

Social support and psychological responses in sport-injury rehabilitation

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This article focuses on the doctoral research of the winner of the 2010 DSEP PhD Dissertation Prize, Ian Mitchell. Research in social support has highlighted its importance in dealing with stress; however, there has been little research within the sport injury literature that has focused on the role of social support within the injury-response process. Furthermore, research that has been conducted within a sport-injury context has raised a number of conceptual issues that should be considered. Based on this premise, a programme of research is outlined that involved the examination of social support in the sport-injury response process. Specifically, four studies are discussed in relation to the pathways and processes that underpin the role of social support from a stress and coping perspective. The article concludes with conceptual considerations of the research alongside practical implications and suggestions for future research.

Keywords: injury; emotions; stress response; coping.

ALONGSIDE stress and coping, social support is one of the most important constructs in health psychology and over recent years its significance has been recognised within the sport and sport-injury literature. In the area of sport-injury the interest in social support has focused on the aetiology of injury, rehabilitation from injury, and subsequent return to full competitive sport (Rees, 2007). However, despite these developments, the sport-injury literature has largely failed to take into account current conceptualisations of social support (Evans, Mitchell & Jones, 2006). This is disappointing, particularly given the importance afforded social support in the injury rehabilitation process generally (Holt & Hoar, 2006), and in its potential for determining psychological responses to stressors specifically (Cohen, Gottlieb & Underwood, 2000). Part of the stimulus for this programme of research was grounded, therefore, in the need to address limitations in the current conceptualisations of social support and the associated empirical research. In addition, my interest in how athletes psychologically respond to injury and the role that social support plays in the rehabilitation

process was also derived from personal experiences. Specifically, the programme of research reported in this PhD was initiated as a result of a serious injury that I sustained as a professional football player. Before my injury as a player I had always recognised the important role that social support from family, friends and coaches had played in my success. My injury experience served to reinforce, for me, the role that social support plays in dealing with what for me was an extremely difficult period of my football career.

Injury can be seen as a stressful event and a number of related stressors that can affect athletes' psychological responses characterise the rehabilitation process. The integrated model of response to sport injury (Wiese-Bjornstal et al., 1998) highlights the role of social support as both a situational variable and as a coping resource for the injured athlete. This is consistent with the literature which proposes stress-buffering and main effects as the two main pathways that may explain how social support functions. These are conceptually linked to received support and perceived support respectively (Cohen & Wills, 1985). However, empirical

research suggests that the perceived availability of social support is more consistently linked to stress-buffering effects than received support (Cohen et al., 2000).

The success of stress-buffering effects has been largely accounted for by optimally matching stressors and the social support type (Cutrona & Russell, 1990). However, a number of factors have been identified in the literature that may complicate this process and hinder identification of the stress-buffering properties of social support. Indeed, the interaction between recipients and providers of social support is not as straight forward as it may first seem and research that examines the underpinning pathways of social support will lead to a better understanding of how the perception of available support and received support operate in the injury-response model. This in turn can inform the design of social support intervention that are intended to expedite an athlete's recovery from sport injury.

In order to explore the pathways underlying the relationship between social support and health outcomes in an injury context, Study 1 of the PhD examined main and stress-buffering effect relationships between the perception of social support availability and athletes' psychological responses to injury. The study comprised two parts. Part 1 sought to develop and refine theoretically derived measures of stressors, social support, and psychological responses. Items were derived from the research literature to represent single-item measures of stressors associated with sport-injury rehabilitation. Based on a measure of social support developed by Rees and Hardy (2004), and a review of the relevant sport-injury literature, items were initially derived which represented four social support types (i.e. emotional, esteem, informational, tangible). Psychological responses were measured using a modified version of the Psychological Responses to Sport Injury Inventory (PRSII), originally reported by Evans, Hardy and Mullen (1996). This version reflected five subscales: restlessness, feeling cheated, devastation, iso-

lation and reorganisation. Participants were 319 injured athletes (258 males, 61 females; mean age 27.27, $SD=9.43$) from 33 different sports. Standards ranged from recreational to international level, and injury severity (i.e. time loss from participation) ranged from one week to 336 weeks ($M=12.24$, $SD=11.09$). Participants were required to be injured for a minimum period of one week, to have sustained their injury through sport, and received treatment from one of the 10 physiotherapists involved in the study.

