

Author copy of published article. To cite this publication, use the following citation:

Houge Mackenzie, S. & Brymer, E. (2018). Conceptualizing adventurous nature sport: A positive psychology perspective, *Annals of Leisure Research*, DOI: [10.1080/11745398.2018.1483733](https://doi.org/10.1080/11745398.2018.1483733)

Abstract

Research and public policy has long supported links between traditional sports and well-being. However, adventurous nature sport literature has primarily focused on performance issues and deficit models of risk or sensation-seeking. This standpoint is limited by assumptions that participation is: (a) dependent on personality structures; (b) solely motivated by risk-taking and hedonism; (c) only attractive or accessible to a narrow demographic; and (d) widely perceived as dysfunctional or deviant. In contrast, recent research suggests that adventurous nature sports provide unique benefits due to their context. This paper critically assesses the validity of dominant perspectives against emerging literature to illustrate how nature sports can be conceptualised through a positive psychology lens as well-being activities that facilitate both hedonic and eudaimonic outcomes. The significance of this perspective is that nature sports may become an important consideration when designing health and well-being interventions for both people and the planet.

Keywords: eudaimonia, extreme sports, positive psychology, adventure motivations, well-being, high risk sports

Conceptualising adventurous nature sport: A positive psychology perspective

Introduction

“The secret for harvesting from existence the greatest fruitfulness and the greatest enjoyment is -
to *live dangerously!*” - Nietzsche (1974, p. 228)

Over the past two decades, interest in adventurous and ‘extreme’ nature sports, such as skiing, skydiving, rock climbing, and whitewater kayaking, has steadily increased (e.g., Brymer & Schweitzer, 2017; Lyng, 2005). While participation in many traditional organised sports has declined or stagnated, a wider range of nature-based sports have grown in popularity (e.g., Outdoor Foundation, 2017). According to Puchan (2004, p. 177), involvement in these sports is “not... just a ‘flash in the pan’ but a sign of the times in which people are looking for a new way to define their lives and to escape from an increasingly regulated and sanitised way of living.”

At the ‘extreme’ end of the nature sport spectrum (e.g., activities such as B.A.S.E. [Buildings, Antennae, Space, Earth] jumping, big wave surfing, waterfall kayaking, rope-free climbing), the most likely outcome of a mismanaged error or accident is death. Thus, many psychologists view this behavior as irrational and deviant, resulting from ignorance or the inability to self-regulate (e.g., Lupton & Tulloch, 2002). However, emerging research contests traditional definitions and models (Brymer & Oades, 2009; Brymer & Schweitzer, 2013; Kerr & Houge Mackenzie, 2012). Traditional theoretical paradigms in adventurous nature sport literature are often narrowly focused on risk, danger, and/or physical or emotional discomfort, which limits their predictive power and depth. These accepted narratives preclude serious consideration of adventurous nature sport activities in mainstream health and well-being discourses and public health initiatives. Thus, the aim of this paper is to explain how adventurous nature sports can be conceptualised through a contemporary positive psychology lens. In particular, we propose that an

improved frame of analysis can be developed from well-being models that integrate hedonic and eudaimonic dimensions. To demonstrate the potential of these positive psychology approaches, we critique dominant discourses in adventurous nature sport literature by illustrating how traditional models fail to encapsulate a range of research outcomes. We then suggest theoretical perspectives that may explain emerging findings.

Adventurous nature sports: Traditional definitions & risk perspectives

Inherent in the concept of nature sports is an outdoor, natural context for these activities. Nature contexts can be quite varied and include water (e.g., surfing, whitewater kayaking), land (e.g., climbing, mountain biking), and wind-based activities (e.g., skydiving, paragliding). While examples of nature sports abound, clear definitions and models of these activities are difficult to ascertain. This may be due in part to the proliferation of terminology, such as ‘extreme’, ‘high-risk’, ‘adventure’, and ‘alternative’, across a range of disciplines including sport and exercise psychology, sociology, philosophy, tourism, leisure studies, business studies, experiential education and wilderness therapy (e.g., Bowen, Neill, & Crisp, 2016; Castanier, Le Scanff, & Woodman, 2011; Krein, 2014; Melo & Gomes, 2017). For the purpose of this discussion, the term *adventurous nature sports* (ANS) is used to encompass activities traditionally described as ‘high-risk’, ‘adventurous’, or ‘extreme’ nature-based sporting activities. These have typically been characterised by the following attributes: self-initiated, physical activities within a natural environment that provide opportunities to exercise personal skills in order to minimise real or apparent risk or danger, and thereby influence uncertain outcomes (e.g., Ewert & Hollenhorst, 1989). In contrast to traditional sports, the primary challenge involved in ANS often lies not in defeating one’s opponent, but in identifying and engaging with opportunities for challenges posed by the participant-environment relationship through use of personal and group competencies.

