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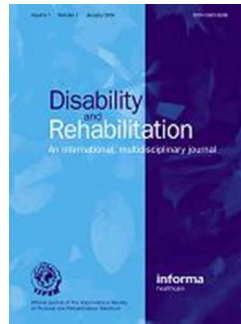
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### Implications for Rehabilitation

- Acquiring a physical disability may have a detrimental impact on the satisfaction of an individual's fundamental psychological needs.
- In order to foster posttraumatic growth, the para sport environment should allow for participants to feel competent, autonomous, and to have meaningful interactions with fellow athletes and coaches.
- Para sport may be particularly beneficial for individuals with previous sporting backgrounds and for those with severe initial reactions to their disability.

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4 1 **Understanding posttraumatic growth of paratriathletes with acquired**  
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6 2 **disability**  
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## 1 **Understanding posttraumatic growth of paratriathletes with acquired** 2 **disability**

3 Purpose: To examine the relevance of key components of Organismic Valuing Theory of Growth  
4 through Adversity in understanding posttraumatic growth amongst paratriathletes with acquired  
5 disability. Methods: Semi-structured interviews informed by organismic valuing theory of growth  
6 through adversity were conducted with 14 elite paratriathletes (8 male, 6 female). To increase the  
7 likelihood that participants had experienced posttraumatic growth, a short form of the  
8 Posttraumatic Growth Inventory was completed prior to interview participation. Interview data  
9 were analyzed using directed content analysis. Results: Although the initial response to disability  
10 was largely negative, paratriathlon experiences were reported to be a mechanism through which  
11 growth was facilitated. In particular, participants suggested that social, competence,  
12 empowerment, and identity development processes were instrumental in facilitating posttraumatic  
13 growth. Conclusions: Analysis identified themes largely consistent with the main tenets of  
14 organismic valuing theory of growth through adversity, supporting its utility in understanding  
15 response to a traumatic event and subsequent growth. These findings also suggest that para sport  
16 may be an efficacious means for promoting posttraumatic growth, especially for individuals with  
17 severe initial reactions to their disability. Lastly, findings suggest that fostering perceptions of  
18 competence, autonomy, and social connection may promote posttraumatic growth.

19 Keywords: para sport, adaptive sport, organismic valuing theory, physical activity, trauma

## 1 Introduction

2 Acquiring a physical disability that results in the loss of valued functions can be a traumatic  
3 experience accompanied by an array of adverse psychosocial and behavioral consequences [1].  
4 Tasks taken-for-granted prior to impairment may subsequently require detailed consideration  
5 (e.g., bathing, using the stairs) while the psychological consequences can result in the fracturing  
6 of one's social life [2–4]. For these reasons, adjusting to a disability can be an extremely arduous  
7 and long-term process [3,4]. For some, positive adjustment may never occur [5]. Problems of a  
8 clinical nature such as depression or even suicidal ideation may be pronounced among those  
9 experiencing a poor adjustment to disability [2,3]. However, despite the deleterious  
10 consequences often associated with acquiring a physical disability, some individuals report  
11 positive experiences, such as greater appreciation for life, strengthened social relationships, and  
12 enhanced life meanings [2,6]. As Tedeschi and Calhoun state, "the frightening and confusing  
13 aftermath of trauma, where fundamental assumptions are severely challenged, can be fertile  
14 ground for unexpected outcomes that can be observed in survivors: posttraumatic growth"  
15 [7,p.1]. To this end, Tedeschi and Calhoun [7] defined posttraumatic growth as positive  
16 psychological change resulting from the struggle with exceedingly challenging life events.

17 Although the concept of suffering as an impetus for growth is fundamental to many of the  
18 world's religions, cultures, and philosophies, psychological inquiry has traditionally focused  
19 almost exclusively on pathological and maladaptive behaviors among those experiencing a  
20 negative life event [8]. However, over the past few decades, researchers grounded in a positive  
21 psychology framework have devoted increased attention to questions about optimizing human  
22 health, well-being and functioning across various life domains [9]. As such, there is a growing  
23 body of literature concerned not just with the return to baseline functioning, but with the positive

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3 1 changes that may occur following a traumatic event. Various terms have been utilized, often  
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5 2 interchangeably, to describe this concept of positive change following a negative event, such as  
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8 3 posttraumatic growth, stress-related growth, perceived benefits, positive adaptation, and  
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10 4 adversarial growth. Park [10] advises that the term posttraumatic growth be reserved for cases  
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12 5 where the individual truly suffered a traumatic event, such as an event which results in a threat to  
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14 6 life or bodily integrity. Acquiring a physical disability meets this criteria, and therefore the term  
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17 7 posttraumatic growth was employed in the present investigation.

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20 8       Research concerning the role of physical activity on posttraumatic growth is an emerging  
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22 9 area of study, with much of the existing work conducted on female cancer survivors [11,12].  
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24 10 While surmounting the challenges of various physical activities (e.g., summiting a mountain)  
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26 11 often serves as a metaphor for overcoming cancer, those with an acquired disability likely face a  
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28 12 different path, as permanent injury provides enduring reminders of the traumatic event that may  
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30 13 prevent one from ever being entirely “posttraumatic” [13]. Although the benefits and barriers to  
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32 14 physical activity and sport for individuals with disabilities are well documented [14,15], the role  
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34 15 of physical activity and sport participation on posttraumatic growth for this population has  
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36 16 received considerably less research attention. Preliminary evidence with seven 2012 Paralympic  
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38 17 hopefuls [3] revealed that physical activity and sport participation facilitated posttraumatic  
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40 18 growth by affording participants opportunities to create new life meanings, specifically, to test  
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42 19 the boundaries of their physical limitations. In doing so, participants better understood their  
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44 20 capabilities and thus pursued future opportunities involving taking risks, accepting responsibility,  
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46 21 and demonstrating personal control. Experiences of success and other meaningful rewards  
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48 22 reinforced these newly constructed life meanings. In another sport specific investigation,  
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50 23 Crawford et al. [2] interviewed spinal cord injured individuals to determine if para sport (i.e.,  
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1 sport for people with acquired disabilities) participation influenced perceptions of posttraumatic  
2 growth. The researchers uncovered five general dimensions of growth due to para sport, which  
3 encompassed emotional (e.g., greater appreciation for life and re-establishment of self-identity),  
4 social (e.g., meeting others and sharing experiences), and physical domains (e.g., improved  
5 overall health). In addition to the benefits of para sport participation, however, both studies [2,3]  
6 found that growth was also accompanied by substantial negative consequences of the trauma,  
7 such as depression, feelings of loss, and hopelessness. These findings suggest that the path to  
8 achieving posttraumatic growth is not without its challenges, and that experiences of growth and  
9 distress are not mutually exclusive. This lack of exclusivity speaks to the notion that  
10 posttraumatic growth and posttraumatic stress are not opposite ends of a continuum, but rather  
11 distinct constructs that can be experienced concurrently [16]. Moreover, these studies identify  
12 not only the existence of posttraumatic growth among those with an acquired disability, but the  
13 potential value of sport in facilitating growth.

