Examining the Relationship between Hardiness and Perceived Stress-Related Growth in a Sport Injury Context

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Running head: HARDINESS AND PERCEIVED STRESS-RELATED GROWTH

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Abstract

This study examined the relationship between hardiness, coping and perceived stress-related growth (SRG) in a sport injury context. Due to the exploratory nature of the study, a cross-sectional design was employed, whereby 206 previously injured athletes (148 male, 58 female, M_{age} = 22.23 years) who had recently returned to sport completed three questionnaires: Dispositional Resilience Scale, Stress-Related Growth Scale, and Brief COPE. Pearson product-moment correlations and Preacher's and Hayes's (2008) bootstrapping procedure were used to analyze the data. Findings revealed a significant positive relationship between hardiness and perceived SRG (r = .36; p < .05). Two coping strategies were found to mediate this relationship (i.e., emotional support and positive reframing). That is, the reason why athletes higher in hardiness had higher SRG scores is because they reported greater use of their social support for emotional reasons (e.g., moral support, sympathy or understanding) and were able to construe their injury in positive terms. These findings support some of the central tenets of Joseph and Linley's (2005) organismic valuing theory and provides implications for professional practice. Future researchers should embrace qualitative inquiry to enhance the interpretability and meaningfulness of these findings (e.g., interpretative phenomenological analysis, narrative analysis), and use a prospective, longitudinal pre-to-post sport injury design to further substantiate them.

Keywords: Positive reframing, emotional support, personality, recovery outcomes, stress-related growth

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There has been a shift in the psychology of sport injury literature, from the dominant focus on the negative consequences following injury, to a more inclusive approach that accounts for positive subjective experiences, positive individual traits, and positive resources in the environment (Crawford, Gayman, & Tracey, 2014; Podlog & Eklund, 2006; Wadey, Clark, Podlog, & McCullough, 2013). This shift is encouraging in that Wadey, Evans, Evans, and Mitchell (2011) suggested that to provide a more balanced, complete understanding of the sport injury experience, not only do both positive and negative consequences need to be explored, but also how they interact with one another. Indeed, although previous research has provided important insights into the stressors (e.g., incapacitation and rehabilitation setbacks), negatively-toned responses (e.g., grief and depression), and suboptimal outcomes (e.g., not returning to one's pre-injury level of functioning) experienced by injured athletes, more recently researchers have conducted studies that complement this body of literature by exploring desirable concepts such as personal growth, dispositional optimism, and self-determination (e.g., Podlog, Dimmock, & Miller, 2011; Tracey, 2011; Wadey, Evans, Hanton, & Neil, 2012a). For example, Podlog et al. (2011) used the self-determination theory to guide interventions for injured athletes returning to competitive sport that aim to promote an environment that satisfies the three human psychological needs of competence, relatedness, and autonomy in order to minimize negative responses and maximize positive outcomes. We feel this more inclusive approach has the potential to provide valuable insights for practitioners who aim to buffer injured athletes' against negative consequences, as well as fostering desirable responses and recovery outcomes.

One positive subjective experience that is gaining increased research attention in sport and exercise psychology generally, and the psychology of sport injury specifically among

researchers interested in stress and coping, is one's perceptions of growth following a stressful or traumatic experience. By growth, we mean perceived positive changes that propel the individual to a higher level of functioning than that which existed prior to the stressor (cf. Carver, 1998). Taken together, the research that has been conducted thus far across the discipline of sport and exercise psychology can be considered at a macro-, meso- and micro-level. A macro-level perspective considers the effect demanding stimuli have over an individual's career (e.g., Connaughton, Wadey, Hanton, & Jones, 2008; Day, 2013; Galli & Reel, 2012). A meso-level perspective is concerned with a more finite time period; for example, Burke and Sabiston's (2012) investigation of breast cancer survivors' perceived growth after scaling Mt. Kilimanjaro. Finally, a micro-level perspective explores a specific 'snap-shot' of an individual's experiences at any one given moment in time, which has been the approach typically taken to explore positive changes experienced by injured athletes once they have returned to sport (e.g., Udry, Gould, Bridges, & Beck, 1997; Wadey, Clark, Podlog, & McCullough, 2012). However, although the application of perceived growth is gaining research attention following various conditions and across different contexts, one issue surrounding this concept is that researchers continue to refer to this concept with a variety of terms (e.g., post-traumatic growth, stress-related growth, perceived benefits, thriving), which perpetuates conceptual ambiguity. Considering the choice of terminology is not trivial, Wadey et al. (2012) recently recommended that researchers should justify the terms they employ. For this study, we use the term perceived stress-related growth (SRG) for two reasons: (a) we are interested in perceptions of growth rather than veridical growth; and (b) we are examining a 'stressful' event (e.g., sport injury) rather than a 'traumatic' experience (i.e., severe events or conditions involving threat to life).

One of the first studies that aimed to observe perceived SRG following sport injury was by Eileen Udry and her colleagues who conducted a program of research with injured

U.S. elite skiers who had suffered season-ending injuries. Udry et al. (1997) found three dimensions of perceived SRG (a) personal growth, (b) psychologically based performance enhancements, and (c) physical/technical development. Personal growth included gaining perspective (e.g., clarified priorities), personality development (e.g., enhanced empathy), developing aspects related to non-skiing life (e.g., developed different sides of self), and learned better time management (e.g., learned to meet deadlines). Psychologically based performance enhancements referred to increased efficacy/toughness (e.g., mentally tougher), enhanced motivation (e.g., learned whole new work ethic), and realistic expectations (e.g., learned what can/cannot do). Finally, physical/technical developments constituted skiing technically better (e.g., learnt to ski smarter) and physical health improvements (e.g., got stronger than ever before). Altogether, 81 raw data themes were identified. Considering that many of these positive changes have been reported in other fields of research to be associated with heightened sporting performance, improved subjective well-being, and reduced risk of (re)injury occurrence (cf. Connaughton et al., 2008; Williams & Andersen, 1998), it is clear that this concept may have important practical implications in terms of enabling injured athletes to successfully return to sport.

