tolerance subscale scores
 (Note that on all subscales a higher score represents a more positive attitude)
 * = significant difference between groups at this time point

Behaviour: Referral

Prior to commencing study (PRE), participants were asked if they had ever referred an injured athlete to a sport psychologist. Following the completion of the module (POST1) participants were asked if they had made a referral during the course of the module, and then finally three months (POST2) and six months (POST3) after completing the module they were asked if they had made a referral since finishing the module. These referral rates are presented in Table 38.

Table 38: Rates of referral to a sport psychologist

	PRE	POST1	POST2	POST3
Sport Psychology Group	12 (27.3%)	0 (0%)	4 (9.1%)	8 (18.2%)
Control Group	13 (25.5%)	2 (3.9%)	5 (9.8%)	6 (11.8%)

Module engagement

The completion rate for the three assessments was 100% on both modules (control and intervention), indicating a high level of module engagement amongst participants who undertook all four data collection points.

A further measure of module engagement was participation in the forum, which was requested within activities contained in the units of both modules. Table 39 provides a summary of participation rates in the module forum for each group. Engagement with the forum was defined as a participant making one or more post on the forum. The table shows that participation rates were higher for the intervention (sport psychology) group than the control group.

Table 39: Forum participation rates (intervention group)

	Intervention Group	Control Group
Engaged with forum	27 (61.4%)	21 (41.2%)
Didn't engage with forum	17 (38.6%)	30 (58.8%)

Participation in the forum appeared to have a positive impact on outcomes. For example, amongst the intervention (sport psychology) group, those who engaged with the forum had a higher perceived use of sport psychology at three and six months post (POST2 and POST3) studying the module than those who hadn't engaged with the forum (Table 40). Additionally, those who engaged with the forum showed an increase in perceived use of sport psychology

between POST1 and POST3 (3.7 percentage point increase), whilst those who did not engage with the forum showed a decrease in perceived use of sport psychology (11.7 percentage point decrease).

Table 40: Perceived use of sport psychology by the intervention group according to forum engagement

	PRE	POST1	POST2	POST3
Engaged with forum	n/a	22/27 (81.5%)	24/27 (88.9%)	23/27 (85.2%)
Did not engage with forum	n/a	15/17 (88.2%)	14/17 (82.4%)	13/17 (76.5%)

Similarly, amongst the intervention group, rates of referral were higher for those who had engaged with the forum at PRE, POST2 and POST3 (see Table 41). A comparable finding was evident on the PIUS and AAIS data, where there was a clear trend for those within the intervention group who had engaged with the forum to have higher scores on all subscales at virtually all four data collection periods. The only exception to this was at POST2 where those who had not engaged with the forum had slightly higher scores on the AAIS goal setting subscale than those who had engaged with the forum. This was not the case at any other data collection point or on any other subscale. The total scores on the PIUS and AAIS for those who engaged with the forum and those who did not are shown in Table 42.

Table 41: Referral to a sport psychologist by the intervention group according to forum engagement

	PRE	POST1	POST2	POST3
Engaged with forum	11/27 (40.7%)	0/27 (0%)	4/27 (14.8%)	7/27 (25.9%)
Did not engage with forum	1/17 (5.9%)	0/17 (0%)	0/17 (0%)	1/17 (5.9%)

Table 42: Total scores on the PIUS and AAIS of the intervention group according to forum engagement

	PRE		POST1		POST2		POST3	
	Engaged	Didn't engage	Engaged	Didn't engage	Engaged	Didn't engage	Engaged	Didn't engage
Total PIUS	245.41	228.59	268.44	256.35	275.81	260.41	275.00	262.65
Total AAIS	84.11	80.18	91.89	88.71	89.52	86.94	89.41	85.47

5.4 Discussion

The purpose of this study was to evaluate the impact of an online sport psychology education module on the sport psychology related attitudes and behaviours of qualified sports physiotherapists in the UK. Overall the results indicate that the sport psychology education intervention had a positive impact on the physiotherapists, supporting the findings of previous research examining the impact of sport psychology education on SIRPs by Harris et al. (2005), Clement and Shannon (2009), Stiller-Ostrowski et al. (2009) and Pero and Sachs (1997).

For hypothesis 1, the null was rejected as attitudes towards sport psychology (AAIS total scores) changed significantly over time for physiotherapists who studied the sport psychology module. Participants studying the sport psychology module demonstrated an increase in their attitude (AAIS total) scores from pre-module to immediately post-module. This would suggest that the sport psychology module was effective in improving attitudes in relation to sport psychology. Whilst some decline in attitude scores was evident in the six months following the completion of the module (POST1 to POST3) the physiotherapists continued to hold attitude scores that exceeded basal levels.

For hypothesis 2, the null was also rejected as sport psychology related behaviour (PIUS total) scores changed significantly over time for physiotherapists who studied the sport psychology

module. This would suggest that the sport psychology module was effective in improving physiotherapists' use of sport psychology. Participants studying the sport psychology module demonstrated an increase in their PIUS total scores at each data collection point from pre-module to six months post-module. This trend is different to that seen in relation to attitude where some decline was evident in the six months following the completion of the module. This is perhaps indicative of a period of assimilation being required for physiotherapists to absorb the information covered in the module and gradually gain in confidence to be able to integrate sport psychology into their practice. These findings support the work of Pero and Sachs (1997) who found that the sport psychology knowledge and behaviours of a group of athletic trainers were still above basal levels six months following a sport psychology workshop.

In addition to the PIUS data, other measures of sport psychology related behaviour also show evidence of the longitudinal impact of the sport psychology module on sport psychology related behaviour. Perceived use of sport psychology (Table 33) remained relatively stable in the six months following the completion of the sport psychology module and referral to a sport psychologist (Table 38) increased during the six month period following the module, although it did not reach pre-module levels. This could, however, be proportional to the time frame (i.e. there is more opportunity to make referrals in six months than three months).

It should be noted that the improvements in relation to behaviour extended to the use of sport psychology strategies by the physiotherapist and not to referral by the physiotherapist to a sport psychologist. Amongst the intervention group, reported referral rates were higher before the module started than after it (see Table 38). A similar finding was reported by Clement and Shannon (2009), who found that whilst improvements were seen in various sport psychology related behaviours, no improvement was seen in referral behaviour in their study of 160 athletic training students. As the rates of referral to a sport psychologist were relatively low both before

and after the education intervention, the findings also support research which suggests that SIRPs can be reluctant to use the services of sport psychologists (Johnson, Jutte, & Bell, 2012). The findings of the present study are, however, in contrast to those of Study 2 of this thesis where it was found that those who had studied sport injury psychology demonstrated significantly higher referral rates than those who had not.

There are various explanations as to why referral rates may have decreased from pre to post study. Firstly, it could be argued that the increase in sport psychology knowledge gained from the module reduced the need for referral, i.e. the physiotherapists became more competent in integrating sport psychology into their practice and therefore did not need to refer athletes to a sport psychologist. Alternatively, the physiotherapists may not have access to a sport psychologist in order to make referrals. Data on access to a sport psychologist was not collected as part of the study, but previous research has suggested that SIRPs often have limited access to sport psychologists (Arvinen-Barrow et al., 2007; Clement et al., 2013; Hemmings & Povey, 2002; Larson et al., 1996; Mann et al., 2007). This explanation does not, however, explain why referral rates were higher before the module was studied as this would indicate a capacity to make further referrals. Finally, and perhaps most significantly, there were limitations in the way that the physiotherapists were asked about referral at the different stages of data collection which makes comparisons difficult. At the pre-module stage participants were asked if they had *ever* referred an injured athlete to a sport psychologist and thus responses could span a period of many years. In contrast the post-module questions asked whether any referrals had been made since studying the module and thus only referred to a period of between zero and six months.

As physiotherapists in the intervention group demonstrated significantly higher attitude towards sport psychology (AAIS total) scores than physiotherapists in the control group immediately following the completion of the module, null hypothesis 3 was rejected. This provides further

evidence that studying the sport psychology module improved the sport psychology related attitudes of the physiotherapists. It should however be noted that these significant differences between the groups were not evident three months and six months after the module was completed, although the intervention group did maintain higher scores than the control group at these points.

Whilst the intervention group improved their sport psychology behaviour (PIUS total) scores following their study of the module, so did the control group, albeit to a lesser extent. As such, although the intervention group showed greater levels of improvement than the control group, the differences between the groups was not statistically significant and so null hypothesis 4 was accepted. It should be noted that whilst there were no significant differences between the groups in relation to the total PIUS score, there was a significant time by group interaction seen on the sport psychology subscale of the PIUS, with a significant difference seen between the two groups three months after the module, suggesting that those who had studied the sport psychology module were integrating more sport psychology techniques such as imagery, relaxation and self-talk into their practice. This could indicate that the content of the sport psychology module was more specifically related to improving scores on this subscale than other subscales of the PIUS.

The unexpected improvement in the scores of the control group could be attributed to the questionnaire package. Whilst the control group were not exposed to any sport psychology within their module, they were on four occasions asked to complete a questionnaire package in which they were asked lots of questions about sport psychology. It is plausible that this in itself could have stimulated interest in sport psychology and a greater awareness of sport psychology practice, which could lead to improvements in attitude and behaviour. The influence of external factors could also be a contributory factor in explaining the improvements in the control group. Those in the control group could have been influenced by, for example, self-directed reading on

sport psychology, previous exposure to sport psychology or interaction with sport psychologists. It is clear from the referral data that at least some of the control group had access to a sport psychologist so this is a possibility. Controlling for this type of informal learning over a six month period would be extremely difficult.

Another possible reason for a lack of significant differences between the groups could be that participants had relatively high basal (pre-module) scores, and so had limited capacity for improvement. Whilst Stiller-Ostrowski et al. (2009) do not identify what can be classified as a high or low score on the PIUS it is notable that basal total PIUS scores amongst participants in the present study were much higher than for those in Stiller-Ostrowski et al.'s (2009) study of athletic trainers. In fact basal scores in the present study were actually higher than the post sport psychology education intervention scores in Stiller-Ostrowski et al.'s (2009) study. Interestingly, in the present study the control group had higher basal scores on both the AAIS and PIUS than the intervention group, suggesting that the control group had more positive attitudes than the intervention group and made greater use of sport psychology prior to studying the module. This could have further restricted the capacity for differences to be seen between the two groups.

Deeper investigation of the subscale scores on the PIUS and AAIS reveals some interesting findings that support previous research. Previous research has suggested that SIRPs who have not received sport psychology training tend to gravitate towards using more practical sport psychology techniques that are motivational in nature (Francis et al., 2000; Lafferty et al., 2008; Lamba & Crossman, 1997; Wiese et al., 1991). Goal-setting, for example, is a motivational strategy that is well established within the SIRP community (Clement et al., 2013; Kamphoff et al., 2010). This would suggest that prior to studying the module participants were likely to already be using techniques that fit into this category and may therefore have had limited scope for improvement in these areas. The results support this to some extent with no significant interactions between

time and group seen on, for example, the PIUS motivation subscale or the AAIS goal setting subscale. In line with this, sport psychology scores on the PIUS (use of imagery, relaxation, self-talk and cognitive restructuring) and imagery and self-talk scores on the AAIS, which are techniques that SIRPs tend to be less familiar with (Arvinen-Barrow et al., 2007; Kamphoff et al., 2010), all showed a significant interaction between time and group, indicating that for techniques that tend to be less familiar to SIRPs the intervention group demonstrated significantly greater improvement than the control group.

The patterns observed on the subscales were also reflective of the content of the sport psychology module. Whilst the module covered areas that related to all subscales of the AAIS and PIUS, this coverage was not equal and this lack of equality appeared to be reflected in the results. For example, in relation to the PIUS, the module content was skewed more to the 'sport psychology' subscale than other subscales, and this was only subscale of the PIUS that showed a significant interaction between group and time. This might indicate the limitations of using a pre-existing questionnaire.

Whilst the findings reported so far have indicated that the sport psychology education module led to improvements in the sport psychology related attitude and behaviours of the physiotherapists it is important to also consider the participants' perceptions of the module. The vast majority of participants (77%) who studied the sport psychology module gave a score of seven or above when asked how beneficial they found it on a ten point scale. This is important as regardless of whether a module has a positive impact on attitude and behaviour, unless the participants find it enjoyable and beneficial they will not be motivated to adhere to it. When asked what they liked and disliked about the module, the number of likes far exceeded the number of dislikes. The content analysis revealed that some of the things the participants liked about the sport psychology module were its practical application, clarity, and flexibility (see Table 29). The identification of practical

application as a strength of the module is particularly salient as it has been suggested that sport psychology education interventions for SIRPs need to be applied in nature in order to be effective (Clement & Shannon, 2009; Hamson-Utley et al., 2008; Heaney, 2006a). Additionally, positive feedback relating to the flexibility of the module in allowing the participants to study at their own pace and to study at home supported distance learning as an appropriate method of delivery. Any future sport psychology education packages for qualified physiotherapists should ensure that the content is clear, has an applied focus and is delivered in a format appropriate for busy professionals such as distance or online learning.

In further support of the positive impact of the sport psychology module, most participants in the intervention group indicated that they had been motivated to undertake further study, either formal or informal, of sport psychology. This supports Clement and Shannon (2009) who found that those undertaking a sport psychology workshop demonstrated a significant increase in 'seeking out sport psychology information'. The three month and six month follow ups in the present study revealed that higher levels of formal further learning in the topic area of the module studied had been undertaken by the control group than the intervention group, perhaps due to there being more formal learning opportunities in strength and conditioning than sport psychology for UK physiotherapists. At the time of writing, none of the key continuing professional development (CPD) course providers were offering sport psychology courses for physiotherapists. This would suggest the need for such CPD courses to be made available.

When measuring the effectiveness of an education module it is important to consider the level of engagement, since completion alone does not indicate how far the student has engaged with the module materials. In this study two measures of engagement were used: completion of the assessments and participation in the module forum. As all participants completing the study successfully completed the three assessments, perhaps motivated by the certificate of completion

on offer, this did not prove to be an effective discriminator. The forum participation data did, however, produce some interesting findings. Firstly, rates of forum participation were higher in the intervention group, than the control group, suggesting that engagement on this module was higher, which is interesting given the initial reluctance amongst some participants to study this module and the resultant higher dropout rate amongst this group in the first phase of data collection. This was reflected in the content analysis of what participants liked about the module they studied, where a far greater proportion of the intervention group had identified the forum as one of the things they liked about studying the module than the control group had (see Tables 29 and 31). This would suggest that forums, and perhaps other methods of encouraging peer discussion and interaction, are effective tools in sport psychology education for physiotherapists.

Secondly, engagement with the forum appeared to have an impact on sport psychology related attitudes and behaviours. For example, there was a clear trend for those in the intervention group who had engaged with the forum to have higher perceived use of sport psychology, referral, AAIS and PIUS scores than those who did not engage with the forum. It would make sense that those who engage more with the module materials will derive greater benefits from them, however, the link between engagement and scores cannot be assumed to be a causative relationship. It is perfectly plausible that those with positive attitudes and behaviours in relation to sport psychology may be more inclined to post in the forum. Despite this possibility, engagement appears to be an important factor and any future studies examining the impact of an education module should take module engagement into account.

Limitations and future directions

Whilst this study has revealed some interesting findings, and has addressed some of the limitations of previous research in this area (e.g. use of student populations, limited investigation of longitudinal impact of education intervention, USA participants only) it does have some

limitations. Firstly, there were limitations related to participant recruitment and retention. The self-selection method of participant recruitment may have impacted upon the results since those volunteering to study an education module are perhaps more likely to have an interest in the area and be more open to learning, and attitude and behaviour change than the wider physiotherapist population. The participant group did have high basal attitudes and behaviours in relation to sport psychology and it would be interesting to see what impact a sport psychology education intervention would have on SIRPs with lower basal attitudes and behaviours in relation to sport psychology.

A further limitation was participant retention in the early stages. As previously mentioned, the intervention group had a 30% attrition rate in the first phase of data collection (pre to immediately post module) which was attributed to a number of participants being disappointed at not being assigned to the strength and conditioning (control) group who subsequently chose not to study the module. This is an interesting research finding in its own right and suggests that education on the benefits of sport psychology for SIRPs may be a necessary pre-requisite to any future sport psychology modules in order to maximise recruitment and retention. Future research in this field should look at ways of targeting and retaining participants without a pre-existing interest in sport psychology.

There were also limitations related to the questionnaire package. As with any self-report measure, there was risk of social desirability response bias influencing results, which is often difficult to guard against. Additionally, some of the items (e.g. information collected in relation to making referrals to a sport psychologist) relied on the accuracy of the participants' recall. A decision was made to use two pre-existing questionnaires as part of the questionnaire package (AAIS and PIUS). Whilst there are advantages to this in relation to the validity and reliability of the instruments, a newly constructed questionnaire could perhaps have related more specifically to

the content of the sport psychology module. A final limitation of the questionnaire, which has already been discussed, is that it may have inadvertently stimulated an interest in sport psychology amongst the control group minimising the capacity for differences to be seen between the intervention and control groups. Future studies should be aware of this potential outcome and perhaps consider alternative data collection methodologies, such as the use of less frequent data collection points. Additionally, alternative research tools to questionnaires (e.g. interviews, focus groups) may be advantageous in future research in this area. For example, interviews could be used to gain a deeper understanding of the educational experiences of SIRPs who are successfully integrating sport psychology into their practice.