14 A number of theoretical frameworks have been proposed to understand posttraumatic  
15 growth. For instance, Tedeschi and Calhoun [7] represent posttraumatic growth as an outcome  
16 resulting from deliberately ruminating on the trauma. Other scholars however, conceive of  
17 posttraumatic growth as a coping strategy, such as a construal for meaning making [17,18]. One  
18 theory that seeks to accommodate existing posttraumatic stress theories while explaining why  
19 individuals are motivated towards growth is the organismic valuing theory of growth through  
20 adversity [19]. Drawing from Janoff-Bulman's [20] model of shattered assumptions, Joseph and  
21 Linley [21] state that a traumatic event may thwart personal growth and well-being by shattering  
22 an individual's assumptive world (i.e., firmly held core beliefs about the self and the world),  
23 leaving the individual in need of integrating the trauma information (i.e., completion tendency).



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3 1 This need for integration causes oscillating phases of *intrusive* and *avoidance* states, during  
4  
5 2 which the individual seeks to process the trauma-related information while simultaneously  
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8 3 defending against the distress triggered by such processing. Eventually, the intrusive and  
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10 4 avoidant states subside resulting in one of three potential cognitive outcomes – *assimilation* (i.e.,  
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12 5 integrating the trauma information into an existing worldview), *accommodation in a negative*  
13  
14 6 *direction* (i.e., changing one’s worldview adversely leading to possible psychopathology), or  
15  
16 7 *accommodation in a positive direction* (i.e., posttraumatic growth).

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20 8 The final outcome can either be facilitated or impeded by one’s social environment. A  
21  
22 9 supportive social environment is one that allows for the satisfaction of the fundamental human  
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24 10 needs of relatedness (i.e., to feel connected), autonomy (i.e., to feel volitional), and competency  
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26 11 (i.e., to feel capable) [19]. According to the theory, satisfaction of these psychological needs will  
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28 12 give voice to the organismic valuing process (i.e., one’s capacity and tendency to recognize what  
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30 13 is important in order to lead a fulfilling life) and facilitate positive accommodation, which is  
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32 14 characterized by well-being in the eudaimonic tradition (i.e., psychological well-being) as  
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34 15 opposed to the hedonic tradition (i.e., subjective well-being). The distinction is significant, as it  
35  
36 16 is entirely possible that even in circumstances when individuals experience positive  
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38 17 accommodation, happiness in terms of subjective well-being will not be an inevitable outcome  
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40 18 [19,22]. While the alleviation of distress can be attained either through assimilation or  
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42 19 accommodation, only by positively accommodating the trauma information, can one experience  
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44 20 growth [21].

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46 21 Preliminary findings in the para sport and posttraumatic growth literature suggest that  
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48 22 para sport participation may play a role in facilitating posttraumatic growth amongst individuals  
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50 23 who have acquired a disability [2,3]. There is however, a need to better understand the processes  
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1 through which this growth occurs. In order to enhance an understanding of *how* para sport may  
2 facilitate posttraumatic growth, the purpose of this investigation was to examine the relevance of  
3 the organismic valuing theory of growth through adversity in understanding the phenomenon of  
4 posttraumatic growth amongst individuals with physical disabilities participating in triathlon  
5 (i.e., paratriathletes). A more nuanced understanding of the psychological processes involved in  
6 experiencing posttraumatic growth among paratriathletes can provide healthcare specialists (e.g.,  
7 physiotherapists, psychologists) as well as organizations (e.g., adaptive sport charities, hospitals)  
8 with essential information on the development of therapeutic interventions. Further, findings  
9 from this investigation can provide coaches and sport administrators with evidence-based  
10 knowledge on best practices for developing sport programs that encourage enhanced sport  
11 performance as well as a greater likelihood of posttraumatic growth. Finally, from a theoretical  
12 standpoint, the present investigation has the potential to examine the utility of the organismic  
13 valuing theory of growth through adversity in understanding individuals experience in a sport  
14 specific context.

## 15 **Methods**

### 16 *Participants*

17 The current study utilized the purposive sampling technique of criterion sampling [23], where  
18 participants were required to meet predetermined conditions deemed to be important (i.e.,  
19 experience of posttraumatic growth), in order to glean knowledge of the role of paratriathlon on  
20 posttraumatic growth from a population who have experienced the phenomenon. The participant  
21 population was delimited broadly to include individuals over the age of 18, who acquired a  
22 physical disability yet remained ambulatory, and who participated in the sport of triathlon. These