Since Udry et al.'s (1997) study, a number of subsequent studies have gone to on directly examine perceived growth following injury (e.g., Smith & Sparkes, 2005; Tracey, 2011; Wadey et al., 2013; Wadey et al., 2011) or reported it as a serendipitous finding (e.g., Bianco, Malo, & Orlick, 1999; Ford & Gordon, 1999; Hurley, Moran, & Guerin, 2007; Podlog & Eklund, 2006, 2009; Podlog, Wadey, Stark, Lochbaum, Hannon, & Newton, 2013; San Jose, 2003). Collectively, the aforementioned body of research has shown that male and female athletes, from team and individual sports, across various levels of competition, and with different types of injuries have transformed their injury from a potentially debilitating experience into an opportunity for growth and development. However, one interesting finding

to emerge from previous research is that while some injured athletes' perceive growth, others do not. Indeed, Udry et al. (1997) reported, "One skier was unable to identify any benefits associated with being injured" (p. 244). Consequently, they recommended that future researchers should identify the personal and situational factors that can affect growth and explain the mechanisms through which they operate. This recommendation aligns with the Integrated Model of Psychological Response to Sport Injury and Rehabilitation which was first published by Wiese-Bjornstal, Smith, Shaffer, and Morrey in 1995 and revised in 1998. The integrated model posits that both pre-and post-injury variables affect how an athlete will respond to and rehabilitate from injury. Pre-injury factors comprise of personality (e.g., hardiness), history of stressors (e.g., daily hassles), coping resources (e.g., psychological skills), and interventions (e.g., stress management). After an athlete has incurred an injury, personal factors (e.g., personality) and situational factors (e.g., type of sport) are suggested to moderate cognitive, emotional, and behavioral responses to injury, which in turn affect recovery outcomes, such as returning to a higher level of functioning (e.g., perceived SRG). Although this model does not explain how these pre- and post-injury factors might affect perceived SRG, it does have the potential to provide a comprehensive understanding of when and for whom an injury will lead to perceived SRG.

One personal disposition that has been conceptualized to transform stress into an opportunity for growth and development is the personality trait of hardiness. Kobasa (1979) observed that those individuals who experienced adversity and were able to cope effectively possessed three resilient attitudes that conceptualize hardiness: commitment, control, and challenge (i.e., the 3Cs). Specifically, commitment is a, "tendency to involve oneself in (rather than experience alienation from) whatever one is doing or encounters" (Kobasa, Maddi, & Kahn, 1982, p. 169); control is a, "tendency to feel and act as if one is influential (rather than helpless) in the face of the varied contingencies of life" (Kobasa et al., 1982, p.

169); and challenge is the, "belief that change rather than stability is normal in life and that the anticipation of changes are interesting incentives to growth rather than threats to security" (Kobasa et al., 1982, p. 169-170). Maddi (2002) suggested that these attitudes provide the courage and motivation to use the hardiness actions that transform stressful situations from potential disasters into health and performance advantages. These actions cluster around three behaviors and cognitions: (a) social support, (b) positive health practices, and (c) transformational coping. In terms of transformational coping, for example, an individual high in hardiness is suggested to take a number of progressive steps to address not only the stressful event but also the strain it arouses (i.e., integration of problem- and emotion-focused coping). These steps involve broadening one's perspective to lower strain responses, increasing one's understanding of the stressful event and its aftermath to devise a plan-of-action, and implementing the plan-of-action to resolve and learn from the experience rather than avoiding it (Maddi, 2002).

The few researchers who have explored the effect of hardiness in the context of sport injury have revealed that it can facilitate athletes' recovery. In 1990, Grove, Stewart, and Gordon found that hardiness was negatively related to mood disturbance following injury, and Ford, Eklund, and Gordon (2000) observed a negative association with time-loss from injury (i.e., those higher in hardiness returned to sport sooner than their counterparts). Despite these preliminary isolated studies, only recently has hardiness been explored systematically. Wadey, Evans, Hanton, and Neil (2012a, 2012b) examined hardiness throughout the sport injury process (i.e., the prediction of, and response to, sport injury). In terms of responses to injury, the authors were interested in examining the effect hardiness has on injured athletes' psychological responses and coping strategies over time. Post-injury findings revealed those individuals higher in hardiness used transformational coping throughout their recovery. Specifically, they coped with their injury in three progressive phases: (a) re-evaluated their

injury and own thoughts (e.g., imagined how their injury could be worse), which lowered their strain responses and enabled problem-focused coping; (b) increased their understanding of their injury and the recovery process, which allowed them to form a realistic, yet progressive rehabilitation program; and (c) executed the program to resolve and transform their experience from a potentially debilitating encounter into an opportunity for growth and development. Although this program of research did find athletes higher in hardiness to report that they had experienced perceived growth, it is important to acknowledge that this was not the central aim of these studies. In terms of the relationship hardiness and perceived growth therefore, the findings are tentative and descriptive rather than explanatory.

Taken together, two main themes can be synthesized from the research that has explored perceived growth in a sport injury context to-date. First, the majority of athletes' perceive they gain positive changes following their injury experiences, whether these changes reflect 'actual' growth is another research question altogether. However, one issue with this theme is that all the research that has been conducted to-date has used qualitative inquiry; therefore, some scholars would suggest that this body of literature is limited in terms of its generalizability. Second, not all injured athletes' perceive growth (cf. Udry et al., 1997), which suggests–in line with Wiese-Bjornstal et al.'s (1998) integrated model–that future researchers need to explore the personal and situational factors that may affect perceived growth and explain how these factors operate. With these themes in mind, the aim of this study is to conduct a quantitative study that explores the direct and indirect relationship between hardiness and perceived SRG. Based on previous research (Wadey et al., 2012b) and consistent with the integrated model (Wiese-Bjornstal et al., 1998), the following hypotheses for this study were established: (a) hardiness will have a positive relationship with perceived SRG; and (b) coping will mediate this relationship, specifically, those higher in hardiness will

more likely report greater SRG because they use more problem- and emotion-focused coping strategies.