Successful completion of the module assessments was intended to be a measure of module engagement; however, all participants successfully completed the assessments suggesting that they were perhaps too easy. A more difficult programme of assessments may have been a more successful discriminator of level of engagement. The length of the module was also a potential limitation of the study. Whilst a short duration module was selected based on the findings of Study 3 that a brief intervention would be more attractive to qualified physiotherapists, it is possible that a longer, more in-depth module may have led to more significant differences between the intervention and control groups. However, in Study 2 although there was a general trend of increasing usage of sport psychology (PIUS total score) with increased exposure to sport psychology education, there were no significant differences between those who had studied one or two sessions, an entire module or two or more modules on sport psychology. Future studies should compare the impact of sport psychology education of various modes and duration in order to identify the optimal education package for this population group of qualified professionals.

Conclusions

It can be concluded from this study that the online sport psychology module was effective in improving the sport psychology related attitude and behaviour of already qualified UK physiotherapists working in sport. Such an improvement can have a beneficial impact on the practice of physiotherapists and the experience of the injured athletes they treat and should not be underestimated. It is notable that a longitudinal impact was observed, with participants continuing to utilise sport psychology in their practice six months after completing the module. This indicates that a sport psychology education module can have long reaching benefits. This coupled with previous research findings that have revealed that physiotherapists have expressed a desire for further training in sport psychology (e.g. Arvinen-Barrow et al., 2007) suggests that opportunities for physiotherapists and other SIRPs to be exposed to sport psychology education should be maximised. Firstly, in order to encourage qualified physiotherapists to seek out sport psychology education opportunities they need to be educated regarding the benefits of sport psychology. Secondly, given the deficit in sport psychology education courses available for physiotherapists there is a real need for CPD opportunities in sport psychology to be made available to qualified UK physiotherapists. As indicated by this research any such CPD opportunities should be applied in nature, relevant to practicing physiotherapists and be flexible in their delivery in order to maximise their success.

CHAPTER 6:
GENERAL DISCUSSION, THEORETICAL AND APPLIED
CONTRIBUTIONS, AND CONCLUSIONS

CHAPTER 6: GENERAL DISCUSSION, THEORETICAL AND APPLIED CONTRIBUTIONS, AND CONCLUSIONS

This chapter draws together the thesis by summarising its aims, objectives and key findings, and considering both the theoretical and applied contributions it has made to the field. The limitations of the thesis and future research directions are also considered.

6.1 Summary of the Thesis Aims and Objectives

As outlined in Chapter 1, the over-arching aim of this thesis was to examine the influence of sport psychology education on the attitude and behaviour of UK physiotherapists. The four primary research objectives connected to this were:

1. to investigate the psychology content of UK university physiotherapy training programmes (Study 1, Chapter 2);
2. to identify whether those who have previously undertaken sport psychology training demonstrate more positive attitudes and behaviours towards sport psychology than those who have not (Study 2, Chapter 3);
3. to identify the most appropriate content for a sport psychology education package for practicing physiotherapists (Study 3, Chapter 4);
4. to investigate the impact of a sport psychology education intervention on the attitude and behaviour of practising physiotherapists (Study 4, Chapter 5).

6.2 Summary of Main Findings

These aims and objectives were progressively achieved through the four component studies.

Firstly, Study 1, which investigated the psychology content of physiotherapy training programmes in the UK, revealed that there are vast inconsistencies between institutions in the nature and extent of psychology content within physiotherapy degree programmes. It would appear that some students are gaining little or no specific education relating to psychology, yet others are receiving highly specific training – an inconsistency that needs to be addressed to ensure uniformity of experience and readiness of physiotherapists to deal with psychological issues in their practice. An integrated approach to teaching psychology appears to have been adopted by most institutions, with only a small number offering a named module in psychology for physiotherapy students. This approach has been criticised by Kamphoff et al. (2010) who suggest that students who are provided with a specific module in psychology are likely to be more confident in integrating psychology into their practice. It is certainly possible that the integrated approach to teaching psychology can de-emphasise its importance to students and make it difficult to track how much is actually being taught. These findings from Study 1 were vital to help understand the educational grounding on which physiotherapists' attitudes and behaviours towards sport psychology are based, and to explain the consistent finding within the literature (e.g. Arvinen-Barrow et al., 2007; Heaney, 2006a; Lafferty et al., 2008) that UK physiotherapists often feel unprepared to deal with the psychological aspects of sports injury.

The key focus of this thesis was to evaluate the impact of sport psychology education on the attitudes and behaviours of physiotherapists. Therefore an appropriate next step after Study 1 was to compare the attitude and behaviour of SIRPs who had received sport psychology education with those who had not; an approach used by Hamson-Utley et al (2008) in their investigation of athletic trainers and physical therapists in the USA. Study 2 showed that those who had studied sport psychology demonstrated significantly higher use of sport psychology than

those who had not. The relevance of sport psychology training received appeared to be important, with those who had specifically studied the psychological aspects of sports injury also demonstrating significantly higher use of sport psychology as well as significantly higher levels of referral to a sport psychologist than those who had not. Interestingly there was no significant dose-response effect in terms of the amount of sport psychology education received. This indicated the need to investigate the optimal features of a sport psychology education course for physiotherapists in terms of factors such as duration, mode, and content, which was undertaken in Study 3.

Study 3 reviewed the existing literature relating to the recommended content and mode of delivery for a sport psychology education programme for SIRPs. Specifically it addressed four questions: (1) What topic areas do researchers suggest should be integrated into the sport psychology education of SIRPs?, (2) What topic areas are currently being recommended by professional bodies?, (3) What are the findings of research examining the impact of sport psychology education on SIRPs?, and (4) What do researchers recommend to be the most appropriate mode of delivery for sport psychology education for SIRPs? In relation to content, three broad themes emerged as recommended topic areas: (1) understanding of the psychological impact of injury, (2) interventions and psychological skills/techniques, and (3) referral and professional boundaries. These topic areas were adopted for the education intervention used in Study 4. Whilst the optimal time for sport psychology education would be at an undergraduate level (Arvinen-Barrow et al., 2007; Gordon et al., 1998; Heaney, 2006a), there is a strong body of evidence indicating that qualified SIRPs of various guises have not received adequate training in sport psychology and wish to gain training in this area as they recognise the impact of psychological factors in sports injury (Arvinen-Barrow et al., 2007; Hamson-Utley et al., 2008; Heaney, 2006a). This suggests that there is a significant need for sport psychology education for those who are already qualified and practising in the field. It is the training of these

practitioners that the thesis has focused on. For these professionals time is a significant factor (Arvinen-Barrow et al., 2008; Scherzer & Williams, 2008), therefore Study 3 concluded that a relatively short duration distance learning sport psychology education intervention would be most effective in both recruiting and encouraging adherence amongst SIRPs. This was consequently the format of the sport psychology education intervention utilised in Study 4.

Study 4 sought to investigate the impact of this sport psychology education intervention on the attitudes and behaviours of a group of qualified physiotherapists, comparing its impact to that of a control education intervention. The study revealed that those who completed the sport psychology module found it to be beneficial and felt that they had used more sport psychology in their physiotherapy practice since completing the module throughout the six months following its completion, indicating the value of the education intervention. Additionally, their AAIS (attitude) and PIUS (behaviour) total scores increased significantly after studying the module and remained above basal levels in the six months following the module. However, the control group also demonstrated improvements in their AAIS and PIUS scores, although to a lesser extent than the intervention group. Significant differences were consequently only seen between the two groups on the AAIS total score and not the PIUS total score, but, significant differences were evident on the sport psychology subscale of the PIUS. The increases seen in the control group were attributed to the sport psychology questionnaire encouraging reflection on sport psychology related practice.

Table 43 provides a summary of the four studies within the thesis. Collectively it can be concluded that these studies have indicated the importance of sport psychology education to physiotherapists and highlighted the positive impact of sport psychology education.

Table 43: A summary of the key findings from each of the thesis studies

Study	Overview	Key Findings
Study 1	<p><i>Aim:</i> To examine current psychology provision within UK physiotherapy programmes (specifically the nature and extent of psychology covered in physiotherapy programmes, the delivery of any psychology content, the assessment of any psychology content, the perceived importance of psychology in physiotherapy training, and factors influencing psychology provision in physiotherapy programmes)</p> <p><i>Method:</i> Representatives from seventeen UK universities running physiotherapy programmes were interviewed/surveyed</p>	<ul style="list-style-type: none"> • The nature and extent of psychology provision across UK university physiotherapy programmes is extremely diverse and inconsistent • There is an inconsistency between the cited importance of psychology and its visibility in the curriculum • Health psychology was the most commonly taught topic • Psychology was predominantly delivered through an integrated approach (only 23.5% had named modules in psychology) • 64.7% used non-psychology specialists to teach psychology content • 41% indicated that their provision did not contain any theoretical underpinning
Study 2	<p><i>Aim:</i> To compare the attitudes and behaviours of two groups of UK SIRPs – those who have received sport psychology education and those who have not</p> <p><i>Method:</i> 94 SIRPs (54 physiotherapists and 40 sports therapists) were surveyed using a questionnaire package that included the AAIS (attitude) and the PIUS (behaviour)</p>	<ul style="list-style-type: none"> • Use of sport psychology (PIUS total score) was significantly higher for those who had studied sport psychology compared to those who had not • Use of sport psychology (PIUS total score) was also significantly higher for those who had specifically studied sport injury psychology compared to those who had not • No significant differences were seen for attitude (AAIS total scores) • There was no dose-response effect with regard to the amount of sport psychology/psychology of injury studied (PIUS total scores) • Sport psychologist referral rates were also higher for those who had studied sport psychology and/or the psychology of sports injury
Study 3	<p><i>Aim:</i> To review the existing literature relating to the recommended content and mode of delivery for a sport psychology education programme for SIRPs</p> <p><i>Method:</i> 36 publications which satisfied the inclusion criteria were reviewed</p>	<ul style="list-style-type: none"> • 3 areas that should be covered by an education package emerged: <ol style="list-style-type: none"> (1) Understanding of the psychological impact of injury (2) Interventions and psychological skills/techniques (3) Referral and professional boundaries • All content should have an applied focus and theoretical underpinning • Sport psychology education packages of varying duration have been found to be effective • To encourage recruitment and adherence sport psychology education needs to be provided in a short duration package, possibly utilising distance learning methods to maximise flexibility

(Continued overleaf)

Study	Overview	Key Findings
Study 4	<p><i>Aim:</i> To investigate the impact of a sport psychology education package on the attitudes and behaviours of a group of qualified UK physiotherapists</p> <p><i>Method:</i> 95 physiotherapists studied either a sport psychology module or a control module (strength and conditioning) and were surveyed 4 times over a 6 month period (pre, immediately-, 3 months- and 6 months- post module) using a questionnaire package that included the AAIS (attitude) and the PIUS (behaviour)</p>	<ul style="list-style-type: none"> • The results indicated that the sport psychology education intervention had a positive impact on the physiotherapists • Participants found studying the module to be beneficial • Participants in the sport psychology group felt that they had used more sport psychology since completing the module throughout the 6 months following the module • AAIS and PIUS total scores increased significantly after studying the module and remained above basal levels in the 6 months after the module • The control group also demonstrated improvements in their AAIS and PIUS scores, although to a lesser extent to the intervention group • Significant differences were seen between the intervention and control groups on the AAIS total score

6.3 Contributions to the Literature

Literature examining the role of the SIRP in the psychological aspects of injury is still a relatively new area of research within the field of sports injury psychology, with Wiese et al.'s (1991) seminal work being one of the very first studies to examine this area. Wiese et al. (1991) surveyed a group of SIRPs regarding their perceptions relating to the use of sport psychology strategies with injured athletes, a method used in several subsequent studies (e.g. Arvinen-Barrow et al., 2007; Heaney, 2006a; Hemmings & Povey, 2002; Lafferty et al., 2008; Larson et al., 1996; Ninedek & Kolt, 2000). Whilst many of these studies covered the education and training of SIRPs to some extent, studies specifically examining the education and training of SIRPs in sport psychology were not evident until the late 1990s initially (e.g. Gordon et al., 1998; Pero & Sachs, 1997) and then more prominently from the 2000s (e.g. Clement & Shannon, 2009; Harris et al., 2005; Stiller-Ostrowski et al., 2009).

This thesis has provided a significant contribution to the literature relating to the sport psychology education and training of SIRPs by extending the work of others and researching some novel areas. Study 1, which has been published in the *Journal of Physical Therapy Education*, provided a much needed audit of the current status of psychology within the physiotherapy curriculum in the UK. As no similar investigation had been published since 1989 (Baddeley & Bithell, 1989) there was a significant gap in the literature in this area, which has been filled by Study 1 (Heaney et al., 2012).

Study 2 as an investigation comparing those who had studied sport psychology to those who had not was essentially a replication of Hamson-Utley et al.'s (2008) study, but with a UK population. This represented the first UK study to compare the attitudes and behaviours of SIRPs with differing educational experiences towards sport psychology. Study 2 also sought to extend the work of Hamson-Utley et al. (2008) by measuring not just attitudes towards sport psychology, but also behaviour. This is important because positive attitudes cannot be assumed to always translate into positive behaviour (Kraus, 1995). Most UK based research examining the attitudes and perceptions of SIRPs toward sport psychology has examined physiotherapists (e.g. Arvinen-Barrow et al., 2007; Heaney, 2006a; Hemmings & Povey, 2002; Lafferty et al., 2008). Sports therapists appear to be a largely ignored group of SIRPs in the literature and so including sports therapists in Study 2 was also a novel direction.

Study 3 represented a novel area of investigation as there has been no previous review of the recommendations relating to the content and mode of delivery of sport psychology education for SIRPs. The review, which has been accepted for publication in the journal *Physical Therapy in Sport*, provides a much needed analysis of such recommendations, helping to inform the development of future sport psychology education programmes for SIRPs.

Limited research exists which has delivered a sport psychology education intervention to SIRPs and measured its impact. Only four such studies were identified in Chapter 4 (Clement & Shannon, 2009; Harris et al., 2005; Pero & Sachs, 1997; Stiller-Ostrowski et al., 2009) and therefore Study 4 (Chapter 5) adds to and advances this body of work by addressing some of the limitations of the existing research and investigating some novel areas. The four existing studies all examined North American populations. Study 4 therefore adds a novel dimension to the body of literature by researching a previously un-researched group in this area – UK physiotherapists, thus addressing a need for a broader range of SIRPs to be investigated. It also develops the work of Arvinen-Barrow (2009), who in her thesis identified a need for research investigating the effectiveness of sport psychology education on practising physiotherapists. The vast majority (75%) of the four existing research studies which have measured the impact of a sport psychology education intervention on SIRPs examine student populations, despite the fact that it has been suggested that those already qualified are also in need of sport psychology training (Arvinen-Barrow et al., 2007; Hamson-Utley et al., 2008; Heaney, 2006a). Therefore, by examining qualified SIRPs, Study 4 has investigated a relatively under-researched group within this type of research. A relatively unique feature of Study 4, in comparison to the existing research in this area, was that it included a six month follow-up period to assess the longitudinal impact of the education intervention. All of the existing studies, with the exception of Pero and Sachs (1997), had a much shorter follow-up period and thus Study 4 has significantly added to the understanding of the longer term impact of sport psychology education. All of the studies, with the exception of Clement and Shannon (2009), examined either attitudes towards sport psychology or sport psychology related behaviours, and not both of these. Additionally, only half of the studies reported having a control group. Study 4 addresses this by considering both attitudes and behaviours and including a control group. A further novel aspect of Study 4 was the use of a distance learning education intervention – a mode not previously investigated within sport psychology education for SIRPs research.

Given the novel areas researched and the extension of existing work it can be said that the four studies contained in this thesis have made a significant contribution to the body of work examining the education and training of SIRPs in sport psychology.

6.4 Implications for Practice

The work presented in this thesis has demonstrated that sport psychology education has a positive impact on SIRPs. This finding provides a strong indicator that sport psychology education should be made available to SIRPs. Ideally this training should be provided as part of the undergraduate and postgraduate training of SIRPs, but given the consistent finding in the research (e.g. Arvinen-Barrow et al., 2007; Hamson-Utley et al., 2008; Heaney, 2006a) that qualified SIRPs often feel unprepared to provide sport psychology support to injured athletes, education opportunities also need to be provided for those who are already qualified.

Recommendations for undergraduate/postgraduate training

Given the importance of psychological factors in the rehabilitation from sports injury it is vital that physiotherapy students (and other SIRP students) study psychology as part of their undergraduate training and any postgraduate training. Study 1 revealed that there are vast inconsistencies between institutions in the quality and quantity of psychology covered in physiotherapy degree programmes in the UK and as such it is recommended that steps are taken by the relevant bodies to ensure that more consistency is achieved and that all physiotherapy graduates have an appropriate understanding of psychology. Greater specificity from governing bodies with regard to the required content and coverage would likely address this as a lack of specificity inevitably leads to diversity of interpretation (Bithell, 2007). A greater level of visibility of psychology within the physiotherapy curriculum is also recommended in order to highlight its importance to students and to enhance students confidence in applying psychology in their professional practice once qualified. It is important that physiotherapists (and other SIRPs) are exposed to sport

psychology education that is relevant to their professional practice, therefore, a final recommendation for undergraduate and postgraduate sport psychology education is that it relates specifically to the psychological aspects of injury, covering the three broad topic areas identified in Study 3 (see Table 43 or Figure 7 in Chapter 4) with an applied focus and a theoretical underpinning.

