

1 Abstract

2 Although previous research has shown that experiencing an injury can act as a catalyst for self-
3 development, research that has examined the concept of sport injury-related growth (SIRG)
4 remains largely descriptive. This study aimed to address this by developing a substantive theory
5 to explain the processes through which injured athletes experienced SIRG. Using Strauss and
6 Corbin's (1998) variant of grounded theory, 37 injured athletes competing in a range of sports
7 and competitive levels participated in qualitative interviews. Interviews ($N=70$) and data analysis
8 were conducted over a period of 24 months. Transcripts were analyzed using open, axial, and
9 selective coding. Quality criteria used were fit, relevance, workability, and modifiability. The
10 grounded theory produced (i.e., *Theory of Sport Injury-Related Growth*) suggests a number of
11 internal (i.e., personality, coping styles, knowledge and prior experience, and perceived social
12 support) and external factors (i.e., cultural scripts, physical resources, time, and received social
13 support) enable injured athletes to transform their injury into an opportunity for growth and
14 development. The mechanisms through which this occurs are meta-cognitions, positive
15 reappraisal, positive emotions, and facilitative responses. This theory offers a number of exciting
16 avenues for future research, and provides medical personnel and practicing sport psychologists
17 with a detailed explanation of how sport injury can lead to growth experiences.

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19 **Key words:** Psychology, Sociology, Qualitative, Positive Emotions

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1 *Sport Injury-Related Growth* (SIRG) to denote perceived changes that propel injured athletes to a
2 higher level of functioning than that which existed prior to their injury. This heightened level of
3 functioning can include psychological, social, physical, and behavioral changes (Podlog &
4 Eklund, 2009; Wadey, Clark, Podlog, & McCullough, 2013). The intention behind our proposal
5 is to extend previous conceptualizations of growth that are solely concerned with psychological
6 change (Tedeschi & Calhoun, 2004). Indeed, some of the positive changes that have been
7 reported by injured athletes are physical (e.g., increased strength and conditioning) as opposed to
8 psychological. Our conceptualization also extends previous dimensions of growth by embracing
9 behavioral changes, which addresses recent recommendations to account for the connection
10 between an individual's internal cognitive state and external behaviors (Hobfoll, Hall, Caneti-
11 Nisim, Galea, Johnson, & Palmieri, 2007).

12 To elaborate, our reasoning for proposing the term SIRG is threefold: First, sport injuries
13 and the rehabilitation context are unique, providing a set of experiences that are ideally viewed
14 contextually through a lens that is sensitive to the rehabilitation process as well as the
15 characteristics of the athletes themselves. For example, unlike many other traumatic and stressful
16 events, athletes put themselves at risk of getting injured, typically experience multiple injuries
17 throughout their career, and most subsequently return to sport (Savage, Collins, & Cruickshank,
18 2016; Wadey, Evans, Hanton, & Neil, 2011). Athletes also typically experience many stressors
19 in the developmental stages of their careers, which may impact how they subsequently respond
20 to adversity compared to other populations (Collins & MacNamara, 2012; Connaughton, Wadey,
21 Hanton, & Jones, 2008; Howells & Fletcher, 2015). Second, we are interested in perceived
22 change; that is, whether athletes believe they have changed in positive ways as a result of their
23 injury experience. While some researchers are also interested in exploring perceived change,

1 others are more concerned with discovering ‘actual’ growth (e.g., Cohen, Hettler, & Payne,
2 1998; Gunty, Frazier, Tennen, Tomich, Tashiro, & Park, 2011). To clarify, actual growth is
3 concerned with the ‘reality’ of growth and, rather than using retrospective self-reports of change,
4 is assessed via a pre- and post-trauma change in self-report measures. We align with Tennen and
5 Affleck (2002) who argued that although the notion of actual growth is a quaint one it is
6 arguably secondary to people’s perception in any case. Finally, we use the term SIRG to help
7 create a more unified, identifiable, and context-specific conceptualization that provides a basis
8 for researchers to more easily ground and advance their findings; a process achieved in other
9 sport psychology areas of research to good effect (e.g., sport-confidence, Vealey, 2001;
10 competitive stress, Mellalieu, Hanton, & Fletcher, 2006).

11 Given the growing empirical support for growth, it is perhaps not surprising that
12 researchers have recently shifted their focus to exploring the mechanisms that underlie its effects
13 (e.g., Galli & Reel, 2012; Howells & Fletcher, 2015, 2016; Salim, Wadey, & Diss, 2015a,b;
14 Tamminen, Holt, & Neely, 2013; Wadey et al., 2011; Wadey, Podlog, Galli, & Mellalieu, 2016).
15 Some researchers have approached this by including injury alongside other stressors whereas
16 others have exclusively focused on injury. With regard to the former, Tamminen et al. and
17 Savage et al. interviewed athletes who had experienced a number of sport and non-sport specific
18 stressors (e.g., performance anxiety, bullying, and eating disorders) and identified that a
19 combination of personal factors (e.g., positive outlook, meaning making abilities, and previous
20 life experiences) and social support (e.g., perception of social support availability matching
21 individual needs) affected athletes’ perceptions of growth following adversity. However, given
22 the diverse nature of the stressors, these findings may not reflect injured athletes’ experiences. In
23 relation to injury-specific studies, Wadey et al. found mechanisms specific to the context of sport

1 explains how and why persons, organizations, or communities experience and respond to events,
2 challenges, or problematic situations (Holt, 2016). For researchers using GT, one of the
3 challenges they face is that there are many variants of GT, with differing philosophical
4 underpinnings, techniques and strategies (Bryant & Charmaz, 2007). Holt and Tamminen (2010)
5 recommended that the first decision for researchers planning a GT study is to select a variant that
6 is consistent with their philosophical beliefs. As a result of the first author's personal beliefs (i.e.,
7 critical realism and modified dualism/objectivism), the Glaserian approach was ruled out for its
8 realist philosophical perspective (Glaser & Strauss, 1965) as was Charmaz's (2006)
9 constructivist approach. The approach decided upon was Corbin and Strauss's (2008) variant
10 (i.e., Straussian approach), which resonated with the first author's philosophical beliefs.