Method

Participants

The sample comprised of 148 males and 58 females (N=206) with a mean age of 22.23 years (*SD* = 6.50). The participants represented 10 team and 23 individual sports from recreational to elite standards of competition, with an average of five years' experience at their current level. Each participant had been injured through sport within two years prior to the outset of the study, with a variety of injuries, including fractures, dislocations, strains, or sprains of different body parts. The time loss from training and/or competition ranged from four to 154 weeks (M_{weeks} = 24.66; *SD* = 30.11).

Measures

Hardiness. Dispositional Resilience Scale (DRS; Bartone, Uranso, Wright, & Ingraham, 1989) was used to measure hardiness and its subcomponents: commitment, control and challenge. The DRS contains 45 statements about general life (e.g., "Most days, life is really interesting and exciting for me" and "Planning ahead can help avoid most future problems") – 15 items for each subcomponent. Each participant was asked to indicate the truthfulness for each statement on a 4-point Likert scale anchored at 0 (*not at all true*) and 3 (*completely true*). Scores for each subcomponent range from 0 to 45. The composite hardiness scored ranges from 0 to 135. Cronbach's alpha coefficients of .74 for hardiness composite, .78 for commitment, .69 for control, and .68 for challenge were found in this study.

Perceived SRG. The Stress-Related Growth Scale (SRGS; Park, Cohen, & Murch, 1996) was used to assess perceived SRG. SRGS is a 50-item one-dimensional questionnaire designed to assess individuals' perceptions of whether they experience positive outcomes

following a stressful event (e.g., "*I developed new relationships with helpful others*" and "*I learned that I was stronger than I thought I was*"). To ascertain athletes' perceptions of stress-related growth, the original stem was modified from "*Rate how much you experienced each item below as a result of this year's most stressful event*" to "*Rate how much you experienced each item below as a result of your injury*". Participants were asked to rate each item from 0 (*not at all*), 1 (*somewhat*) or 2 (*a great deal*). Park et al. observed the SRGS to have content, criterion and construct validity. In the validation sample, Cronbach's alpha was .94 and two-week test-retest reliability was .81. A Cronbach's alpha of .96 was found in this study.

Coping. Brief COPE (Carver, 1997) was used to assess coping. The questionnaire was a situation-specific version, which asked the participants to reflect on the coping strategies they used throughout their sport injury experience. This scale consists of 14 subscales and 28 items (2 items for each subscale), which are rated from 1 (*I did not do this at all*) to 4 (*I did this a lot*). However, in line with the second hypothesis, only problem- and emotion-focused coping scales were used in this study (cf. Carver, 1997). Cronbach's alpha coefficients of .70 for instrumental support, .61 for venting, .71 for emotional support, .68 for positive reframing, .72 for planning, and .60 for acceptance were found in this study. Active coping was removed from the analysis as it showed a low Cronbach's alpha (.34). Research has suggested that measures with only a few items per sub-scale with a Cronbach's alpha value of .50 or above should be accepted (Carver, 1997; Nunally, 1978).

Procedure

Potential participants were recruited by approaching a number of sporting Universities and sports clubs across the United Kingdom. Institutions were contacted by phone and email to discuss the nature of the study, and whether they would be willing to provide access to potential participants. It was explained that the participants needed to fit the following

criteria: (a) experienced an injury through sport (i.e., injuries sustained in training or competition) rather than outside of sport (e.g., everyday accidents). This criterion helped to define and delimit the nature of our sample, especially considering our interest in perceived SRG following 'sport' injury; (b) been out of training and/or competition for a minimum of four weeks due to injury to ensure athletes incurred a serious injury. This criterion was introduced so that all the participants had the potential to experience growth (cf. Joseph & Linley, 2006). Minor scrapes and bruises that may require certain modifications (e.g., strapping or protective garments) for training and competition purposes were not classified as injuries in this study; and (c) returned to sport in the previous two-years (i.e., 24 months). This criterion was introduced to minimize recall biases (cf. Ptacek, Smith, Espe, & Rafferty, 1994; Smith, Leffingwell, & Ptacek, 1999).

All Universities and sports clubs who were contacted agreed to take part in the study. A suitable time and place to administer the questionnaires was discussed. Those who agreed to participate and met the selection criteria provided written informed consent in line with the University's Ethics Committee; participation was entirely voluntary (i.e., participants were not compensated in anyway). Participants filled out a demographic sheet which included information about when they returned to training and/or competition, time loss whilst injured, and the type and location of their injury. The DRS, SRGS, and Brief COPE were completed which included standardized instructions based upon the recommendations of Bartone et al. (1989), Park et al. (1996), and Carver et al. (1989). All questionnaires were counterbalanced (i.e., ordered randomly).

Data analysis

Data was analyzed using SPSS 19.0 and involved four stages. First, the data was entered and then screened to check for accuracy and statistical assumptions. Second, demographic variables were analyzed for their potential confounding effects. Specifically,

Pearson product-moment correlations were used to establish if there was a relationship between certain demographic variables (i.e., age, time loss, time since returning back to sport) and perceived SRG. Three independent-samples t-tests and a one-way ANOVA were conducted to examine the differences between sex, sport type (i.e., team vs. individual), injury type (i.e., upper vs. lower body injuries) and competition level (i.e., recreational, club, county, regional, national, and international) respectively. Third, Pearson product-moment correlations were used to identify the direct effect of hardiness and its subcomponents on perceived growth (i.e., Hypothesis 1). Finally, Preacher and Hayes's (2008) bootstrapping procedure was used to examine if coping mediated the relationship between hardiness and perceived SRG (i.e., Hypothesis 2). Bootstrapping is a non-parametric procedure in which samples are taken multiple times from an existing dataset to create an empirical approximation of the sampling distribution. Confidence intervals are then generated based on this sampling distribution to test the indirect effects associated with mediational models. If the computed confidence intervals do not include 0, this indicates that the variable is a significant mediator in the proposed model (for a detailed discussion, see Preacher & Hayes, 2008). Bootstrapping is a particularly useful technique when testing models with multiple mediators as it allows for the assessment of the direction and magnitude of various indirect effects to be assessed independently. In particular, it reveals the unique effect of a given mediator when controlling for other possible mediators, while also testing for the combined effect of these mediators on a particular relationship. Multiple mediation analysis in this study was performed using Preacher and Hayes's (2008) MEDIATE macro; 95% confidence intervals were employed and 5,000 bootstrapping resamples were run.