Recommendations for training qualified SIRPs

Deficiencies in undergraduate training have led to a clear need for sport psychology education opportunities for qualified physiotherapists and other SIRPs. Examination of the CPD courses currently available to UK physiotherapists from key bodies reveals that there is a distinct lack of CPD opportunities in sport psychology. Therefore it is recommended that more CPD opportunities are made available to practicing physiotherapists (and other SIRPs), perhaps utilising or adapting the model of sport psychology education intervention developed for Study 4. In line with the recommendations for undergraduate/postgraduate training, a CPD education course should specifically address the psychological aspects of sports injury, covering the three broad topic areas identified in Study 3 (see Table 43 or Figure 7 in Chapter 4) with a theoretical underpinning and an applied focus, which draws upon the experiences of the physiotherapist. This should be delivered through a format that offers flexibility to the busy professional.

Recommended model of good practice for the sport psychology education of SIRPs

In light of the findings of this thesis and the recommendations for undergraduate/postgraduate training and training for qualified SIRPs discussed above, a model of good practice for the successful integration of sport psychology education into the training of physiotherapists and other SIRPs is presented in Figure 13.

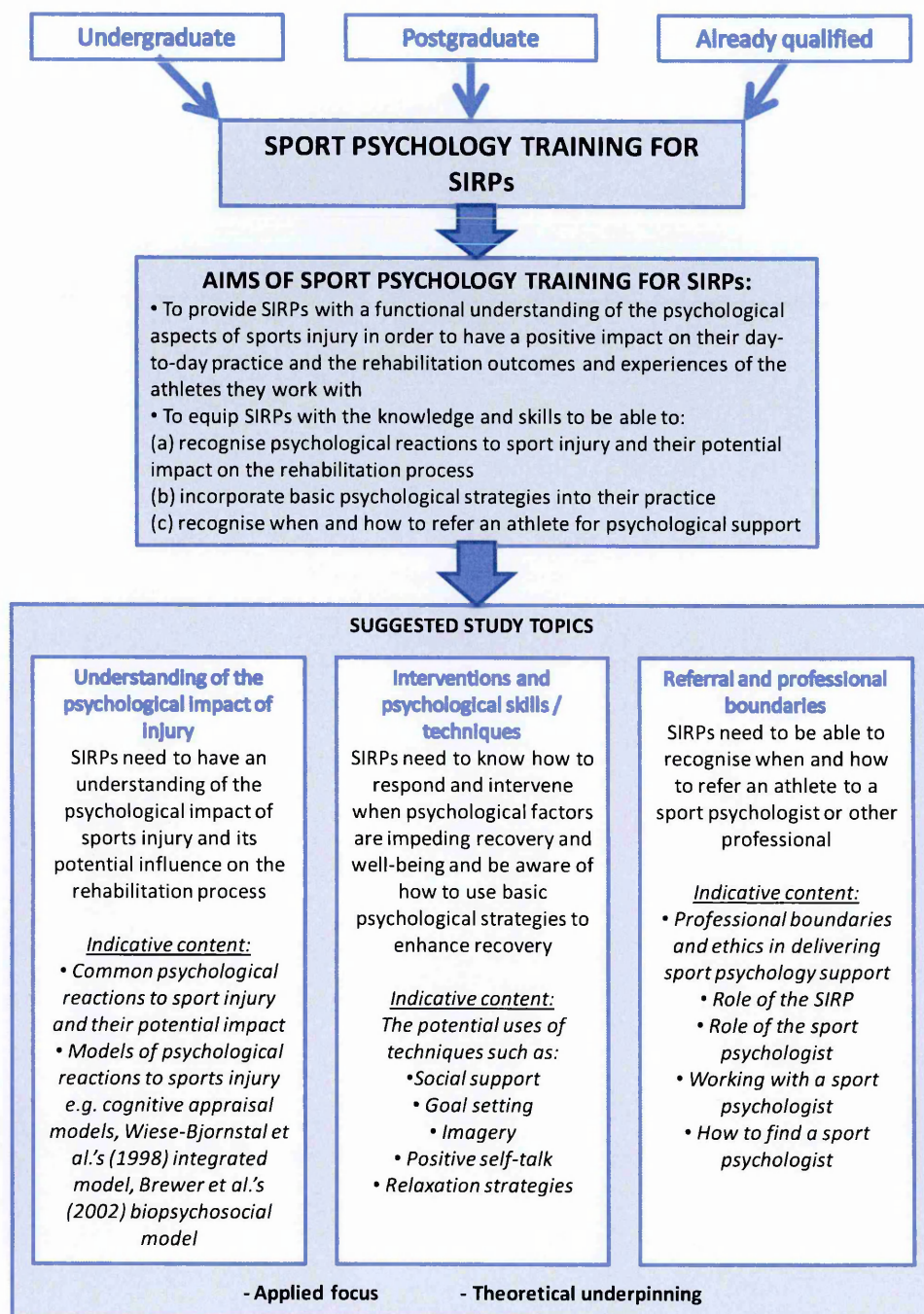


Figure 13: Model of good practice in the delivery of sport psychology education for SIRPs

The model (Figure 13) shows that sport psychology education is appropriate to be embedded both into undergraduate/postgraduate training and into CPD programmes for those already qualified. As discussed previously this is to ensure that both qualified SIRPs and those still in training are able to improve their sport psychology related practice. In time, if such a model is

widely adopted and SIRPs receive a consistent grounding in sport psychology through undergraduate and postgraduate education, the need for CPD training may diminish or develop to address more specific areas as a progression from undergraduate/postgraduate sport psychology education rather than an alternative to it. The question as to whether sport psychology education is best placed in the curriculum at an undergraduate or postgraduate level is an area for debate. It is argued that as the ability to recognise and address psychological issues during rehabilitation from sports injury is such an essential skill it should be embedded in both undergraduate and postgraduate curricula. Opponents to this stance may argue that this is impractical for undergraduate physiotherapy programmes or pre-registration postgraduate physiotherapy programmes as the curriculum is already very full and physiotherapists are being trained to work in a variety of settings of which sport is just one, however, this thesis has demonstrated that sport psychology education for physiotherapists does not need to be time consuming. There is scope for students to be introduced to sport psychology at an undergraduate level, perhaps with deeper investigation at a postgraduate level where greater specificity is possible. Additionally, it can be argued that the skills that can be developed through sport psychology education are transferable to other settings.

As illustrated in the model (Figure 13) the aim of sport psychology training for physiotherapists and other SIRPs is to provide them with a functional understanding of the psychological aspects of sports injury in order to have a positive impact on their day-to-day practice and the rehabilitation outcomes and experiences of the athletes they work with. The key term here is 'functional' – physiotherapists are not training to be psychologists and therefore do not need to have a vast and deep understanding of psychological concepts and theories, rather they need to develop practical skills, underpinned by psychological theory, that can be applied in a physiotherapy setting. Specifically sport psychology training for physiotherapists should aim to equip physiotherapists with the knowledge and skills to be able recognise psychological reactions to sport injury and

their potential impact on the rehabilitation process, to incorporate basic psychological strategies into their practice and to recognise when and how to refer an athlete for psychological support.

To achieve these aims sport psychology education for physiotherapists and other SIRPs needs to be highly relevant and specifically address the psychological aspects of sports injury, rather than more generic sport psychology topics. In line with the findings of Chapter 4 the model in Figure 13 suggests that the topic areas that should be covered are: understanding of the psychological impact of injury, interventions and psychological skills/techniques, and referral and professional boundaries. In order to maximise the adoption of sport psychology into the day-to-day practice of SIRPs and enhance its perceived credibility it is essential that this content is delivered in an applied context with a strong theoretical underpinning.

The first of the three topic areas, understanding of the psychological impact of sports injury, will help SIRPs to gain the ability to understand and recognise the potential psychological impact of sports injury on rehabilitation, and as Figure 13 indicates should cover models of psychological reaction to sports injury and encourage SIRPs to consider their positioning within these models. Having gained an understanding of the potential impact of psychological factors of sports injury, the second topic area (interventions and psychological skills / techniques) introduces SIRPs to basic psychological strategies they can integrate into their practice. Figure 13 suggests that strategies such as social support, effective goal setting, imagery, positive self-talk and relaxation can be introduced to SIRPs. It is important that SIRPs know their limitations in delivering sport psychology support to the injured athlete and are aware of the professional ethics involved; therefore the final topic area proposed in Figure 13 is referral and professional boundaries. The model indicates that this topic area should address when it is appropriate to refer an injured athlete to a sport psychologist, the processes involved in doing so, and the working relationship between the SIRP and sport psychologist.

It is proposed that the model presented in Figure 13 should be adopted by any provider of sport psychology education for SIRPs, including both Higher Education Institutions and organisations which provide CPD for SIRPs. With regard to physiotherapy in the UK, the adoption of the model by the Chartered Society of Physiotherapy and integration of sport psychology education into their curriculum recommendations would be highly advantageous and lead to more consistent experience of psychology training across the country.

6.5 Limitations

Whilst this thesis has revealed some significant findings which impact upon the sport psychology education and training of physiotherapists and other SIRPs it is important to note that it does have some limitations. The specific limitations of each study are discussed in the relevant chapters, but there are some broad limitations which warrant discussion here.

One of the key limitations is that the studies involved self-selected participants. It is feasible that participants who chose to participate in research related to sport psychology likely have an interest in and positive perceptions of the topic, which may not be entirely representative of the wider physiotherapy/SIRP population. This certainly appeared to be possible as, for example, in Study 2 all groups of participants had attitude (AAIS scores) indicative of a positive attitude to sport psychology, reducing the scope for potential improvements in attitude.

Where participants were recruited who perhaps did not hold such positive attitudes towards sport psychology, retention was an issue. Informal observations suggested that a number of participants who volunteered to participate in Study 4 did so because they were attracted by the control group education intervention (strength and conditioning) and were disappointed when assigned to the intervention (sport psychology) group. This led to a higher attrition rate in the

sport psychology group in the early stages. Although no formal data was collected on this, informally a number of participants had expressed that they were withdrawing without commencing study as they had specifically wanted to study the strength and conditioning module. To combat this, the participants were able to undertake the alternate module at the end of the study if they wished to do so. Interestingly, in the later stages, the attrition rates were much lower and were more comparable between the intervention and control groups, perhaps indicating that once exposed to the module their resistance to sport psychology was diminished. Greater familiarity with the applicability of strength and conditioning to their work compared to sport psychology may have been a factor, indicating the need to educate SIRPs on the reasons why they need to study sport psychology. After experiencing a low uptake of SIRPs to their sport psychology education sessions for athletic trainers Scherzer and Williams (2008) investigated the reasons why the athletic trainer's had chosen not to attend and found that one reason cited was a lack of interest in the subject area. A limitation of Study 4 was that it did not investigate the reasons why participants withdrew from the study as this may have been an interesting finding in itself.

A further potential limitation was the inclusion of participants qualified to either undergraduate or postgraduate level. It may have been more appropriate only to include participants qualified to the same level (e.g. undergraduate level) since educational experiences at the two levels are quite different. For example, the data from Study 2 shows that most physiotherapists who had studied sport psychology did so at a postgraduate rather than undergraduate level. However, restricting participation may have led to a participant group that was unrepresentative of the larger UK physiotherapy population who comprise both those qualified to undergraduate and postgraduate level.

Whilst interviews were used in Study 1, the thesis relied predominantly on questionnaires as a data collection tool. This was deemed appropriate since pre-existing questionnaires (AAIS and PIUS) were used that had established validity and reliability and allowed for large volumes of data to be collected, however, questionnaires do not always allow for a detailed understanding of the individuals lived experiences and do not allow for further 'probing' (Gratton & Jones, 2004). Additionally, as self-report measures the questionnaires were vulnerable to social desirability response bias (Van de Mortel, 2008) and sometimes relied on participants' recall on historical events (e.g. how much sport psychology they had studied as part of their degree). To overcome some of these limitations it may have been beneficial to combine the questionnaires with other data collection tools such as interviews or observation.

Further limitations are touched upon in the following section considering future research directions.

6.6 Future Directions

This thesis has added to the body of research examining the impact of sport psychology education on SIRPs, but the field is still a relatively under-researched area and thus more research is needed to strengthen the body of work. In particular more research is needed examining the impact of an education intervention on a broader range of SIRPs, comparing education interventions of various modes and durations to help identify the optimal features of a sport psychology education package for SIRPs.

This work has specifically focussed on the SIRP's perceptions of the impact that sport psychology education has had upon their attitudes and behaviours. Future research may benefit from also considering the perspective of those around the SIRP such as the injured athlete or coaches. For

example, it would be useful to evaluate whether injured athletes identify any improvement in practice from their SIRP following sport psychology education.

Another area which warrants further investigation is the impact on the student of an integrated approach to teaching psychology within the physiotherapy (or other SIRP) curriculum compared to the modular approach. Inferences have been made within this thesis that the integrated approach may lead to a diminished perception of the importance psychology or lower levels of confidence in applying psychology techniques compared to studying a distinct module in psychology, but there is a lack of research to directly measure whether this is the case. Such research could help to shape the future direction of psychology content within physiotherapy programmes.

6.7 Conclusion

This thesis has contributed to, and extended, the research in the area of sport psychology education for SIRPs, providing a much needed assessment of the sport psychology training of UK based SIRPs and the impact of this training. The thesis has shown that sport psychology education can have a positive impact on the sport psychology related attitudes and behaviours of physiotherapists. Future research should develop this work by investigating a broader range of SIRPs and comparing education interventions of various modes and duration.

The findings could potentially have a significant impact on the future education and training of UK physiotherapists. Sport psychology education should be made much more available to UK based physiotherapists and other SIRPs through both undergraduate/postgraduate training and CPD opportunities. This would have a significant impact on the practice of physiotherapists and other SIRPs and their ability to help injured athletes to cope with the psychological impact of injury.

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APPENDICES

Appendix 1a: Walker and Heaney (2013a)

Walker, N. & Heaney, C. (2013a). Psychological responses to injury: a review and critique of psychological response to injury models. In: Arvinen-Barrow, M. & Walker, N. (eds). *The Psychology of Sport Injury and Rehabilitation* (pp.23-39). London: Routledge.

3

PSYCHOLOGICAL RESPONSES TO INJURY

A review and critique of existing models

Natalie Walker and Caroline Heaney

Introduction

Anyone who has ever experienced a sport injury, whether it be an athlete who has sustained an injury, a coach of an injured athlete or sport medicine professional treating an injured athlete, will be aware that the occurrence of an injury can have both a physical and psychological effect on the athlete. In addition to the physical effects, sport injury may, for example, lead to feelings of frustration, anxiety, depression, anger or isolation (Johnston and Carroll, 1998). Consideration of the psychological responses to injury is important as they can potentially impact on the athlete's rehabilitation behaviour, the overall rehabilitation outcomes and the subsequent return to training and competition (De Heredia, Munoz and Artaza, 2004). Therefore, understanding the process in which athletes psychologically respond to injuries is of importance. According to Walker, Thatcher and Lavalley (2007), sport medicine professionals should be aware of psychological factors impacting on the injury experience if complete holistic recovery is to occur. Such an understanding is vital in an applied context and can be gained through considering the underpinning psychological theory (Cranney *et al.*, 2009; Thompson, 2000). However, it appears that sport medicine professionals rarely receive adequate training in psychological aspects of sport injuries (for example, Arvinen-Barrow, Penny, Hemmings and Corr, 2010) and these aspects are seldom taught at degree level. For example, Heaney, Green, Roston and Walker (2012) examined the current psychology provision within physiotherapy programmes in UK universities with the intention of exploring the nature and extent of psychology covered in physiotherapy programmes, the delivery and perceived importance of any psychology content and the factors influencing psychology provision. The authors found that 41 per cent of participants indicated that their psychology provision did not contain any theoretical underpinning.

Appendix 1b: Walker and Heaney (2013b)

Walker, N Walker, N. & Heaney, C. (2013b). Relaxation techniques in sport injury rehabilitation. In: Arvinen-Barrow, M. & Walker, N. (eds). *The Psychology of Sport Injury and Rehabilitation* (pp.86-102). London: Routledge.

7

RELAXATION TECHNIQUES IN SPORT INJURY REHABILITATION

Natalie Walker and Caroline Heaney

Introduction

Several studies have explored the different stressors that athletes may have to cope with when participating in sport. The literature suggests that aspects of competition (for example, thinking about mistakes), interpersonal relationships (for example, expectations from coaches, team mates, or the media), financial concerns (for example, sponsorship), environmental conditions (such as the weather), and traumatic experiences (for example, enduring an injury), can all test an athlete's coping resources. The key to coping with these stressors is for the athlete to learn to become self-aware of their responses to stressors and then adopt appropriate techniques (such as relaxation techniques) to facilitate coping. Thus far, a number of psychological interventions have been identified as being beneficial in helping athletes to deal with stressors, one of which is relaxation techniques. The use of such psychological interventions expands beyond the performance-enhancement context to also include sport injury rehabilitation (for example, Arvinen-Barrow, Hemmings, Weigand, Becker and Booth, 2007; Heaney, 2006). It has been documented that both athletes and sport medicine professionals use psychological interventions, including relaxation techniques, as part of rehabilitation programmes as well as during the process of returning to training and sporting competition following an injury. This chapter (a) introduces the purpose of relaxation techniques in sport injury rehabilitation; (b) outlines the types of relaxation techniques used in sport injury rehabilitation; (c) summarises the literature related to the use of relaxation techniques in sport injury rehabilitation; (d) discusses the ways in which relaxation techniques can be combined with other psychological interventions; and (e) provides practical advice to those working with injured athletes on how to maximise the use of relaxation techniques.

