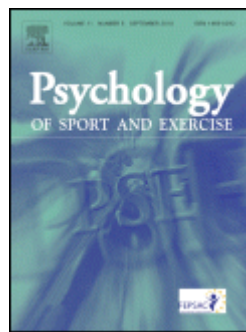Running head: SOCIAL SUPPORT AND PSYCHOLOGICAL RESPONSES TO INJURY

Stressors, social support and psychological responses to sport injury in high and low-performance standard participants

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performance standard participants

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Abstract

Objective

The purpose of the present study was to examine the main and buffering effect relationships between social support and psychological responses to sport injury with samples of high- and low-performance standard injured participants.

Method

High- ($N = 147$) and low-performance ($N = 114$) standard injured participants completed measures of perceived social support, injury-related stressors and psychological responses during physiotherapy clinic visits.

Results

Moderated hierarchical regression analyses revealed the following key findings: a) in the high-performance sample, there were significant ($p < 0.05$) main effects for social support in relation to psychological responses; b) in the low-performance sample, there were significant buffering effects for social support in relation to psychological responses. That is, in the low-performance sample, 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.

Conclusion

These results highlight that the relationships between social support, stressors, and psychological responses to sport injury may differ, depending upon the performance standard of the athlete. The impact of social support in the injury process may therefore be more complicated than first thought, and this has implications for interventions aimed at increasing social support for injured athletes.

Key words: Social support, stressors, sport injury, psychological responses, sport psychology

Stressors, social support and psychological responses to sport injury in high and low-

performance standard participants

There is growing recognition in the sport psychology literature that social support

plays an important role in the way athletes cope with and rehabilitate from sport injury (e.g.,

Bianco, 2001; Johnston & Carroll, 1998; Podlog & Eklund, 2006; Tracey, 2003; Udry, 1997).

As well as being noted within the most widely accepted conceptual models of the injury

process (e.g., Wiese-Bjornstal, Smith, Shaffer, & Morrey's, 1998, stress-based Integrated

Model of Response), empirical evidence demonstrates that social support can enhance the

well being of injured athletes by reducing distress (Bianco, Malo, & Orlick, 1999),

preventing perceptions of isolation and fears of re-injury (Podlog & Eklund, 2004), and by

increasing motivation (Bianco, 2001), rehabilitation adherence (Duda, Smart, & Tappe, 1989;

Evans, Hardy, & Fleming, 2000; Fisher, Domm, & Wuest, 1988; Johnston & Carroll, 1998),

and self-confidence (Magyar & Duda, 2000). Indeed, injury is a social process whereby

exchanges with, as well as the perception of the availability of support from, friends, family

members, teammates, coaches and medical staff, in addition to the size and aptness of the

network, may affect athletes' ability to cope. It is therefore unsurprising that social support

has been afforded such a central role in injury response and rehabilitation (Gould, Udry,

Bridges, & Beck, 1997a; Tracey, 2003; Udry, 1997).

Three key theoretical perspectives have underpinned research on social support

(Lakey & Cohen, 2000): the stress and coping perspective, the social constructionist

perspective and the relationship perspective. Within each perspective, different types of

support and operational mechanisms are emphasised. There is, therefore, no definitive

understanding of how social support per se and the different types of support operate. There

are, however, two principal models that explain the conditions under which social support is

related to outcomes (for reviews, see Bianco & Eklund, 2001; Cohen, Gottlieb, &

Underwood, 2000; Cohen & Wills, 1985; Holt & Hoar, 2006; Rees, 2007): the buffering effect model and the main effect model.

The notion of buffering effects is primarily tied to models of the stress process, appraisal and coping (e.g., Cox, 1978; Lazarus, 1966; Lazarus & Folkman, 1984). Social support may intervene at specific points along the pathway from encountering stressors, through experiencing stress, to subsequent outcomes such as psychological responses to sport injury (Cohen & Wills, 1985). For example, social support may help to redefine the threat posed by a stressor, alter an individual's perceptions of his/her available resources to cope, or lead an individual to feel more in control, which could all prevent a stressor from being appraised as highly stressful (Cohen et al., 2000; Cohen & Wills, 1985; Schwarzer & Leppin, 1991). Once stress is experienced, however, social support may reduce or alter the affective reaction, physiological response, or behavioural response to the stressful event, decrease the perceived importance of the problem, lead to improved coping, or provide a distraction from, or a solution to, the problem (Cohen et al., 2000; Cohen & Wills, 1985).

In the context of the present study, buffering would imply that the detrimental relationships between stressors and psychological responses would be reduced (buffered) for those with high social support compared to those with low social support, but level of social support would be relatively unimportant at low levels of stressors. In other words, social support moderates the negative relationship between stressors and psychological responses to sport injury. Injured athletes may be faced with a variety of highly stressful demands (stressors) that have the potential to significantly affect their responses to, and rehabilitation from injury (Evans et al., 2000; Podlog & Eklund, 2006, 2007; Tracey, 2003). For example, incapacitation and disruption to normal functioning have been found to exacerbate feelings of depression and frustration (cf. Evans & Hardy, 1995; Johnston & Carroll, 1998). In turn, slowness of progress and rehabilitation setbacks can reduce athletes' levels of motivation and self-confidence, and as a result, their adherence to rehabilitation programmes. Given that

injury can be a stressful and traumatic experience for many athletes (Bianco et al., 1999; Eklund & Bianco, 2004; Tracey, 2003), the potential for social support to buffer the negative relationships between stressors and psychological responses has important implications for the injury process.