The construct validity of the measures of social support and psychological responses was assessed using confirmatory factor analysis (CFA: Jöreskog, 1993; Jöreskog & Sörbom, 1993). A sequential model testing approach was employed to assess the adequacy of the model fit prior to testing the whole model. Overall goodness of fit for each model was examined together with standardised residuals, completely standardised factor loadings and modification indices for the covariances of the measurement errors. Fit statistics suggested an acceptable model fit for the final four-factor (i.e. emotional, esteem, informational, tangible), 16-item social support measure ($\chi^2=182.1$ (98), $p<.05$; RMSEA=.05, $p>.05$; SRMR=.05; CFI=.94; GFI=.93; and, NNFI=.92). The five-factor (i.e. isolation, restlessness, devastation, feeling cheated, reorganisation) 19-item psychological response measure demonstrated adequate model fit and was considered conceptually sound ($\chi^2=357.60$ (142), $p<.05$; RMSEA=.05, $p>.05$; SRMR=.05; CFI=.93; GFI=.93; and, NNFI=.92).

Using the measures of social support and psychological responses, part 2 of Study 1 matched social support dimensions with injury-related stressors, to explore the main and stress-buffering effects of available social support on the psychological responses of injured athletes. To examine the relationships between stressors, social support and psychological responses, moderated hierarchical regression analysis was used (Jaccard & Wan, 1996). Prior to the formation of product terms, all variables were standardised

(with a mean of 0 and standard deviation of 1) to enhance the interpretation of the interaction term (Finney et al., 1984). Based on the recommendations of Biddle et al. (2001), each variable was entered into a hierarchical model that comprised of three blocks. The first independent variable (i.e. the stressor) was entered in the first block and the second independent variable (i.e. social support), hypothesised as the moderating variable, was entered into the second block. The percentage of the total variability explained by each independent variable (R^2) indicated the main effects of the respective variables. The product term was entered in the third block together with the main effect (i.e. stressor) variable and an interaction was reflected by a significant rise in R^2 . The results of the moderated hierarchical regression analysis are shown in Table 1.

Six interactions (buffering effects) added significantly (model 1, restlessness=.01, $b=-.32$, $p<.05$; model 2, isolation=.02, $b=-.09$, $p<.01$; model 3, isolation=.02, $b=-.10$, $p<.01$; model 4, feeling cheated=.04, $b=-.58$, $p<.01$; model 5, restlessness=.01, $b=-.35$, $p<.05$; and model 6, isolation=.02, $b=-.12$, $p<.01$) to the variance in psychological responses explained by the main effects of stressors and social support. Significant interactions demonstrated consistency with the explanation of buffering: The detrimental relationships between stressors and psychological responses were reduced for those with high social support compared to those with low social support, but level of social support was relatively unimportant at low levels of stressors.

The literature has highlighted that stressors such as incapacitation and loss of confidence can exacerbate feelings of frustration and depression together with the loss of important constructs such as self-image, self-esteem, and habitual confidence sources (Johnston & Carroll, 1998; Magyar & Duda, 2000). Interruptions to these social and psychological attachments are important as these attachments form the basis of many types of self-gratification and social reinforcement

for the athlete (Peretz, 1970). It is feasible, therefore, that the participants in the current study perceived that they had someone there to listen to them (i.e. emotional support) and to reassure them that they could achieve (i.e. esteem support), which consequently may have enhanced coping by altering the appraisals of the proposed losses. Indeed, emotional support may help athletes vent the frustrations associated with their perceived losses resulting from injury (e.g. loss of mobility) and esteem support may have bolstered esteem thereby replacing the sources of esteem that the injured athlete had temporarily lost through incapacitation and isolation from network members (Bianco, 2001; Johnston & Carroll, 1998).

The main effects for social support were considered in conjunction with the significant interactions that were found in Part 2 of the first study. The proportion of variance in psychological responses explained by the main effects of perceived support availability ranged from three per cent to 11 per cent. This is comparable to the three per cent to 10 per cent range of main effects for social support on performance that Rees and Hardy (2004) reported. These findings highlight the impact that social support may have in relation to psychological responses of injured athletes. They also suggest that social support will always offer some benefit, irrespective of the stress of injury or related stressors. In essence, the structural elements of social support (i.e. support network) allow an individual to experience positive outcomes such as improved self-concept, feelings of self-worth, and personal control as well as the adoption of positive behavioural patterns through a preventative pathway (Rees, 2007). Specifically, social support can influence an individual's appraisals that may lead to the development of effective coping skills to deal with the situation (Bianco & Eklund, 2001). As a result, an individual's network provides a social context in which stressful events are appraised (Lazarus & Folkman, 1984). Availability of appropriate resources through networks can help people

Table 1: Hierarchical regression analyses: Effects of stressors, social support factors and products on psychological responses.