11 **Participants**

12 Criterion sampling was initially used to recruit 'information-rich' participants. By
13 information rich, we mean participants who participate in sport, have been injured through sport,
14 and self-reported that they have experienced SIRG (for more information, see Data Collection
15 and Procedure). As the data collection progressed and initial concepts were identified, theoretical
16 sampling was used thereafter to address gaps in the data and achieve theoretical saturation
17 (Strauss & Corbin, 1998). To illustrate, early interviews consisted of athletes from team sports
18 who had access to teammates who provided them with social support, which was suggested to be
19 an effective resource to facilitate SIRG. As a result, we decided to interview individual athletes
20 with limited access to teammates to challenge, refine and/or extend the identified concept of
21 social support. Other examples of theoretical sampling include seeking to interview athletes with
22 certain demographics: (a) non-elite injured athletes due to elite performers reporting having
23 access to several physical resources, (b) athletes with less severe injuries because participants

1 with more severe injuries expressed challenges with mobilizing their social support, and (c)
2 athletes with no past injuries due to participants with a history of multiple injuries reporting
3 using these experiences to inform how they (re)interpreted their injury.

4 In total, thirty-seven ($N= 37$) injured athletes participated in this study (23 males, 14
5 females), all of whom were British. Participants' ages ranged from 19-39 years ($M= 27.3$, $SD=$
6 5.4) and represented a variety of sports: rugby, football, triathlons/endurance events, field
7 hockey, cross country, badminton, mixed martial arts, rowing, cricket, track and field, tennis,
8 figure skating, Gaelic football, baseball, volleyball, and gymnastics. Competitive levels ranged
9 from recreational (i.e., local and regional clubs) to elite (i.e., competing at international events
10 such as the Olympics). All injuries had been sustained through participation in sport and
11 included fractures, dislocations, strains and sprains of different body parts (i.e., knee, shoulder,
12 back, hip, ankle, wrist, hamstring, elbow, stress fractures, broken cheekbone, and finger).
13 Participants were at various phases of their injury at the time of the interview (i.e., injury onset,
14 rehabilitation, and return to sport). Athletes interviewed at injury onset or rehabilitation were re-
15 interviewed throughout their recovery and once again upon their return to sport.

16 **Data Collection and Procedure**

17 Following ethical approval, the first participant, a male professional rugby player who
18 had previously torn his ACL through sport and was known to the first author, was contacted via
19 email to participate in the study. He was considered 'information rich' based on an informal
20 conversation with the participant during which he revealed experiencing SIRG. Specifically,
21 rather than using a questionnaire with pre-defined subscales, he was asked if he believed he had
22 changed (i.e., psychological, social, physical, and/or behavioral) as a result of his injury
23 experience, and whether he considered these changes to be positive and/or negative and in what

1 contexts and situations. He expressed that his injury experience brought him closer to his partner
2 and had improved his physical strength, which aligned with our conceptualization of SIRG. As a
3 result, written informed consent was elicited and a semi-structured interview was conducted to
4 discuss his SIRG at a time and location of mutual convenience. The majority of subsequent
5 participants were also asked if they had experienced SIRG before inviting them to participate;
6 however, to gain a deeper understanding and challenge some of the identified concepts, some
7 participants were recruited during injury onset or rehabilitation because they reported, for
8 example receiving social support or experiencing positive emotions (see Figure 1). These injured
9 athletes were subsequently re-interviewed during their recovery and upon their return to
10 competitive sport; all subsequently reported experiencing SIRG during follow-up interviews.

11 Our rationale for using semi-structured interviews was because they have been shown to
12 be effective in understanding athletes' stories, through the rich, in-depth and complex data that
13 they can generate (Corbin & Strauss, 2008). Specifically, the interview focused on athletes'
14 injury experience (e.g., thoughts, feelings, and actions at various phases of recovery) and what, if
15 any, changes were experienced as a result of the injury. Detail-oriented (e.g., "Who was with
16 you?"), elaboration (e.g., "Can you give me an example?"), and clarification probes (e.g., "Can do
17 you mean by that?") were used throughout to develop a deeper understanding of participants'
18 experiences and the contexts and situations in which they occurred (Sparkes & Smith, 2014).
19 Over time, the interview guide evolved and became more refined to focus on emerging concepts
20 and categories (Strauss & Corbin, 1998). However, some of the more common questions across
21 the interviews included: "Can you tell me about your injury experience?", "Can you give me an
22 example of one positive change you have experienced as a result of your injury experience?",

1 “Why do you consider this change to be positive?”, “How did this positive change come about?”,
2 and “Who or what (if anyone/anything) helped bring about this positive change?”

3 Data collection took place between January 2014 and January 2016, at which point data
4 no longer yielded new concepts or insights (i.e., theoretical saturation; Corbin & Strauss, 2008).
5 Every participant was interviewed face-to-face at a mutually convenient time and location (e.g.,
6 café, University office), and most participants ($N=31$) were re-interviewed once or twice to
7 further refine and extend our understanding of their experiences. In total, 70 interviews were
8 conducted, lasting between 35-140 minutes. Each interview was recorded and transcribed
9 verbatim.