Appendix 2a: Heaney, Green, Rostron and Walker (2012)

Heaney, C.A., Green, A.J.K., Rostron, C.L. & Walker, N.C. (2012). A qualitative and quantitative investigation of the psychology content of UK physical therapy education programs. *Journal of Physical Therapy Education*, 26(3), 48-56.

RESEARCH REPORT

A Qualitative and Quantitative Investigation of the Psychology Content of UK Physiotherapy Education Programs

Caroline A. Heaney, MSc, Alison J.K. Green, PhD, Claire L. Rostron, PhD, and Natalie C. Walker, PhD

Background and Purpose. A knowledge and understanding of psychology is recognized as being important to physiotherapy practice since psychological factors can impact upon physical recovery. However, little is known about the nature of psychology education within UK physiotherapy training programs. The purpose of the study was, therefore, to examine current psychology provision within physiotherapy programs in UK universities, using both qualitative and quantitative methods.

Subjects. The participants were self-selected representatives from 17 UK universities. These representatives were program directors, program leaders, or lecturers teaching on the physiotherapy program.

Methods. The participants were questioned regarding the nature and extent of psychology covered in their program, the delivery and assessment of any psychology content, the perceived importance of psychology in physiotherapy training, and factors influencing psychology provision in their physiotherapy programs.

Results. All of the universities claimed to include some degree of psychology content within their physiotherapy programs.

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Natalie Walker is a senior lecturer in the School of Health at the University of Northampton, UK. Ethical approval for this study was provided by The Open University Human Participants and Materials Research Ethics Committee.

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and largely agreed that psychology is an important component in the education and training of physiotherapists. However, there appears to be great diversity both within and between universities in the provision of psychology education, and an underlying inconsistency between the reported importance of psychology and the demonstrated importance of psychology through its visibility within physiotherapy programs.

Discussion and Conclusion. More needs to be done to standardize the psychology content of physiotherapy programs in order to ensure that students at all institutions receive a similar level of training in psychology, which can have a positive impact on their professional practice.

Key Words: Psychology education, Biopsychosocial, Physical therapy curriculum.

BACKGROUND AND PURPOSE

An understanding of psychology is essential to the physical therapist since psychological factors can greatly impact physical therapy outcomes. Therefore, psychology education should form a significant part of any physical therapist education program.¹ However, little is known about provision in this area. This investigation seeks to examine current psychology provision within UK physical therapist education programs (known as "physiotherapy" in the UK). Specifically, the purpose of the investigation is to explore the nature and extent of psychology covered in physiotherapy programs, the delivery and perceived importance of any psychology content, and the factors influencing psychology provision.

Review of the Literature

Physiotherapists are health care professionals involved in the treatment and rehabilitation of a broad range of patients in a variety

of settings. This means that physiotherapy training and practice needs to cover a diverse spectrum of topic areas. Physiotherapy, as suggested by its name, is primarily concerned with the physical condition and has traditionally focused on just the physical aspects of injury and impairment.

However, more recently, consideration of the psychological condition during treatment has grown in importance in physiotherapy as demonstrated by the following Chartered Society of Physiotherapy's (CSP)²—the professional body for physiotherapists in the UK—definition of physiotherapy: "Physiotherapy is a healthcare profession concerned with human function and movement and maximizing potential. It uses physical approaches to promote, maintain and restore physical, psychological and social well-being, taking account of variations in health status."^{2(p19)}

An understanding of psychology is essential for the physiotherapist as reflected by physiotherapy research increasingly recognizing the importance of psychological factors in patient well-being, with areas such as the psychology of pain,³⁻⁵ patient motivation,^{6,7} and cognitive behavioral therapies⁸⁻¹⁰ receiving attention. This has led to a shift towards the *biopsychosocial* model in physiotherapy from the more traditional biomedical model.⁸ This shift has been supported by the introduction of the World Health Organization's (WHO) International Classification of Functioning, Disability and Health (ICF), which provides a scientific framework for the application of a biopsychosocial approach.¹¹ It has been suggested that the adoption of the biopsychosocial model can have a positive impact on patient satisfaction, empowerment, and pain management.^{8,12,13}

Whilst recognition of the biopsychosocial model in physiotherapy research has grown, it has been reported that that information on the importance of psychological factors has not been accepted widely enough by physio-

Appendix 2b: Study 1 Semi-Structured Interview Script

PERSONAL DETAILS

Name of interviewee:

Institution:

Date/time of interview:

Telephone number:

VERBAL INTRODUCTION/INFORMED CONSENT:

- Thank you for agreeing to be interviewed.
- Can you confirm that you have read and completed the informed consent form (sent electronically in advance of the interview) Yes No
If no, complete verbal informed consent below.
- Can you confirm that you consent to me recording this interview? Yes No

Verbal informed consent (only use if online consent form has not been completed):

- **Purpose:** The purpose of this investigation is to complete an audit of the current psychology content of physiotherapy programmes in the UK. Such an audit has not been completed for several years and should provide some valuable information. Over the course of the next few weeks I will be interviewing representatives from several UK institutions.
- **Confidentiality:** All of the data collected from you today will remain confidential. To maintain the anonymity of you and your institution the data will be reported collectively in the research outputs. None of the participant universities or representatives will be identifiable in the research outputs. All data collected from you today will be stored in a secure location.
- **Recording:** To aid me with the transcribing process I was hoping to record this interview. Are you happy for me to make an audio recording of this interview? The audio recording will be stored electronically with password protection and will only be listened to by myself and possibly my supervisors.
Record Don't record
- **Freedom of consent:** Finally, you are free to choose whether you wish to participate in this interview or not. If at any time during the interview you wish to stop, you have the freedom to do so.
- **Verbal informed consent agreed:** Do you give your consent to participate in this interview?
Yes No

QUESTIONS:

1. What physiotherapy courses do you offer at your institution?

- Undergraduate Full-time Part-time Other (e.g. distance learning)
- Postgraduate – pre-registration Full-time Part-time Other (e.g. distance learning)
- Postgraduate – post-registration Full-time Part-time Other (e.g. dist. learning)

2. Does your physiotherapy programme(s) cover any psychology?

3. If yes, what areas of psychology are covered? (*including detail where possible*)
4. Within your programme, are there specific named modules or units in psychology or is the psychology content integrated within other modules/units?
- Named modules/units
 - Integrated
 - Both

Further detail (e.g. names of module, pros and cons of the approach used):

5. Is the psychology content underpinned by theoretical knowledge or by experiential (implicit/tacit) knowledge?
- Theoretical
 - Implicit/tacit/experiential

Details:

6. What methods of delivery are used for the psychology content of your programme?
7. Are the psychology components of your programme optional or compulsory?
- Optional
 - Compulsory

Detail (e.g. if there are core options and optional options etc):

8. Who teaches the psychology components of your programme?
- Specialist in psychology / psychology staff
 - Non-specialist in psychology / physiotherapy staff
 - Both

Any further details (e.g. pros and cons of using each):

9. Are the psychology components of your programme assessed? If so how?
- Yes
 - No

10. Does the assessment contribute to the module/award grade?
- Yes
 - No

If yes, how big a proportion?

11. Is the psychology content of your programme taught at a specific stage or is it taught at all levels of the programme?
- All levels
 - UG Level 1
 - UG Level 2
 - UG Level 3
 - Postgraduate

12. What percentage of the entire physiotherapy programme at your institution would you estimate is focussed on psychology? (If possible, support with module guides/overview)

13. Some would argue that psychology is an important part of physiotherapy training. On a scale of 1-10, where 1=not very important and 10= very important, how important do you feel psychology is to physiotherapy training?

1 2 3 4 5 6 7 8 9 10

Why/Reasons for rating given:

14. Do you feel that there is enough psychology in your physiotherapy programme?

Yes No

Comments:

15. What factors dictate the amount of psychology in your physiotherapy programme?

16. Do you think that professional bodies such as the HCPC and CSP give enough guidance on the psychology content of physiotherapy programmes?

17. *Additional questions for those with MSc (pre-registration) programmes:*

What previous degree programmes do your students tend to come from?

Do they tend to bring with them a certain amount of psychology knowledge?

18. Student destination: Where do students tend to progress onto after your course(s)? (other courses – which?, physiotherapy careers – NHS, private practice, sport, other?)

19. Do you have any further comments to make about the psychology content of your physiotherapy programme?

20. Would you like to receive a copy of the key findings from this study?

Yes No

Thank the participant for taking the time to be interviewed.

Appendix 2c: Study 1 Online Questionnaire

SCREEN 1 OF 9:

11% Complete

The Psychology Content of Physiotherapy Programmes

Thank you for taking the time to complete this questionnaire. It should take no more than 15 minutes to complete.

Please answer the questions as fully as possible and use the 'comment' boxes to provide any additional information. There may be some questions that you are unable to answer - if this is the case, please type 'unable to answer' in the box.

This research forms part of a PhD research project being undertaken by Caroline Heaney at The Open University. If you have any questions please email: c.heaney@open.ac.uk

Next >>

SCREEN 2 OF 9:

22% Complete

The Psychology Content of Physiotherapy Programmes

INFORMED CONSENT

Please read the information below and provide your consent by ticking the appropriate box at the bottom of this page.

PURPOSE OF THE STUDY
The purpose of this investigation is to complete an audit of the current psychology content of physiotherapy programmes in the UK. Information will be collated from representatives for UK HEIs regarding the range, type and amount of psychology training undertaken by UK physiotherapists.

BENEFITS OF PARTICIPATION
Such an audit has not been completed for several years and should provide some valuable information. The information will be used to inform continuing professional development needs, and would likely be a useful resource for physiotherapy training providers and organisations. You will have the opportunity to be provided with a summary of the key findings from the research on completion of the study.

CONFIDENTIALITY
All of the data collected in this questionnaire will remain strictly confidential. To maintain the anonymity of you and your institution, the data will be reported collectively in the research outputs. None of the participant universities or representatives will be identifiable in the research outputs. In accordance with the Data Protection Act all data collected from you will be stored in a secure location. Once the data has been collated the identity of you and your institution will be removed from the data.

FREEDOM OF CONSENT
You are free to choose whether you wish to complete this questionnaire or not. If at any time you wish to cease participation you have the freedom to do so. You also have the freedom to request the removal of your interview from the data set at any time.

Having read the information above regarding the purpose of the study, benefits of participation, confidentiality and freedom of consent, please indicate whether you give your consent to participate in the study by ticking the appropriate statement below.

- I consent to participating in the study
- I do not consent to participating in the study (if you select this option you will not be able to complete the rest of the questionnaire)

Please provide your name and the name of institution in the box below.

Note that this information is only being collected for administrative purposes. To ensure your confidentiality your name and the name of your institution will not be kept with your responses to the rest of this questionnaire.

Name:

Institution:

<< Back Next >>

SCREEN 3 OF 9:

33% Complete

The Psychology Content of Physiotherapy Programmes

Does your institution run an undergraduate physiotherapy programme?

- Yes
- No

Please add any additional information about this programme below (optional)

Does your institution run a postgraduate **pre**-registration physiotherapy programme?

- Yes
- No

Please add any additional information about this programme below (optional)

Does your institution run a postgraduate **post**-registration physiotherapy programme?

- Yes
- No

Please add any additional information about this programme below (optional)

<< Back Next >>

SCREEN 4 OF 9:

44% Complete

The Psychology Content of Physiotherapy Programmes

Do the physiotherapy programmes at your institution cover any psychology?

- Yes
- No

If yes, what psychology-related topics/areas are covered?

Within your programme, are there specific named modules or units in psychology or is the psychology content integrated within other modules/units?

- There are named modules/units in psychology
- The psychology content is integrated within other modules/units
- Both

What are the benefits of this approach?

If the psychology content is integrated within other modules/units, is this underpinned by theoretical knowledge or by experiential knowledge?

- Theoretical knowledge
- Experiential/implicit/tacit knowledge
- Both

Comments:

<< Back Next >>

SCREEN 5 OF 9:

46% Complete

The Psychology Content of Physiotherapy Programmes

What methods of delivery are used for the psychology content of your programme?

- Lectures
- Seminars
- Workshops
- Practicals
- E-learning
- Clinical practice
- Other (please state below)

Are the psychology components of your programme compulsory?

- Yes
- No

Please give any relevant further information below:

Who teaches the psychology components of your programme?

- Psychology specialists (e.g. psychology staff)
- Non-psychology specialists (e.g. physiotherapy staff)
- Both

Please give any further comments below:

Is the psychology content of your programme taught at a specific stage (e.g. level 1) or is it taught at all levels?

- All levels
- Undergraduate level 1
- undergraduate level 2
- Undergraduate level 3
- Postgraduate

Please give any further comments below:

<< Back Next >>

SCREEN 6 OF 9:

67% Complete

The Psychology Content of Physiotherapy Programmes

Are the psychology components of your programme assessed?

- Yes
- No

If yes, how are they assessed? i.e. what assessment methods are used (e.g. essay, practical, report, presentation etc)

Does the assessment of the psychology elements contribute to the module/award grade?

- Yes
- No

If yes, approximately what proportion of the assessment?

What proportion of the entire physiotherapy programme would you estimate is focussed on psychology?

<< Back Next >>

SCREEN 7 OF 9:

75% Complete

The Psychology Content of Physiotherapy Programmes

Some would argue that psychology is an important part of physiotherapy training. On a scale of 1-10, where 1=not very important and 10=very important, how important do you feel psychology is to physiotherapy training?

1 (not very important) 2 3 4 5 (moderately important) 6 7 8 9 10 (very important)

Please give reasons for your rating below:

Do you feel that there is enough psychology in your physiotherapy programme?

Yes
 No

Please give any further comments below:

What factors dictate the amount of psychology you include in your physiotherapy programme?

What factors dictate the amount of psychology you include in your physiotherapy programme?

Do you feel that the CSP and HPC provide enough guidance regarding the psychology content of physiotherapy programmes?

Yes
 No
 Not sure

Please give any additional comments below:

<< Back Next >>

SCREEN 8 OF 9:

89% Complete

The Psychology Content of Physiotherapy Programmes

Only answer this question if your institution runs a pre-registration masters programme.

What previous degree programmes do your students tend to come from?

Do they tend to bring with them a certain amount of psychology knowledge?

Student destination: Where do your students tend to progress onto after completing your programme? (e.g. NHS careers, private practice, sports clubs, non-physiotherapy careers, further training)

Student destination: Where do your students tend to progress onto after completing your programme? (e.g. NHS careers, private practice, sports clubs, non-physiotherapy careers, further training)

Do you have any further comments to make about the psychology content of your physiotherapy programme?

<< Back Next >>

SCREEN 9 OF 9:

100% Complete

The Psychology Content of Physiotherapy Programmes

Thank you for taking the time to complete this questionnaire.
Your participation is greatly appreciated.

If you would like to receive a copy of the key findings of this study please provide your name and contact details (email or postal address) in the box below.

<< Back < Finish Survey >

Appendix 2d: Study 1 Online Informed Consent Form (Interviews)

Informed Consent - The Psychology Content of Physiotherapy Programmes [Exit this survey](#)

1. Informed Consent

You are to be interviewed by Caroline Heaney regarding the psychology content of the physiotherapy programme at your institution. As this interview is to be conducted by telephone you are required to provide your consent to be interviewed electronically. Please read the information below and provide your consent by providing your name and initials where indicated. Caroline will confirm that you have read this information and provided your consent before commencing your interview.

PURPOSE OF THE STUDY
The purpose of this investigation is to complete an audit of the current psychology content of physiotherapy programmes in the UK. Over the course of the next few weeks representatives from several UK institutions will be interviewed and information will be collated regarding the range, type and amount of psychology training undertaken by UK physiotherapists.

BENEFITS OF PARTICIPATION
Such an audit has not been completed for several years and should provide some valuable information. The information will be used to inform continuing professional development needs, and would likely be a useful resource for physiotherapy training providers and organisations. You will be provided with a summary of the key findings from the research on completion of the study.

CONFIDENTIALITY
All of the data collected from you during the interview will remain confidential. To maintain the anonymity of you and your institution, the data will be reported collectively in the research outputs. None of the participant universities or representatives will be identifiable in the research outputs. In accordance with the Data Protection Act all data collected from you during the interview will be stored in a secure location. Once the data has been collated and transcribed by the interviewer, the identity of you and your institution will be removed from the data.

FREEDOM OF CONSENT
You are free to choose whether you wish to participate in this interview or not. If at any time during the interview you wish to cease participation you have the freedom to do so. You also have the freedom to request the removal your interview from the data set at anytime.

***1. DECLARATION OF CONSENT**
Having read the information above regarding the purpose of the study, benefits of participation, confidentiality and freedom of consent, please indicate whether you give your consent to be interviewed by ticking the appropriate statement below.