Model	Dependent variable	Independent variable	ΔR^{2a}	$P(F)^b$	b^c	$p(t)^d$
1	Restlessness	Incapacitation	.02	.01	.50	.01
		Esteem	.02	.01	-.49	.01
		Product	.01	.04	-.32	.04
2	Isolation	Incapacitation	.03	.00	.16	.00
		Emotion	.06	.00	-.22	.00
		Product	.02	.01	-.09	.01
3	Isolation	Incapacitation	.03	.00	.15	.00
		Esteem	.08	.00	-.22	.00
		Product	.02	.01	-.10	.01
4	Feeling Cheated	Incapacitation	.05	.00	.70	.00
		Esteem	.02	.01	-.49	.01
		Product	.04	.00	-.58	.00
5	Restlessness	Loss of confidence	.13	.00	1.13	.00
		Esteem	.01	.02	-.40	.02
		Product	.01	.04	-.35	.04
6	Isolation	Loss of confidence	.12	.00	.26	.00
		Esteem	.06	.00	-.20	.00
		Product	.02	.00	-.12	.00

N=319. All variables standardised except for product. Product formed from the two preceding standardised variables.

^a Stepwise change in R^2 .

^b Probability of F for ΔR^2 .

^c Unstandardised regression coefficient in final equation.

^d Probability of t for b .

cope with or appraise an event as less stressful (Cohen, 1992).

Although considered separate constructs (Dunkel-Schetter & Bennett, 1990; Wethington & Kessler, 1986), both the perception of available support and received support have been linked to the stress-buffering hypothesis (Cohen, 2004). In addition, within a sports injury context some evidence exists to support the main and buffering effect of social support (e.g. Bianco, 2001; Johnston & Carroll, 1998). There remains, however, some ambiguity as to how social support functions in relation to health and well-being, particularly with regard to the pathways that are hypothesised to underpin the social support process. From an empirical

perspective, it is the perception of available support that has been most consistently linked to stress-buffering (Cohen et al., 2000), although theoretically, received support should also result in stress-buffering effects (Lakey & Cohen, 2000). Based on the findings of Study 1, and in light of the fact that both received support and the perception of support availability are believed to have stress-buffering properties, Study 2 examined the stress-buffering effect relationships of received support and athletes' psychological responses to sport injury. Again, the study was divided into two parts. Part 1 developed a measure of received support which reflected the same four types of emotional, esteem, informational, and tangible

support derived from Study 1. Specifically, the 16 items that formed the measure in Study 1 were reworded to reflect received support. Participants were 302 injured athletes (194 males, 108 females; mean age 29.47 years, $SD=10.57$) from 23 different sports; sampling and procedures were consistent with those of Study 1. The results of the confirmatory factor analysis suggested that the 4-factor, 16 item measure of received support provided an adequately fitting model ($\chi^2=177.4$ (98), $p<.01$; RMSEA=.04, $p>.05$; SRMR=.05; CFI=.94; GFI=.92; and, NNFI=.91).

Part 2 of the study utilised the measure of received social support together with the measures of psychological responses and stressors developed in Study 1 to examine the main and stress-buffering effect relationships between social support and psychological responses of injured athletes when confronted by injury-related stressors. The results of the moderated hierarchical regression analysis did not show any significant interactions in the form of stress-buffering. The absence of significant interactions may have been explained by the issues that surround recipient and provider characteristics together with the unhelpful nature of received support. However, the main effects of support suggested that received support had a significant effect on psychological responses irrespective of injury related stressors, which is an important finding in itself and should not be overlooked. Social support can function regardless of the stress of injury and we should be aware that a vibrant and responsive network that facilitates regular integration might provide a preventative mechanism for the injured athlete. Social support should, therefore, always be offered to athletes that match their needs. Providing support that athletes need and are satisfied with, will in turn allow them to fulfil certain needs and roles in life. The findings from Study 2 and Study 1 raised a number of interesting issues in relation to the stress-buffering effects of social support in an injury context and provided the basis

for exploring the pathways and processes underlying the effects of social support on the psychological responses of injured athletes.