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3 1 criteria did not include individuals whose disability required permanent use of a wheelchair due  
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6 2 to the unique challenges that this population may face compared to those with disability who  
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8 3 remain ambulatory (e.g., accessibility, transportation, etc.). Furthermore, individuals with  
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10 4 congenital disabilities were not included as their disability did not occur as a result of a  
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12 5 personally traumatic event. Of the prospective participants who responded to a contact phone call  
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14 6 or email all agreed to participate in an interview. Recruitment efforts resulted in a sample of  
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16 7 fourteen national and international level paratriathletes (8 male, 6 female), including  
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18 8 Paralympians, world champions, national champions, and those with other notable  
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20 9 accomplishments. The average participant age was 34.6 years (SD = 5.88), and the mean time  
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22 10 since acquiring a disability was 11.4 years (SD = 6.21). At the time of data collection,  
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24 11 participants were involved in para sport for an average of 7.9 years (SD = 3.91). While only three  
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26 12 participants had triathlon experience prior to disability, all participants reported a competitive  
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28 13 sport background. For the purpose of anonymity, pseudonyms were selected for all participants  
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30 14 and certain demographic information is withheld from the manuscript. A range of disability  
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32 15 types, as well as incidents in which disabilities were acquired were represented in the sample.  
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34 16 Table 1 provides a more detailed description of participants' demographic information.  
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42 [Insert table 1 here]  
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### 46 ***Instruments*** 47 48

49 19 As a criterion for participation was having experienced posttraumatic growth, a short form of the  
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51 20 Posttraumatic Growth Inventory [24] was used to screen participants. The inventory is a 10-item  
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53 21 survey that provides a global indicator of posttraumatic growth that has shown good reliability  
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55 22 and validity across a variety of samples [24,25]. Response options range from 0 (*I did not*  
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1 *experience this change as a result of my crisis) to 5 (I experienced this change a very great*  
2 *degree as a result of my crisis).* Additionally, a semi-structured interview guide informed by the  
3 tenets of the organismic valuing theory of growth through adversity (i.e., shattered assumptive  
4 world, intrusive and avoidant states, psychological needs satisfaction) was constructed and  
5 subsequently pilot tested with two paratriathletes to further refine items. Sample interview  
6 questions included “Describe your thoughts and feelings in the immediate aftermath of acquiring  
7 your disability,” “Tell me about the relationships you have made during your para sport  
8 experiences,” and “How have your experiences with paratriathlon changed or evolved, if at all,  
9 since your initial experiences as a paratriathlete?”

### 10 ***Data Collection***

11 Institutional review board approval was obtained and informed consent was given by all  
12 participants prior to participation. As indicated, posttraumatic growth was first screened for by  
13 completing a short form of the Posttraumatic Growth Inventory [24]. An a priori designated cut-  
14 off criteria of a mean score of 2.0 was selected, as this score indicates that participants  
15 experienced at least “a small degree of posttraumatic growth.” Participants who met the criteria  
16 were then interviewed by the first author, a caucasian male Paratriathlete. Such shared  
17 experience facilitated a greater understanding of subcultural norms and values, an expedited and  
18 more complete acceptance by participants, and greater openness, trust, and a richer data set  
19 [26,27]. While the merits of conducting research on one’s own social group have been  
20 extensively debated, the first author’s congenital impairment, helped him occupy a space on the  
21 continuum between that of “insider” and “outsider” [26]. Interviews were conducted at various  
22 locations (e.g., Olympic Training Center, hotels, competition venues) to facilitate a convenient

1 and safe environment for participants to share their stories and to address pragmatic  
2 considerations such as athletes' training and competition schedules. Audio data from all  
3 interviews were recorded and transcribed verbatim. Interviews lasted an average of 43.5 minutes.

#### 4 *Analysis*

5 Given the aim of examining the applicability of the organismic valuing theory of growth through  
6 adversity as an appropriate framework for understanding posttraumatic growth experiences  
7 among individuals with an acquired disability, directed content analysis was utilized [28].

8 Directed content analysis is a specific approach to analyzing qualitative data that utilizes theory  
9 or relevant research to inform initial coding before allowing novel themes to emerge from the  
10 data. The approach can be used to validate or expand a conceptual framework or theory [28].

11 Using directed content analysis, the data was analyzed as follows. First, interviews were  
12 transcribed verbatim, and the first author further familiarized himself with the data by reading  
13 through each transcript multiple times. Second, operational definitions of the major concepts of  
14 the organismic valuing theory of growth through adversity (i.e., shattered assumptive world,  
15 psychological needs satisfaction) were developed, and data representative of these concepts were  
16 coded and grouped into initial themes in a deductive manner [28]. Data that did not fit within a  
17 theoretically derived theme were coded into additional themes in an inductive manner [29].

18 Third, several authors evaluated the emerging themes and determined if subcategories were  
19 necessary. This process consisted of inductively clustering data based on underlying conceptual  
20 similarities. For example, the initial reaction to trauma theme was separated into subcategories  
21 depending on the psychosocial domain that was impacted (e.g., social consequences, identity  
22 crises, feelings of incompetence). Both the inductive and deductive phases of analysis were

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3 1 discursive in nature and involved iterative groupings and classifications of themes, with raw data  
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6 2 statements being organized and reorganized following discussion of conceptual similarities  
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8 3 between data statements and *a priori*/emergent themes. In order to enhance the rigor of the  
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10 4 findings several authors including those with substantial experience publishing qualitative  
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12 5 research, an intimate knowledge of organismic valuing theory of growth through adversity, and  
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14 6 an insider's and outsider's perspective (i.e., one Paralympian and several non-Paralympians)  
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16 7 acted as critical friends [30]. They did so, by questioning the first author's grouping of findings,  
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18 8 helping the first author consider personal biases that may have influenced interpretation of the  
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20 9 interview data, and by facilitating a reflexive viewpoint. Specifically, the first author presented  
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22 10 his interpretations of the data on a regular basis to the co-authors who provided a theoretical  
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24 11 sounding board to encourage reflection upon, and exploration of, alternative explanations and  
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26 12 interpretations as they emerged in relation to the data. As part of this process of critical dialogue,  
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28 13 the first author was required to make a defensible case that the available data supported his  
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30 14 interpretations. Furthermore, participant reflections on our analytical interpretations were sought  
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32 15 [30]. This process involved sharing and dialoguing with the participants about the study's  
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34 16 findings and providing opportunities for additional data and insight. Member reflections are not  
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36 17 to be mistaken with member checking which seeks to find the data credible by matching the  
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38 18 participants' and researchers' interpretations of the data.  
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## 48 **Results**