Yes I give my consent to be interviewed

No I do not give my consent to be interviewed

***2. AUDIO RECORDING**
To aid the transcribing process it is intended that your interview will be recorded. The recording will be stored electronically in a secure location and password protected. Only the interviewer will have access to this audio recording. Please indicate below whether or not you provide your consent for the interview to be recorded. If you do not provide your consent, the interview will not be recorded.

I consent to the interview being recorded.

I do not consent to the interview being recorded.

***3. YOUR DETAILS**
Please enter your name and the name of your institution in the boxes provided.

NAME:

INSTITUTION:

4. Thank you for completing this informed consent form and for agreeing to be interviewed.

If you have any questions about the interview or this informed consent form please contact me at c.heaney@open.ac.uk or use the box below.

Survey Powered by:
SurveyMonkey
"Surveys Made Simple."

Appendix 3a: Study 2 Online Questionnaire

SCREEN 1 of 6:

17%

Welcome and Eligibility Check

Thank you for volunteering to complete this questionnaire. It will take around 10-15 minutes to complete and is designed to gauge your attitudes and beliefs about the use of sport psychology strategies during sports injury rehabilitation. It is an anonymous questionnaire.

To participate in the study you are required to be either a physiotherapist or sports therapist who has been practising for at least one year. Additionally, a significant amount of your therapy practice must be in sport.

To confirm your eligibility for the study please answer the questions below.

* 1. What is your occupation? (please select one option)

- Physiotherapist
- Sports therapist (this can include similar titles such as sports rehabilitation specialist)
- Other - please state below (Note: if you tick this box you are not eligible to participate in the study and should not continue to complete the questionnaire)

* 2. What level of qualification do you hold in physiotherapy or sports therapy?

(You are allowed to tick more than one answer)

- Undergraduate degree (BSc or BA) - Please give the degree title (e.g. 'BSc Physiotherapy' or 'BSc Sports Therapy') in the box below
- Postgraduate qualification (MSc, MA, PG Certificate, PG Diploma, MPhil, PhD) - Please give the title of this qualification (e.g. 'MSc Physiotherapy' or 'MSc Sports Medicine') in the box below
- Other - please state in the box below (Note: if you do not hold a degree or postgraduate qualification in a physiotherapy or sports therapy related subject area you are not eligible to participate in the study and should not continue to complete the questionnaire)

Qualification title(s):

* 3. How much of your therapy practice is in sport (treatment, rehabilitation or 'prehabilitation' of sports people)?

Please use the comments box to record any additional information.

- 75-100%
- 50-75%
- 25-50%
- 0-25% (Note: if you select this option you are not eligible to participate in the study and should not continue to complete the questionnaire)

Comments (optional):

* 4. How long have you been practicing as a physiotherapist/sports therapist?

(Note: if your answer is less than one year you are not eligible to participate in the study and should not continue to complete the questionnaire)

Next >>

SCREEN 2 of 6:

33%

Informed Consent

Please read the information below and provide your consent by ticking the appropriate box at the bottom of this page

PURPOSE OF THE STUDY

This study is an Open University higher degree project. Its purpose is to evaluate sport injury rehabilitation professionals' attitudes towards and use of sport psychology strategies during sports injury rehabilitation. Both physiotherapists and sports therapists are being invited to complete this questionnaire and comparisons will be made between the two groups. The results will be used to evaluate the sport psychology training needs of sports injury rehabilitation professionals in the UK.

BENEFITS OF PARTICIPATION

The results of this study will be used to inform sport psychology education and training for sports injury rehabilitation professionals. Therefore your participation may help to shape future developments in this area. Completing the questionnaire may also serve to help you reflect on your attitudes towards the use of sport psychology strategies during injury rehabilitation. You will have the opportunity to request to be provided with a summary of the key findings from the research on completion of the study.

CONFIDENTIALITY

This is an anonymous questionnaire – you are not required to give your name at any point. However, if you wish to receive a summary of the key findings from the study you will need to provide an email address. If you choose to do this, in order to maintain your confidentiality, your email address will be separated from your questionnaire responses as soon as it is received. All data collected from you will be stored in a secure location.

FREEDOM OF CONSENT

You are free to choose whether you wish to complete this questionnaire or not. If at any time you wish to cease participation you have the freedom to do so. Any uncompleted questionnaires will be deleted. You also have the freedom to request the removal your responses from the data set at anytime by contacting c.heaney@open.ac.uk, stating the date and time that your questionnaire was submitted. Any request to have your responses removed from the data set should be received by 1st March 2011.

* 5. Having read the information above regarding the purpose of the study, benefits of participation, confidentiality and freedom of consent, please indicate whether you give your consent to participate in the study by ticking the appropriate statement below.

- I consent to participating in the study
- I do not consent to participating in the study (if you select this option you will not be able to complete the rest of the questionnaire)

<< Back Next >>

SCREEN 3 of 6:

50%

Sport Psychology Education, Training and Experience

* 6. Did you undertake any formal study of sport psychology as part of your undergraduate or postgraduate degree?

- Yes (if you answer yes, please move on to question 7)
- No (if you answer no, please move on to question 9)

7. If you answered yes, please give details of the amount of sport psychology you studied by ticking the option below which best applies (you may only tick one answer).

- I had one or two lectures/sessions on sport psychology (if possible please specify approximately how many hours this entailed in the additional comments box)
- I studied an entire module on sport psychology (if possible please specify how many credit points this module was worth in the additional comments box)
- I studied more than 1 module on sport psychology (if possible please specify how many credit points these modules were worth in the additional comments box)

Please use the box below to provide any additional comments:

8. Did your study of sport psychology include any specific study of the psychological aspects of sports injury? (please tick the answer which best applies)

- No
- Yes – this was covered as part of a more general module/session
- Yes – I studied an entire module on the psychological aspects of sports injury

Please use the box below to provide any additional comments:

* 9. Have you ever undertaken any of the following education activities? (Please tick those that apply – you can tick more than one answer)

- Attended a workshop or course on sport psychology (not including your degree)
- Attended a conference session on sport psychology
- Read sport psychology literature (books or journal articles)
- Spoken to a sport psychologist
- I have not undertaken any of the activities listed above

Please use the box below to provide any additional comments:

* 10. Have you ever referred an injured athlete to a sport psychologist?

- Yes
- No

If you answered yes, please use the box below to outline how frequently you have made referrals to a sport psychologist and whether you have found it beneficial:

<< Back Next >>

SCREEN 4 of 6:

67%

Assessing The Effectiveness Of Mental Skills Used As A Rehabilitation Tool (Hamson-Utley et al., 2008)

* 11. This part of the questionnaire assesses your attitudes and beliefs about the effectiveness of psychological skills for rehabilitating from sport-injury. Decide whether you disagree or agree with each the following statements using the 7 point scale ranging from strongly disagree (1) to strongly agree (7).

If you have any additional comments to make relating to these questions, please use the text box at the bottom of the page.

	1 Strongly disagree	2	3	4	5	6	7 Strongly agree
1. The use of mental imagery is an effective way to increase focus on specific rehabilitation exercises.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. The use of mental imagery is an effective way to improve focus on specific goals of rehabilitation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. The use of mental imagery is an effective way to decrease pain during rehabilitation sessions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The use of positive self-talk is an effective way to decrease pain during rehabilitation sessions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. The use of mental imagery is an effective way to maintain a positive mind-set during a long rehabilitation from sport-injury.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. The use of mental imagery during rehabilitation can aid the recovery process by visualizing healing occurring within the body.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The use of mental imagery during rehabilitation from sport-injury has the potential to return the athlete to full participation faster than without the use of mental imagery.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Keeping a positive attitude during rehabilitation will help speed up the recovery process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Controlling the level of pain associated with rehabilitation exercises will help speed up the recovery process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Setting appropriate rehab goals will help speed up the recovery process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Keeping a positive attitude during rehabilitation will increase the athlete's adherence rate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Controlling the level of pain associated with rehabilitation exercises will increase the athlete's adherence rate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Setting appropriate rehab goals will help improve the athlete's adherence rate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. The use of mental imagery during rehabilitation is an effective way to increase motivation to complete rehabilitation exercises.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. The use of mental imagery to increase relaxation is an effective way to reduce anxiety prior to and following surgery.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Additional Comments:

SCREEN 5 of 6:

82%

Use Of Communication And Sport Psychology With Injured Athletes (Stiller, 2008)

* 12. This part of the questionnaire assesses your current use of sport psychology with injured athletes. State how frequently you use each of the strategies listed below using the 9 point scale ranging from never (1) to always (9). As you are answering these questions keep in mind that the purpose of this questionnaire is to evaluate what is being done in the treatment room, not what should be done. While it may be socially desirable to answer a certain way, please answer questions based on your actual behaviours in the treatment room.

If you have any additional comments to make relating to these questions, please use the text box at the bottom of the page.

	Never	Almost never	Seldom	Occasionally	About half the time	Often	Frequently	Almost always	Always
1. I try to make my athletes feel comfortable talking to me about issues unrelated to injury or sport	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I have a positive attitude when I am in the athletic training room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(continued overleaf)

SCREEN 6 of 6:

100%

Thank You!

Thank you for taking the time to complete this questionnaire.

If you would like to receive a summary of the key findings, please provide an email address in the box below. Please note that it is not compulsory to provide this information.

If you have any questions or queries about this research, please contact c.heaney@open.ac.uk

13. Email address (optional):

<< Back < Finish Survey >

Appendix 3b: Scoring Instructions for the Attitudes About Imagery Survey (Hamson-Utley et al., 2008)

The AAIS is scored by adding together the answers to each of the individual items indicated in the table below.

Subscale	Item Numbers	Minimum score possible	Maximum score possible
Imagery	1, 2, 3, 5, 6, 7, 14, 15	8	56
Positive Self Talk	4, 8, 11	3	21
Goal Setting	10, 13	2	14
Pain Tolerance	9, 12	2	14
Total	All (1-15)	15	105

Appendix 3c: Scoring Instructions for the Psychology of Injury Usage Survey (Stiller, 2008)

The PIUS is scored by adding together the answers to each of the individual items indicated in the table below.

Subscale	Item Numbers	Minimum score possible	Maximum score possible
Communication	6, 8, 12, 17, 18, 23, 34	7	63
Social Support	1, 5, 11, 19, 24, 26	6	54
Motivation (motivation and goal setting)	7, 10, 20, 28, 31, 36	6	54
Attention (attitude and attentiveness)	2, 16, 21, 29	4	36
Relationship Development	3, 13, 22, 30, 32	5	45
Sport Psychology (imagery, relaxation, self-talk and cognitive restructuring)	4, 9, 14, 15, 25, 27, 33, 35	8	72
Total	All (1-36)	36	324

Appendix 4a: Heaney, Walker, Green, and Rostron (2014)

Heaney, C., Walker, N.C., Green, A.J.K. & Rostron, C.L. (2014, in press). Sport psychology education for sport injury rehabilitation professionals: A review. *Physical Therapy in Sport*. Proof available online from: [http://www.physicaltherapyinsport.com/article/S1466-853X\(14\)00030-3/abstract](http://www.physicaltherapyinsport.com/article/S1466-853X(14)00030-3/abstract).

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Literature review

Sport psychology education for sport injury rehabilitation professionals: A systematic review

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ABSTRACT

Sport psychology education has been shown to have a positive impact on the practice of sport injury rehabilitation professionals (SIRPs). The purpose of this paper is to review recommendations relating to such education. The paper presents a review of existing literature relating to the content and mode of delivery for a sport psychology education programme for SIRPs. The review seeks to address four questions: (1) What topic areas do researchers suggest should be integrated into the sport psychology education of SIRPs? (2) What topic areas are currently being recommended by professional bodies? (3) What are the findings of research examining the impact of sport psychology education on SIRPs? and (4) What do researchers recommend to be the most appropriate mode of delivery for sport psychology education for SIRPs? The findings of the review suggest that in order to maximise adherence amongst already qualified SIRPs sport psychology education should be delivered in a flexible short duration package. Additionally three broad areas that sport psychology education should cover emerged: (1) understanding of the psychological impact of injury, (2) interventions and psychological skills/techniques, and (3) referral and professional boundaries. This has important implications for the future training of SIRPs.

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1. Introduction

Sport psychology intervention has been shown to benefit sport injury rehabilitation (Armatas, Chondrou, Yiannakos, Galazoulas, & Velkopoulos, 2007; Levy, Polman, Clough, & McNaughton, 2006). As such previous research investigating the attitudes and behaviours of sport injury rehabilitation professionals (SIRPs) has indicated that sport psychology education is likely to have a positive impact on the sport psychology related behaviours of SIRPs (Arvinen-Barrow, Hemmings, Weigand, Becker, & Booth, 2007; Hamson-Utley, Martin, & Walters, 2008; Heaney, 2006a). However, the nature of such education is clearly important, as a poorly designed education programme with little relevance to its target audience will likely have much less impact than a well designed programme with highly relevant content. Previous researchers have discussed the appropriate content and mode of education on the psychological aspects of sport injury for SIRPs, but to date no research has reviewed the existing literature. This is necessary in order to help shape and standardise psychology education for SIRPs, which has

been found to be inconsistent (Heaney, Green, Rostron, & Walker, 2012). Therefore the purpose of this paper is to present a review of this work with the aim of identifying the most appropriate content and mode of delivery for a sport psychology education programme. The review will specifically seek to address the following research questions:

1. What topic areas do researchers suggest should be integrated into the sport psychology education of SIRPs?
2. What topic areas are currently being recommended by professional bodies?
3. What are the findings of research examining the impact of sport psychology education on SIRPs?
4. What do researchers recommend to be the most appropriate mode of delivery for sport psychology education for SIRPs?

2. Method

2.1. Sources

The strategy used to identify published materials relating to the education and training of SIRPs involved: (1) electronic searches of online databases including SPORTDiscus, PubMed, Academic

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E-mail address: caroline.heaney@open.ac.uk (C.A. Heaney).

Appendix 4b: Quality Assessment Checklist

Title:

Author(s):

Journal:

1. Is the field of study relevant to the research topic? YES/NO
2. Are the aims of the study relevant to one of the questions within the research topic?
YES/NO
If yes, which question: Question 1 / (Question 2) / Question 3 / Question 4
3. Does the paper have a clearly stated and focused question or aim? YES/NO
4. Is the paper peer reviewed? YES/NO
5. Is the study reporting a process of structured enquiry? YES/NO/UNCLEAR
6. If yes, is it transparent and replicable? YES/NO/UNCLEAR
7. Validity: Does the study measure what it is supposed to measure? YES/NO
8. Is the study design appropriate to answering the question? YES/NO/UNCLEAR
9. Do the data collection methods appear unbiased? YES/NO/UNCLEAR
10. Do the statistical analyses appear appropriate? YES/NO/UNCLEAR
11. If not a structured enquiry is it: discussion or opinion piece / non-systematic review /
other
12. Does the study report whether informed consent to participate was obtained from
participants? YES/NO/UNCLEAR
13. Does the paper state that ethical approval was obtained? YES/NO/UNCLEAR
14. Are there any ethical problems with the design or conduct of the study? YES/NO
15. Any comments/observations:

DECISION: YES / NO

(Adapted from Smith, 2010)

Appendix 4c: Data Extraction Form

Title:

Author(s):

Journal/Source:

1. Which question(s) does this paper relate to?

Question 1 / Question 2 / Question 3 / Question 4

2. What is the study aim / research question(s)?

3. How many participants were used in the study?

4. What are the characteristics of the participants (*e.g. age, profession, gender*)

5. What intervention is being studied? (*e.g. question 3 – length and details of education intervention*)

6. What methods are used?

(Continued overleaf)

Appendix 4d: National Athletic Trainers' Association - Psychology Related Competencies

(adapted from National Athletic Trainers' Association, 2011)

	Competencies
	Theoretical Background:
PS-1	Describe the basic principles of personality traits, trait anxiety, locus of control, intrinsic and extrinsic motivation, and patient and social environment interactions as they affect patient interactions.
PS-2	Explain the theoretical background of psychological and emotional responses to injury and forced inactivity (e.g., cognitive appraisal model, stress response model).
PS-3	Describe how psychosocial considerations affect clinical decision-making related to return to activity or participation (e.g., motivation, confidence).
PS-4	Summarise and demonstrate the basic processes of effective interpersonal and cross-cultural communication as it relates to interactions with patients and others involved in the healthcare of the patient.
PS-5	Summarise contemporary theory regarding educating patients of all ages and cultural backgrounds to effect behavioural change.
	Psychosocial Strategies:
PS-6	Explain the importance of educating patients, parents/guardians, and others regarding the condition in order to enhance the psychological and emotional well-being of the patient.
PS-7	Describe the psychological techniques (e.g., goal setting, imagery, positive self-talk, and relaxation/anxiety reduction) that the athletic trainer can use to motivate the patient during injury rehabilitation and return to activity processes.
PS-8	Describe psychological interventions (e.g., goal setting, motivational techniques) that are used to facilitate a patient's physical, psychological, and return to activity needs.
PS-9	Describe the psychosocial factors that affect persistent pain sensation and perception (e.g., emotional state, locus of control, psychodynamic issues, sociocultural factors, personal values and beliefs) and identify multidisciplinary approaches for assisting patients with persistent pain.
PS-10	Explain the impact of sociocultural issues that influence the nature and quality of healthcare received (e.g., cultural competence, access to appropriate healthcare providers, uninsured/underinsured patients, insurance) and formulate and implement strategies to maximize client/patient outcomes.
	Mental Health and Referral:
PS-11	Describe the role of various mental healthcare providers (e.g., psychiatrists, psychologists, counsellors, social workers) that may comprise a mental health referral network.
PS-12	Identify and refer clients/patients in need of mental healthcare.
PS-13	Identify and describe the basic signs and symptoms of mental health disorders (eg, psychosis, neurosis; sub-clinical mood disturbances (e.g., depression, anxiety); and personal/social conflict (eg, adjustment to injury, family problems, academic or emotional stress, personal assault or abuse, sexual assault or harassment) that may indicate the need for referral to a mental healthcare professional.
PS-14	Describe the psychological and sociocultural factors associated with common eating disorders.
PS-15	Identify the symptoms and clinical signs of substance misuse/abuse, the psychological and sociocultural factors associated with such misuse/abuse, its impact on an individual's health and physical performance, and the need for proper referral to a healthcare professional.
PS-16	Formulate a referral for an individual with a suspected mental health or substance abuse problem.
PS-17	Describe the psychological and emotional responses to a catastrophic event, the potential need for a psychological intervention and a referral plan for all parties affected by the event.