Results

Means and Standard Deviations

The means, standard deviations, and correlations for the study's variables are presented in Table 1. The mean score for hardiness (M = 55.94; SD = 12.86) was generally lower compared to previous findings in other contexts (e.g., McCalister, Dolber, Webster, Mallon, & Steinhardt, 2006; Steinhardt, Dolber, Gottlieb, & McCalister, 2003). A possible explanation for this finding is that athletes high in hardiness are less likely to get injured through sport via psychosocial mechanisms (Wadey et al., 2012). The mean perceived SRG score in this study (M = 43.48; SD = 21.95) was also found to be lower compared to Park et al.'s (1996) study (M = 52.87; SD = 21.40). A potential reason for this difference is the stressors being examined. For example, Park et al. explored perceived SRG following events such as the death of a significant other, which would typically be considered to be more stressful than sports-related injuries (cf. Holmes & Rahe, 1967). Indeed, Joseph and Linley (2005) suggested that the greater the severity of the event, the more likely an individual is to perceive growth. In terms of coping, strategies assessed were reportedly used a moderate amount, which is consistent with previous research that has observed injured athletes to report using both to use both problem-and emotion-focused coping strategies throughout their recovery (e.g., Gould, Udry, Bridges, & Beck, 1997; Wadey et al., 2011).

Demographic Analyses

Two-hundred and six participants completed data entry for all study variables. Only four participants were removed from the data analysis because of incomplete data. Before proceeding to the main analysis, the relationships and differences between the demographic variables and dependent variable were assessed. Findings revealed no significant relationship between perceived SRG and age ($r = -.292$, $p > .05$) or time loss ($r = .266$, $p > .05$). A significant relationship was found for time since returning back ($r = .298$, $p < .05$), identifying that those athletes who had returned to sport for a longer period of time experienced more growth. No significant differences were found for sex (t [204] = -.402, $p >$

.05) or competitive level (F [7, 198] = 1.79, p >.05). However, a significant difference was found between sport type and perceived SRG. Findings revealed that those with lower limb injuries experienced more growth than those with upper limb injuries (t [81.9] = -3.55, p < .05). Additionally, there was a significant difference for team and individual sports (t [120] = .2.08, p < .05). This finding suggests that those who participated in team sports experienced more perceived SRG than those in individual sports, which is perhaps consistent with Joseph and Linley (2006) who suggest the need for a supportive environment to promote growth. As a result, sport type was controlled in the main analysis.

Main Analysis

Coefficients reveal hardiness (r = .36, p < .05), commitment (r = .33, p < .05), control (r = .27, p < .05), and challenge (r = .30, p < .05) had a significant positive relationship with perceived SRG. These findings suggest that those higher in hardiness are more likely to experience growth following sport injury. Follow-up multiple mediator models (Figures 1-4) indicate that coping mediated the relationship between hardiness and perceived SRG. The multiple mediator model was found to be significant, F (8,197) = 11.60, p <.001, and accounted for 32% of the variance (Adj. R^2 = .29). Controlling for sport type, findings indicated significant confidence intervals [CI] for emotional support and positive reframing mediating the relationship between hardiness (CI = .03, .18; .03, .18), control (CI = .11, .50; .04, .45), and commitment (CI = .08, .42; .09, .44) and perceived SRG. Although emotional support was found to mediate the relationship between challenge and perceived SRG (CI = .01, .39), positive reframing was found to be non-significant (-.07, .36). All other coping strategies (i.e., instrumental support, venting, planning and acceptance) were found to be non-significant.

Discussion

The purpose of this study was to examine the relationship between hardiness, coping and perceived SRG following sport injury. The results support the first hypothesis, finding a significant positive relationship between hardiness and perceived SRG. This finding supports a key element of the conceptualization of hardiness (i.e., using adversity to one's advantage). Indeed, Maddi (2006) purported, "Hardiness is a combination of attitudes that provide the courage and motivation to do the hard, strategic work of turning stressful circumstances from potential disasters into growth opportunities" (p. 160). This result also supports Wiese-Bjornstal et al.'s (1998) integrated model, which suggests that personal variables can affect recovery outcomes (e.g., perceived SRG). However, although this model has the potential to provide a comprehensive understanding of when and for whom an injury will lead to perceived SRG, it fails to explain how or why this occurs. Indeed, the integrated model is not a theory, and therefore cannot explain the mechanisms by which some athletes high and low in certain dispositions such as hardiness perceive SRG and others do not. With the absence of a context-specific theory to explain the underlying processes that lead to perceived SRG, this study set out to explore the mediators of this relationship based upon hardiness research.

The second hypothesis was only partially supported, with the findings revealing that certain emotion-focused coping strategies (i.e., positive reframing and emotional support) and not problem-focused coping strategies (e.g., active coping and planning) mediated the relationship between hardiness and perceived SRG. This finding is in contrast with the conceptualization of hardiness, which suggests that problem- and emotion-focused coping transform a potentially debilitating situation into an opportunity for growth (Maddi, 2002). However, a potential explanation for this finding is that we only assessed one criterion variable in this study. For example, it might be that problem-focused coping strategies help individuals high in hardiness to 'resolve' controllable stressful demands, whereas emotion-

focused coping strategies help them to ‘transform’ them into opportunities for growth and development.