In contrast to the buffering effect model, the main effect model would suggest that social support has a beneficial relationship with psychological responses irrespective of levels of stressors (Cohen & Wills, 1985). In other words, the mere perception of one's relationships as being supportive is enough to lead to favourable outcomes. In the absence of buffering, main effects should therefore be routinely examined. For example, as Wheaton (1985) demonstrated, significant main effects for stressors and social support could be described within an independent distress deterrent model. That is, stressors and social support may be associated with separate and opposite effects, with social support counteracting the negative relationships between stressors and psychological responses (Wheaton, 1985).

A main effect would be demonstrated if social support is significantly associated with psychological responses independent of stressors; a buffering effect would be demonstrated if the interaction term of stressors and perceived support is significantly associated with psychological responses. The normal procedure for testing buffering effects is moderated hierarchical regression analysis (Cohen & Wills, 1985; Jaccard, Turrisi, & Wan, 1990; Biddle, Markland, Gilbourne, Chatzisarantis, & Sparkes, 2001), which incorporates tests for main effects of social support and interactions of stressors and social support (buffering). This is the procedure we followed in the present study.

In light of the preceding discussion, the principal aim of the present research was to examine the main and buffering effect relationships between social support and psychological responses to sport injury. A secondary, exploratory, aim was to examine these relationships across different performance standards of participants. Wiese-Bjornstal et al.'s (1998) model highlighted performance standard (level of competition) as one of a number of situational

factors that exert an impact throughout the injury process. Although performance standard has received limited attention with regard to the relationships between social support and injury-related outcomes, research suggests that the impact of injury-related stressors may be greatest for athletes who have made a large investment in sport (Johnston & Carroll, 1998), who have developed a strong athletic identity, for whom sport involvement is an important source of self-worth (Green & Weinberg, 2001), and for whom sport provides important sources of attachment (Evans & Hardy, 1995). These findings are consistent with Podlog and Eklund (2007) who recently acknowledged the importance of sporting standard (or level of sports participation) in the social support-injury relationship and the extent to which social support may moderate injured athletes' appraisals of injury-related stressors. Potentially, therefore, sporting standard may have important implications for the way in which social support functions and its relationships with the psychological responses of injured athletes. To summarize, the overall purpose of the present study was to examine the main and buffering effect relationships between social support and psychological responses to sport injury with samples of high- and low-performance standard injured participants.

Hypotheses

    Hypothesis 1: There will be a main effect for stressors: Stressors will be associated with negative psychological responses to sport injury.

    Hypothesis 2: There will be a main effect for social support: Social support will be associated with positive psychological responses to sport injury.

    Hypothesis 3: There will be an interaction of social support and stressors. Specifically, we hypothesised an ordinal interaction that would be demonstrated by the following: the detrimental relationships between stressors and psychological responses would be reduced (buffered) for those with high social support compared to those with low social support, but level of social support would be relatively unimportant at low levels of stressors.

Method

Participants

Participants were 261 injured athletes (213 males, 48 females) from 28 different sports with a mean age of 27.27 years (SD = 9.43). The high-performance standard participants (*N* = 147: 121 males, 26 females; mean age 26.63 years, SD = 8.51) were of national and/or international standard. The low-performance standard participants (*N* = 114: 92 males, 22 females; mean age 28.10 years, SD = 10.33) were of college, recreational, or local league standard. More than 85% of sports were similar across the performance standards. Injury severity across the whole sample (in terms of time not participating in sport due to injury) ranged from 3 to 336 weeks (Mean = 21.31, SD = 35.55). There was no difference in the injury severity between the high-performance standard participants (Range 3 to 288 weeks, Mean = 24.46, SD = 35.83) and the low-performance standard participants (Range 3 to 336 weeks, Mean = 17.26, SD = 34.92), t_{259} = 1.63, *p* = .11.

Procedures

The study was approved by an institutional ethics committee, and participants provided informed consent. Participants who were receiving treatment for their current injury from various chartered physiotherapist clinics across the United Kingdom were approached and asked to self-report on their standard of performance (international/national, regional, college/recreational/local league). They were then asked to complete measures of social support, stressors, and psychological responses to sport injury before clinical appointments with ten physiotherapists. Participants who self-reported a standard of regional (i.e., could neither be classified as high- or low-performance standard; *N* = 40) were omitted from the study.