(Continued overleaf)

PS-18	Provide appropriate education regarding the condition and plan of care to the patient and appropriately discuss with others as needed and as appropriate to protect patient privacy.
Competencies outside of the psychosocial strategies and referral section:	
CIP-7	Select and integrate appropriate psychosocial techniques into a patient's treatment or rehabilitation program to enhance rehabilitation adherence, return to play, and overall outcomes. This includes, but is not limited to, verbal motivation, goal setting, imagery, pain management, self-talk, and/or relaxation.
CIP-8	Demonstrate the ability to recognize and refer at-risk individuals and individuals with psychosocial disorders and/or mental health emergencies. As a member of the management team, develop an appropriate management plan (including recommendations for patient safety and activity status) that establishes a professional helping relationship with the patient, ensures interactive support and education, and encourages the athletic trainer's role of informed patient advocate in a manner consistent with current practice guidelines.
PHP-46	Identify and describe the signs, symptoms, physiological, and psychological responses of clients/patients with disordered eating or eating disorders.
PHP-47	Describe the method of appropriate management and referral for clients/patients with disordered eating or eating disorders in a manner consistent with current practice guidelines.
EBP-14	Apply and interpret clinical outcomes to assess patient status, progress, and change using psychometrically sound outcome instruments.

Appendix 4e: Society of Sports Therapists - Psychology Related Learning Objectives (adapted from Society of Sports Therapists, 2005)

The Society of Sports Therapists' (2005) competencies and scope of practice document states that sports therapists must achieve the following sport psychology related learning objectives:

Sport Psychology Related Learning Objectives
• the understanding of any pathological, physiological and psychological signs and symptoms that may influence the rehabilitation process
• the basic components of a comprehensive fitness regime and injury and illness prevention programme including psychological factors in prevention of injury/illness
• the use of massage and its physiological and psychological effects on exercise and performance
• the typical psychological and emotional responses to trauma and imposed physical inactivity as factors affecting the rehabilitation process
• the psychological parameters associated with rehabilitation,
• the application of occupational and sports specific rehabilitation programmes to address psychological problems and deficiencies related to the patients injury/trauma

Note that this document has now been superseded by the 'Standards of Education and Training: Competencies of a Graduate Sports Therapist' document (Society of Sports Therapists, 2012), which was not available at the time of data collection.

Appendix 4f: International Federation of Sports Physiotherapists - Psychology Related Standards and Competencies
(adapted from Bulley et al., 2005)

Section	The sports physiotherapist demonstrates:
1,2,3,4	knowledge and understanding of psychological theories, awareness of sports psychology and psychological approaches, indications and possibilities for referral and ability to advise the athlete and other professionals accordingly
1	assessment of injury risk - integrating evaluations of: <ul style="list-style-type: none"> the athlete's physical and psychological performance capacity
1C: 1	the ability to elicit a subjective client history to identify any physical and psychological factors that suggest increased risk of injury
1D: 2	the ability to make individual and sport-specific professional judgments regarding injury risks in different sporting contexts – integrating the following information: <ul style="list-style-type: none"> physical and psychological performance capacity
3	analysis of the injury and underlying processes, requiring specific knowledge of: <ul style="list-style-type: none"> specific sports: frequently associated injuries, specific physical and psychological demands, physical and psychological processes that occur during healing, psychosocial influences in different athletic contexts,
3	communication with the athlete that reflects understanding of psychosocial influences on the rehabilitation process
3A: 3	the ability to identify the potential impacts of various factors on recovery, including: <ul style="list-style-type: none"> psychological, social and cultural influences
3A: 4	the ability to show insight into the biopsychosocial impact of injury on athletes and other professionals in different sporting contexts
3C: 2	the ability to obtain a client history using reasoned selection of questions and sensitive communication <i>in different sporting contexts</i> ; the history should incorporate information relating to: <ul style="list-style-type: none"> the client's priorities and goals psychosocial influences
3D: 3	the ability to reach a clinical diagnosis and devise a problem list that integrates information from a variety of sources, including: <ul style="list-style-type: none"> awareness of the psychosocial influences on the athlete sport-, athlete-, and team-specific rehabilitation goals
3E: 7	the ability to sensitively communicate with the athlete to promote compliance with advice and rehabilitation, incorporating exercise psychology principles such as goal-setting, pacing and feedback
4A: 3	the ability to show insight into psychosocial factors that might affect optimal performance
5	Integration of knowledge from several fields into advice given and communications strategies used, including: <ul style="list-style-type: none"> understanding of behaviour change physical, psychological and social influences on activity participation.
5A: 2	the ability to analyse the physical and psychological benefits of different types of physical activity and exercise in specific individuals with varying needs, for example, of different genders, ages, and abilities
5B: 3	the ability to continually critique and synthesise research into the effects of movement and exercise on the physical and psychological health of specific population groups
11	knowledge and understanding of the psychosocial issues relating to sports participation, including the tensions between sporting interests and the duty of care of the health professional
11C: 3	the ability to regularly observe for physical and psychological changes in an athlete that might indicate use of banned substances

Appendix 4g: Recommended Core Curriculum for Psychology Medical Education (adapted from Bundy et al., 2010)

Core Curriculum Areas	
Psychology – core knowledge:	
(1)	<p>Psychological factors in health and illness</p> <ul style="list-style-type: none"> • Psychological factors in health promotion and illness prevention (health protective behaviour, health belief model, motivation) • Psychological interventions to change behaviour, modify risk and improve outcomes (interventions to improve health outcomes, intervention to improve adaption to illness, interventions to improve coping and illness behaviours) • Psychological processes in disease (behavioural contributions to disease, social factors, biopsychosocial interactions, contribution of psychology to specific disease groups/states, psychoneuro-immunology, personality types) • Pain (gate control theory, psychological management of pain, pain assessment) • Genes and behaviour (interaction between genes and environment, genetic contribution to mental illness, genetic counselling) • Mental health and mental illness (models of abnormal behaviour, co-morbidity, addiction)
(2)	<p>Psychological responses to illness</p> <ul style="list-style-type: none"> • Emotional, cognitive and behavioural responses to illness (adherence behaviours, mood changes in chronic illness, illness cognitions, hyper-vigilance, attribution theories, self-concept and self-esteem, co-morbidity, cognitive dissonance, aggression) • Coping with illness – adjusting behaviour or thoughts to reduce effects of an acute or chronic illness (effectiveness of coping responses, types of coping)
(3)	<p>Psychology across the lifespan</p> <ul style="list-style-type: none"> • Cognitive development (stage theories of development, development of thinking) • Cognitive aspects of ageing (normal function) • Social relationships across the lifespan (development of attachments, deprivation and privation, close relationships, relationships over the lifespan) • Death, dying and bereavement • Assessment of cognitive functioning over the lifespan (assessment scales, developmental delay) • Attachment (quality of attachments)
(4)	<p>Cognitive functioning in health and illness</p> <ul style="list-style-type: none"> • Memory (models of memory and forgetting) • Learning (classical and operant conditioning, social learning, skill acquisition) • Sleep and consciousness (level of awareness and impact of sleep deprivation) • Attention (selective attention, divided attention) • Perception (visual information, auditory information) • Language (localisation of language centres of the brain)
Psychology for professional practice:	
(5)	Clinical reasoning and decision making – information processing (sources of biases in information processing, decision making and problem solving, errors, heuristics, reflective practice)
(6)	Human communication and communication skills training (communication appropriate attitudes, managing personal emotional in difficult situations, information processing, persuasive communication, attitudes, prejudice)
(7)	Research methods and evidence-based medicine (qualitative and quantitative design and analysis, measurement of psychological constructs)
(8)	Social processes shaping professional behaviour (altruism, ethical behaviour, conformity and obedience, non-technical factors in patient safety, decision making in group setting, clinical governance)
(9)	Stress, wellbeing and burnout (stress and coping response, stress management)
(10)	Leadership and team working (characteristics of groups, group processes, team building and development)

(Continued overleaf)

(11) Teaching the next generation of doctors (basic learning theories, feedback - knowledge of results, memory processes)

Psychology – contribution to the educational process:

(12) Learning and skills development

- Learning to learn (memory, information processing, motivation, learning theories)
- Skills training (procedural memory, visualisation techniques, knowledge of results)
- Reflective practice (development of metacognitive skills, patient safety)

(13) Situated learning

- Learning content (environmental factors that affect learning, the importance of context, knowledge and skill transfer)
- Feedback and appraisal (behaviour shaping, information processing, using principles of behaviour change)
- Assessment design and quality assurance (basic psychometrics methods, criteria for scale design, evaluation methodologies)

Psychology topics – postgraduate level only:

(14) Leadership (models of leadership and management, traits versus skills)

(15) Selection and appraisal (job analysis, performance appraisal)

(16) Organisational change (psychological responses to change, perception of threat)

**Appendix 4h: Areas of required and desirable knowledge for the sports team physician
(adapted from Herring et al., 2006)**

Area	Essential and Desirable Knowledge and Skills
(1) Psychological antecedents of athletic injuries	<p>It is essential the team physician:</p> <ul style="list-style-type: none"> • Recognise that psychological factors may play a role as antecedents to sports injuries. <p>It is desirable the team physician:</p> <ul style="list-style-type: none"> • Promote monitoring by the athletic care network of major life events and stressors (e.g., death in family, divorce, change in peer relationships, life transitions) that may place athletes at greater risk for injury • Develop strategies to address psychological factors that may contribute to the risk of athletic injuries including: <ul style="list-style-type: none"> ○ Educating coaches and parents regarding the effects of attitudes and behaviours that equate injury with worthlessness (e.g., “go hard or go home,” “no pain, no gain”) that may increase stress and consequently increase injury risk ○ Educating coaches and parents regarding excessive training and competition regimens in athletes ○ Addressing life stressors during preseason evaluations ○ Provision of psychological support services (e.g., stress management, counselling) as needed
(2) Psychological issues accompanying athletic injury	<p>It is essential the team physician understand:</p> <ul style="list-style-type: none"> • Emotional reactions accompany athletic injuries • These reactions may resolve or become problematic, thus impacting recovery from injury <p>It is desirable the team physician:</p> <ul style="list-style-type: none"> • Promote monitoring of emotional reactions by the athletic care network • Facilitate provision of psychological support services as needed • Educate athletes, coaches and parents regarding emotional reactions to injury and recovery • Promote utilisation of a supportive social network in injury recovery
(3) Psychological issues of athletic injury rehabilitation	<p>It is essential the team physician:</p> <ul style="list-style-type: none"> • Recognize psychological factors play a role in injury rehabilitation <p>It is desirable the team physician:</p> <ul style="list-style-type: none"> • Understand athletic injury rehabilitation programs should incorporate psychological as well as physical strategies • Coordinate a comprehensive rehabilitation program that addresses physical and psychological issues, including provision of psychological support services as needed • Coordinate graduated return to practice and play to promote psychological readiness • Assess an athlete’s social network • Educate athletes, parents, families, friends, and others about the importance of a supportive social network

<p>(4) Psychological issues and return-to-play</p>	<p>It is essential the team physician understand:</p> <ul style="list-style-type: none"> • Physical clearance to return-to-play may not correlate to psychological readiness <p>It is desirable the team physician:</p> <ul style="list-style-type: none"> • Coordinate the athletic care network to monitor the psychological readiness of athletes who are preparing to return-to-play or have returned-to-play • Coordinate efforts to maintain the athlete's contact with the team to enhance psychological readiness • Coordinate psychological support services as needed
<p>(5) Referring athletes to mental health providers</p>	<p>It is essential the team physician:</p> <ul style="list-style-type: none"> • Identify licensed mental health providers for athlete referrals • Maintain confidentiality, recognising psychological issues are particularly sensitive <p>It is desirable the team physician:</p> <ul style="list-style-type: none"> • Integrate licensed mental health providers into the athletic care network • Educate coaches, parents and athletes about the importance of psychological treatment • Dispel the perception that "counselling equals weakness" • Coordinate referrals for mental health treatment • Involve mental health providers in educational programs for coaches, athletes and parents about psychological issues

Appendix 4i: Outline of the Sport Psychology Workshop used by Clement (2008)/Clement and Shannon (2009)

Brief Education intervention
<p>I. Introduction</p> <ul style="list-style-type: none"> • Overview of the study • Ask: What is sport and exercise psychology? Can sport and exercise psychology be used in Athletic Training? If so how?
<p>II. Sport and Exercise and Athletic Training: They can function collaboratively</p> <ul style="list-style-type: none"> • Highlight research studies which demonstrate the efficacy of psychological interventions in the rehabilitation context. • Ask: Do you know of any athletic training/sports medicine facility which incorporates sport psychology into their services?
<p>III. Sport and Exercise Psychology and Sport Injury: The Real World</p> <ul style="list-style-type: none"> • Introduce United States Olympic Committee, Universities, Mayo Clinic and University of Pittsburgh Medical Centre as examples where sport psychologists and athletic trainers work collaboratively. • Ask: What issues within rehabilitation do you think sport and exercise psychology can be helpful?
<p>IV. Areas in Rehabilitation sport and exercise psychology that can be helpful</p> <ul style="list-style-type: none"> • Introduce case study pertaining to confidence • Ask: How can you help individual in the case study believe he can adhere to his rehabilitation program? • Introduce how sport and exercise psychology can be used to maintain confidence during rehabilitation. • Introduce case study pertaining to motivation • Ask: What strategies can you build into the individual's rehabilitation program to help his motivation? • Introduce how sport and exercise psychology can be used to maintain motivation during rehabilitation. • Introduce case study pertaining to anxiety • Ask: What can you do to help reduce anxiety in the case study presented? • Introduce how sport and exercise psychology can be used to reduce anxiety during rehabilitation
<p>V. Introduce basic principles of relaxation</p> <ul style="list-style-type: none"> • What is relaxation? • How can it be beneficial? • Different methods of relaxation: breathing, passive/progressive relaxation
<p>VI. Introduce basic principles of imagery</p> <ul style="list-style-type: none"> • What is imagery? • Introduce the different types of imagery that can be helpful during rehabilitation
<p>VII. Introduce the principle of goal setting</p> <ul style="list-style-type: none"> • What is goal setting? • Introduce how goal setting can be beneficial during rehabilitation
<p>VIII. Short discussion about stereotypes and sport psychology</p> <ul style="list-style-type: none"> • Ask: what is a stereotype? • Ask: what are stereotypes about athletic training students? • Ask: what are stereotypes about sport psychologists? • Ask: what are the stereotypes of working with someone of a different race? • Ask: how are stereotypes hurtful? • Ask: what can you do about it (stereotypes)?