In the third study, a qualitative approach was used to facilitate an in-depth understanding of the stress-buffering effects of the perceived availability of social support on psychological responses of participants from Study 1 and the main effects of received support on psychological responses of participants from Study 2. The potential reasons why received support failed to produce stress-buffering effects in Study 2 were also explored. Participants comprised a purposeful sample of 12 injured athletes from the first two studies. Criterion based sampling was used to select information-rich cases according to predetermined criteria (Patton, 2002). The criteria were intended to ensure an equal sample size from each of the previous studies, and a sample of participants that accounted for differences in gender, sport (team or individual), and injury severity. Six participants were selected from Study 1 (perceived available social support) and six from Study 2 (received social support). Participants' ages ranged from 23 to 36 ($M=27.83$, $SD=3.76$) with an equal gender divide in both groups. Participants' sports comprised football, rugby, netball, triathlon, running, swimming, and gymnastics. Semi-structured interviews were conducted using an interview guide designed specifically for the purpose of the study and interview data was inductively analysed within a deductive framework.

Participants from Study 1 suggested that the belief that others were available to them enabled them to deal with injury-related stressors and positively influenced their psychological responses. In particular, by matching the perception of available support to the stressors that were being experienced, although appraisals and coping were not explicitly assessed in the previous studies (i.e. Study 1 and Study 2), it is feasible that participants were able to alter appraisals that subsequently enhanced coping. For example, the

stressors that injured athletes experienced possibly created a deficit or loss to the athletes. Subsequently, the support that was perceived to be available and elicited specifically by certain stressors, together with the nature of the deficit or loss, may have replaced that which was perceived to be lost. It is reasonable to assume, therefore, that it was the support that was perceived to be available to the injured athletes that enhanced their perceptions of their ability to cope with the particular stressor(s). In turn, the negative responses associated with injury were perceived as less stressful and harmful. This is congruent with research that hypothesises those perceptions of social support work through a process of cognitive appraisal (Cohen et al., 2000; Lakey & Cohen, 2000). In addition, it was clear that a secure attachment history influenced injured athletes' perceptions of support availability. Attachment stability in turn increased athletes' sense of control and the feeling that they were equipped to deal with the injury and associated stressors. These findings are consistent with the perspective that social support can represent a stable set of beliefs about the social environment, and that it is these beliefs, rather than the actual support from others, that accounts for the beneficial effects of support on psychological responses (Sarason, Pierce & Sarason, 1990).

Participants from Study 2 suggested that the support that they received was beneficial, irrespective of the stress of injury or related stressors they experienced. As a result of regular contact and receiving support from network members, social support played a preventative role that seemed to influence the appraisal of injury and related stressors. Subsequent to regular contact within their network, participants felt in control of the situation and were able to sustain feelings of self-worth and self-value. The absence of stress-buffering effects of received support emanated from a general mismatch between the support provider and recipient. In addition to the support not meeting their needs, participants suggested that the support that

was offered to them questioned their own ability to cope with injury and related stressors which, in turn, affected their self-esteem. Indeed, stress-buffering effects of received support are contingent on a fit between the support offered and support needs (Goldsmith, 2004).

The final study was underpinned by the findings from each of the earlier three studies and research investigating injury-related stressors, social support, and the psychological responses of injured athletes. The purpose of the study was to provide an eight-week intervention to increase an injured athlete's perception of available and received support. The intervention was conducted in an injury setting using an action research approach. The participant was a male, ex-professional footballer who had sustained an injury to his medial collateral ligament in the right knee. In this study, I fulfilled the roles of both coach and researcher and facilitated the social support intervention to the participant. In addition to the researcher, a chartered physiotherapist and assistant coach were used to assist in the delivery of the support intervention.

To date, despite the association between social support and positive health outcomes there is a lack of empirical research to support the effectiveness of social support interventions in the sport injury literature. The most extensive review of social support interventions in the social psychology literature which categorises support interventions into group and individual interventions however suggests the need to adapt the types of social support to suit the specific needs of the individual based on their existing support network (Hogan, Linden & Narjarian, 2002). As a result, it was important that the intervention considered not only the participant's existing level of support, but also his preference for specific support types relative to his particular needs at any given time (Gottlieb, 2000).