10 **Data Analysis**

11 In line with grounded theory procedures, data analysis began after the first interview and
12 continued in an iterative manner until all interviews had been conducted (Strauss & Corbin,
13 1998). Although in most cases interviews were transcribed and analyzed before the next
14 interview took place, sometimes it was challenging to do this due to the short time periods
15 between interviews. In these cases, the first author listened to the participant’s audio file, made
16 reflexive notes about the emerging concepts, and then debriefed with co-authors to refine the
17 interview guide for the ensuing interview. Where time permitted, Strauss and Corbin’s (1998)
18 more formal guidelines of open, axial and selective coding were employed. Open coding
19 consisted of line-by-line coding to identify concepts, their properties and dimensions. To begin,
20 the raw data was broken down and assigned a descriptive label, otherwise referred to as a code.
21 These codes were then extracted and compared to other codes in order to determine any
22 similarities or differences. Codes with similar meanings were linked together and, if they shared
23 common characteristics, were organized into related features of a concept. These concepts are

1 what form the building blocks of the theory. For example, any raw data identified as pertaining
2 to “resources” were extracted and analyzed in order to differentiate between separate categories
3 of resources. As the data analysis progressed more categories were identified, and through a
4 process of constant comparison were either placed into a pre-existing category based on
5 similarities to the concepts in that category or formed the basis of a new category. All categories
6 were given a descriptive label that referred to the concepts’ essential characteristics to assist in
7 the categorization process.

8 As key concepts were identified, data analysis evolved to focus on axial coding, which
9 consists of reassembling the data and identifying relationships between the open codes (Strauss
10 & Corbin, 1998). Axial coding takes the concepts that were identified during open coding and
11 refines these into categories in order to provide a more complete explanation about the processes
12 at work throughout the sport injury experience that may lead to SIRG. During this process of
13 axial coding, the data was continuously compared to previous data sets. Finally, data analysis
14 consisted of selective coding, a process of identifying the categories and focusing on establishing
15 the relationships between these concepts (Strauss & Corbin, 1998). It is at this stage that the key
16 themes are established as the core concepts with the lower order categories integrated and
17 arranged to explain the relationships among the different categories of variables (Corbin &
18 Strauss, 2008).

19 Several tools were used to facilitate the analytic process and enhance methodological
20 rigor. First, analytic memos were used to represent the first author’s understanding and
21 reflections of the data (Glaser & Strauss, 1967). Memo keeping has been reported to be critical in
22 helping researchers to organize their thoughts and reactions to the data, and to assist
23 understanding by encouraging reflexivity, clarification, category saturation, and concept

1 development (Charmaz, 2000). The co-authors also acted as ‘critical-friends’ by asking the first
2 author to defend her interpretations during oral presentations and informal discussions about the
3 findings. Third, the researchers used diagrams to visually represent the data and emerging
4 themes throughout the analysis process to help the first author to think theoretically rather than
5 descriptively. Finally, a delayed full literature review helped foster an inductive approach. Once
6 the data collection and analysis was complete, an exhaustive literature review was completed to
7 further inform and illuminate data analysis and interpretation (Holt & Dunn, 2004).

8 In addition to the aforementioned analytical strategies, and to further enhance the
9 methodological rigor of the study, the resultant theory can also be subjected to a post-hoc
10 evaluation of research outcome using quality criteria recommended for grounded theory; namely
11 fit, relevance, workability, and modifiability (Weed, 2009). We therefore encourage the reader to
12 respond to the following questions: Do you believe the concepts and theory closely ‘fit’ the
13 phenomena of SIRG? Does the theory ‘work’ in that it provides an analytical explanation of the
14 relationship between sport injury and SIRG? Is the theory of ‘relevance’ to injured athletes
15 aspiring to return to their sport at a higher level of functioning? Are the concepts and theory
16 amenable to ‘modification’ to accommodate new insights gleaned through future research?

17 **Results**

18 Five key categories were identified: *sport injury*, *resources*, *metacognition and challenge*
19 *appraisal*, *positive emotions and facilitative responses*, and *SIRG*. These categories suggest that
20 sport injury is a stressful experience, and injured athletes’ responses are influenced by internal
21 and external resources. To encourage SIRG, these resources need to enable certain cognitive
22 processes (i.e., meta-cognitions and positive reappraisals), which in turn affect subsequent
23 cognitive, affective and behavioral mechanisms (i.e., positive emotions and facilitative

1 responses). It is these processes that explain the relationship between the sport injuries
2 experienced and SIRG. Figure 1 provides a schematic representation of these identified concepts
3 and illustrates their relationships in the form of a substantive theory. These concepts are now
4 explained to provide the reader with an in-depth understanding of the complex relationship
5 between sport injury and SIRG.

6 **Sport Injury**

7 All participants reported that sustaining a sport injury was a stressful experience in that it
8 threatened, reminded them, and encouraged them to reflect on their long- and short-term sporting
9 goals (e.g., international, national and regional events), beliefs (e.g., robustness of their body),
10 and values (e.g., winning, competition, training). In addition, all participants reported facing
11 numerous stressors *throughout* their recovery, as well as creating stressors for others (e.g., the
12 impact of their injury on their coach and teammates). In particular, the participants reported a
13 high volume of stressors during the early stages of rehabilitation, which ranged from everyday
14 chores such as preparing food and taking a shower, transporting themselves to and from the
15 hospital and/or physiotherapist, to being isolated from the sporting environment. One participant
16 reported in the first week following his injury:

17 Interviewer: How did your injury affect you?

18 Participant: You don't realize it until it happens to you, but injuries take over your whole
19 life. Just the little things that you always could do, like taking a shower or making a cup
20 of tea; I either can't do it anymore or I need someone to help.

21 Responses to these demands included feelings of shock, frustration, anger, guilt, helplessness,
22 and/or regret, which manifested themselves in the participants as well as from their interactions
23 with others (e.g., coach, teammates). Typically, these responses were more intense and

1 prolonged for more severe, reoccurring, and lower extremity injuries (e.g., greater mobility
2 issues), as well as those injuries that happened at a critical point in the competitive season.

3 While the aforementioned factors influenced how the athletes' initially responded to their
4 injury, it was how they reacted to these responses and future demands throughout their recovery
5 that set them on their journey towards SIRG. But despite the linear appearance of Figure 1, it is
6 important that readers do *not* imply that injuries are stressful initially and are followed by SIRG.
7 Rather the theory produced suggests the negative demands and responses not only trigger the
8 development of SIRG, but also co-occur with the processes and experiences of SIRG (Figure 1).
9 To elaborate, the intermittent strain experienced by the participants throughout their recovery
10 acted as a prompt for them (and others) to mobilise and remobilise the internal and external
11 resources leading to SIRG. In addition, participants suggested that the stress they experienced
12 during their recovery could be transformed into more facilitative responses that contributed to
13 SIRG (for more information, see Positive Emotions and Facilitative Responses). In short, stress
14 had an important role to play in the development of SIRG.

