

## Response to “Nature fix: Addiction to outdoor activities”

R. C. Buckley’s commentary on Heirene, R. M., Shearer, D., Roderique-Davies, G., & Mellalieu, S. D. (2016). *Addiction in extreme sports: An exploration of withdrawal states in rock climbers*. *Journal of Behavioral Addictions*, 5, 332–341.

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(Received: November 24, 2016; revised manuscript received: November 30, 2016; accepted: December 1, 2016)

Buckley’s commentary on our study of rock climber’s withdrawal experiences raises a number of important questions surrounding the concept of extreme or adventure sports addiction. Drawing on the few available investigations of this topic, we respond to Buckley’s questions here, though emphasize the need for further studies of extreme sports addiction in order to provide more empirically informed answers.

**Keywords:** adventure, sport, extreme, rush, addiction, withdrawal

In a recent study, we found evidence for conceptual and phenomenological similarities between the withdrawal experiences of extreme sports athletes and those with an addiction, with rock climbers reporting comparable states of craving, negative emotions, and anhedonia (Heirene, Shearer, Roderique-Davies, & Mellalieu, 2016). In the following discussion, we offer a response to Buckley’s (2016a) commentary on our study.

First, we would like to thank Buckley (2016a) for stimulating discussion on this new and emerging area of research and for highlighting a number of important questions for future investigations. Buckley begins his commentary by supporting the notion that extreme sports exponents display characteristics of addiction, though questions why some individuals who participate in extreme or adventure sports do not display such symptoms. Based on the existing literature on this topic (Buckley, 2015; Heirene et al., 2016; Price & Bundesen, 2005), it appears individuals who have participated for an extended period or who are highly skilled in their craft may be likely to exhibit the characteristics of extreme sports addiction. Factors that moderate the rewarding experiences of extreme sports are also likely to play a determining role. For example, Buckley views the experience of “rush” – a unique state of excitement and exhilaration in which both thrill and flow states are experienced simultaneously – as an addictive state for extreme sports athletes (Buckley, 2012). Though, the likelihood of an individual experiencing rush when participating in extreme sports may be mediated by variations in personality traits. As Buckley suggests, sensation seeking and anxiety management are likely to moderate the state of thrill, determining the balance of excitement and fear experienced (Buckley, 2016b). Certain personality characteristics are also thought to affect a person’s proneness to flow experiences, including novelty seeking, persistence, and low

self-directedness (Teng, 2011). Similarly, increases in dopamine receptor availability have been shown to correlate positively with flow proneness (de Manzano et al., 2013), suggesting neurobiological markers may also have value in understanding why some individuals become addicted to extreme sports while some do not. In short, there is not a one size fits all explanation, so further research is needed to explore the specific factors that predict the likelihood of becoming addicted to these sports.

Next, Buckley raises three questions for future research in this area: (1) what makes some activities more addictive than others? (2) why do some individuals become addicted to extreme sports while others do not? and (3) what are the factors that maintain, augment, or attenuate this addiction? We have already addressed question 2, and will therefore focus on questions 1 and 3. Buckley suggests the experience of rush may provide one explanation as to why extreme sports can be addictive. Based on anecdotal reports, the existing empirical evidence surrounding addiction in this population (Buckley, 2015; Heirene et al., 2016; Price & Bundesen, 2005; Willig, 2008), and the personal experience of the authors as extreme sports exponents, the experience of rush as a central feature of extreme sports addiction is intuitively appealing. Buckley has previously argued that the experience of “rush” is viewed within the extreme sports culture as ineffable, though has provided autobiographical accounts of rush experiences and attempted to conceptualize the state (Buckley, 2012). Still, much remains to be understood about *rush* and its role as both a psychological motive for participation and the processes through which it may

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lead to an addiction. As Buckley notes, reported motives for extreme sports participation are often multiple and diverse (Buckley, 2012), and as yet little empirical evidence exists to suggest exponents view rush as the primary motivator – though further research is needed to directly explore the concept.

Buckley suggests that if rush is the sole factor underpinning extreme sports addiction, this fails to explain why individuals also exhibit addictions to low-skill activities such as automated machine gambling, where the probability of experiencing flow – a central component of rush – would be low. Though, even low-skill activities can lend themselves to positive experiences resembling flow (Haworth & Evans, 1995), suggesting a similar state of rush could be experienced. Nonetheless, rush is not the only reward associated with extreme sports participation and may therefore not be wholly, if at all, responsible for the development and maintenance of the addiction. Indeed, the reported benefits are multiple and varied (Kerr & Mackenzie, 2012). Clough, Mackenzie, Mallabon, and Brymer (2016) proposed six rewarding aspects of adventure sports engagement: (1) increased positive emotions, resilience, and self-efficacy; (2) overcoming challenge and achieving optimal experiences; (3) the fulfillment of basic psychological needs, such as autonomy, competence, and relatedness; (4) a connection to nature; (5) increased physical activity; and (6) the experience of intense emotions. Still, the psychological and neurobiological rewards associated with engagement in these sports are not yet fully understood; thus, further research is warranted on the experiences associated with extreme sports, including rush, in order to understand why they can become the focus of an addiction.