Data collection comprised a number of techniques. The participant maintained a self-report diary throughout the rehabilitation and return to competition period,

which aimed to provide descriptive accounts of his injury experiences and the availability and provision of social support. Similarly, as a support provider, I maintained field notes which described the participant's behaviour and enhanced my own reflexive process in relation to the support intervention that I provided. In addition, I conducted four semi-structured interviews with the participant over the eight-week rehabilitation period in order to gain an in-depth understanding of the stressors, social support, and psychological responses that he experienced. I provided (and facilitated the provision of) four types of social support to him that were identified in the previous three studies: emotional, esteem, informational, and tangible. The intervention was implemented through individual meetings with the participant which were complemented by discussions that took place with the physiotherapist and assistant coach. During the provision of social support, and as a result of the previous studies in this thesis, I was mindful of the nature of the stressors and responses being experienced by the participant. The main stressors that were identified by the participant were concerns over his medical provision and the rehabilitation process (early stage of rehabilitation), scheduling of his rehabilitation (mid stage of rehabilitation), and his return to a competitive environment (late stage of rehabilitation). Social support that I provided was, therefore, suited to the needs of the participant in relation to the time of the rehabilitation period. The pathways by which social support operates and highlighted in the three previous studies (i.e. main and stress buffering models), underpinned the delivery of the social support intervention.

The results of the study revealed that the participant's perception of support availability increased as a result of the intervention. Specifically, the quality of the relationships developed between the participant and network members enhanced the perception that support was available. The researcher's own interpersonal skills and awareness of

what support was required at specific times enhanced the participant's perception that a responsive and appropriate support resource was available whenever it was needed.

Conceptual issues

A number of conceptual issues from the current programme of research. Specifically, issues related to the functional properties of perceived and received social support, specific components of social support, the measurement of social support and psychological responses to injury, and the temporal nature of social support and psychological responses to injury throughout the research.

Functional properties of perceived and received social support

The literature shows that there appears to be a theoretical link between stress-buffering and social support and the hypothesised effects that both perceived and received support have on a number of outcomes (Lakey & Cohen, 2000). Although received support has been linked to the stress-buffering hypothesis, empirically the link between the perceptions of support availability is stronger (Cohen & Wills, 1985; Cohen et al., 2000; Wills & Shinar, 2000). As a result, it is unclear whether received social support will consistently achieve the same stress-buffering effects as perceived support across different outcomes.

Researchers have examined the stress-buffering effects of social support in sports performance. Adopting functional measures of social support and the perspective of optimal matching theory, Rees and Hardy (2004), and Rees et al. (2007), revealed stress-buffering effects of the perception of support availability and main effects of received support respectively. Research in sport injury has generally supported the palliative role that received support plays when dealing with the stress of injury (e.g. Johnston & Carroll, 1998). Indeed, studies that have reported benefits of perceived support have alluded to the perception of what

support has been received, not the perception of available support (e.g. Bianco, 2001).

The current programme of research adopted functional measures of perceived availability of social support and received support to explore the main and stress-buffering effects of support on the psychological responses of injured athletes (Study 1 and Study 2). Functional measures are more likely to be associated with stress-buffering effects as they can directly meet the needs elicited by stressful events (Cohen & Wills, 1985). Findings of the current thesis support the suggested stress-buffering properties of the perception of available support as opposed to received support. It was evident that the perception of support availability lessened negative psychological responses by influencing the appraisal of the stressful situation. Specifically, the stressors that injured athletes experienced created a deficit or loss to the athletes. Subsequently, the support that was perceived to be available and elicited specifically by certain stressors, together with the nature of the deficit or loss, replaced that which was perceived to be lost. It was, therefore, the support that was perceived to be available to the injured athletes that enhanced their perceptions of their ability to cope with the particular stressor(s). In turn, the negative responses associated with injury were perceived as less stressful and harmful.

In contrast, received support (Study 2) failed to produce stress-buffering effects. The significant main effects for received support on the psychological responses of injured athletes that were reported in Study 2 suggested that received support was beneficial irrespective of the stress of injury. Although from a theoretical perspective received support should provide stress-buffering effects (Lakey & Cohen, 2000), a number of issues were evident throughout the programme of research to suggest why it failed to produce stress-buffering effects. For example, received support involves an exchange of resources (i.e. a behavioural component) as opposed to something that is

perceived to be available (i.e. a perceptual component) (Rook & Underwood, 2000). Therefore, received support, through interpersonal exchanges with network members, can provide opportunities for disparity between the support provider and support recipient. Indeed, participants in this thesis suggested that they experienced a mismatch between the social support that they wanted in relation to the support that they received. Subsequently, the support that was provided to them to cope with the stress of injury, did not optimally match that which was elicited by the stressor and what the athlete wanted at a particular time. Similarly, when support was provided to athletes in order to cope with particular stressors in this thesis, the perception of their self-esteem diminished. This was largely as a result of the athletes feeling inadequate to cope with the demands of the stressful event and was associated with poor adjustment and negative experiences in interactions with certain network members.