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50 20 The average score across participants on the short form of the Posttraumatic Growth Inventory  
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52 21 was 3.34 (SD = 0.68), signifying moderate to strong perceptions of posttraumatic growth. Two  
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54 22 participants (Matthew and Will), however, had mean responses considerably lower than the rest  
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3 1 of the participants (Matthew: 2.1; Will: 2.0), indicating that they experienced posttraumatic  
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5 2 growth changes to a small degree. Carl was the next lowest with a mean of 2.7 (i.e., small to  
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7 moderate degree of growth), while all other participants ranged between 3.2 and 4.4, indicating  
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9 3 that they experienced moderate to high levels of posttraumatic growth. All participants met the  
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11 4 cut-off criteria of 2.0 and were subsequently interviewed.  
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15 6 As the interviews addressed varying facets of the disability experience, so too the derived  
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17 7 themes are diverse in scope. Furthermore, due to the complexity of participant experiences, each  
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19 8 theme consists of a number of subthemes in order to further illustrate participants' lived  
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21 9 experiences. The first theme highlights participants' initial reactions to trauma and having  
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23 10 acquired a physical disability. Perhaps not surprisingly, these reactions were largely negative and  
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25 11 illustrate how one's assumptive world can be shattered by a traumatic event such as acquiring a  
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27 12 disability. The second theme addresses the organismic valuing theory of growth through  
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29 13 adversity assertion that individuals who suffer a trauma experience intrusive and avoidance states  
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31 14 while processing the trauma information. The majority of participants reported that having a  
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33 15 physical disability had too profound of an effect on their lives to block out, and therefore  
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35 16 intrusive thoughts were more prevalent. The third theme focuses on paratriathlon participation.  
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37 17 Participants described these experiences in terms of the processes by which para sport helped to  
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39 18 facilitate positive outcomes. Finally, the fourth theme pertains to reactions to one's disability  
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41 19 status, which appeared to be unrelated to para sport participation.  
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50 20 ***Initial reaction to trauma/disability: Changing beliefs about the "self" and one's "place" in***  
51 21 ***the world***

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53 22 Participants described their initial reactions to their trauma and subsequent disability in  
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55 23 predominantly negative terms. A number of subthemes emerged resulting in a range of  
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1 psychosocial consequences. One such consequence frequently cited was the impact that  
2 disability had on one's social life. These social ramifications took on multiple forms. For  
3 instance, Carl spoke of a new found "fear of being in society":

4 I wouldn't go out into public. I used to study a lot – I was in college at the time – and I  
5 would study in the coffee shop. It took me months to actually drive back and forth to the  
6 coffee shop, and then, finally, when I parked, I would just leave, and then it took me months  
7 until I would actually get out of my car and start to get comfortable being out in public.

8 Others reported similar feelings, such as believing they no longer fit in with their peers, drifting  
9 away from friends, avoiding being out in public, or being more reserved in social situations. One  
10 reason for these apprehensions was due to a desire to not attract unwelcome attention or pity, as

11 Allison illustrated:

12 I didn't want to be the center of attention, so I wore long pants frequently. I would run and  
13 still exercise and things like that, but when I was going into a public place – I remember  
14 specifically church, because it was an older congregation – I wouldn't wear a skirt because I  
15 didn't want to kind of alarm the other parishioners that would have felt so bad for me.

16 A perceived loss of control as a result of having acquired a physical disability was  
17 another prevalent consequence reported by participants. Acquiring a disability caused many  
18 participants to feel less independent or in some cases provoked a realization that they were not as  
19 invincible as they once thought they were. Indicative of the sentiments of others, Evan  
20 commented:

21 I guess I have always thought that I am in control of everything, and when I stepped on the  
22 IED [improvised explosive device] – when I got hurt – I quickly realized that I am not in  
23 control of everything. It is one of those things that I just couldn't believe it happened to me,  
24 that I couldn't go back and change it.



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3 1 Feelings of incompetence was another salient consequence of acquiring a disability.

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5 2 Many participants reported concerns regarding their ability to function in the world or  
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8 3 frustrations related to struggles with tasks once taken for granted. Ben described how these  
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10 4 feelings of incompetence led to his frustrations:

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14 5 Initially, I was frustrated and annoyed with how much it impacted my life, particularly how  
15 6 slow I was at doing things. Everything seemed to take two or three times longer than it did  
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17 7 before, even the simple stuff – like putting toothpaste on a toothbrush was incredibly  
18 8 frustrating. It wasn't necessarily any kind of big thing that was super frustrating; it was those  
19 9 small little things that kind of added up over time. I remember a particular instance with a  
20 10 tube of toothpaste, and I couldn't get toothpaste on the toothbrush without getting it all over  
21 11 the counter, and I just got reduced to tears because of that frustration.

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27 12 Many participants also reported that acquiring a disability resulted in feeling like they  
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29 13 lost their identity.

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32 14 Pre-injury my purpose in life was to be a phenomenal athlete. And then, immediately post-  
33 15 injury, there was a loss of purpose. To be honest with you, I felt like I didn't know what I  
34 16 was here for. Everything was stripped from me, and all of those things I thought I was  
35 17 supposed to be before were gone. (Carl)

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40 18 Other participants felt like their disability became their defining feature and that everything else  
41 19 was stripped away. As Allison illustrated, "It was very hard for me to rationalize that I had other  
42 20 gifts besides physical attributes and my physical mobility." Furthermore, depression and other  
43 21 psychopathological responses were also pronounced amongst several participants. Carl credited  
44 22 his loss of identity as the source of his depression:

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48 23 I definitely was depressed. I had about three months of depression, and a lot of that stemmed  
49 24 from the fact that everything I had known about myself, defining factors like sports and  
50 25 athleticism, were gone, so I got very depressed for about three months post-amputation.