15 **Meta-Cognition and Positive Reappraisal**

16 The first core concept identified to lead to SIRG was *meta-cognition*. This concept refers
17 to the athletes' knowledge of, and control over, their own thoughts. Indeed, rather than allowing
18 certain concerns (e.g., I might not return to sport) and emotions to occupy their thoughts, the
19 participants reflected on *what* they were thinking and *why* they were thinking and feeling the
20 way they were; a process that was facilitated by conversations they had with members of their
21 social support network. They reported that this process made them mindful of unproductive
22 thought patterns and the importance of their sporting goals and aspirations, which, with the help
23 of their internal and external resources, enabled them to rationalize their thoughts by normalizing

1 their injury by considering how the situation could be worse. Ultimately, this process allowed
2 them to bring their thinking under their own perceived control. For example, two participants
3 reported, “I thought, get a grip! I’ve been through so much worse in my life, with my Mum
4 dying and losing my job and all that. So I decided I wasn’t going to let this injury get me down”
5 and “I did get a little down at the start. But, at some point in your life, you have to decide how
6 you're going to react to things that go wrong. I just went, ‘Eh, it’s happened’. Hip injuries
7 happen”. This awareness of and subsequent change in their thinking helped the participants’ to
8 regulate negative emotions to a manageable level. In turn, and with the assistance of their
9 internal and external resources, this allowed them to positively reappraise how they interpreted
10 the situation they found themselves in. Rather than interpreting their injury as a threat and
11 obstacle, they were able to identify possible opportunities and benefits that could be derived
12 from being injured.

13 Interviewer: So you now see your injury in a different light?

14 Participant: Yeah, now I’ve sorted my head out, I’ve realized that time away from
15 competition can be a good opportunity for me to work on the reasons why I’ve got
16 injured the first place. So, I’ve decided I’m going to spend a lot of time working on my
17 hip-flexors in the gym.

18 **Positive Emotions and Facilitative Responses**

19 From positively reappraising their injury and the circumstances surrounding it, as well as
20 drawing upon their internal and external resources, the athletes subsequently reported
21 experiencing positive affective states (e.g., confident, hopeful, optimistic, grateful, appreciative,
22 inspired, uplifted, interested, excited, and curious). One athlete provided the following example
23 of *hope* and *optimism*:

1 Interviewer: What happened next?

2 Participant: Once I got over the initial, “it sucks” phase, it wasn’t too bad. Rather than
3 looking at the glass half empty, I felt far more optimistic and upbeat that I’ll be back.

4 Interviewer: Optimistic and upbeat?

5 Participant: Yeah, confident that I’d get back, which was reinforced by my surgeon. He
6 looked me right in the eye and told me that I would get back playing. He was so
7 confident that I immediately felt hopeful. I could tell he meant it and he really cared.

8 Another participant provided the following account in terms of his *excitement*:

9 Interviewer: So, the way you viewed your injury changed?

10 Participant: Yeah, at first I was like, “Well this is shit”, but once I’d realized how it could
11 be worse. I then got excited about how I could do these other things that I had been
12 wanting to do but never could because sport was always in the way. So I started signing
13 up for these camps and retreats and going sailing and all this stuff. I still really missed
14 rugby but it was exciting that I got to do all these things that I’d always wanted to do.

15 Participants also reported taking a great deal of *interest* in their injury (i.e., injury itself,
16 recovery process, and identifying successful role models) and how best to maximize their newly
17 found free time (e.g., attend training as a spectator, spend time with significant others, engage in
18 hobbies away from sport, work on sport-specific skills, and/or train non-injured body parts at the
19 gymnasium).

20 Interviewer: You say your ‘thinking’ changed?

21 Participant: Yeah, once I’d calmed down and reassessed the situation, I started thinking
22 what can I learn from this?

23 Interviewer: What do you mean by ‘learn from this’?

1 Participant: Well, I took a lot of interest in my injury to find the best way to complete my
2 physiotherapy. I read articles. I read blogs. It was a case of I needed to find out anything I
3 could. I really wanted to know what was happening to me, like what was actually going
4 on inside my knee. It was all sort of new and I wanted to know, almost like, a detective,
5 like, What's happened? Why did it happen? That sort of thing.

6 Other examples of positive emotions included feelings of *gratitude* and *appreciation* for
7 the care and acts of kindness they had received from members of their support network (e.g.,
8 doing house chores, driving them around, buying them food, bringing gifts, and giving them their
9 time) and by being *inspired* and *uplifted* by stories that they had observed or heard from other
10 athletes who had returned to their sport above and beyond their pre-injury level of functioning. In
11 some instances these athletes were personally known to the participant, in others they were a
12 professional athlete who the injured individual admired.

13 Interviewer: Can you tell me more about [teammate]?

14 Participant: I saw what [teammate] went through when she got injured and how she came
15 out the other side better for it. And now that I'm injured myself I can understand how
16 hard that must have been for her. But she always had such a good attitude and she's been
17 so encouraging to me now that I'm going through the same thing. She's been able to give
18 me a lot of practical advice too. She's a real inspiration.

19 These positive emotions in turn led to a number of facilitative responses, including
20 seeking knowledge (e.g., books, journals, former injured athletes), exploring and acting upon the
21 opportunities available to them to make the most of their free time (e.g., visiting others or
22 inviting others to their home, going to the gymnasium, working on other aspects of training,
23 observing training and/or learning about training principles, and learning a musical instrument),

1 engaging in purposeful reflection, using negative emotions in a facilitative way (e.g., guilt of
2 letting teammates down provided the motivation to return-to-sport physically stronger), sustained
3 efforts to adhere to their rehabilitation, and reciprocating acts of kindness. For example, the
4 participants were thankful for the support received from members of their support group and
5 appreciative of their acts of kindness, which led them to want to reciprocate. Supportive acts
6 included gifts, cards of gratitude, taking the time to thank them, and spending time with and
7 taking an interest in them. These acts led the participants to feel good about their relationships,
8 which created further pro-social urges and uplifting experiences during their rehabilitation (e.g.,
9 giving and receiving positive comments).