Adventurous nature sports have long been associated with risk and sensation-seeking. From an anthropological perspective, Clark (1986) differentiated between the inevitable *risk-taking* that occurs in life, and *risk-seeking* involved in adventure that is deliberate and easily avoidable. Clark and Foster (1993) identified risk-seeking through adventure as one way of attaining high levels of emotional arousal. “Risk-seeking is a deliberate way of inducing the emotional arousal that risk-taking generates ... both pleasurable and unpleasurable excitement are involved in risk-seeking” (Foster, 1993, p. 67). These perspectives remain prominent in research literature (e.g., Baretta, Greco, & Steca, 2017; Kopp, Wolf, Ruedl, & Burtscher, 2016).

Traditional definitions and models of ANS have narrowly focused on risk, sensation-seeking, and ‘pushing’ participants out of their ‘comfort zone’. For instance, risk-taking, danger and control were central to Ewert and Hollenhorst's (1989) initial model of adventure recreation; “It is [the] positive valuation of risk and danger that makes adventure recreation fundamentally different from other recreation experiences” (p.127). Despite challenges to this view, many researchers and educators maintain that confronting risk, fear or danger produces optimal stress and discomfort, which in turn promotes outcomes such as improved self-esteem, character building, and psychological resilience (e.g., Ewert & Garvey, 2007; Ewert & Yoshino, 2011; Lupton & Tulloch, 2002; Priest & Gass, 2018). Although fear, risk and associated sensation-seeking have long been conceptualised as integral to ANS experiences (e.g., Kopp et al., 2016; Zuckerman, 2007), the importance of these elements in ANS motivations and outcomes remains contested.

There are a number of problematic implicit assumptions embedded within traditional risk-taking approaches to ANS. Some researchers argue that paradigms focusing on risk have neglected the unpleasant experience of anxiety that accompanies risk perceptions (Brown, 2009; Davis-

Berman & Berman, 2002). The risk paradigm also assumes that ANS will only appeal to a narrow demographic of individuals with particular personality structures. However, this is at odds with statistics demonstrating that participation rates are growing faster than many traditional sports and are increasingly attracting a broader range of participants (e.g., Outdoor Foundation, 2017). The risk perspective has also tended to overlook more positive, developmental motivations and outcomes by characterising participants as deviant, dysfunctional, or psychologically deficient. A possible explanation for these discrepancies is that investigations of ANS motivations and behavior have generally applied models and theories developed to understand ‘abnormal’ behavior in clinical contexts to disparate nature sport contexts. This approach also stems from a disproportionate focus on ill-being, rather than well-being, in psychology (Seligman & Csikszentmihalyi, 2014). As a result, alternative, and potentially more appropriate, perspectives on the adventurous nature sport experience may have been overlooked.

Beyond risk: Well-being and adventurous nature sports

Despite these traditional narratives, the risk-oriented paradigm has been increasingly questioned on multiple fronts. Ewert and Sibthorp’s (2009) methodological critique identified a lack of quantitative, longitudinal, and randomised controlled studies and called for the development of context specific models that incorporate underlying processes. Brookes (2003) and Brown (2009, 2010) have repeatedly argued that research and theory should refocus to account for cultural, regional, historical, and social aspects of ANS experiences. Kerr and Houge Mackenzie (2012) identified several motivations beyond thrill-seeking across multiple adventure sports, a finding supported by studies reporting outcomes such as personal control, courage, attention restoration, personal growth, self-actualisation, achievement, and mastery (e.g., Fischer & Smith, 2004; Lyng, 2005; Pain & Pain, 2005; Pearson & Craig, 2014).

Barlow, Woodman, and Hardy (2013) further challenged the sensation-seeking perspective in a series of three studies. They concluded that different ANS involve distinct motivations (e.g., emotional regulation, agency) and highlighted how understanding these motivations can improve our understanding of human behavior more generally. Notwithstanding, Barlow et al.'s interpretations were still founded on a deficit model in which an adventurous nature sport (i.e., mountaineering) served as a compensatory activity through which to counteract difficulties with emotional regulation, personal agency and anxiety. Varley and Temple (2015, p.77), although writing about adventure travellers specifically, eloquently summarised how current adventure conceptualisations ignore the “holistic social nature of the [adventure] experience”:

“Many theories of adventure (Ewert, 1989; Keiwa, 2002; Lewis, 2000; Morgan, 2014; Mortlock, 1984; Priest & Bunting, 1993) encapsulate the adventure motive as a desire for borderline experiences occupying the threshold between catastrophe and adventure. Such representations, with their almost fatalistic proximity to disaster seem essentialist and elitist, and intuitively are at odds with the motives of many contemporary adventure travelers.”

Positive psychology approaches

In contrast to traditional risk and sensation-seeking perspectives, the emerging field of positive psychology provides an alternative way of understanding ANS that reflects current research findings. Positive psychology is concerned with understanding and fostering well-being by studying optimal experiences and functioning across individuals, communities, organisations and societies (Seligman & Csikszentmihalyi, 2014). Researchers investigate concepts such as character strengths, positive relationships, meaning, autonomy, engagement and accomplishments. Prior to the establishment of positive psychology as an official branch of psychology, Ryff (1989)

proposed a model of psychological well-being that included personal growth, self-acceptance, life purpose, mastery, autonomy and positive relationships. Well-being has since been conceptually developed to include multiple dimensions and domains (e.g., physical, psychological, emotional, social, financial) that are dynamic and function at various levels (e.g., individual, group) (Mental Health Commission of NSW, 2017). This approach to well-being includes the effective management of unhelpful psychological phenomenon and nurturing of positive accomplishments, emotions, relationships, engagement and meaning.