Measures

Social support. Social support was assessed using the Social Support Inventory for Injured Athletes (SSIIA: Mitchell, Rees, Evans, & Hardy, 2005). This 16-item self-report inventory assesses perceived social support and represents the dimensions of emotional,

esteem, informational, and tangible support identified by Rees and Hardy (2000) in their examination of the social support experiences of high-level sportspeople. Emotional support relates to how, during times of injury, others are there for comfort and security, leading the individual to feel loved and cared for. Esteem support relates to other people bolstering the individual's sense of competence or self-esteem by providing positive feedback on the individual's skills and abilities or by communicating a belief that the individual is capable of coping with the injury. Informational support relates to the provision of advice or guidance to the individual concerning possible solutions to injury-related problems. Tangible support relates to concrete instrumental assistance given to an individual, in which an injured person is given the necessary resources to cope with the injury (cf. Cutrona & Russell, 1990). The inventory asked respondents, "To what extent do you have someone . . . ?" with response options ranging on a 5-point Likert scale from 1 (*not at all*) to 5 (*a lot*). Sample items included "who listens to your concerns" (emotional), "who reassures you" (esteem), "who helps you put things into perspective" (informational), and "who helps plan training to deal with injury problems" (tangible). Prior to data collection, the items making up each social support dimension (and all other items in this study) were scrutinised for relevance and representativeness by the study authors, as well as an Olympic-level athlete and a senior physiotherapist. A further four researchers/applied practitioners who were experienced in the field of the psychology of sports injury within the study authors' institutions correctly assigned 100% of the social support items to their corresponding dimensions.

Data from the present study were screened for outliers, missing values, and indices of non-normality, prior to conducting confirmatory factor analysis (CFA: Jöreskog & Sörbom, 1993). As departures from multivariate normality were observed (a phenomenon often observed with Likert-type scaling), we computed Satorra-Bentler (SB: Satorra & Bentler, 1994) scaled chi-square tests. CFA of the four-factor model using data from the 261 participants in the present study revealed a good model fit (cf. Hu & Bentler, 1999: SB χ^2(98)

= 163.07, $p < .01$; RMSEA = .05; RMSEA(p) = .46; SRMR = .05; CFI = .96; NNFI = .95).

Cronbach's alpha internal consistency reliability coefficients for the subscales were as

follows: emotional ($\alpha = .82$), esteem ($\alpha = .85$), informational ($\alpha = .81$), and tangible ($\alpha = .84$).

Correlations between the social support dimensions ranged from moderate ($r = .39, p < .001$)

to high ($r = .85, p < .001$). Correlations of this magnitude have been noted with other social

support measures (see, e.g., Brookings & Bolton, 1988). In light of these correlations, we also

ran two further models with the social support data in CFA: A single higher-order factor

model revealed a good fit (SB χ^2(100) = 174.18, $p < .01$; RMSEA = .05; RMSEA(p) = .32;

SRMR = .05; CFI = .95; NNFI = .94); A model with all items loading on a single scale

revealed a poor fit (SB χ^2(104) = 527.30, $p < .01$; RMSEA = .13; RMSEA(p) < .01; SRMR =

.10; CFI = .83; NNFI = .80). The correlations between the social support dimensions and the

result of the higher-order factor model CFA provided support for the use in subsequent

analyses of (a) an aggregate social support score (a mean of the four subscales), and (b)

individual social support subscale scores[1].

Stressors. Cohen, Kessler, and Underwood-Gordon (1997) highlighted three broad

approaches used by researchers to measure stress. Each approach focuses upon different

components of the stress process from situational demands to outcomes (e.g., psychological

responses to sport injury). The environmental approach focuses upon situational demands; the

psychological approach focuses upon subjective stress appraisals; and the biological approach

focuses upon stress responses. The present study assessed situational demands (stressors)

faced by injured athletes. The following two perceived stressors were used to generate single-

item measures of potential injury-related stressors and were chosen for their particular

relevance to the injury process: "incapacitation," and "slowness of progress." These stressors

have been acknowledged within previous injury research (e.g., Johnston & Carroll, 1998;

Eklund & Bianco, 2004; Evans et al., 2000; Gould, Udry, Bridges, & Beck, 1997b; Podlog &

Eklund, 2006, 2007; Tracey, 2003). The measure asked respondents, "To what extent are

these an issue for you as an injured athlete . . . ?" with response options ranging on a 5-point

Likert scale from 1 (*not at all*) to 5 (*a lot*). Although these stressor items were chosen to

assess different sources of stress, they were averaged to create a total score for stressors.

They were not, however, intended to form a single-factor scale. This process served to reduce

the number of models to be tested and aided clarity, but should not be interpreted as evidence

that the stressors measure the same underlying construct. The correlation between the two

stressors was $r = .42$ ($p < .001$).

Psychological responses to sport injury. Psychological responses to sport injury were

measured using two negatively-worded subscales (devastation, dispirited) and the one

positively-worded subscale (reorganisation) from the Psychological Responses to Sport

Injury Inventory (PRSII: Evans, Hardy, & Mullen, 1996; Evans, Hardy, Mitchell, & Rees,

2008), a population-specific inventory of athletes' psychological responses to sport injury.