One theory that explains how emotion-focused coping strategies can facilitate perceived SRG is the organismic valuing theory (OVT; Joseph and Linley, 2006). This theory proposes that encountering a stressful event can shatter a person’s assumptive world. When this shattering effect occurs, the theory suggests that there is a need to integrate the new stress-related information (i.e., completion tendency). The person then goes through a series of oscillating phases of intrusion and avoidance as this new information is processed in one of two ways. Either this information is ‘assimilated’ within existing models of the world, or existing models of the world ‘accommodate’ this information in a positive or negative direction. The theory holds that individuals have an innate tendency to modify existing models of the world to positively accommodate new stress-related information (i.e., organismic valuing process). However, the organismic valuing process is challenging and requires a supportive social environment that facilitates satisfaction of the basic human needs of autonomy, competence, and relatedness. If the environment is not supportive of these needs, the OVT process will be thwarted and the information will be accommodated in a negative direction. Overall, the theory posits three outcomes that result from the way the information is processed: (a) assimilation, leading to a pre-stressor baseline; (b) negative accommodation, leading to distress; and (c) positive accommodated, leading to perceived SRG. Relating the OVT back to the present study, it is clear that the theory places a lot of significance of the way individuals’ regulate the oscillating phases of intrusion and avoidance and mobilize the resources available to them. It may be that the athletes higher in hardiness in this study positively reframed their injury from mobilizing their support network, which in turn lowered distressing affective responses and enabled them to positive accommodation the stress-related information. Future research should further explore the applicability of the

OVT in the context of sport injury. In terms of practical application, the findings emphasize that practitioners who work with injured athletes may not only have an important role in preventing and/or repairing the negative consequences of injury, but also in terms of enabling them to experience perceived growth. Furthermore, practitioners should be aware that certain athletes are less likely to experience perceived SRG than others and therefore may require greater assistance to meet this outcome. Although it is too early to be certain of how best to facilitate perceived growth, the present findings would suggest practitioners need to challenge injured athletes to (re)appraise the significance of their injury in more adaptive ways, raise their awareness of their social support networks, and encourage them to mobilize their support. They should also work with athletes' social support networks to provide them with the skills and strategies to create an ideal environment for injured athletes to disclose their emotions to enable them to positively reframe their injury and optimize the likelihood of experiencing growth . Indeed, researchers have started to observe the efficacy and effectiveness of self-disclosure in promoting perceived growth following adversity in other contexts (Hudson & Day, 2012; Stanton & Danoff-Burg, 2002; Ullrich & Lutgendorf, 2002). For example, Hudson and Day (2012) explored written emotional disclosure with sixteen athletes who had encountered a stressor. Research findings identified that through written emotional disclosure, the athletes were able to reappraise their stressor, which then lead to a number of perceived positive outcomes (e.g., increased passion or motivation for their sport).

As with all research, this study had a number of strengths and limitations. The main strength was that it was the first study to explore perceived SRG in a sport injury context using a cross-sectional design, which provides a more generalizable set of findings than previous qualitative findings. Another strength of this study is that we have an excellent sample size, and composition of sample pool with regard to the timing and severity of injury. Some previous studies have reported including minor injuries (i.e., one-day away from

training or competition) and those that date back over 10 years to increase their sample size; however, these have obvious limitations (e.g., memory recall). Finally, the current study also observed not only whom is more likely to experience growth (i.e., those higher in hardiness) but also how (i.e., using emotional support and positive reframing). These findings, therefore, have important theoretical and applied implications. From a theoretical perspective, these findings have extended Wiese-Bjornstal et al.'s integrated model (1998) and identified the potential application of the Joseph and Linley's (2005) OVT in the context of sport injury. In terms of limitations of this study, shared method variance is one due to both the predictor and criterion variables being assessed solely through self-report. When assessing psychological variables and rehabilitation outcomes it is desirable to use additional measures to validate athletes' self-report (e.g., informant report, biological indices, and behavioral markers). Another limitation of this study is its cross-sectional design. Although such designs are helpful in identifying potential causal associations, experimental designs are needed to provide causal associations. Prospective, longitudinal pre-to-post injury studies would also be more desirable than cross-sectional designs in order to better understand the relationship between hardiness and growth. A final limitation to this study is that it lacks depth in terms of the coping strategies used and the perceived growth experienced by athletes both high and low in hardiness.

There are several avenues for future research. First, future researchers should explore in greater depth the terms used to describe positive life change in the context of sport injury (e.g., post-traumatic growth, stress-related growth) and how they are distinguished (e.g., trauma vs. stress). Researchers should also further examine the relationship between hardiness and growth, using prospective and experimental methodological designs. These research designs will determine whether hardiness is truly a predictor of growth and not, for example, an outcome of the recovery process. Following this, future research could attempt to

enhance the interpretability and meaningfulness of the present findings. For example, in terms of emotional support, it would be interesting to explore how those athletes high in hardiness use this coping strategy: Who do they disclose their emotions to? What was said? When and where did the exchange(s) occur? How did it lead to perceived growth? Answers to these questions will have important insights in the structure, timing and content of interventions. To derive these insights, future researchers should employ methodologies (e.g., interpretative phenomenological analysis or narrative analysis) and appropriate methods (e.g., diaries or interviews) that enable injured athletes to tell their stories in their own words. As well as exploring adaptive strategies used by athletes high in hardiness, future researchers should also consider their counterparts (i.e., athletes low in hardiness), thereby identifying what not to do. By examining adaptive and maladaptive strategies, these will help to provide a more complete, balanced understanding for scholars and practitioners. This approach is very much in line with the wider positive psychology agenda (Seligman & Csikszentmihalyi, 2000). Indeed, "While Accentuating the Positive, Don't Eliminate the Negative or Mr. In-Between" (Tennen & Affleck, 2003, p. 163). Finally, it would also be of interest to explore why does perceived growth matter? What are its consequences? How does this concept affect subjective well-being and sporting performance? Does making an injured athlete more physical and mentally stronger than prior to his or her injury make them less prone to reinjury? And by making them less prone to injury does this have economic implications for the health care system? Carver (1998) reported:

> Some individuals are even stronger after their traumatic event than before. These people cost the [health] care even less, by being less prone to relapse, maybe even less vulnerable to new adversities. If we can understand why some people [experience growth], and if we can teach the skill to others, the benefits to the nation's health care system could potentially be enormous (p. 263).