Specific components of social support

Functional components of support focus on the support that is made available or provided to an injured athlete. The distinction between the perception of available support and received support is therefore important (as previously discussed), particularly from a measurement perspective. In sport performance, Rees and colleagues (Rees & Hardy, 2004; Rees, Ingledew & Hardy, 1999) adopted a specific, functional measurement approach and reported differential relationships between different support types and performance components. Similarly, within the sport injury literature, a number of qualitative studies have highlighted the provision of different support types by different providers (e.g. Johnston & Carroll, 1998; Bianco, 2001). This research suggests that social support can be broken down to a specific level (i.e. providers and types).

The thesis adopted specific and functional measures of social support to test the main and stress-buffering effects of social

support on the psychological responses of injured athletes. The rationale for this approach was developed from the assumption that general support measures may not capture the entire stress-support relationships evident in stressful situations (Vaux, 1992). Therefore, functional measures that have been used to focus on support effects of specific stressors should include specific aspects of the stressor characteristics and the support needs of the target population (Wills & Shinar, 2000).

Findings in the thesis attest to the strength of adopting a specific perspective to social support. That is, specific support types and support providers were evident throughout the programme of research. Specifically, the matching hypothesis was adopted in Study 1 and Study 2 to explore the main and stress-buffering effects of social support upon psychological responses of injured athletes. Stress-buffering effects of social support are more likely to occur when specific types of social support are optimally matched to the needs elicited by the specific stressors. To achieve this it is important to differentiate between support types compared to social support *per se* in a sport-injury context. For example, when examining stress-buffering effects in Study 1, the four types of social support (i.e. emotional, esteem, informational, and tangible) that have been reflected in the injury and sport literature were carefully matched to injury-related stressors. Subsequently, injured athletes reported beneficial effects for social support in light of the related stressors that they were experiencing. That is, when confronted by certain stressful situations (e.g. being incapacitated), the perception that social support was available enabled the injured athletes to appraise the event in a less stressful manner and enhanced their perception of their ability to cope with that stressor. Indeed, injured athletes in Study 3 confirmed that different network members provided specific types of social support to deal with the numerous stressors that they experienced throughout the rehabilitation

period. Similarly, in Study 4 a number of social support types were provided to the injured athlete to help him deal with the different stressors he experienced. The specificity of the different social support types that were offered to the injured athlete along with the perception of their availability were believed to be particularly beneficial in helping him to deal with different injury-related stressors.

It is clear from the programme of research that specific support types were needed by injured athletes and provided by different support network members throughout the rehabilitation period. The specific aspect of social support within the thesis is similar to previous sport-injury research, although some researchers have utilised a higher-order, global support factor and so it may be the case that a more global approach to social support may warrant attention in order to further our understanding of stress-buffering effects of social support.

Measurement of social support and psychological responses to sport injury

Research has highlighted a number of issues in relation to the measurement of social support and a number of approaches have been adopted (Holt & Hoar, 2006). Although there is some agreement that social support should be viewed from a multidimensional perspective (i.e. structural and functional), the psychometric properties of many of the measures of social support presented in the research literature have been questioned (Rees, 2007). The programme of research attempted to address the need for context-specific, psychometrically derived measures to examine main and stress-buffering effects of social support.

In line with the multidimensional perspective of social support that was adopted in the thesis, a functional measurement approach was utilised. A functional measurement approach is inherently a multidimensional one as it assumes that different types of supportive functions are differentially use-

ful for various types of stressors (Cohen & McKay, 1984; Cutrona & Russell, 1990). This conceptualisation of social support was reflected throughout the programme of research. For example, functions that were provided to injured athletes by network members could be organised along two dimensions: the perception of support availability and received support. In addition, the types of social support (i.e. emotional, esteem, informational, and tangible) that formed the basis of the measures developed in Study 1 and Study 2 to examine main and stress-buffering effects, reflected the functional aspects of social support highlighted in the literature.