In response to Buckley's third question – what contributes to the maintenance, augmentation, or attenuation of an extreme sports addiction? – our research provides an initial insight into the potential mechanisms. The negative experiences of climbers in our study suggest that participation in extreme sports, particularly at a high-skill level, results in negative experiences when not participating, namely, a sense of craving or urges, negative emotions, and a lack of enjoyment of other experiences. Buckley (2015) corroborates this finding in his exposition of the similarities between avid adventure sports athletes and those with a behavioral addiction, where he reports observing similar withdrawal states in athletes of various adventure sports during his years of ethnographic fieldwork. If alleviated through engagement in extreme sports, withdrawal experiences are likely to contribute to the maintenance of an addiction; though further research is required to confirm this.

The severity of extreme or adventure sports addiction may also be influenced by the process of tolerance or habituation: the need for increasingly more frequent or more intense engagement in the activity to experience the same rewards previously achieved. Evidence of this process was observed in our research, where climbers reported gaining little reward from less thrilling forms of climbing (e.g., indoor climbing) as their experience increased. Buckley, again, has reported similar observations of tolerance in this population, a process he states led to greater

risk-taking and time spent achieving the level of reward previously experienced (Buckley, 2015).

Buckley's final and central question considers environmental and situational factors and the notion that can a person become addicted to the outdoor environment, either in combination with, or independently of, extreme sports participation. The setting in which adventure sports take place are typically remote and scenically beautiful environments, and visiting these locations and connecting with the natural world have been cited as motives for participation (Kerr & Mackenzie, 2012). Though, whether outdoor environments can become the direct focus of an addiction is yet to be understood. From the perspective of craving, it is plausible that outdoor environments act as a cue for the activity and thus elicit cravings or urges for extreme sports. Cue-elicited craving has been widely observed in the psychopharmacology literature (Davies, Willner, & Morgan, 2000; Roderique-Davies, 2008), and rock climbers in our study reported augmentations in craving when viewing climbing-related materials. Future research should further explore the concept of extreme sports craving and how it may be moderated by factors such as environmental setting and personality traits. Nonetheless, spending time in nature is in itself a rewarding experience. As Buckley states, exposure to nature has been linked to a number of positive outcomes, including improvements in cognitive function (Berman, Jonides, & Kaplan, 2008) and increased overall physical and psychological well-being (Maller, Townsend, Pryor, Brown, & St Leger, 2006). Recently, adventure sports have been specifically proposed as a form of mental health intervention due to the psychologically rewarding experiences gained, coupled with the opportunity to spend time in natural settings (Clough et al., 2016). Thus, as Buckley suggests, continuing research on the combined effects of adventure sports and nature exposure may be a valuable avenue to pursue.

Overall, many of the issues raised here, both by Buckley and ourselves, appear to mirror those found in the existing addictions literature: why do some people become addicted to heroin or gambling, while some do not? Are some behaviors more addictive than others and why? What determines whether an addiction is augmented, maintained, or fades? Although some evidence is available in answer to each of these questions, much remains unknown. Similarly, considerably more research is required to answer these questions in relation to extreme sports addiction.

Based on the conceptual similarities identified between the experiences of extreme sports athletes and those with drug and behavioral addictions, we can begin to make inferences about the possible processes underlying an extreme sports addiction, as we did in our study of rock climber's experiences while abstinent from their sport (Heirene et al., 2016). In the same view, the opposite transference of knowledge may be of worth. The study of extreme sports addiction presents a novel opportunity to examine the features of addiction in an accessible population, and the possibility to investigate how these features are influenced or predicted by specific variables, while avoiding the ethical concerns associated with the use of illicit substances or engagement in monetary gambling. Thus, further research on extreme sports addiction is required not solely

for the benefit of understanding the phenomenon itself or for the benefits to the adventure tourism industry, but also to better understand the addiction process in all its manifestations. We support Buckley's view that this should come from researchers of varying disciplines, including psychology, neuroscience, and adventure tourism, and in varying forms: experimental or laboratory studies, ethnography, and observational- and interview-based research.

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*Funding sources:* No financial support was received for this article.

*Authors' contribution:* All authors equally contributed to this article.

*Conflict of interest:* The authors declare that they have no conflict of interest.