10 Interviewer: Tell me more about your relationship with your Mum?

11 Participant: Well, my Mum helped me a great deal when I was injured. And I remember I
12 had something on one weekend, but I decided to swap it and go and support my Mum.
13 She sings in a choir and I've never supported her. And I thought, I need to do something,
14 give something back to her. And so I went to watch and it was nice, because I think she
15 felt supported. And it felt good to give something back.

16 **Internal Resources**

17 Four internal resources were identified to influence the meta-cognitions and positive
18 reappraisal, and positive emotions and facilitative responses (Figure 1). However, the reader
19 should *not* interpret from Figure 1 that each participant utilized all four internal resources or used
20 them all at one time. Rather, certain resources were relied on more heavily by certain participants
21 and at specific times throughout their recovery. For example, some participants reported having a
22 more refined coping style, extensive knowledge and prior experience of injury, and greater
23 awareness of available support. These resources were also found to be amenable to change,

1 influenced by external factors, and interrelated. For example, those with a more extensive
2 experience of injury reported a more refined coping style. However, while these resources were
3 participant-dependent, contextually derived, amenable to change, and interrelated, they all had an
4 important role in the development of SIRG.

5 The first internal resource identified, *Personality*, refers to the participants' personal
6 qualities of confidence, creativity, resilience, social intelligence, openness to experience,
7 extraversion, optimism, reflexivity, and emotional intelligence. These qualities enabled the
8 participants to understand and express their emotions, be creative in how best to maximize their
9 free time and approach problems, be open to and act upon opportunities in the environment,
10 remain resilient and confident that they could overcome adversity and elicit positive benefits, and
11 understand the importance of give and take in relationships. For example, one participant
12 described his typical response in the face of adversity, "I see the good in things; otherwise you
13 can get so frustrated. There's no point in getting angry, just enjoy the experience. Don't try to
14 make it any worse for yourself. Just relax and see what opportunities arise." In relation to her
15 resilience, another reported:

16 Interviewer: You say 'resilient', what do you mean by that?

17 Participant: Yeah, I think I'm a pretty resilience person. It [injury] wasn't fun and there
18 were some bad days but I decided that I wasn't going to let it get to me. There are people
19 out there a lot worse off than I am. I knew it wasn't the worst thing that could ever
20 happen to me. Yeah, I'd say I'm a pretty resilient person in general.

21 Personality also informed the second internal resource, *Coping Styles*, which reflected the
22 participants' typical thoughts and behaviors in response to stressful demands. Participants coping
23 styles reflected those of emotion-focused (e.g., meaning making, emotional venting, seeking

1 support for emotional reasons, and/or turning to religion) and problem-focused (e.g., planning,
2 active coping, seeking support for instrumental reasons). For example, one participant reported
3 how he turned to religion, “I often pray and go, ‘What's happening?’ And as I understand my
4 religion more, I realize sometimes in life these things happen, and I believe that something
5 positive will come out of this.”

6 The third internal resource, *Perceived Social Support*, referred to participants’ awareness
7 and appraisal of the quality of support available to them. Indeed, the participants had learned
8 from their past experiences and who in their support network could and would help if needed.
9 This knowledge was reported to help the athletes rationalize and control their thinking by
10 reassuring them that they had the resources to cope, instilling positive emotions (e.g., optimism
11 and confidence), and fostering facilitative responses (e.g., sustained efforts to adhere).
12 Furthermore, reflecting on their past experiences and drawing upon the lessons learned was
13 identified as the fourth internal resource: *Knowledge and Prior Experiences*. This knowledge
14 was suggested to help enable participants to normalize their injury by recognizing that injury is
15 part-and-parcel of sport, imagine how it could be worse by comparing their injury to other
16 stressful events that were perceived to be more ‘traumatic’, and instill a sense of confidence that
17 they could come back from their injuries physically and mentally stronger by drawing from other
18 growth-related experiences. The past experiences the participants drew upon were both sporting
19 (e.g., injury, illness, losing major championships) and non-sporting critical incidents (e.g., death
20 of loved one, relationship breakup), and had either occurred to them directly or vicariously (e.g.,
21 witnessing a teammate overcome an injury).

22 Interviewer: Sounds like you’ve been through a lot in your life?

1 Participant: Yeah, and I decided that my injury wasn't going to get me down. I have had
2 a lot thrown at me in my life, which has got me down. Someone close to me died when I
3 was 17, and I had to fight my way back from that. So I've already come through some of
4 the hardest things that you can come through, so an injury—it's nothing really. It's just an
5 inconvenience and more of an annoyance than anything else. I knew I would be able to
6 cope with it.

7 **External Resources**

8 Four external factors were identified to affect the processes leading to SIRG: *Cultural*
9 *Scripts*, *Physical Resources*, *Received Social Support*, and *Time*. However, each participant did
10 not have access to all or were only aware of some of these resources, and some relied more
11 heavily on certain external resources than others. For example, the more elite athletes were more
12 concerned with using physical resources (e.g., gymnasium) to achieve certain SIRG outcomes
13 (e.g., physical growth), whereas some of the non-elite athletes did not have the same access to
14 these resources and decided to invest their free time elsewhere. The four external resources were
15 all context-dependent, interrelated, amenable to change, and influenced by the participants'
16 internal resources.