In theory, functional measures should be most relevant to adjustment for injured athletes experiencing high levels of stress as they tap the availability of different types of social support needed to cope with varying stressors. These measures typically demonstrate stress-buffering effects; that is, they reduce the relationship between stressors and negative, adverse responses. The use of functional measures in Study 1 and Study 2 enabled the assessment of the types of social support functions that are thought to be most effective when dealing with injury-related stressors. Furthermore, it allowed an understanding of those support functions that were not beneficial at particular times and in relation to specific stressors.

Early research when measuring emotional responses to injury adopted the Profile of Mood States (POMS) as the preferred measurement tool. The need for population specific measures to assess the psychological responses of injured athletes was addressed in the thesis. Indeed, the refinement and use of the psychological responses measure highlighted the importance of a number of response characteristics that had not previously been accounted for in much of the empirical research, but which the clinical and qualitative injury research literature had provided support for. Furthermore, the qualitative follow-up study and intervention in the thesis generally supported the responses

assessed by the psychological responses measure. The results of the confirmatory factor analyses that were carried out on all three measures (i.e. perceived available social support, received social support, and psychological responses) reported adequate levels of psychometric integrity. The programme of research, therefore, ensured psychometrically derived, context-specific measures that could be used to test specific hypotheses related to the main and stress-buffering effects of social support on psychological responses of injured athletes.

Temporal nature of social support and psychological responses to injury

The importance for accounting for and exploring change has been identified within the psychological injury response and social support literature (cf. Evans et. al., 2006), and had important implications for this programme of research. Indeed, in Studies 3 and 4, different support types appeared to be salient at different stages of rehabilitation and in response to different injury related stressors. Furthermore, support sources also appeared to display a temporal aspect in relation to the support providers which reflected a change in the stressors over time.

Change is an implicit feature of psychological and emotional responses. However, within the empirical research there has been much variability in the frequency and timing of data collection throughout the rehabilitation period relative to the onset of injury and return to sport. The research programme employed methodologies which accounted for this temporal feature. An intraindividual process oriented approach underpinned the development of the psychological responses measure which allowed for the examination of the temporal changes implied by models of injury (Evans & Hardy, 1999). Data collection procedures in subsequent studies in the thesis (i.e. Study 3 and Study 4) accounted for all response phases and tapped the change in responses over time.

The qualitative follow-up study (Study 3) examined the process of change, from injury

occurrence to return to sport. This enabled an understanding of the antecedents of specific cognitions, emotions, and behaviours, and the potential mechanisms through which effects are exerted, which in turn, underpinned the intervention study reported in Study 4. The longitudinal action research study was able to explore some of the antecedents of the athlete's psychological responses, and the factors that precipitated a change in these responses over time and the role of social support in the injury-response process.

Practical implications

A number of practical implications emerged from this programme of research. The accurate measurement of athletes' psychological responses to injury has been identified as a concern in the literature, particularly when intervening with injured athletes (Evans et al., 2006, 2008). This was addressed in the thesis by developing the measure of psychological responses. Specifically, this measure will enable researchers and applied practitioners to enhance understanding of the psychological responses that an athlete may experience during injury and rehabilitation. This in turn will help practitioners working with injured athletes to expedite their return to competitive sport. In addition, through a process of education, athletes and sports medicine providers alike will gain a greater understanding of the psychological consequences of sport injury.

It is evident from the thesis that social support helps individuals to cope with a variety of injury-related stressors. This was demonstrated through the stress-buffering effects of the perception that support was available to injured athletes. The stress-buffering effects of social support reported in this thesis highlight the palliative nature of social support in a rehabilitation context. Applied practitioners should, therefore, be mindful of the protective qualities of different support types for different stressors. For example, when athletes are incapacitated or experience a loss of confidence as a result of

injury, social support may enhance an injured athlete's self-esteem, reduce feelings of isolation and restlessness, and influence their emotional state and feelings of well-being. However, as well as the beneficial effects, applied practitioners should be aware of the potential negative effects that providing support can have. Network members need to be educated to ensure that they become effective support providers, both in terms of the quantity and quality of the support that they make available to the injured athlete.