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4 1 Several other initial reactions were articulated, albeit to a lesser extent than those  
5  
6 2 described above. Such reactions included denial or a delayed acceptance, anger at having  
7  
8 3 acquired a disability, loss of self-esteem, and negative body image. For example, Ben's  
9  
10 4 comments epitomized the loss of confidence and decrements to self-esteem mentioned by several  
11  
12 5 participants, "I definitely felt like I had less value after the accident, that I couldn't contribute as  
13  
14 6 much [to society]" while Carl's statement provided a powerful demonstration of body image  
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16 7 concerns: "I never wanted to really see myself without clothes on. I never wanted to see myself;  
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18 8 even in sexual relationships, it was more like hurrying to cover my body up."  
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#### 24 9 *Intrusive and avoidance states*

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27 10 Interviews revealed that intrusive thoughts regarding the moment of injury and one's newly  
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29 11 acquired disability were far more prevalent than avoidant thoughts. As Katie suggested, "It was  
30  
31 12 very time consuming, and all you do is think about what happened, if anything could have been  
32  
33 13 different." The use of avoidance strategies was far less prevalent, although several examples of  
34  
35 14 this strategy were articulated. As Gwen described, "I think that I tried to repress a lot of it. I  
36  
37 15 definitely wanted to be seen as 'normal', and I wanted to just go back to being as normal as  
38  
39 16 possible." However, many participants described how the significant physical and overall life  
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41 17 alterations occurring as a result of their disability made it hard to avoid or block out injury-  
42  
43 18 related thoughts. Jared illustrated this point in stating, "It's kind of hard when you need crutches  
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45 19 to go to the bathroom. You're constantly reminded about it, so it's kind of hard to block it out."  
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47 20 Despite the intrusive thoughts experienced by many, all participants reported that perseverance  
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49 21 over their disability, for the most part, eventually subsided.  
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#### 56 22 *Para sport participation*

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3 1 When describing their para sport experiences, participants spoke of the processes through which  
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6 2 their para sport experiences facilitated growth as well as the explicit experiences of posttraumatic  
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8 3 growth resulting from their para sport involvement.  
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12 4 *Processes of para sport*  
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15 5 Para sport facilitated posttraumatic growth through a variety of mechanisms. One way that para  
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17 6 sport accomplished this was by providing opportunities for meaningful social experiences that  
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19 7 allowed for feelings of kinship and support, as well as opportunities to learn from others. This  
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21 8 sense of community within the para sport environment was highlighted by all participants. As  
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23 9 Megan observed, “There’s competition, but there’s still community and I think that’s helpful  
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25 10 because you’re not alone. You’re not alone.” In terms of kinship, para sport provided  
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27 11 opportunities to relate to individuals with similar circumstances, which was not something that  
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29 12 could be experienced in their existing relationships. Jared illustrated this point in commenting:  
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35 13 Being exposed to all these people – you know, disabled athletes – it’s special. It’s really,  
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37 14 really, special to me. I mean, you don’t get to spend time with people who’ve been through  
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39 15 things like you’ve been through and had some challenges that you’ve been through. It’s  
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41 16 something about having that kinship, you know; you don’t get that kinship anywhere else.  
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43 17 For some participants, para sport helped them cope with their disability by providing role models  
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45 18 of other disabled athletes who had overcome disability related challenges. Such models provided  
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47 19 participants with the belief that they too could overcome their challenges.  
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51 20 Sports have really helped me deal with it [my disability] in that I’ve been surrounded by a  
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53 21 community of other people that have similar disabilities, if not worse disabilities – or  
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55 22 disabilities that affect them more, I wouldn’t say worse or better – but have a higher impact  
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1 of how they're affected by their disability. And seeing them being able to cope and still  
2 succeed in athletics and life has really made dealing with my disability a lot easier. (Carl)

3 Another way para sport served to facilitate posttraumatic growth was by providing  
4 opportunities for participants to experience competence by setting goals and overcoming  
5 challenges. For example, when asked how learning to be a triathlete affected his life, Carl  
6 responded:

7 I think that's when my life started to change for the better, you know, starting to have a goal,  
8 which, might have been small, but learning to run better was a goal, and it gave me purpose  
9 to try to really overcome the whole 'this disability owns me' as opposed to 'I own this  
10 disability', and I started learning that I could be a good runner. I could be a competitive  
11 athlete because of all that, and that really changed my mindset from 'this defines me', and  
12 then turnaround to 'I define myself.'

13 Moreover, many participants mentioned how learning to adapt in sport helped in other aspects of  
14 life. As Ben suggested:

15 It's taught me to find ways to work around parts of my life. There are certain things that are  
16 just much more difficult, or I'm unable to do, and being in sport has taught me ways to be  
17 inventive and figure out how to do things that, beforehand, I would just have someone else  
18 do for me.

19 Numerous participants commented on how para sport enabled a sense of empowerment  
20 and control. As Jared explained, "The para side of it takes it to a different level. I'm empowered.  
21 I'm not less. I'm more." Ben further described how para sport was empowering in terms of  
22 assuming control over your life.