17 The first external resource, *Cultural Scripts*, refers to narratives embedded in the
18 participants' sporting culture that reflect triumph over adversity. The participants reported that
19 these narratives stemmed from televised events (e.g., Paralympics Games and Invictus Games),
20 films (e.g., *Rocky*, *Any Given Sunday*), drama series (e.g., *Friday Night Lights*), celebrity
21 autobiographies (e.g., Lance Armstrong, *It's Not About the Bike*; Kelly Holmes, *Black, White,*
22 *and Gold*), and stories shared within the sporting culture of former athletes' successful recovery
23 outcomes. The plot of the stories was success-against-the-odds and tales of struggle and ultimate

1 glory. The participants knowingly embodied these stories and drew upon them to help identify
2 and act upon opportunities, as well as induce affect (e.g., inspiration) and facilitate adaptive
3 responses (e.g., using their negative emotions in a facilitative way).

4 Interviewer: What was it that you watched?

5 Participant: I watched *Friday Night Lights* and it's funny because I see a lot of
6 similarities between my situation and the quarterback who got injured. Obviously, my
7 injury wasn't as bad as his and I know it's a T.V. show, but that character really inspired
8 me. What he went through and how he never gave up. I decided then and there that I
9 would come back from this stronger than I was before.

10 The second external resource, *Physical Resources*, refers to a variety of environmentally-
11 based resources. These resources included transport, internet, television, medical care (e.g.,
12 National Health Service and private hospitals), and the availability of and accessibility to a
13 gymnasium and specific rehabilitation equipment. These resources helped facilitate the processes
14 leading to SIRG by providing educational material, access to inspiring stories, and transport to
15 their social support network and training facilities, which helped rationalize strain responses,
16 instill and heighten positive emotions, and promote facilitative responses. One athlete reported,
17 "I watched a lot of YouTube the first few weeks. Videos on patella tendon snaps. I saw videos of
18 it actually happening, videos of the surgery, videos of the rehab process, and athletes jumping
19 after 9 months."

20 Another important environmental resource to facilitate the growth process was *Received*
21 *Social Support*. Athletes reported receiving two types of social support—emotional and tangible—
22 which helped the participants to reappraise their injury, provide uplifting experiences throughout
23 their rehabilitation, and instill and reverberate positive emotions through their social exchanges

1 that conveyed gratitude and inspiration. Although it may appear in Figure 1 that positive
2 emotions are solely manifested in the individual (i.e., through meta-cognitions and positive
3 reappraisal), it is also important to note that these emotions influenced and were influenced by
4 others in their social support network. Specifically, emotional support included listening,
5 encouragement, sympathy, and challenge. One participant commented, “I mainly talked to my
6 girlfriend who helped me release and understand my emotions, and channel them in a more
7 positive way.” Tangible support took the form of assistance of a practical nature (e.g., help with
8 daily life, car rides to doctor’s appointments):

9 Interviewer: Can you tell me more about your fiancé?

10 Participant: My fiancé was really great, very helpful. Usually, I’m the one doing the
11 cleaning and the cooking, but he’s really stepped up and he’ll do the things that I can’t do
12 anymore, like the hoovering. I know he doesn’t like doing it but he doesn’t complain and
13 it’s reminded me how much he actually does love me and takes care of me, which has
14 been really nice.

15 The final external resource was *Time*. Indeed, all participants reported a significant
16 change in the amount of personal free time available to them from not training, competing, and
17 participating in other sport-related activities. One participant stated, “I’ve got all this free time
18 just to do things I couldn’t really do before”. For many athletes this meant more time to devote to
19 personal pursuits (i.e., non-sport related hobbies such as painting, writing, playing a musical
20 instrument) and/or with their family and friends outside sport, which helped mobilize the factors
21 and mechanisms associated with SIRG:

22 Interviewer (probe): So what did you do with your free time?

1 Participant: Well, for the first five weeks it was amazing. I was talking to people more
2 than I usually do. And people were coming to me to talk about other things. It was really
3 nice. It was really novel. And I liked that... It wasn't necessarily more people; it was just
4 when I talked to my friends I talked to them for longer.

5 Interviewer: Was that the main thing you did with your free time?

6 Participant: No, I also started painting and writing a lot more, which I used to do when I
7 was younger. And it helped me to calm down and get my emotions out. Getting it down
8 on paper and out of my head would just help me get my thoughts in order. And I've kept
9 it up, especially the painting, it really helps calm me down and think things through.

10 **Sport Injury-Related Growth**

11 Facilitated by the previous processes and internal and external factors, participants
12 reported a number of interrelated themes of SIRG. Interestingly, what was clear from the
13 findings was that growth meant different things to different participants. For example, some
14 participants reported strengthening their relationships with significant others, while others
15 reported a weakening or detaching from relationships with others as a benefit of their injury (e.g.,
16 learning who were not your real friends). It is also interesting to note that those participants who
17 had returned to sport for some time felt that their SIRG could help them adjust to and cope more
18 effectively with other demanding situations (e.g., relationship breakdown, being dropped from
19 the team), as well as be used to offer other athletes and non-athletes support during stressful
20 situations. In contrast, those participants who had only recently returned to sport had yet to
21 realise the potential application of their SIRG to other contexts and situations.

22 Collectively participants reported a number of interrelated SIRG themes. These themes
23 related to psychological-, social-, physical- and behavioral-changes. Behavioral changes

1 comprised *Pro-Social Behaviors* (i.e., helping others in need) and *Health Behaviors* (i.e.,
2 engaging in healthy behaviors, avoiding unhealthy behaviors). One athlete reported, “I now look
3 after myself. I eat right, stretch and do my warm ups. And make sure I get enough sleep and take
4 some time for myself, little things like that that add up but can really affect you.” Physical
5 changes focused on *Strength and Conditioning* (i.e., strength, flexibility, range of motion,
6 muscular/body control, cardiovascular fitness, and speed). One participant reflected: “I did a lot
7 of specific strength-work, which I hadn't really been doing before. I spent a lot more time doing
8 that. I had to build it up gradually, and I came back a much stronger runner than before.”