Appendix 4j: Content of the Education Programme Used By Stiller-Ostrowski et al. (2009) / Stiller (2008)

Session	Session/Content
Classroom session 1	<p>(1) 3 key areas of psychology of injury research</p> <ul style="list-style-type: none"> • Antecedents (stress) <ul style="list-style-type: none"> ○ Overview of research on antecedents ○ Role of the athletic trainer pre-injury • Emotional reactions <ul style="list-style-type: none"> ○ 'Normal' and 'abnormal' emotional reactions ○ The athletic trainer's role as an informal counsellor • Psychology of athletic injury rehabilitation <p>(2) Communication in the athletic training room</p> <ul style="list-style-type: none"> • Building rapport • 4 fundamentals of effective communication • Key elements of communication skills within health care curriculum • Practical communication skills • Role play activity: injury scenario • Communication "homework" assignment <p>(3) Clarifying expectations during injury and rehabilitation</p> <ul style="list-style-type: none"> • Introduction to pain (as both a physical and emotional experience) • Rehabilitation progression, demands of rehabilitation • Expectations athletic trainers have of athletes <p>(4) Facilitating rehabilitation adherence</p> <ul style="list-style-type: none"> • Gaining athletes' cooperation • Factors that influence athlete adherence • Strategies for improving athlete adherence • Importance of understanding the athlete's sport • Strategies for dealing with difficult or non-compliant athletes • Role play activity: handling a difficult athlete
Classroom session 2	<p>(1) Social support in the athletic training room</p> <ul style="list-style-type: none"> • Definition and types of social support • Injured athletes' 4 main sources of social support <ul style="list-style-type: none"> ○ Family, friends, significant others ○ Support from coaches and teammates ○ Athletic trainer-provided social support (Practical social support provision strategies, Social support "homework" assignment) ○ Social support from similar others (Peer modelling interventions) <p>(2) Motivational strategies</p> <ul style="list-style-type: none"> • Intrinsic versus extrinsic motivation related to rehabilitation • Simple, practical motivation strategies • Goal setting <ul style="list-style-type: none"> ○ Types of goals (process, performance, outcome) ○ Common mistakes in short-term goal setting ○ 'EZ' Goal Form ○ Dealing with failure to reach goals ○ The research on goal setting ○ Goal setting "homework" assignment

(Continued overleaf)

Classroom session 3	<p>(1) Introduction to psychological skills training (PST) used in injury rehabilitation</p> <ul style="list-style-type: none"> • Physiological techniques <ul style="list-style-type: none"> ○ Relaxation (and techniques) ○ Physiological effects of relaxation techniques ○ Stress management (and techniques) ○ Environmental engineering techniques ○ Athlete stress management techniques ○ Centering ○ Relaxation/centering "homework" assignment • Cognitive techniques <ul style="list-style-type: none"> ○ Typical post-injury thought process ○ Introduction to self-talk (positive versus negative) • The use of self-talk during injury rehabilitation <ul style="list-style-type: none"> ○ Positive versus negative self-talk • Techniques for controlling self-talk (thought stopping, cognitive restructuring, countering, reframing, affirmation statements, "rubber-band" techniques) • Imagery and athletic injury rehabilitation <ul style="list-style-type: none"> ○ Research on imagery ○ Characteristics of effective imagery ○ Motivational, cognitive, healing imagery ○ Combination of relaxation and guided imagery ○ Healing Imagery Scripts ○ Use of imagery in injury rehabilitation ○ Combining imagery and relaxation • Cognitive techniques "homework" <p>(2) The athletic trainer as a counsellor</p> <ul style="list-style-type: none"> • Is counselling really our job? • Effective injury counselling (the do's and don'ts) • Practical counselling "flow chart" • Characteristics of the effective ATC-counsellor • Potential dual-role conflicts • When and how to refer
Seminar session 1	<ul style="list-style-type: none"> • Open-floor discussion of successes/challenges related to communication, education, clarifying expectations, facilitating adherence, handling difficulties/non-compliance • Open-floor discussion of other participant-identified issues • Journaling activity (due at Seminar Session 2) <ul style="list-style-type: none"> ○ Self-check: interpersonal skills ○ Do your athletes seem more comfortable with you now (versus beginning of semester)? How comfortable are you talking to them about (appropriate) non-sport related topics? Do athletes with new injuries seem to come to you sooner? • Assign follow-up assignment 1: goal setting follow-up (due at Seminar Session 2) <ul style="list-style-type: none"> ○ Did your athletes achieve their goals? If yes, how did you reward them? If no, how did you reframe/revise goals?

(Continued overleaf)

Seminar session 2	<ul style="list-style-type: none"> • Open-floor discussion of successes/challenges related to social support provision, motivational strategies, use of goal setting • Open-floor discussion of other participant-identified issues • Follow-up assignment 1 and Journaling due today: goal setting follow-up • Journaling activity (due at Seminar Session 2) • Self-check: what did you learn <ul style="list-style-type: none"> ○ Think critically about what you learned during this course. What are some of the most valuable lessons that you have taken away? ○ What were some of the most effective/successful strategies that you have been able to implement with your athletes? ○ What did you think of the in-class activities ○ Emotional Response to Injury, Handling Difficult Athletes, Goal Setting, Progressive Relaxation, Centering, Thought-Stopping, Healing Imagery (comment on each individually) ○ What did you think of the "homework" assignments? ○ Initiating Conversations, Providing Social Support, Goal Setting, Progressive Relaxation, Cognitive Techniques (Imagery), MSU's Referral Network ○ What did you like about the class (please be as specific as possible)? ○ What did you dislike about the class (please be as specific as possible), including any suggestions for improvement. • Assign follow-up assignment 2: PST follow-up (due at Seminar Session 3) <ul style="list-style-type: none"> ○ Are they still using the PST techniques? Do they like them? ○ If they are not using them, why not (didn't buy in? Didn't think it worked? Didn't want to put forth the effort? Lack of athletic trainer follow-up on technique?)
Seminar session 3	<ul style="list-style-type: none"> • Open-floor discussion of successes/challenges related to PST, informal counselling interactions with athletes • Open-floor discussion of other participant-identified issues • Journaling activity due today (participants turn in journals) • Follow-up assignment 2 due TODAY: PST follow-up

Appendix 5a: Heaney (2013)

Heaney, C. (2013). The impact of sport psychology education on the practice of physiotherapists. *British Journal of Sports Medicine*, 47(17), e4. Available from: <http://bism.bmj.com/content/47/17/e4.14?etoc>


021 THE IMPACT OF SPORT PSYCHOLOGY EDUCATION ON THE PRACTICE OF PHYSIOTHERAPISTS

C Heaney. *The Open University, Faculty of Education & Language Studies, Stuart Hall Building-Level 3, Walton Hall, Milton Keynes, MK7 6AA, UK*

10.1136/bjsports-2013-093073.21

Sports injury can lead to negative psychological reactions such as frustration or depression and there is now a body of evidence which indicates that sport psychology intervention can benefit sports injury rehabilitation (Heaney, *IJSEP* 2006;4:67–80). It would, however, appear that physiotherapists are often not equipped to integrate sport psychology into rehabilitation. Generally research has shown that physiotherapists recognise the importance of psychological factors but lack the training to utilise sport psychology (Arvinen-Barrow *et al.* *JSR* 2007;16: 111–121). This suggests a need for further training; yet limited research exists examining such training. Therefore the purpose of this investigation was to examine the impact of sport psychology education on physiotherapists. 67 physiotherapists were assigned to the intervention group who studied an online sport psychology module and 68 were assigned to the control group, who studied an equivalent module with no psychology content. A questionnaire package which included the Psychology of Injury Usage Survey (Stiller-Ostrowski *et al.* *JAT* 2009;44:482–9) and the Attitudes About Imagery Survey (Hamson-Utley *et al.* *JAT* 2008;43:258–264) was completed by the participants at four points: immediately before, immediately after, 3 months and 6 months after completing the module. Data were collected on areas such as attitudes towards sport psychology, use of sport psychology and referral. Studying the module appeared to have a positive impact on the physiotherapists. Both attitudes towards and use of sport psychology improved following completion of the module. Importantly, use of sport psychology strategies was maintained during the 6 months following the completion of the module indicating a positive longitudinal effect. The findings of this study would suggest that sport psychology CPD courses should be more widely available to practicing physiotherapists.

Appendix 5b: Study 4 Online Informed Consent Form



Informed Consent Form

Please read the information below and provide your consent by ticking the appropriate box at the bottom of this page.

PURPOSE OF THE STUDY
This study is an Open University higher degree project. Its purpose is to evaluate the impact of sports science education packages on physiotherapists working in sport. The results will be used to inform the future training of UK physiotherapists in this area.

REQUIREMENTS OF PARTICIPATION
To participate in this study you are required to study an online education module on a sports science topic, complete 3 short assessment activities to assess what you have learnt in the module (5 multiple choice/short answer questions each), and complete an online questionnaire 4 times over a 6 month period. The module will take approximately 12 hours to complete and is divided into 3 study units. You will have 4 weeks to complete the module (deadline for completion = 13th August 2012). You will be required to complete a questionnaire immediately before and after you complete the module, and again 3 months and 6 months after you have completed the module. The questionnaire should only take around 5-10 minutes to complete. You will either study a module titled 'Sport Psychology for Physiotherapists' or a module titled 'Strength and Conditioning for Physiotherapists'. In order to access the module website you will need a Google account. If you do not already have one, you can set one up free of charge by visiting <http://goo.gl/TUHI5>.

BENEFITS OF PARTICIPATION
Participating in the study will give you the opportunity to study high quality educational materials free of charge and develop your knowledge and skills in a field of sport and exercise science relevant to your professional practice. Providing you complete all aspects of the module, you will be provided with a 'certificate of completion' for studying the module. Additionally, the results of this study will be used to inform sport psychology education and training for physiotherapists and therefore your participation may help to shape future developments in this area. You will have the opportunity to request to be provided with a summary of the key findings from the research on completion of the study. For the purposes of this research you will be randomly assigned to study either the module 'Sport Psychology for Physiotherapists' or the module 'Strength and Conditioning for Physiotherapists'. However, you will have the opportunity to study the other module at the end of the study if you so wish.

CONFIDENTIALITY
All information you provide will be kept strictly confidential and will only viewed by the research team. Any personal data (e.g. name, contact details) will be separated from your questionnaire responses as soon as it is received. All data collected from you will be stored in a secure location. Any publications resulting from the study will not identify you in anyway.

(Continued overleaf)

FREEDOM OF CONSENT

You are free to choose whether you wish to participate in the study or not. If at any time you wish to cease participation you have the freedom to do so. Any uncompleted questionnaires will be deleted. You also have the freedom to request the removal of your responses from the data set at anytime by contacting c.heaney@open.ac.uk. Any request to have your responses removed from the data set should be received by 1st February 2013. The data will be fully anonymized after this date and therefore any requests received after this will be impossible to fulfil. If you choose to withdraw from the study, you will still have access to the module materials.

* Required

Having read the information above regarding the purpose of the study, benefits of participation, confidentiality and freedom of consent, please indicate whether you give your consent to participate in the study by ticking and adding your initials the appropriate statement below. *

- I consent to participating in the study
 I do not consent to participating in the study

Name: *

Contact email: *

Google email address (automatically created when you set up a Google account): *

Lead researcher:

Caroline Heaney, The Open University, Walton Hall, Milton Keynes, MK7 6AA

Contact Details – c.heaney@open.ac.uk / 01908-653703

Please contact Caroline if you have any queries about this research project or require any further information.

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Appendix 5c: Study 4 Pre-Module Questionnaire Package

NOTE: The pre-module questionnaire shown below was that used for participants in the intervention (sport psychology) group. However, the exact questionnaire was used for the control (strength and conditioning) group, except that it had the title 'Pre-Module Questionnaire (Strength and Conditioning for Physiotherapists)' instead of 'Pre-Module Questionnaire (Psychology for Physiotherapists)'

SCREEN 1 of 4:



Pre-Module Questionnaire (Psychology for Physiotherapists)

This questionnaire will take around 10-15 minutes to complete and should be completed before you begin studying the module. On completion of the questionnaire you will be given a link to the module website, which contains all of the module materials including an introduction to the module. Please answer all questions accurately and honestly.

* Required

Name: *

Contact email address (in case clarification is needed on any of your answers): *

(1) What physiotherapy-related qualifications do you hold? (you may select more than one answer) *

BSc Physiotherapy

MSc Physiotherapy

MSc Sports Medicine

Other:

(2) How long have you been a physiotherapist? *

0-5 years

6-10 years

11-15 years

16-20 years

More than 20 years

(Continued overleaf)

(3) Have you previously undertaken any formal study of sport psychology or strength and conditioning? If yes, please give further details below (e.g. level and duration of study) *

(4) Have you ever referred an injured athlete to a sport psychologist? *

- Yes
 No

(5) Do you work with a strength and conditioning coach? *

- Yes
 No


If you have any additional comments to add to questions 1-5, please insert them below:

Note: This is not a compulsory question

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SCREEN 2 of 4:



Pre-Module Questionnaire (Psychology for Physiotherapists)

* Required

(6) Decide whether you disagree or agree with each the following statements using the 7 point scale ranging from strongly disagree (1) to strongly agree (7).

(Continued overleaf)

1. The use of mental imagery is an effective way to increase focus on specific rehabilitation exercises. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

2. The use of mental imagery is an effective way to improve focus on specific goals of rehabilitation. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

3. The use of mental imagery is an effective way to decrease pain during rehabilitation sessions. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

4. The use of positive self-talk is an effective way to decrease pain during rehabilitation sessions. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

5. The use of mental imagery is an effective way to maintain a positive mind-set during a long rehabilitation from sport-injury. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

6. The use of mental imagery during rehabilitation can aid the recovery process by visualizing healing occurring within the body. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

7. The use of mental imagery during rehabilitation from sport-injury has the potential to return the athlete to full participation faster than without the use of mental imagery. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

8. Keeping a positive attitude during rehabilitation will help speed up the recovery process. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

(Continued overleaf)

9. Controlling the level of pain associated with rehabilitation exercises will help speed up the recovery process. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

10. Setting appropriate rehab goals will help speed up the recovery process. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

11. Keeping a positive attitude during rehabilitation will increase the athlete's adherence rate. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

12. Controlling the level of pain associated with rehabilitation exercises will increase the athlete's adherence rate. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

13. Setting appropriate rehab goals will help improve the athlete's adherence rate. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

14. The use of mental imagery during rehabilitation is an effective way to increase motivation to complete rehabilitation exercises. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

15. The use of mental imagery to increase relaxation is an effective way to reduce anxiety prior to and following surgery. *

1 2 3 4 5 6 7

Strongly disagree Strongly agree

Please use the box below to insert any additional comments:

Note: This is not a compulsory question.

(Hamson-Utley et al., 2008)

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Pre-Module Questionnaire (Psychology for Physiotherapists)

* Required

(7) State how frequently you use each of the strategies listed below using the 9 point scale ranging from never (1) to always (9). As you are answering these questions keep in mind that the purpose of this questionnaire is to evaluate what is being done in the treatment room, not what should be done. While it may be socially desirable to answer a certain way, please answer questions based on your actual behaviours in the treatment room.

(Scale: 1 = never, 2 = almost never, 3 = seldom, 4 = occasionally, 5 = about half the time, 6 = often, 7 = frequently, 8 = almost always and 9 = always)

1. I try to make my athletes feel comfortable talking to me about issues unrelated to injury or sport. *

1 2 3 4 5 6 7 8 9

Never Always

2. I have a positive attitude when I am in the treatment room. *

1 2 3 4 5 6 7 8 9

Never Always

3. I show interest in my athletes as people (outside of sport). *

1 2 3 4 5 6 7 8 9

Never Always

4. I encourage my athletes to use visualisation and imagery during injury and rehabilitation. *

1 2 3 4 5 6 7 8 9

Never Always

(Continued overleaf)

5. I recognise and compliment my athletes for the effort they are putting into treatment and rehabilitation. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

6. I am able to develop rapport (carry on a conversation) with most of my athletes. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

7. I ask for athlete input in setting goals for the rehabilitation program. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

8. I explain to my athletes how the exercises they are doing will help them return to their sport more quickly. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

9. I teach and encourage athletes to use negative thought-stopping during injury and rehabilitation. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

10. I explain to my athletes how accomplishing each goal will help them return to sport. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

11. I am able to challenge my athletes to work harder without yelling at them. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

12. I explain to athletes the progression they can expect during rehabilitation. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

13. I know things about my athletes outside of sport. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

14. I help my athletes find something positive in any situation. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

(Continued overleaf)

15. I teach and encourage athletes to use relaxation techniques during injury and rehabilitation. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

16. I monitor or pay attention to athletes when they are rehabilitating. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

17. I make sure that my athletes know what to expect during the course of their injury (pain, range of motion, function, etc). *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

18. I explain the purpose of the exercises or treatments that I am having my athlete do. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

19. I encourage my athletes to express their feelings and emotions about their injury. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

20. I provide athletes with objective feedback of their progress on a regular basis (e.g. range of motion, strength). *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

21. I can tell when an athlete is having a bad day. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

22. I show my athletes respect. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

23. I explain treatments and exercises in terms and language that my athletes can understand. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

24. I allow my athletes to vent without judging them. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

(Continued overleaf)

25. I teach athletes how to monitor their negative self-talk during injury and rehabilitation. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

26. I am able to challenge and motivate my athletes when they are not putting enough effort into rehabilitation. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

27. I use healing imagery scripts with my athletes. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

28. I outline a progression of short-term goals for my athletes. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

29. I work with my athletes one-on-one. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

30. I do a good job of getting to know both uninjured and injured athletes on my team. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

31. I help my athletes set short-term goals. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

32. I consider myself a trustworthy person to whom my athlete could turn to for advice. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

33. I explain to my athletes how being tense can hinder success in rehabilitation. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

34. I explain the purpose of the modality that I am using with my athlete. *

	1	2	3	4	5	6	7	8	9	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

(Continued overleaf)

35. I teach and encourage athletes to use cognitive restructuring techniques during injury and rehabilitation. *

1 2 3 4 5 6 7 8 9

Never Always

36. I encourage athletes to play an active role in developing rehabilitation tasks and exercises. *

1 2 3 4 5 6 7 8 9


Never Always

Please use the box below to insert any additional comments:

Note: This is not a compulsory question.

Stiller (2008)

SCREEN 4 of 4:



Pre-Module Questionnaire (Psychology for Physiotherapists)

Thank-you!

Thank-you for completing this questionnaire. You can now begin studying the module 'Psychology for Physiotherapists' by copying and pasting the link below into your internet browser.

<https://sites.google.com/site/sportspsychologymodule/>

You should be able to access the website using your Google email address. If you have any problems accessing the module website please contact: c.heaney@open.ac.uk


Powered by [Google Docs](#)

NOTE: The scoring instructions for this questionnaire (screens 2 and 3) can be found in appendix 3b and appendix 3c.