Devastation (four items) reflects feelings of shock and emptiness, which have frequently been

reported to characterise athletes' responses to injury (Brewer, Petitpas, Van Raalte, Sklar, &

Ditmar, 1995; McDonald & Hardy, 1990). Dispirited (four items) reflects feelings of apathy,

lack of motivation, and frustration. Reorganisation (three items) reflects constructs such as

confidence (Evans et al., 2000; Gordon & Lindgren, 1990). The inventory asked respondents,

"Please indicate the extent to which each of the following statements reflects how you

presently feel . . . ," with response options ranging on a 5-point Likert scale from 1 (*strongly*

disagree) to 5 (*strongly agree*). Sample items included "I am devastated by the injury"

(devastated), "I feel dispirited" (dispirited), and "I have much more confidence in myself"

(reorganisation). Data from the present study were screened for outliers, missing values, and

indices of non-normality, prior to conducting CFA. As departures from multivariate

normality were observed, we computed Satorra-Bentler scaled chi-square tests. CFA of the

three-factor model using the data from the 261 participants in the present study revealed a

reasonable model fit (SB $\chi^2(41) = 84.14$, $p < .01$; RMSEA = .06; RMSEA(p) = .12; SRMR =

.05; CFI = .93; NNFI = .90). Cronbach's alpha internal consistency reliability coefficients for

the PRSII subscales in the present study were as follows: devastated (α =.71), dispirited (α =.68), and reorganisation (α =.66). Correlations between the subscales were as follows: devastation and reorganisation (r = .05, p = .38); dispirited and reorganisation (r = .02, p = .70); devastated and dispirited (r = .64, p < .01).

Results

Means, standard deviations, coefficient alphas, and intercorrelations across the high- and low-performance standard participants for all subscales used in this study are in Tables 1 and 2.

The Relationships between Stressors, Social Support, their Product and Psychological Responses to Sport Injury

Moderated hierarchical regression analyses (Jaccard et al., 1990) were used to examine the relationships between stressors, social support, their product and psychological responses. The independent variables were entered in a three-step process, corresponding with the testing of the buffering hypothesis (Baron & Kenny, 1986; Cohen & Wills, 1985). First, the stressors were entered. Second, social support was entered. Third, the product of the stressors and social support (the interaction term, relating to whether social support has moderated the relationships between stressors and psychological responses) was entered. The significance of increments in explained variance in psychological responses over and above the variance accounted for by those variables already entered into the equation, as well as the sign of the regression coefficients, was then assessed at each step. In line with Jaccard et al.'s recommendations, the independent variables were standardized prior to entry. Assumptions for regression analyses were tested and satisfied as follows. Across all models there were never more than eight standardized residuals greater than 1.96 in absolute value, with none greater than 2.58. The assumption of no multicollinearity was satisfied: Intercorrelations between independent variables were not greater than .80, variance inflation factor (VIF) values were below 10, average VIF values were not substantially greater than 1, and tolerance

values were above .2 (Stevens, 1996). Values for the Durban-Watson statistic (1.61-2.11) were within the accepted range of above 1 and below 3, satisfying the assumption of independent errors. The residuals were normally distributed, and were randomly and evenly distributed at each level of the predictor, satisfying the assumptions of homoscedasticity, normally distributed errors, and linearity.

High-performance standard participants

Results from the moderated hierarchical regression analyses[2] are shown in Table 3. There were significant main effects for stressors in relation to devastation (R^2 = .06, *b* = .20, *p* < .01) and dispirited (R^2 = .04, *b* = .17, *p* < .01). Over and above the variance accounted for by stressors, there were significant main effects for the aggregate social support score in relation to devastation (ΔR^2 = .03, *b* = -.14, *p* = .04) and dispirited (ΔR^2 = .05, *b* = -.18, *p* = .01). These effects were in the hypothesised directions: Stressors were associated with higher levels of devastation and dispirited; social support was associated with lower levels of devastation and dispirited. There were no significant interactions (see Figure 1). There was therefore some support within this subsample for Hypotheses 1 and 2, but no support for Hypothesis 3.

Low-performance standard participants

Results from the moderated hierarchical regression analyses are shown in Table 4. There were significant main effects for stressors in relation to devastation (R^2 = .07, *b* = .17, *p* = .01) and dispirited (R^2 = .04, *b* = .12, *p* = .03). Over and above the variance accounted for by stressors, there was one significant main effect for the aggregate social support score in relation to reorganisation (ΔR^2 = .07, *b* = .21, *p* < .01). These effects were in the hypothesised directions: Stressors were associated with higher levels of devastation and dispirited; social support was associated with higher levels of reorganisation. All three interactions (buffering effects) added significantly (devastation ΔR^2 = .05, *b* = -.17, *p* = .01; dispirited ΔR^2 = .08, *b* = -.22, *p* < .01; reorganisation ΔR^2 = .05, *b* = .17, *p* = .02) to the variance in psychological

responses explained by the main effects of stressors and social support. Graphs of the significant interactions demonstrated (see Figure 2) that these were consistent with buffering explanations: 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. There was therefore some support within this subsample for all three hypotheses.