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Table 2.
Means, standard deviation, and correlation among study variables

Study variables	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Growth	43.48	21.95	-											
2. Hardiness	55.94	12.86	.36**	-										
3. Commmitment	17.97	5.61	.33**	.90**	-									
4. Challenge	22.28	4.62	.30**	.75**	.47*	-								
5. Control	17.90	5.04	.27**	.89**	.74**	.50**	-							
6. Active coping	5.21	1.10	.01	.13	.12	.13	.11	-						
7. Instrumental support	5.09	1.70	.16*	-.04	-.05	-.10	-.03	.21**	-					
8. Emotional support	4.30	1.61	.36**	.23**	.22**	.13	.29**	.01	.44**	-				
9. Venting	4.70	1.00	-.03	.13	.11	.11	.12	.12	.15*	.09	-			
10. Positive reframing	4.45	1.61	.40**	.17*	.20**	.07	.10*	.11	.15*	.23**	.01	-		
11. Planning	5.22	1.61	.22**	.11	.12	.11	.10	.38**	.40**	.22**	.16*	.35**	-	
12. Acceptance	5.81	1.58	.12	-.02	.06	-.03	-.09	.15*	.20**	.17*	.12	.27**	.26**	-

Note. $*p < .05$; $**p < .01$

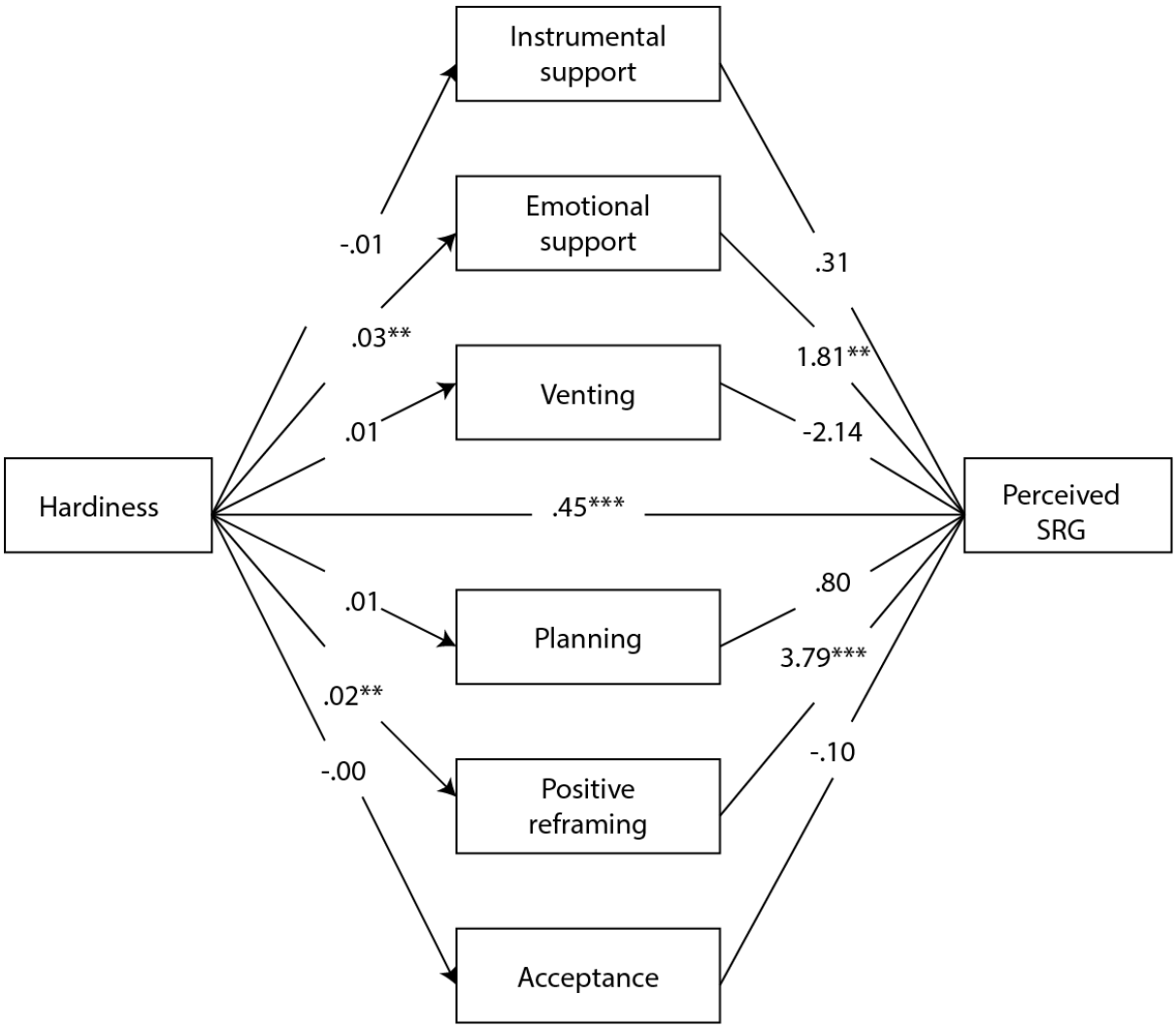

Figure 1. Coefficients representing effects of hardiness on coping and perceived stress-related growth *$p < .05$, **$p < .01$; ***$p < .001$