Appendix 5d: Study 4 Immediately Post-Module Questionnaire Package (POST1)

NOTE: The questionnaire shown below was that used for participants in the intervention (sport psychology) group immediately after the module. However, the same questionnaire, with an amended title and some minor differences on screen 1 (as described) was used for the control (strength and conditioning) group.

SCREEN 1 of 4:



Post-Module Questionnaire (Psychology for Physiotherapists)

This questionnaire will take around 10-15 minutes to complete and should be completed as soon as possible after you have completed the module.

* Required

Name: *

Contact email address (in case clarification is needed on any of your answers): *

(1) On a scale of 1-10, how beneficial would you say that you found studying the module? *

1 2 3 4 5 6 7 8 9 10

Not at all beneficial ● ● ● ● ● ● ● ● ● Very beneficial

(2) What did you particularly like/dislike about studying the module? *

(3) Have you been motivated to undertake any further study in the module topic area (either formal or informal)? *

(Continued overleaf)

(4) Have you referred an injured athlete to a sport psychologist during the course of the module? *

Yes

No

(5) Have you used more psychology in your work since starting the module? *

Yes

No

If you have any additional comments to add to questions 1-5, please insert them below:

Note: This is not a compulsory question

In the version of this questionnaire for participants in the control (strength and conditioning) group, question 5 above was replaced by the question '*Have you consulted a strength and conditioning specialist during the course of the module?*'

SCREEN 2 of 4:

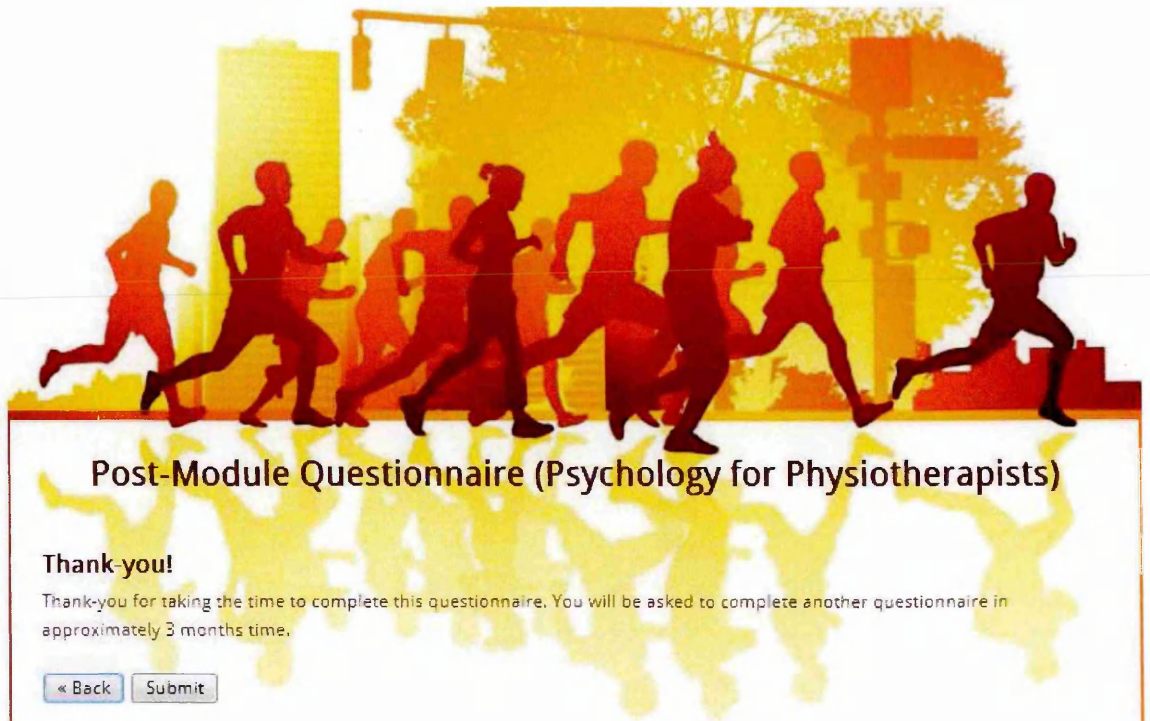
Screen 2 was exactly the same as screen 2 of the questionnaire in appendix 5b.

SCREEN 3 of 4:

Screen 3 was exactly the same as screen 3 of the questionnaire in appendix 5b.

(Continued overleaf)

SCREEN 4 of 4:

A graphic illustration featuring silhouettes of several runners in various stages of a running stride, set against a warm, golden-yellow background. The background includes stylized city buildings and trees, suggesting an urban park or city street setting. The runners are positioned above a white rectangular box that contains the questionnaire text and navigation buttons.

Post-Module Questionnaire (Psychology for Physiotherapists)

Thank-you!


Thank-you for taking the time to complete this questionnaire. You will be asked to complete another questionnaire in approximately 3 months time.

NOTE: The scoring instructions for this questionnaire (screens 2 and 3) can be found in appendix 3b and appendix 3c.

Appendix 5e: Study 4 3-Months Post-Module Questionnaire Package (POST2)

NOTE: The questionnaire shown below was that used for participants in the intervention (sport psychology) group 3 months after the module. However, the same questionnaire, with an amended title and some minor differences on screen 1 (as described) was used for the control (strength and conditioning) group.

SCREEN 1 of 4:



3 Months Post-Module Questionnaire (Psychology for Physiotherapists)

This questionnaire will take around 10-15 minutes to complete.
* Required

Name: *
Please note that in order to maintain your anonymity your name and email address will be removed from your questionnaire responses.

Contact email address: *
Required in case clarification is needed on any of your answers.

Gender: *

Male
 Female

Age (in years): *

(1) Have you undertaken any further study of sport psychology since completing the module 'Psychology for Physiotherapists'? (either formal or informal) *

(Continued overleaf)

(2) Have you referred an injured athlete to a sport psychologist since completing the module? *

Yes

No

(3) Have you used more psychology in your work since completing the module? *

Yes

No

If you have any additional comments to add to questions 1-3, please insert them below:

Note: This is not a compulsory question

In the version of this questionnaire for participants in the control (strength and conditioning) group, question 1 was amended to read *'Have you undertaken any further study of sport psychology or strength and conditioning since completing the module 'Strength and Conditioning for Physiotherapists'?'.* Additionally, question 3 above was replaced by the question *'Have you consulted a strength and conditioning specialist since completing the module?'*

SCREEN 2 of 4:


Screen 2 was exactly the same as screen 2 of the questionnaire in appendix 5b.

SCREEN 3 of 4:

Screen 3 was exactly the same as screen 3 of the questionnaire in appendix 5b.

(Continued overleaf)

SCREEN 4 of 4:



3 Months Post-Module Questionnaire (Psychology for Physiotherapists)

Thank-you!

Thank-you for taking the time to complete this questionnaire. You will be asked to complete a final questionnaire in approximately 3 months time. If your email address is likely to change in the next 3 months please contact caroline.heaney@open.ac.uk with your updated details.


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NOTE: The scoring instructions for this questionnaire (screens 2 and 3) can be found in appendix 3b and appendix 3c (Chapter 3).

Appendix 5f: Study 4 6-Months Post-Module Questionnaire Package (POST3)

NOTE: The questionnaire shown below was that used for participants in the intervention (sport psychology) group 6 months after the module. However, the same questionnaire, with an amended title and some minor differences on screen 1 (as described) was used for the control (strength and conditioning) group.

SCREEN 1 of 4:



6 Months Post-Module Questionnaire (Psychology for Physiotherapists)

This questionnaire will take around 10-15 minutes to complete.

* Required

Name: *
Please note that in order to maintain your anonymity your name and email address will be removed from your questionnaire responses.

Contact email address (in case clarification is needed on any of your answers): *

(Continued overleaf)

(1) Have you undertaken any further study of sport psychology since completing the module 'Psychology for Physiotherapists'? (either formal or informal) *

(2) Have you referred an injured athlete to a sport psychologist since completing the module? *

- Yes
 No

(3) Have you used more psychology in your work since completing the module? *

- Yes
 No

If you have any additional comments to add to questions 1-3, please insert them below:

Note: This is not a compulsory question

Continue »

In the version of this questionnaire for participants in the control (strength and conditioning) group, question 1 was amended to read '*Have you undertaken any further study of sport psychology or strength and conditioning since completing the module 'Strength and Conditioning for Physiotherapists'?*'. Additionally, question 3 above was replaced by the question '*Have you consulted a strength and conditioning specialist since completing the module?*'


SCREEN 2 of 4:

Screen 2 was exactly the same as screen 2 of the questionnaire in appendix 5b.

SCREEN 3 of 4:

Screen 3 was exactly the same as screen 3 of the questionnaire in appendix 5b.

SCREEN 4 of 4:



6 Months Post-Module Questionnaire (Psychology for Physiotherapists)

Thank-you!
Thank-you for taking the time to complete this questionnaire. Your participation in the research study is now complete.

If you would like to receive a summary of the research findings from this project, please tick the box below.

Yes I would like a summary of the research findings

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NOTE: The scoring instructions for this questionnaire (screens 2 and 3) can be found in appendix 3b and appendix 3c.

Appendix 5g: Sport Psychology for Physiotherapists Module Content

The module was hosted on a restricted access website at:
<https://sites.google.com/site/sportpsychologymodule>

Sport Psychology for Physiotherapists

Search this site

0. Introduction

Welcome to the study module 'Sport Psychology for Physiotherapists'. The module has been designed to help practicing sports physiotherapists improve their understanding and practical skills in relation to the psychological impact of sports injury. Those studying the module should achieve the following learning outcomes.

On completion of the module, learners should be able to:

- Recognise psychological reactions to sports injury and be aware of how they can impact upon the rehabilitation process
- Identify sport psychology interventions that could be used to enhance the rehabilitation process
- Recognise when and how to refer an injured athlete to a sport psychologist or other professional

The module is flexible and is designed to be studied by those who are working full-time. The module is split into three study units (see box below) each of which will take approximately 2-4 hours to complete. It is up to you when you study these units, however you must have completed all three units by **Monday 13th August 2012** at the latest. It is recommended that you study at least 1 unit per week. Below is a suggested study calendar.

Week commencing	Activity
Monday 16th July 2012	Unit 1 (including assessment)
Monday 23rd July 2012	Unit 2 (including assessment)

Below is a summary of the module content.

(1) **INTRODUCTION:** An overview of the module content, learning outcomes and recommended study plan and an activity where participants introduce themselves on the module forum.

(2) **UNIT 1: Understanding the Psychological Impact of Sports Injury**

- Section 1.1 – Introduction
- Section 1.2 – Psychological reactions to sports injury
- Section 1.3 – Models of psychological reaction to sports injury
- Section 1.4 – Unit 1 summary (including unit 1 assessment)

(3) **UNIT 2: Psychological Skills and Techniques for Injured Athletes**

- Section 2.1 – Introduction
- Section 2.2 – The role of sport psychology intervention
- Section 2.3 – Social support
- Section 2.4 – Goal setting
- Section 2.5 – Imagery
- Section 2.6 – Positive self-talk
- Section 2.7 – Relaxation strategies
- Section 2.8 – Unit 2 summary (including unit 2 assessment)

(4) **UNIT 3: Referral and Professional Boundaries**

- Section 3.1 – Introduction
- Section 3.2 – Professional boundaries – who should deliver sport psychology support?
- Section 3.3 – Working with a sport psychologist
- Section 3.4 – How to find a sport psychologist
- Section 3.5 – Unit 3 summary (including unit 3 assessment)

(5) **CONCLUSION:** A conclusion to the module recapping the learning outcomes and asking participants to complete the first post-module questionnaire.

(6) **REFERENCES**

(7) **FURTHER READING:** Optional recommended further reading for those who want to know more.

Appendix 5h: Strength and Conditioning for Physiotherapists (Control) Module Content

The module was hosted on a restricted access website at:

<https://sites.google.com/site/sanmodule>

Strength and Conditioning for Physiotherapists

0. Introduction

Welcome to the study module 'Strength and Conditioning for Physiotherapists'. The module has been designed to help practicing sports physiotherapists improve their understanding and practical skills in relation to the strength and conditioning training. Those studying the module should achieve the following learning outcomes:

On completion of the module, learners should be able to:

- Understand and apply the principles of training
- Demonstrate an awareness of how to test and develop aerobic fitness
- Demonstrate an awareness of how to test and develop muscular strength and power

The module is flexible and is designed to be studied by those who are working full-time. The module is split into three study units (see box below), each of which will take approximately 2-4 hours to complete. It is up to you when you study these units, however you must have completed all three units by **Monday 13th August 2012** at the latest. It is recommended that you study at least 1 unit per week. Below is a suggested study calendar.

Week commencing	Activity
Monday 16th July 2012	Unit 1 (including assessment)
Monday 23rd July 2012	Unit 2 (including assessment)

Below is a summary of the module content.

(1) **INTRODUCTION:** An overview of the module content, learning outcomes and recommended study plan and an activity where participants introduce themselves on the module forum.

(2) **UNIT 1: Strength and Conditioning Training Principles**

- Section 1.1 – Introduction
- Section 1.2 – Components of fitness
- Section 1.3 – Principles of training
- Section 1.4 – The purpose of fitness testing
- Section 1.5 – Selecting appropriate fitness tests
- Section 1.6 – Programming and periodisation
- Section 1.7 – Unit 1 summary (including unit 1 assessment)

(3) **UNIT 2: Aerobic Fitness Training**

- Section 2.1 – Introduction
- Section 2.2 – Aerobic fitness
- Section 2.3 – Measuring aerobic fitness – laboratory tests
- Section 2.4 – Measuring aerobic fitness – field tests
- Section 2.5 – Aerobic fitness training methods
- Section 2.6 – Unit 2 summary (including unit 2 assessment)

(4) **UNIT 3: Resistance Training**

- Section 3.1 – Introduction
- Section 3.2 – Resistance training benefits
- Section 3.3 – Measuring muscular strength, resistance and power
- Section 3.4 – Weight training
- Section 3.5 – Plyometric training
- Section 3.6 – Unit 3 summary (including unit 3 assessment)

(5) CONCLUSION: A conclusion to the module recapping the learning outcomes and asking participants to complete the first post-module questionnaire.

(6) REFERENCES

(7) FURTHER READING: Optional recommended further reading for those who want to know more.

Appendix 5i: Module Assessments

Sport Psychology for Physiotherapists Assessments

UNIT 1 ASSESSMENT:

1. Give three examples of common negative psychological reactions to sports injury.
2. Give three examples of factors which may affect how an athlete responds to a sports injury.
3. Which of the following best describes Grief Response models?
 - (a) All injured athletes progress through the same series of sequential stages in response to injury
 - (b) How an individual responds to an injury is dictated by their personal interpretation of the injury
4. Which of the following best describes Cognitive Appraisal models?
 - (a) All injured athletes progress through the same series of sequential stages in response to injury
 - (b) How an individual responds to an injury is dictated by their personal interpretation of the injury
5. What is considered to be the main limitation of Grief Response models?

UNIT 2 ASSESSMENT:

1. Briefly describe how you could use social support to help an injured athlete under your care.
2. Briefly describe how you could use goal setting to help an injured athlete under your care.
3. Briefly describe how you could use imagery to help an injured athlete under your care.
4. Briefly describe how you could use positive self-talk to help an injured athlete under your care.
5. Briefly describe how you could use relaxation strategies to help an injured athlete under your care.

UNIT 3 ASSESSMENT:

1. When might it be appropriate for you to refer an athlete to a sport psychologist?
2. Why is it so important to consider your professional boundaries when providing sport psychology support to an injured athlete?
3. How could you go about finding a sport psychologist if you did not already have contact with one?
4. In the UK, in order to use the title 'sport and exercise psychologist' or 'sport psychologist', sport psychologists need to be registered with which organisation?
 - (a) British Association of Sport and Exercise Sciences (BASES)
 - (b) Health Professions Council (HPC)
 - (c) British Psychological Society (BPS)

Strength and Conditioning for Physiotherapists Assessments

UNIT 1 ASSESSMENT:

1. Name 3 components of fitness.
2. Which of the following best describes the training principle of overload?
 - (a) In order to increase fitness we have to place the body under stress
 - (b) A lack of training will result in a lack of fitness
 - (c) When planning a training programme we should be careful not to do too much too soon

3. What does the term reliability refer to in relation to fitness testing?
 - (a) A fitness test is reliable if it actually measures what we intend it to measure
 - (b) A fitness test is reliable if we are likely to get the same results again if we repeat it
4. What are the 3 phases of the General Adaptation Syndrome?
5. What does the term 'periodisation' refer to?

UNIT 2 ASSESSMENT:

1. Which of the following are thought to influence aerobic performance?
 - (a) Maximal aerobic power
 - (b) Lactate threshold
 - (c) Exercise economy
 - (d) All of the above
2. What is lactate threshold?
3. Give an example of a fitness test that can be used to measure/predict aerobic fitness?
4. Briefly describe the LSD fitness training method.
5. Briefly describe the fartlek fitness training method.

UNIT 3 ASSESSMENT:

1. Does the 1 repetition max (1RM) test measure static or dynamic strength?
2. Give an example of a fitness test that can be used to measure muscular endurance.
3. Is a squat an example of a compound or isolation exercise?
4. If an athlete is lifting weights for 15 repetitions at a load of 60% of 1RM are they likely to develop their muscular strength or their muscular endurance?
5. What element of muscular fitness does plyometric training develop?