Within the programme of research it was clear that injured athletes were able to match the support that they thought was available to them to the stressors that they were experiencing. Subsequently, negative psychological responses were lessened. Therefore, careful consideration should be given to the support that is made available to injured athletes in the rehabilitation domain. Social support networks need to be resourceful and appropriate to ensure that the support that is made available can help an athlete to appraise an injury as less stressful and enable them to cope with related stressors. In order to develop and maintain such a network, members should listen carefully to the needs of the injured athlete so that they can make available support that is specific to the needs elicited by the stressful events that the athlete may be experiencing. Although the perception of support availability may not be as straightforward as it may seem, some evidence suggests that perceived support is affected by receiving support over time (Norris & Kaniasty, 1996). The intervention that was provided in the thesis supported this contention. Supportive environments that are developed over time which provide a stable support resource for the injured athlete should, therefore, be encouraged. In turn this will not only help the athlete to maintain feelings of self-worth and identity through healthy interactions with other members, but will provide a sense of being supported that will be available when and wherever needed.

The main effects of received social support that were reported in the thesis should not be overlooked. Social support can function irrespective of stress and applied practitioners should be aware that a vibrant and responsive network that facilitates regular integration may provide a preventative mechanism for the injured athlete. From a practical perspective, therefore, support should always be offered to athletes that match their needs. Providing support that athletes need and are satisfied with will in turn allow them to fulfil certain needs and roles in life.

Future research directions

This programme of research has resulted in a number of recommendations that are considered relevant for future research. The use of population specific and theoretically derived measures should continue to be encouraged in order to test specific hypotheses in relation to the underpinning pathways of social support (Rees, 2007). As previously discussed, the thesis utilised specific measures of social support to explore the effectiveness of specific dimensions of support in dealing with specific injury-related stressors. That is, from a functional perspective, the emphasis reflected the role of stress appraisals (psychological level factor) on the buffering process (Uchino, 2004). Consequently, this approach has shed further light on the effects of the functions of social interactions in an injury context. However, in order to further test proposed theoretical frameworks, research should consider the existence of a general factor where social support is acknowledged as a stable, global perception of the social environment (Rook & Underwood, 2000). The stable, trait like perspective of social support may offer alternative suggestions by which social support operates to affect psychological responses. Indeed, an aggregate measure of support may warrant further attention particularly as support dimensions were found to be correlated in Study 1 and Study 2. In particular, if measures of perceived and received support

are to be used synonymously as discussed previously, then higher-order factors of social support may be valuable in clarifying how social support operates and distinguishing between the two aspects of social support.

The current programme of research examined social support from a stress and coping perspective. The findings from the studies in the thesis suggest that support reduces the effects of the stress of injury and or related stressors through either received support (i.e. main effects) or the belief that support is available (i.e. main and stress-buffering effects). However, other aspects of social support were reported in Study 3 of the thesis that may reflect a different theoretical perspective worthy of consideration. That is, social support sometimes operated by helping to enhance the injured athletes' identity and self-esteem. Symbolic interactionism (Stryker, 1980) endorses the regularisation of social interaction as opposed to the provision of social support *per se* (Lakey & Cohen, 2000). Indeed, the findings from Study 3 suggested at times that the social network enabled injured athletes to sustain identity through the fulfilment of different roles. Future research could therefore adopt measures of social integration to assess the extent to which injured athletes are involved in their social networks (cf. Brissette, Cohen & Seeman, 2000). Specifically, it could be assumed that diverse social roles would contribute to stress-buffering qualities but also be influential irrespective of the presence of stress.

Social support has historically focused on the positive aspects of relationships on health and well-being and often overlooked the negative aspects of it. The negative aspects of relationships need to be considered in the context of social support processes. The current thesis reported athletes experiencing negative aspects of exchanges when receiving support. Certain network ties can serve as an additional source of stress to certain injured athletes and future research needs to identify these

aspects as they may weaken associations between social support and the psychological responses of injured athletes.

Conclusion

The purpose of the thesis was to conduct an in-depth investigation into the role of social support within the injury-response process. The programme of research has resulted in developing and refining theoretically derived and context-specific measures of social support and psychological responses of injured athletes that demonstrate adequate psychometric integrity. The development of these measures allowed an examination of the main and stress-buffering effects of social support upon the psychological responses of injured athletes. Subsequent studies explored the underpinning processes and pathways of social support and its effects. Finally, a social support intervention examined the effects of social support availability and enacted support on expediting an injured athlete's recovery and return to competition. My thesis has contributed to

the empirical investigation of social support, and provided conceptual and practical implications for athletes and applied practitioners.

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