Comparing the Relationships between Stressors, Social Support, their Product and Psychological Responses to Sport Injury for Low- and High-Performance Standard Participants Simultaneously

In light of the differential pattern of results across the performance standards, we conducted a further set of analyses, the purpose of which was to test the study relationships for both the low- and high-performance standard participants simultaneously. In this set of analyses, three-way interactions of performance standard, stressors and support would provide an additional opportunity to examine the apparent differences between performance standards. We created a dummy-coded variable to represent performance standard, and entered variables into moderated hierarchical regression analysis in a five-step process. First, the dummy-coded performance standard variable was entered. Second, the stressors were entered. Third, social support was entered. Fourth, three two-way interactions were entered: the products of the dummy-coded variable and stressors, the dummy-coded variable and social support, and the stressors and social support. Finally, a three-way interaction of the dummy-coded variable, stressors, and social support was entered. As in the previous set of regression analyses, assumptions were conducted and similarly satisfied. The only differences were as follows: There were 13 standardized residuals greater than 1.96 in absolute value in the model with reorganisation as the dependent variable (none of the standardized residuals were greater than 2.58); and the values for the Durban-Watson statistic ranged from 1.79 to 2.03.

Results from the moderated hierarchical regression analyses are shown in Table 5. There were non-significant relationships between the dummy-coded performance variable and psychological responses across all three models. There were significant main effects for stressors in relation to devastation ($R^2 = .06$, $b = .18$, $p < .01$) and dispirited ($R^2 = .04$, $b = .13$, $p < .01$). Over and above the variance accounted for by stressors, there were significant main effects for the aggregate social support score in relation to devastation ($\Delta R^2 = .03$, $b = -.13$, $p = .01$), dispirited ($\Delta R^2 = .04$, $b = -.15$, $p < .01$), and reorganisation ($\Delta R^2 = .04$, $b = .17$, $p < .01$). Although the relationships between the set of two-way products and psychological responses were only significant in relation to dispirited ($\Delta R^2 = .03$, $p = .03$), the interactions of stressors and social support were all significant in the final equation: devastation ($b = -.09$, $p = .04$), dispirited ($b = -.13$, $p < .01$), and reorganisation ($b = .12$, $p = .02$). The key results of interest in this set of analyses were the three-way interactions, all of which were non-significant: devastation ($\Delta R^2 = .01$, $b = .14$, $p = .13$), dispirited ($\Delta R^2 = .01$, $b = .14$, $p = .13$), and reorganisation ($\Delta R^2 < .01$, $b = -.09$, $p = .43$). Overall, these results suggest that when both performance standards were tested simultaneously, the interactions of stressors and support were significant in relation to psychological responses across all participants.

Discussion

The results of this study suggest that social support is positively related to psychological responses, but its function may differ in high- and low-performance standard participants. For the high-performance standard participants, social support operated as a main effect. Specifically, high levels of social support were associated with lower levels of devastation and dispirited. In contrast, for the low-performance standard participants, social support operated primarily as a buffer effect. That is, the detrimental relationships between stressors and devastation, dispirited, and reorganisation 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.

A caveat to the conclusions above is that the additional set of regression analyses revealed non-significant relationships between the three-way interactions (of the dummy-coded performance standard variable, stressors, and social support) and psychological responses. This might imply that one cannot make robust conclusions with regard to the differential pattern of results observed for the buffer effect interactions within each performance standard group. Indeed, one could, on the basis of this set of results, conclude that for both performance standards the interactions of stressors and support were similarly significant in relation to psychological responses. However, we would argue that it would be misleading to report only the last set of analyses (with both performance standards tested simultaneously) in which non-significant effects for the three-way interactions were highlighted, because this effectively ignores important differences within each performance standard. It is also conceivable, given that such analyses are so affected by power and sample size, that the results of the three-way interactions are Type II errors. In such a stringent analysis, the power to detect effects shrinks with each step of the analysis, and the analysis demands an effect over and above variance that is already accounted for. In the following, we therefore discuss the results in relation to each of the performance standards, but we do urge readers to treat our results and conclusions with caution.

Why then was buffering evident with the low-performance sample but not with the high-performance sample? As we noted in the introduction to this paper, the negative impact of injury-related stressors may be most evident in athletes who have made a large investment in sport (Johnston & Carroll, 1998), who have developed a strong athletic identity, and for whom sport involvement provides important sources of self-worth (Green & Weinberg, 2001) and attachment (Evans & Hardy, 1995). One might therefore expect that injury-related stressors such as incapacitation and slowness of progress would be a far greater source of stress for the high-performance standard participants. For example, incapacitation, which inevitably leads to a disruption to normal functioning can result in the loss of important

attachments (e.g., self-image, self-esteem). Interruptions to these social and psychological attachments are important to the high-performance standard participants with high levels of investment/identity, not least because these attachments form the basis of many types of self-gratification and social reinforcement (Evans & Hardy, 1995). These participants may therefore, experience greater levels of devastation, dispirited, and lower levels of reorganisation. In turn, for these participants, the social support might be far more important as a buffer for these negative relationships.