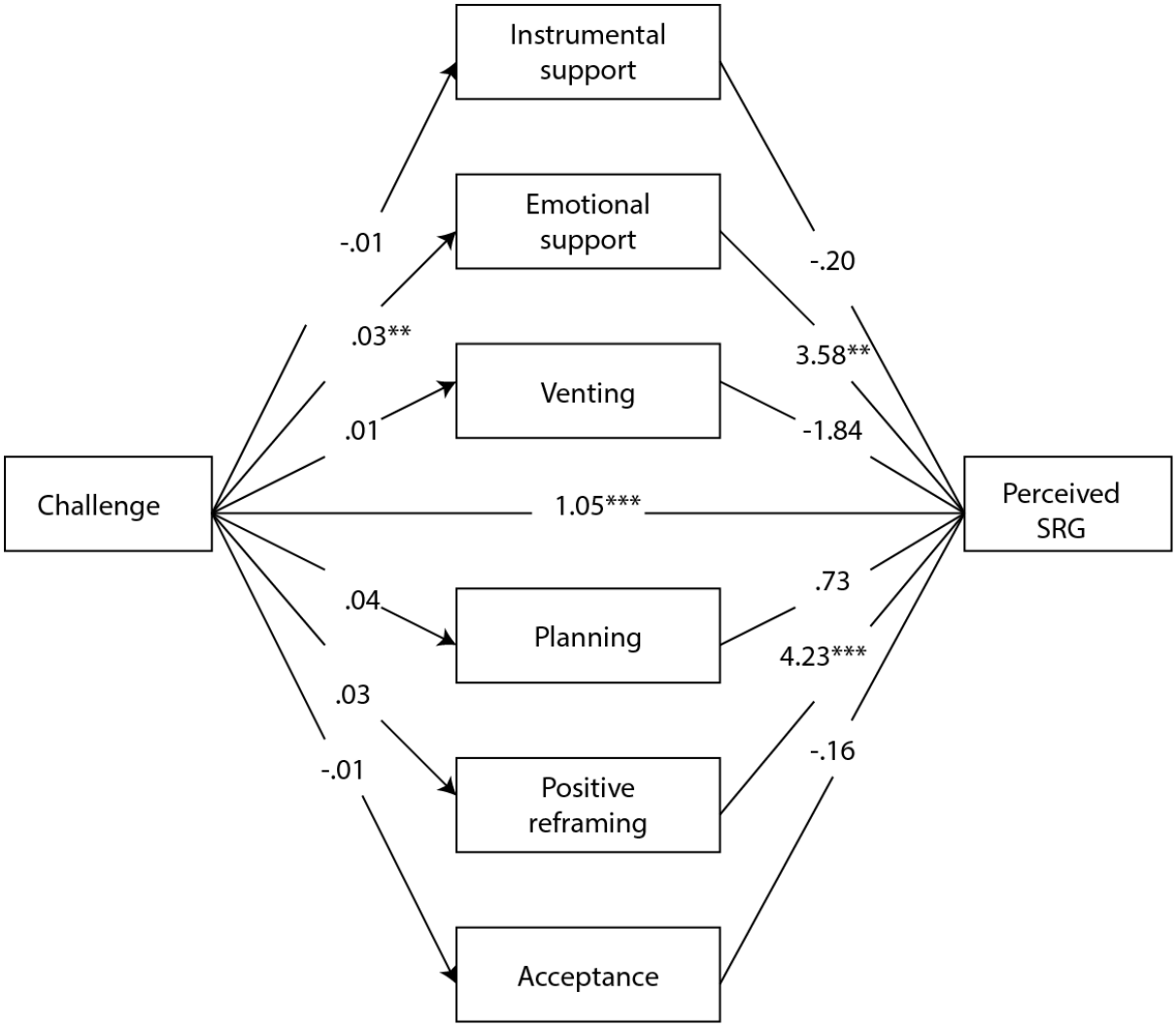

Figure 2. Coefficients representing effects of challenge on coping and perceived stress-related growth *$p < .05$, **$p < .01$; ***$p < .001$