23 I think that, definitely, para sport is empowering, and it gives you something that is  
24 controllable in a world of things that are not controllable, particularly for someone who has

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3 1 recently acquired a disability. The ‘put the work in and get something out’ that happens in  
4 2 sport is very... comforting, might be a good word. In a situation where you recently  
5 3 acquired a disability and there’s still a bunch of unknown, sport is very known and very  
6 4 focused, and there’s an aspect of being able to control things that you wouldn’t be able to  
7 5 control outside of sport.  
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13 6 The theme of identity was also prominent amongst participants. Para sport participation  
14 7 served as a mechanism to regain an old identity. For example, in reflecting on her initial  
15 8 experiences with para sport, Gwen illustrated this theme:  
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21 9 That year of my life was the best year of my life just because I felt like I was constantly, you  
22 10 know, trying – not new things – but trying things [running] that I haven’t done in eight years,  
23 11 and just kind of reconnecting with that whole piece of my identity [being an athlete] that I  
24 12 had lost.  
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29 13 Para sport participation also afforded many participants the opportunity to expand upon their  
30 14 previous identity, one which often centered around para sport. As Evan described:  
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35 15 I think, originally, when I was injured and lost my leg, I immediately felt like I had lost my  
36 16 identity, and now I feel like I have kind of a new identity. Now, I am an athlete. I am an  
37 17 athlete who competes in sports. I think that’s pretty cool.  
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42 18 Moreover, as acquiring a physical disability resulted in a loss of identity for many participants,  
43 19 para sport was perceived as a way to overcome feelings of being defined by a disability.  
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47 20 Sport taught me that I can still do the things I want to do.... like my disability doesn’t define  
48 21 me, and I don’t feel like I have a “woe is me, things are so rough” attitude that I had in the  
49 22 past before finding para sport. (Ben)  
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53 23 Lastly, several participants mentioned how para sport served as a coping mechanism in  
54 24 which they could focus their energy to help them deal with having acquired a disability. For  
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3 1 example, Katie credited para sport for helping her return to functioning: “it got me, in my mind,  
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6 2 out of my hospital bed.” Similarly, Justin affirmed that:

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9 3 Para sports and sports in general basically saved my life because they gave me an outlet in  
10 4 which to filter or eliminate frustrations. ...getting involved in para sports, training, and all  
11 5 the stuff that is associated with para sports has been the [emotional] outlet and the coping  
12 6 mechanism – the main coping mechanism – by which I deal with my disability.

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17 7 *Experiences of posttraumatic growth resulting from para sport participation*

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19 8 In addition to discussing the role that para sport played in the facilitation of growth, participants  
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21 9 commented on several experiences of posttraumatic growth which resulted from their para sport  
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23 10 participation. One such experience was related to the cultivation of relationships. As indicated  
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25 11 previously, the social relationships, camaraderie, and support afforded through para sport  
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27 12 participation were factors that facilitated growth. However, participant comments also suggested  
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29 13 that cultivating deep and meaningful relationships were part of the posttraumatic growth  
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31 14 experience resulting from their para sport involvement. Katie conveyed how para sport  
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33 15 experiences led to meaningful relationships:

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39 16 In para sport, everyone has overcome some sort of... whether they were born with a  
40 17 disability, they've had to grow up with it, or they've overcome some trauma or disease,  
41 18 whatever it is, we've all gone through our period, of trying to fit in or trying to figure out  
42 19 what we want to do, and everyone has these amazing stories, and you all come together, and  
43 20 it's just this.... I mean the people are amazing. I have relationships that will last forever that  
44 21 I met during sports.

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50 22 All participants reported enhancements in their confidence, which they attributed to their  
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52 23 involvement in para sport. Beyond their sport confidence however, participants described how  
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54 24 they became more confident in their ability to succeed in life with a disability, regardless of the  
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1 challenges they faced. As Matthew stated, “It has given me all of the confidence that I have now.  
2 Without it, I probably wouldn’t be doing half the stuff I’m doing now.” Similarly, Ben felt that:

3 Sport has given me the ability to trust in myself and trust what I can do. The self-doubt that  
4 came along with my disability has been eradicated through my participation in sport.  
5 Learning that my disability doesn’t mean that my life has to be so different, like I need to  
6 walk on egg shells around myself. Competing in sport has given me the ability to feel like I  
7 can overcome just about anything that would come my way.

8 Para sport also helped some participants deal with body image issues after acquiring a  
9 disability. As Evan illustrated:

10 At first, when I looked in the mirror, I thought I just looked really strange because I’m  
11 missing a body part. And that has totally gone away. Now, out in public, I’m fine with taking  
12 my leg off or being looked at differently, and I just think getting out there and doing that  
13 sport helped.

14 For many, becoming fit through para sport participation was the reason for enhanced  
15 body image, as Carl’s experiences demonstrated, “I feel very confident in my body because I can  
16 still look good despite the fact that I’m missing a leg. You know, my self-image has really  
17 changed since I’ve become an athlete than it was before.” Irrespective of body image, many  
18 participants credited sport with various general health benefits, especially considering the  
19 challenges they faced as a result of their disabilities (e.g., wearing prosthetics). Other benefits of  
20 the para sport experience frequently cited included becoming more selfless (e.g., using one’s  
21 platform to advocate for para sport and others with disabilities) as well as being afforded unique  
22 opportunities specific to para sport participation. Epitomizing the sentiment of others Gwen  
23 remarked:

1 All the different opportunities that have come my way – that I know never would have  
2 happened – and so, overall, it probably has been the best thing that has ever happened to me,  
3 just because so much of my life right now, so much of how I see myself, somehow links  
4 back to that.

### 5 *Reactions unrelated to para sport*

6 While the utility of para sport in promoting beneficial outcomes for participants was evident in  
7 all interviews, experiences unrelated to para sport were also mentioned. For instance, adjusting to  
8 a “new normal” was commonly cited as something that gradually occurred over time and was not  
9 necessarily an outcome of sport participation. More than a return to baseline functioning,  
10 however, participants also reported having derived benefits from their disability experience, as  
11 demonstrated by comments suggesting that acquiring a disability led to greater empathy and  
12 acceptance of others:

13 I think my view of the world is much more open than it used to be...my acceptance and  
14 tolerance for other people and other views and lifestyles and religions, like, I think all of  
15 that, I’ve become a little more open and accepting, tolerant of different ways of life. (Sara)

16 Several participants also believed that the process of having acquired a disability highlighted or  
17 strengthened elements of their social support network. When asked how acquiring a disability  
18 affected her social relationships, Megan replied:

19 There was much more connection with friends that I had, most of them. Maybe there were a  
20 few outliers, but I was very well supported with my network of friends and relatives, and  
21 that definitely supported me – you know, encouraged me. So, yeah, thinking back, there was  
22 definitely some that dropped off, because it was high school, but, for the most part, we’re  
23 still such good friends with most of the girls I went to school with back then because it  
24 impacted all of our lives.