In terms of the low-performance standard participants, one might logically expect the opposite: Because investment in sport and the sources of attachment are less, and athletic identity weaker, both the sources of stress and the impact of social support might be less salient. However, the findings do not support this proposition, and therefore further structured research is recommended. To elaborate, although the main effect of social support suggested that for the high-performance standard participants social support aided their psychological responses to sport injury, it is possible that these participants were simply better equipped to cope with injury-related stressors than the low-performance standard participants, and as a result did not need social support to aid their coping with stressors as did their low-performance counterparts. Alternatively, in line with Uchino's (2009) more recent predictions, the high-performance standard participants' social support may have led to a more functional psychological response to injury through the mechanism of proactive coping (i.e., efforts undertaken in advance of a potentially stressful event to prevent it or to modify its form before it occurs:" Aspinwall & Taylor, 1997, p. 417), and through making healthy behavioral choices and adhering to medical treatment (DiMatteo, 2004).

Despite this potentially contradictory evidence, the pattern of main effects observed in the high-performance sample may shed further light on the results. There were significant main effects for stressors and social support in relation to psychological responses in two of the three models tested. Entered first, stressors were associated with less positive

psychological responses. Over and above the variance in psychological responses explained by stressors, social support was associated with more positive psychological responses. Thus, these beneficial main effects may have off-set the negative impact of the stressors. As Wheaton, (1985) noted, in such main effect cases, social support may act as an "independent distress deterrent" by directly counterbalancing any negative relationship between stressors and psychological responses, potentially via its impact upon intermediate mechanisms (see Lakey & Cohen, 2000).

The findings of the present study have important implications for researchers and practitioners alike. The results suggest that social support is beneficially associated with psychological responses, but that the distinction between the performance standard of the injured athlete should be taken into account. The main effects imply that for the high-performance standard athlete, attempts to increase perceptions of social support should be encouraged irrespective of the levels of stressors encountered by the athlete. The buffering effects imply that, for low-performance standard athletes, increasing perceptions of social support would be primarily important for those facing stressors (i.e., incapacitation and slowness of progress). The direct provision of support (received support) may increase perceptions of support over time (Norris & Kaniasty, 1996), so at-risk athletes could be encouraged to be proactive in using the social support that is available to them. At the same time, coaches could be encouraged to employ an open door policy for injured athletes (Richman, Hardy, Rosenfeld, & Callanan, 1989), and support providers in general could be educated to better understand the injured athlete's requirements (see Bianco & Eklund, 2001).

A strength of this study is that a clear pattern of results was generated for high-performance and low-performance standard participants. The effect sizes for the interactions (5%, 5%, and 8%) were particularly notable. McClelland and Judd (1993) highlighted a number of statistical factors that contribute to the difficulty in finding significant interactions in field studies, compared with experimental studies, and Evans (1985) noted that significant

moderator effects are so difficult to detect, that effects as low as 1% should be viewed as important. Against this backdrop, there are some potential limitations. The self-report and correlational nature of this study precludes causal inference. The categorization into high-performance and low-performance standard participants was based upon self-report and does not reflect an objective assessment of performance standard. One further potential concern with the self-report measures of social support, stressors, and psychological responses is that any empirical demonstration of a relationship between two variables could be attributed, at least in part, to shared method variance. Finally, although the age and gender distributions across the performance standards were similar, there were more males than females in this study. Thus, conclusive recommendations across gender cannot be drawn.

In conclusion, the present study has provided an insight into when social support may positively influence psychological responses to sport injury. Despite the recent attention social support has received in a rehabilitation context, additional research is required to explore the support needs of athletes when they experience injury-related stressors and the effect of this support on their psychological responses. Clearly more structured research is recommended, in particular with regard to the impact of social support across different performance standards. Due to the temporal nature of injury-related stressors and psychological responses, future studies might include prospective and/or longitudinal designs, in order to examine how current perceptions of support affect subsequent psychological responses. Lakey and Cohen (2000) have outlined how attention should also be focused on the mechanisms underpinning the effects of social support. In relation to psychological responses, social support may lead to a host of positive affective and cognitive states, such as increased self-confidence (Vealey, 2001) and self-efficacy (Bandura, 1997), that in turn lead to better psychological response, and ultimately help to expedite recovery and return to competitive sport.

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Footnotes

[1] Brookings and Bolton (1988) similarly noted with the Interpersonal Support Evaluation List (Cohen, Mermelstein, Kamarck, & Hoberman, 1985) that a higher-order factor model and a more differentiated 4-factor model of support fitted equally well in CFA. These authors thus suggested that researchers employ a strategy of running subsequent analyses using both an aggregate support score and individual subscale scores, in order to best illustrate how social support operates.

[2] Additional analyses using the four social support subscales revealed no differential relationships between individual subscales and performance, and no difference in the predictive utility of individual subscales in comparison with the aggregate social support score. We have therefore only reported results for the aggregate social support score. These analyses therefore highlight that by combining social support subscales, the essence of this study's results is captured equally as well as if subscales had been employed. Although researchers argue that, at a conceptual level, social support may still be broken down into dimensional components (Cohen & Wills, 1985; Cutrona & Russell, 1990), this result suggests that in relation to their psychological responses to sport injury, participants may not distinguish among types of social support.