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## REFERENCES

- Berman, M. G., Jonides, J., & Kaplan, S. (2008). The cognitive benefits of interacting with nature. *Psychological Science, 19*(12), 1207–1212. doi:[10.1111/j.1467-9280.2008.02225.x](https://doi.org/10.1111/j.1467-9280.2008.02225.x)
- Buckley, R. C. (2012). Rush as a key motivation in skilled adventure tourism: Resolving the risk recreation paradox. *Tourism Management, 33*(4), 961–970. doi:[10.1016/j.tourman.2011.10.002](https://doi.org/10.1016/j.tourman.2011.10.002)
- Buckley, R. C. (2015). Adventure thrills are addictive. *Frontiers in Psychology, 6*, 1915. doi:[10.3389/fpsyg.2015.01915](https://doi.org/10.3389/fpsyg.2015.01915)
- Buckley, R. C. (2016a). Nature fix: Addiction to outdoor activities. Commentary on: Addiction in extreme sports: An exploration of withdrawal states in rock climbers. Manuscript in preparation.
- Buckley, R. C. (2016b). Qualitative analysis of emotions: Fear and thrill. *Frontier in Psychology, 7*, 1187. doi:[10.3389/fpsyg.2016.01187](https://doi.org/10.3389/fpsyg.2016.01187)
- Clough, P., Mackenzie, H. S., Mallabon, L., & Brymer, E. (2016). Adventurous physical activity environments: A mainstream intervention for mental health. *Sports Medicine, 46*(7), 963–968. doi:[10.1007/s40279-016-0503-3](https://doi.org/10.1007/s40279-016-0503-3)
- Davies, G. M., Willner, P., & Morgan, M. J. (2000). Smoking-related cues elicit craving in tobacco "chippers": A replication and validation of the two-factor structure of the questionnaire of smoking urges. *Psychopharmacology, 152*(3), 334–342. doi:[10.1007/s002130000526](https://doi.org/10.1007/s002130000526)
- de Manzano, Ö., Cervenka, S., Jucaite, A., Hellenäs, O., Farde, L., & Ullén, F. (2013). Individual differences in the proneness to have flow experiences are linked to dopamine D2-receptor availability in the dorsal striatum. *NeuroImage, 67*, 1–6. doi:[10.1016/j.neuroimage.2012.10.072](https://doi.org/10.1016/j.neuroimage.2012.10.072)
- Haworth, J., & Evans, S. (1995). Challenge, skill and positive subjective states in the daily life of a sample of YTS students. *Journal of Occupational and Organizational Psychology, 68*(2), 109–121. doi:[10.1111/j.2044-8325.1995.tb00576.x](https://doi.org/10.1111/j.2044-8325.1995.tb00576.x)
- Heirene, R. M., Shearer, D., Roderique-Davies, G., & Mellalieu, S. D. (2016). Addiction in extreme sports: An exploration of withdrawal states in rock climbers. *Journal of Behavioral Addictions, 5*(2), 332–341. doi:[10.1556/2006.5.2016.039](https://doi.org/10.1556/2006.5.2016.039)
- Kerr, J. H., & Mackenzie, H. S. (2012). Multiple motives for participating in adventure sports. *Psychology of Sport and Exercise, 13*(5), 649–657. doi:[10.1016/j.psychsport.2012.04.002](https://doi.org/10.1016/j.psychsport.2012.04.002)
- Maller, C., Townsend, M., Pryor, A., Brown, P., & St. Leger, L. (2006). Healthy nature healthy people: 'Contact with nature' as an upstream health promotion intervention for populations. *Health Promotion International, 21*(1), 45–54. doi:[10.1093/heapro/dai032](https://doi.org/10.1093/heapro/dai032)
- Price, I. R., & Bundesen, C. (2005). Emotional changes in skydivers in relation to experience. *Personality and Individual Differences, 38*(5), 1203–1211. doi:[10.1016/j.paid.2004.08.003](https://doi.org/10.1016/j.paid.2004.08.003)
- Roderique-Davies, G. (2008). Cigarette craving: Exploring the enigma. In J. E. Landow (Ed.), *Smoking cessation: Theory, interventions and prevention* (Chapter 7, pp. 254–283). New York, NY, USA: Nova Science Publishers.
- Teng, C. (2011). Who are likely to experience flow? Impact of temperament and character on flow. *Personality and Individual Differences, 50*(6), 863–868. doi:[10.1016/j.paid.2011.01.012](https://doi.org/10.1016/j.paid.2011.01.012)
- Willig, C. (2008). A phenomenological investigation of the experience of taking part in 'extreme sports'. *Journal of Health Psychology, 13*(5), 690–702. doi:[10.1177/1359105307082459](https://doi.org/10.1177/1359105307082459)