9 Psychological and social changes comprised *Intelligence* (e.g., sport-related, injury-
10 related, social and emotional), *Social Relationships* (e.g., positive relations with others,
11 detaching from negative relationships), *Personal Strength* (e.g., resilience, mental toughness,
12 personal growth, acknowledging weaknesses, expressing emotions), *Body-Self Relationship* (e.g.,
13 listening, understanding, and being more compassionate of one's body), *Self-Acceptance* (i.e.,
14 self-understanding and acceptance), and *Purpose and Appreciation of Life* (e.g., purpose in life,
15 appreciation of life). Three participants commented, “I appreciate from my injury and operations
16 that my life doesn't need to be dominated by sport and the need to play sport. There are more
17 important things in life, like spending time with my friends” (i.e., *Purpose and Appreciation of*
18 *Life*); “I listen to my body now. I know how much pain is too much and when to stop so I don't
19 get injured. Before I would keep going and that's what got me injured in the first place” (i.e.,
20 *Body-Self Relationship*); and “I definitely feel closer to my friends now. Them being there for me
21 when I was complaining and helping out with things, I really feel like I can rely on them” (i.e.,
22 *Social Relationships*). Finally, another participant suggested his ACL injury led to him focusing
23 on a new career path away from sport.

1 Interviewer: What changes, if any, have you experienced?

2 Participant: The whole situation has been quite life-turning for me. Because now, I want
3 to go into medicine to become an orthopedic surgeon specializing in the knee. ... Being
4 injured has made me want to learn all about the knee and to go into that line of work. ...
5 As a person, I feel I'm more content now. I know what I want to do and I feel happier
6 because of that. I think that's the biggest change. Because I knew what I enjoyed before
7 but I didn't really know what I wanted to do, and then this happened.

8 Discussion

9 The aim of this study was to develop a grounded theory that explains the complex
10 relationship between sport injuries and SIRG. The theory produced (i.e., *Theory of Sport Injury-*
11 *Related Growth*) makes a significant contribution to previous research by identifying the
12 mechanisms (i.e., meta-cognitions, positive reappraisal, positive emotions, and facilitative
13 responses), as well as the internal and external factors that can affect SIRG. The theory suggests
14 that injured athletes who experience ongoing strain during their recovery but have certain
15 internal and external resources are more likely to experience SIRG through a number of specific
16 mechanisms. That is, injured athletes are more likely to experience SIRG if they have certain
17 dispositional qualities (e.g., optimism, creativity, proactive), available physical resources (e.g.,
18 gymnasium and rehabilitation equipment), previous experience of adversity to draw upon,
19 emotion- and problem-focused coping styles (e.g., meaning-making, emotional venting), an
20 effective social support network, and access to narratives that reinforce the potential for positive
21 outcomes. Possessing, embodying, and mobilizing these resources in their free time during
22 recovery was identified to help the athletes to challenge negative thought-processes, and foster
23 positive emotions and facilitative responses that encouraged SIRG.

1 Although the grounded theory produced is novel (Figure 1), its concepts do resonate with
2 a number of other theories and models. For example, Wiese-Bjornstal, Smith, Shaffer and
3 Morrey's (1998) Integrated Model of Response to Sport Injury, which is one of the most
4 comprehensive models of athletes' responses to injury, hypothesizes that athletes' responses to
5 injury and rehabilitation are influenced by personal and situational variables that in turn affect
6 the way athletes' think, feel and act through a process of appraisal. Indeed, there is empirical
7 support for the effect of a number of personal (e.g., injury severity, personality, motivation,
8 athletic identity, coping strategies) and situational factors (e.g., provision of social support,
9 rehabilitation environment) on injured athletes' responses (for reviews, see Evans, Mitchell, &
10 Jones, 2006; Wade & Evans, 2011), which are consistent with the internal and external
11 resources illustrated in Figure 1. But despite the merits of this model and its contribution to our
12 enhanced understanding of athletes' responses to injury, the model is descriptive rather than
13 explanatory in nature. In addition, the model was never developed to explain how SIRG occurs
14 or indeed suggest the specific internal or external factors that might influence its development.

15 There are also a number of theories and models of growth following adversity; most
16 notably the Functional-Descriptive Model (FDM; Tedeschi & Calhoun, 1995) and the
17 Organismic Valuing Theory (OVT; Joseph & Linley, 2005). In support of Figure 1, these
18 theories suggest the importance of social environmental conditions, successful coping efforts,
19 and cognitive processing to support growth through adversity. However, in contrast to the
20 present findings and based on Janoff-Bulman's (1992) theory of shattered assumptions, these
21 theories hypothesize that the main mechanism leading to growth is the shattering effect on a
22 person's assumptive world (e.g., goals, beliefs, assumptions). This shattering effect leads to
23 ruminative activity that can be distressing, which is indicative of cognitive activity that is

1 directed at rebuilding pre-trauma schema and allowing new worldviews to emerge (i.e., growth
2 following adversity). Despite injury threatening athletes' beliefs and goals in this study, our
3 findings do not support the theory of shattered assumptions. One possible reason for this is that
4 the theory explains responses to *traumatic* events, and perhaps sport-related injuries are not
5 sufficiently traumatic to shatter athletes' assumptive worlds. However, since the sample used in
6 this study all returned to sport following injury it might be that the OVT and FDM are more
7 applicable to career-ending injuries. Another potential reason is that the theory of shattered
8 assumptions simply does not explain growth following adversity. Indeed, Wortman (2004)
9 reported on the basis of her own empirical work, "... it is my clear impression that those whose
10 assumptions about the world have been most shattered by the event—those who experienced a
11 sudden dramatic loss—are far less likely to experience growth" (p. 85). As a result, Wortman
12 recommended that future research should consider other factors that may be important in
13 promoting growth, suggesting "The more we can learn about what promotes growth, the more
14 we can intervene effectively among people who have experienced life experiences" (p. 86).