Table 1

Means, Standard Deviations, Coefficient Alphas, and Intercorrelations for All Scales - High-Performance Standard Participants

Scale	Mean	SD	α	1	2	3	4
1. Stressors	3.74	.98	.67				
2. Social support	3.76	.72	.92	-.01			
3. Devastation	2.20	.82	.70	.25**	-.17*		
4. Dispirited	2.49	.81	.69	.19*	-.23**	.63**	
5. Reorganization	2.89	.88	.68	.08	.15	.11	-.02

N = 147. *Note.* * denotes correlation significant at 0.05 level (2-tailed)
** denotes correlation significant at 0.01 level (2-tailed)

Table 2

Means, Standard Deviations, Coefficient Alphas, and Intercorrelations for All Scales - Low-Performance Standard Participants

Scale	Mean	SD	α	1	2	3	4
1. Stressors	3.62	.95	.54				
2. Social support	3.58	.81	.92	.00			
3. Devastation	2.24	.81	.70	.26**	-.14		
4. Dispirited	2.44	.79	.65	.21*	-.16	.68**	
5. Reorganization	2.70	.83	.59	.04	.27**	.05	.03

N = 114. *Note.* * denotes correlation significant at 0.05 level (2-tailed)
** denotes correlation significant at 0.01 level (2-tailed)

Table 3

Relationships between Stressors, Social Support, Product and Psychological Responses -
Hierarchical Regression Analyses for High-Performance Standard Participants

Dependent Variable	Independent Variable	ΣR^{2a}	ΔR^{2b}	$P(F)^c$	b^d	$p(t)^e$
Devastation	Stressors	.06	.06	.00	.20	.00
	Social support	.09	.03	.04	-.14	.04
	Product	.09	.00	.72	-.02	.72
Dispirited	Stressors	.04	.04	.02	.17	.01
	Social support	.09	.05	.01	-.18	.01
	Product	.09	.00	.34	-.06	.34
Reorganization	Stressors	.01	.01	.34	.05	.50
	Social support	.03	.02	.08	.12	.09
	Product	.04	.01	.27	.08	.27

$N = 147$. *Note.* All variables standardized except for product. Product was formed from the
two preceding (standardized) variables.

[a]Cumulative R^2. [b]Stepwise change in R^2. [c]Probability of F for ΔR^2. [d]Unstandardized
regression coefficient in final equation. [e]Probability of t for b.

Table 4

Relationships between Stressors, Social Support, Product and Psychological Responses -

Hierarchical Regression Analyses for Low-Performance Standard Participants.

Dependent Variable	Independent Variable	ΣR^{2a}	ΔR^{2b}	$P(F)^c$	b^d	$p(t)^e$
Devastation	Stressors	.07	.07	.01	.17	.02
	Social support	.09	.02	.12	-.10	.16
	Product	.14	.05	.01	-.17	.01
Dispirited	Stressors	.04	.04	.03	.12	.10
	Social support	.07	.03	.09	-.11	.14
	Product	.15	.08	.00	-.22	.00
Reorganization	Stressors	.00	.00	.65	.07	.35
	Social support	.07	.07	.00	.21	.01
	Product	.12	.05	.02	.17	.02

$N = 114$. *Note.* All variables standardized except for product. Product was formed from the

two preceding (standardized) variables.

[a]Cumulative R^2. [b]Stepwise change in R^2. [c]Probability of F for ΔR^2. [d]Unstandardized

regression coefficient in final equation. [e]Probability of t for b.

Table 5

Relationships between Dummy-Coded Performance Standard Variable, Stressors, Social Support, 2-Way and 3-Way Products and Psychological Responses - Hierarchical Regression Analyses for Low- and High-Performance Standard Participants Combined.

Dependent Variable	Independent Variable	ΣR^{2a}	ΔR^{2b}	$P(F)^c$	b^d	$p(t)^e$
Devastation	Performance standard	.00	.00	.73	-.03	.77
	Stressors	.06	.06	.00	.18	.00
	Social support	.09	.03	.01	-.13	.01
	2-way products	.10	.01	.22		
	(performance standard *stressors)				.06	.58
	(performance standard *social support)				-.04	.70
	(stressors*social support)				-.09	.04
	3-way product	.11	.01	.13	.14	.13
Dispirited	Performance standard	.00	.00	.64	.06	.51
	Stressors	.04	.04	.00	.13	.01
	Social support	.08	.04	.00	-.15	.00
	2-way products	.11	.03	.03		
	(performance standard *stressors)				.08	.43
	(performance standard *social support)				-.07	.47
	(stressors*social support)				-.13	.00
	3-way product	.12	.01	.13	.14	.13
Reorganization	Performance standard	.01	.01	.08	.14	.18
	Stressors	.02	.01	.31	.07	.22
	Social support	.06	.04	.00	.17	.00
	2-way products	.08	.02	.09		
	(performance standard *stressors)				-.05	.64
	(performance standard *social support)				-.09	.42
	(stressors*social support)				.12	.02
	3-way product	.08	.00	.43	-.09	.43

$N = 261$. *Note.* [a]Cumulative R^2. [b]Stepwise change in R^2. [c]Probability of F for ΔR^2.