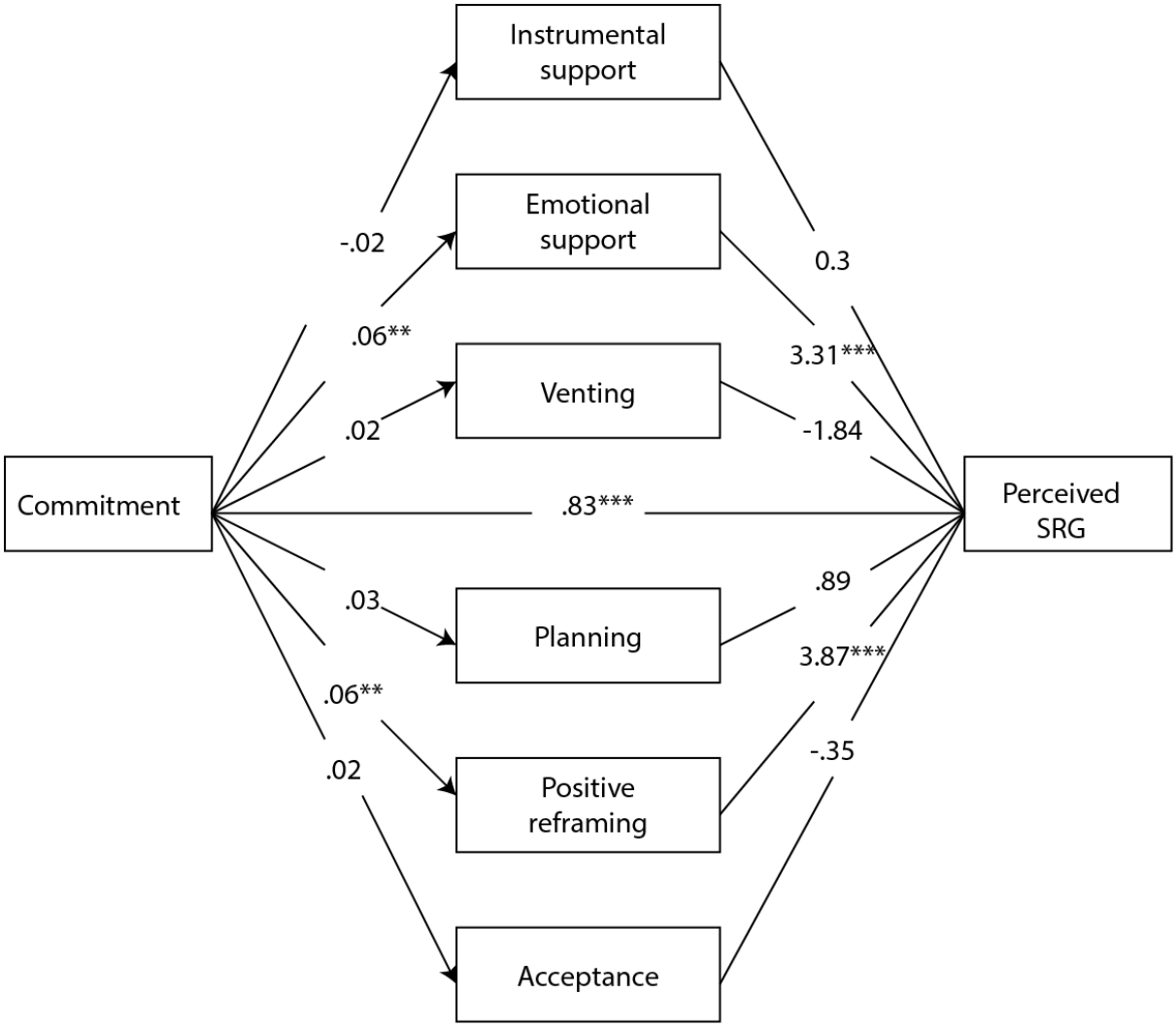

Figure 3. Coefficients representing effects of commitment on coping and perceived stress-related growth *$p < .05$, **$p < .01$; ***$p < .001$

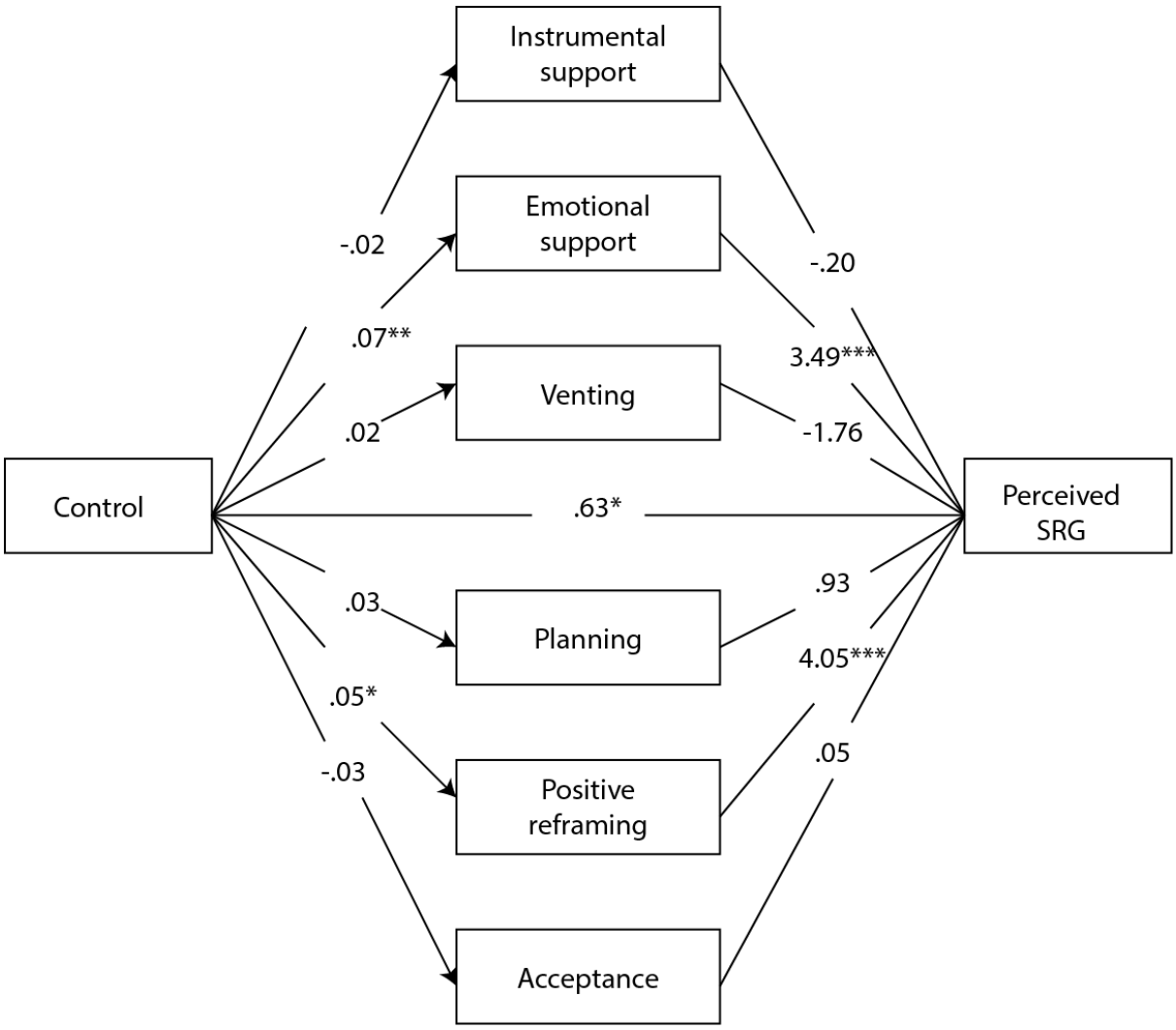

Figure 4. Coefficients representing effects of control on coping and perceived stress-related growth *p < .05, **p <.01; ***p <.001