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3 1 Many participants also cited how their experiences of having acquired a disability resulted in a  
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6 2 changed perspective and greater appreciation for life. As Sara described:

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9 3 This is probably kind of cliché, but I just realized how precious life was. Knowing, for me, at  
10 4 any time, things could change and get much worse, and change not only the way I live but  
11 5 how long I live. And so, you know, everyday has become more important than before my  
12 6 disability.

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17 7 Evan further illustrated how his disability effected his perspective on life:

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20 8 It shifted my priorities a little. So, before my injury, I was a marine. I had a plan of what was  
21 9 next, and I was going to get out of the Marine Corps and try to get a job – a corporate  
22 10 position – and I just had this plan in my life, and then, after getting injured, I realized that  
23 11 my priorities were my family and my faith, and I began to let those help me answer any  
24 12 questions or help me dictate how I was going to live my life.

## 25 26 27 28 29 30 13 **Discussion**

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33 14 Given our aim of examining the relevance of the organismic valuing theory of growth through  
34 15 adversity in understanding posttraumatic growth among paratriathletes with an acquired  
35 16 disability, we highlight areas of consistency and/or novelty between key theoretical tenets and  
36 17 findings from the present investigation. Consistent with the fundamental assumption of  
37 18 organismic valuing theory that an individual's assumptive world (i.e. core beliefs) are shattered  
38 19 in the trauma aftermath, participants in the current study demonstrated how the disability  
39 20 experience negatively influenced beliefs about the self and one's "place" in the social world as  
40 21 agentic beings. Previous research similarly demonstrates the difficulties incurred by those with  
41 22 acquired disability in the disability aftermath [2,3]. Moreover, the organismic valuing theory of  
42 23 growth through adversity posits that individuals have innate psychological needs (i.e.,  
43 24 relatedness, competence, autonomy) which must be met for the organismic valuing process to be

1 given voice, and for growth to occur. Evidence from this investigation extends the organismic  
2 valuing theory of growth through adversity by illustrating how acquiring a disability may not  
3 only elicit challenges to firmly held assumptions about life, but may also thwart the essential  
4 psychological needs necessary for growth. That is, participants highlighted the manifold ways in  
5 which acquiring a disability weakened their perceived competence, reduced perceptions of  
6 volitional control over one's life, and negatively impacted many aspects of their social life.  
7 Research similarly shows those with an acquired disability have reported deficiencies in their  
8 needs satisfaction [6,31,32]. For example, many persons with an acquired disability have feelings  
9 of incompetence as they question their ability to perform tasks done previously [31] and often  
10 experience social isolation or dislocation from former peer groups [6].

11 While acquiring a disability was shown to thwart the psychological needs essential for  
12 posttraumatic growth, results from this study suggest that para sport participation may be one  
13 mechanism by which to facilitate posttraumatic growth, in part by satisfying these important  
14 needs. Specifically, the role that para sport played in fostering growth encompassed five  
15 domains, namely, it provided opportunities: for meaningful social experiences, to overcome  
16 challenges, to become empowered, to develop one's identity, and it served a general coping  
17 mechanism. Consistent with the contentions of the organismic valuing theory of growth through  
18 adversity, these domains relate specifically to the fundamental needs for competence, autonomy,  
19 and relatedness. Specifically, meaningful social experiences addressed one's need for  
20 relatedness, overcoming challenges is akin to feelings of competency, while becoming  
21 empowered (i.e., gaining control over one's body and life) relates to the need for autonomy. The  
22 implications of physical activity and sport participation on psychological needs satisfaction has  
23 been demonstrated previously, with research suggesting that many of the potential benefits of

1 sport or physical activity may be largely a function of the extent to which environmental  
2 supports satisfy individuals' basic needs [33]. According to Deci & Ryan [34] sports provide a  
3 valuable opportunity to be self-determining, receive competence feedback, and to be socially  
4 involved.

5         Research has specifically demonstrated the role that para sport can play in satisfying  
6 one's psychological needs. For instance, in a study of disabled military service members taking  
7 part in a Paralympic sports camp, participants reported that sport strengthened their relationships  
8 with family members and other service members (i.e., relatedness) and that their involvement  
9 afforded them the opportunity to build and test new skills (i.e., competence) [32]. Similarly, Day  
10 [3] suggested that para sport may facilitate posttraumatic growth by providing an environment  
11 where individuals could take risks and test their boundaries, and that feelings of success in sport  
12 translated to confidence in other areas of life. Furthermore, in a qualitative study of elite para  
13 athletes, participants felt that they were viewed as less competent by others because of their  
14 disability, however, by participating in sport, these perceptions were negated and one's own  
15 feelings of competence were affirmed [35]. Participants also reported how para sport was  
16 empowering as well as a source of fitness, the latter of which was important for maintaining  
17 physical independence. Similarly, sport and physical activity was found to empower college  
18 males with disabilities and wheelchair rugby athletes by giving them a greater sense control over  
19 their lives [36,37], and helping the latter feel part of a sport community [37]. The importance of  
20 having control over circumstances in one's life is central to the construct of autonomy within  
21 organismic valuing theory of growth through adversity. Findings from the present study add to  
22 the growing body of research on disabled athlete populations suggesting the value of sport – in

1 particular, salient individuals within the sport context such as teammates and coaches – in  
2 satisfying basic psychological needs [38].

3 In support of the organismic valuing process, an important construct underpinning the  
4 organismic valuing theory, participant responses highlight how para sport prompted individuals  
5 to restructure the self in such a way that more closely aligns with one's innate self [19]. For some  
6 participants, this innate self was aligned with their pre-disability self, while for others, this innate  
7 self was quite different. Regardless of whether participants reconnected with an old identity or  
8 developed a new one, participants credited their para sport participation for facilitating this  
9 outcome. Being forced to adapt a new identity or being able to reconnect with a previously lost  
10 identity were cited as benefits of para sport participation in a study of individuals with spinal  
11 cord injury [2]. Similarly, Day [3] found that para sport served to help individuals re-build their  
12 sense of self, while Perrier and colleagues [39] found that sport helped some individuals to form  
13 an athletic identity after acquiring a physical disability. The notion of restructuring one's self in  
14 such a way that more closely aligns with one's innate self speaks to the concept of the  
15 organismic valuing process at work [19].