[d]Unstandardized regression coefficient in final equation. [e]Probability of t for b.

Figure Caption

Figure 1. The non-significant interactions of stressors and social support in relation to

devastation, dispirited and reorganisation (high-performance standard participants). The x-

axis represents values of low (1 SD below the mean), mid (the mean), and high (1 SD above

the mean) levels of stressors. The lines represent values of low (1 SD below the mean) and

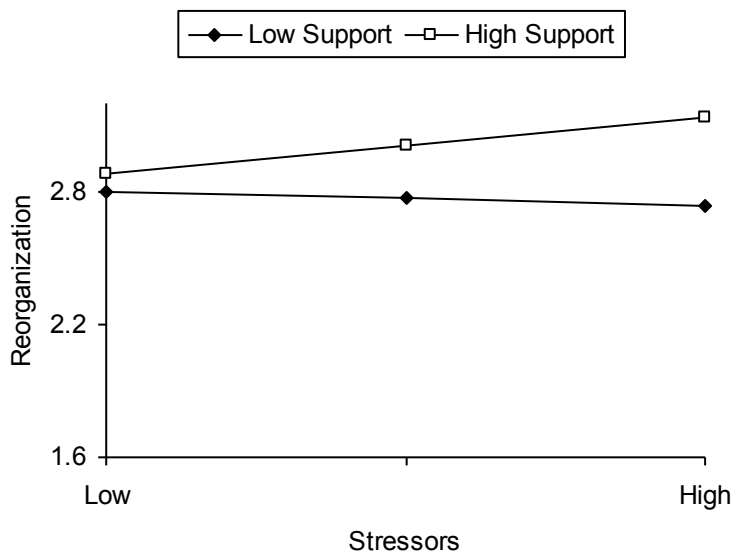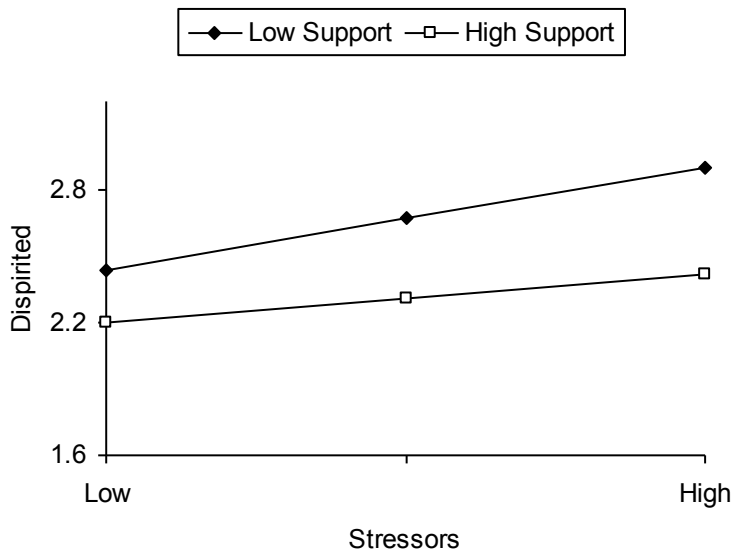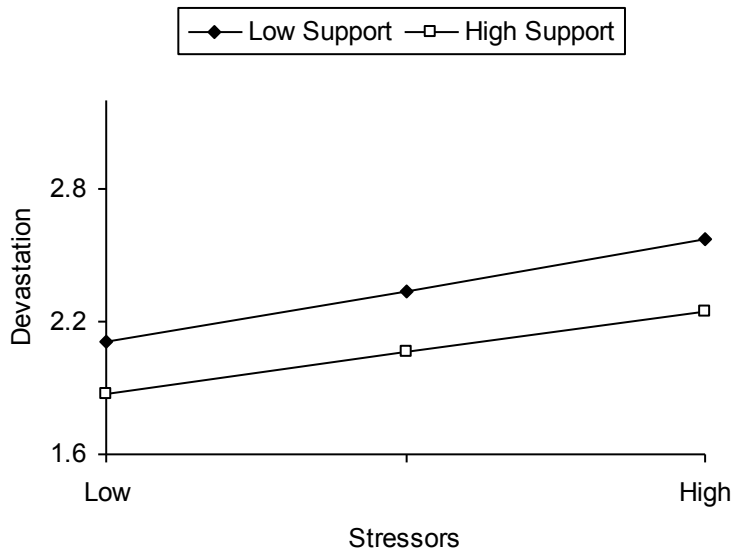high (1 SD above the mean) social support.

Figure Caption

Figure 2. The significant interactions of stressors and social support in relation to

devastation, dispirited and reorganisation (low-performance standard participants). The x-axis

represents values of low (1 SD below the mean), mid (the mean), and high (1 SD above the

mean) levels of stressors. The lines represent values of low (1 SD below the mean) and high

(1 SD above the mean) social support.