15 The mechanisms found to lead to SIRG in this study were meta-cognitions and positive-
16 reappraisal, and positive emotions and facilitative responses. These findings support and extend
17 the research of Salim and associates (Salim, Wadey, & Diss, 2015a,b) and Fredrickson's (1998)
18 Broaden and Build Theory of Positive Emotions. Indeed, Salim et al. (2015a) recently examined
19 the relationship between the personality trait of hardiness and growth following sport injury. As
20 hypothesized, findings revealed a significant positive relationship between hardiness and growth.
21 The mechanisms underpinning this relationship included positive reappraisal and positive
22 emotions. Not only does do these findings support Figure 1, but they also support Fredrickson's
23 Broaden and Build Theory of Positive Emotions. Fredrickson's theory implies that positive

1 emotions not only “broaden” an individual’s momentary thought-action repertoire but also
2 “build” an individual’s resources (e.g., growth following adversity). Yet, despite its relevance to
3 a sport injury context, it is important to note that Fredrickson’s theory did not set out to explain
4 growth, or what personal and situational factors might generate positive changes. Nevertheless,
5 the inclusion of positive emotions in the context of sport injury is an unexpected finding, not
6 least because research has largely denoted injury in terms of negative emotions (Evans & Hardy,
7 1995). Examining the more adaptive (and perhaps maladaptive) role of positive emotions is an
8 exciting area for future research that has the potential to inform new directions of enquiry. For
9 example, one area of investigation identified in this study that warrants attention is that emotions
10 are not only manifested within the individual, but socially and relationally (cf. Coulter, 2008;
11 Gergen, 2009; Tamminen, Palmateer, Denton, Sabiston, Crocker, & Smith, 2016). This finding
12 extends Wiese-Bjornstal et al.’s (1998) integrated model that views emotions at an individual
13 level. Future research should examine post-injury emotions as social phenomena.

14 The present study has a number of significant strengths. Its main strength is that it has
15 developed an original and substantive theory of SIRG that informs research and practice. Indeed,
16 the psychology of sport injury literature has remained largely atheoretical to-date (Brewer, 2010;
17 Wadey & Evans, 2011). It is hoped therefore that the theory of SIRG will help to better inform
18 programs of research and the interpretation of future findings. And by having developed a deeper
19 and enriched explanation of injured athletes’ experiences, practitioners are in a stronger position
20 to bridge the gap between theory-and-practice. In terms of limitations, one potential limitation of
21 this theory is its linear appearance; therefore, future researchers should seek to examine potential
22 reciprocal relationships between concepts. Other future avenues of research include using
23 alternative qualitative traditions (e.g., ethnography), methods (e.g., visual methods) and forms of

1 representation (e.g., creative non-fiction) to further enhance our knowledge and understanding of
2 SIRG. Indeed, Figure 1 is open to extension and can be tested and modified to accommodate new
3 insights. Finally, future research could also seek to identify interventions that sport psychologists
4 might use to foster SIRG in athletes, and explore the challenges of integrating this concept into
5 professional practice. For example, there might be inherent dangers in promoting SIRG, which is
6 perhaps best summed up by Wortman (2004) who discusses the impact growth might have on
7 survivors of traumatic and stressful experiences:

8 Our culture champions people who are strong, invulnerable, and independent in the face
9 of adversity. ... Yet there are dangers inherent in these views. First, we have to consider
10 the burden such views place on survivors. Even without these notions of growth,
11 survivors often suffer at the hands of others who expect them to be recovered from the
12 trauma or loss rather quickly. If they show distress, they are often regarded as poor
13 copers who are wallowing in their pain ... If outsiders believe that growth is prevalent,
14 this can become a new standard that survivors' progress is measured against. Such a
15 standard may lead to negative judgments toward those who do not show personal growth,
16 making them feel like coping failures (p. 88-89).

17 Wortman's comments resonate with sporting cultures that have been identified to revere
18 positivity (Coulter, Mallett, & Singer, 2016; Douglas & Carless, 2009; Mankad, Gordon, &
19 Wallman, 2009). For example, Mankad et al. explored perceptions of emotional climate among
20 injured athletes and found that injured athletes felt they had to suppress expressions of negativity
21 for fear of the negative reactions of others. Rather, they were expected to display intense
22 positivity and confidence. Thus, social-cultural environments can govern athletes' stories,
23 silencing some and amplifying others. Although SIRG may further amplify stories of positivity

1 following injury and perhaps indirectly inhibit others, it is important that it is not employed in a
2 way as to inhibit athletes' experience of and recovery from injury. Labeling injured athletes as
3 'failures' if they do not experience SIRG could result in poor mental health outcomes (Mankad
4 et al., 2009; Salim et al., 2015b). As recommended by Brown, Gilbourne, and Clayton (2009), all
5 injured athletes need to be afforded the space and opportunity to share their stories, which should
6 be met with support, understanding, and empathy (Wadey & Evans, 2011).

7 In conclusion, this study has developed a theory that explains how an injury can lead to
8 the growth and development of self (i.e., *Theory of Sport Injury-Related Growth*). This study
9 extends previous research in a number of important ways. First, the study proposes the concept,
10 *Sport Injury-Related Growth*, to create a more unified, identifiable, and context-specific
11 conceptualization of growth following sport injury. Second, the theory produced is novel and can
12 be used to inform future research and create greater congruence between theory and practice.
13 Third, the analysis has identified a number of mechanisms for SIRG. For example, the findings
14 suggest that positive emotions play a crucial role in athletes' recovery from injury, which has
15 been overlooked in the sociology and psychology of sport injury literature. Finally, the findings
16 identify a number of internal and external factors that can affect the likelihood of experiencing
17 SIRG. Although researchers have previously identified personality and social support to have an
18 important role in SIRG (e.g., Salim et al., 2015a; Wadey et al., 2011), a number of original
19 factors have been identified in this study including cultural scripts, knowledge and prior
20 experience, and coping styles. We hope the theory of SIRG produced helps to inform new
21 directions of enquiry in the quest to better understand, explain and support athletes' recovery
22 from injury.

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