16 Participants in the current study also revealed findings unconnected with organismic  
17 valuing theory. Although para sport was frequently lauded by participants for its positive impact  
18 on their lives, many participants also suggested that acquiring a disability led to growth  
19 experiences unrelated to their sport experience (e.g., greater appreciation for life). While these  
20 findings do not detract from the efficacy of para sport as a means by which to experience growth  
21 after acquiring a physical disability, they demonstrate that para sport is not the only means  
22 through which one may experience growth. Indeed, a number of psychosocial interventions such  
23 as cognitive-behavioral therapy [40], expressive writing [41], and mindfulness-based stress

1 reduction programs [42] have been shown to facilitate posttraumatic growth. It is also possible  
2 that as participants in this study seem to have achieved growth without such interventions, it may  
3 be the case that growth can occur naturally without intervention. Moreover, individuals without  
4 an athletic background may be less inclined to participate in para sport or may find less value in  
5 it. As Smith and Sparkes comment, “not all disabled people can be, or wish to be, an elite  
6 athlete” [15,p.339]. The fact that all participants in the present study reported involvement in  
7 sport prior to acquiring a disability, suggests that participants were already predisposed to view  
8 sport as a worthwhile coping mechanism, and therefore sport may play a uniquely effective role  
9 in facilitating growth for this population. It seems likely that individuals with non-sport interests  
10 or those with different athletic backgrounds than those in the current study would report different  
11 experiences. It is plausible that even for individuals who report the posttraumatic growth  
12 facilitating benefits of para sport, the mechanisms which underlie the development of growth  
13 (i.e., supportive social environment) may be fulfilled through avenues besides sport.

14 Despite the valuable findings emerging from this study, a number of limitations and  
15 future research directions should be acknowledged. First, given the a priori selection of  
16 participants who met pre-defined posttraumatic growth criteria, it is possible that participants  
17 with novel experiences of growth might not have been eligible for study participation.  
18 Researchers are therefore encouraged to examine the post-disability experiences of a broad range  
19 of individuals who do not necessarily meet pre-established criteria for posttraumatic growth [43].  
20 Second, studies that emphasize growth may inadvertently normalize the experience, causing  
21 people to expect growth, making those who do not report such experiences feel like “coping  
22 failures” [44,p.89]. It is important to avoid concluding that posttraumatic growth is the only  
23 desirable outcome when one is faced with a potentially traumatic event. **Third, given the specific**

1 characteristics of participants in the current study (e.g., all participants competing in sport pre-  
2 disability, only individual sport athletes competing at a high level), future research is needed to  
3 examine the impact of previous sport participation, involvement in individual versus team sport,  
4 and one's level of para sport participation on experiences of post-traumatic growth. Fourth,  
5 future studies would be well served to examine the viability of a para sport intervention for  
6 individuals who do not identify as athletes. Fifth, as posttraumatic growth has been  
7 conceptualized as both a process and an outcome [45], future studies may consider employing a  
8 prospective, longitudinal design in order to gain deeper insight into the process. Finally, the  
9 organismic valuing theory of growth through adversity posits that a pre-trauma environment  
10 supportive of needs satisfaction can also be important in terms of facilitating the organismic  
11 valuing process. Future investigations may consider taking the pre-trauma environment into  
12 account.

13 To the authors' best knowledge this study is original in that it is the first to qualitatively  
14 examine the tenets of the organismic valuing theory of growth through adversity as a framework  
15 for understanding growth processes and experiences of posttraumatic growth among para sport  
16 athletes. Results from the investigation largely support the theoretical tenets of the organismic  
17 valuing theory of growth through adversity, suggesting that future studies may be well served to  
18 employ this framework when investigating posttraumatic growth. By acquiring a better  
19 understanding of whether and *how* sport facilitates posttraumatic growth, and by recognizing that  
20 positive accommodation is not an inevitable outcome of the coping process, a shift towards an  
21 environment conducive to needs satisfaction may be constructive. Rehabilitation practitioners  
22 may consider educating their patients with disabilities about the opportunities and benefits of  
23 engaging in para sport, as physical activity and specifically organized para sport may be an

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1 efficacious mechanism by which to facilitate posttraumatic growth, especially for individuals  
2 with previous sporting backgrounds.

3 **Declaration of interest**

4 The present study was self-funded. There are no conflicts of interest and no financial benefits to  
5 the authors.

6

For Peer Review

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**Table 1. Participant characteristics**

Name (pseudonym)	Age (years)	Disability	Cause of disability	Years since acquiring disability	Years involved in para sport
Michael	28	Above knee amputation	Cancer	14	13
Gwen	24	Above knee amputation	Cancer	10	9.5
Carl	35	Above knee amputation	Cancer	12	10.5
Katie	35	Above knee amputation	Military combat	11	8
Allison	46	Below knee amputation	Struck by car	8	6
Matthew	31	Below knee amputation	Motor vehicle accident	2	1.5
Evan	32	Below knee amputation	Military combat	4	4
Jared	43	Below knee amputation	Motor vehicle accident	16	14
Sara	27	Traumatic brain injury, incomplete spinal cord injury, below knee amputation	Delay in diagnosis and treatment of congenital condition	8	7.5
Jenny	39	Visual impairment	Auto immune disease	8	2
Justin	34	Visual impairment	Macular degeneration	25	14
Megan	40	Above elbow amputation	Motor vehicle accident	23	8
Will	35	Below elbow amputation	Military combat	11	5
Ben	35	Brachial plexus injury (paralysis of arm)	Ski accident	8	7

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