In positive psychology literature, well-being has generally been approached from two distinct perspectives: hedonia and eudaimonia. Hedonic well-being consists of pleasure, positive emotions and avoidance of pain (e.g., Waterman, Schwartz, & Conti, 2008). Conversely, eudaimonic well-being encompasses meaning, purpose, optimal functioning, self-realisation and flourishing (e.g., Huppert & So, 2013; Ryan & Deci, 2011). Although these perspectives seem to define well-being in distinct ways, research has increasingly supported less dialectical, more holistic approaches to well-being that incorporate both hedonic and eudaimonic elements (e.g., Henderson & Knight, 2012; Lomas & Ivtzan, 2016). For example, Huta and Ryan (2010) argued that the pursuit of eudaimonic well-being results in a more complete and meaningful life and fosters more stable and enduring hedonic happiness. Eudaimonic benefits have been shown to stem directly from the immediate satisfaction of basic psychological needs for autonomy, competence, and relatedness (Ryan, Huta, & Deci, 2013). Despite the volume of research supporting these models, critics argue that these predominantly western, anthropocentric approaches should be expanded to include connection to nature and community (Mental Health Commission of NSW, 2017).

Hedonic and eudaimonic perspectives of well-being are both relevant to the expanded conceptualisation of ANS presented in this paper. Indeed, given the seemingly paradoxical or divergent findings related to ANS participation (e.g., thrill or ‘adrenaline’-seeking motives versus self-actualisation motives), incorporating both perspectives may help to explain these discrepancies in the literature and provide a fuller picture of ANS motives, experiences, and benefits. These perspectives may also help to explain how outcomes and motivations can change over time and through experience (e.g., Brymer, Downey, & Gray, 2009). For instance, an individual might begin an ANS with hedonistic desires and develop more eudaimonic motivations and benefits through repeated experiences. In the following section, we explore research that supports this framework for understanding ANS from a well-being perspective.

Adventurous nature sports as well-being activities

A growing body of literature, typically using an inductive approach, supports the proposition that a well-being framework can expand current conceptualisations of ANS motivations and outcomes. Recent research suggests that adventurous nature activities enhance physical health and psychological well-being in a variety of ways, and that these experiences of well-being encourage further participation (Brymer & Schweitzer, 2017). Participants report hedonic and eudaimonic outcomes that include: positive life transformations; optimal experiences; emotional regulation; development of emotional agency in interpersonal relationships; improved quality of life; goal achievement; social connections; escape from boredom; exploring personal boundaries; overcoming limitations imposed by fear; pleasurable kinesthetic bodily sensations; a sense of merging with nature; and transcendence (e.g., Brymer & Gray, 2010; Willig, 2008; Woodman, Cazenave, & Le Scanff, 2008; Woodman, Hardy, Barlow, & Le Scanff, 2010). Studies of adventure education and wilderness therapy further underscore the eudaimonic benefits of these

activities across a range of domains. Meta-analyses of hundreds of adventure education and adventure therapy studies demonstrate program efficacy, particularly for longer programs and younger participants, with outcomes that include improved self-concept, self-awareness and acceptance; chemical dependency recovery; and reduced behavioral and emotional symptoms (e.g., Gass, Gillis, & Russell, 2012; Hattie, Marsh, Neill, & Richards, 1997).

A variety of mechanisms have been proposed to explain links between well-being and nature-based activities. The aesthetic, spiritual and novel qualities of natural environments have been found to promote personal development, self-awareness, and environmental consciousness (e.g., D'Amato & Krasny, 2011; McKenzie, 2000). ANS may restore person-environment relationships by, for example, restoring attentional resources and improving cognitive function (e.g., Berman, Jonides, & Kaplan, 2008; Pearson & Craig, 2014). Socioecological models suggest that nature-based adventure can promote healthy behavioral changes and eco-centric perspectives (Pryor, Carpenter, & Townsend, 2012). Studies by Sibthorp and colleagues (e.g., Ramsing & Sibthorp, 2008; Sibthorp & Arthur-Banning, 2004) highlight the importance of autonomy and personal relevance in fostering positive outcomes. These findings challenge traditional risk-focused theories and suggest that natural settings and underlying psychological processes play an important role in promoting well-being through ANS.

Physical Activity in Nature. The additive effects of combining physical activity with natural settings may be an important mechanism through which ANS promote positive outcomes. Studies show the benefits of vigorous activity, particularly in outdoor contexts, for psychological function and well-being (e.g., Coon et al., 2011; Frumkin et al., 2017; Kamijo, Takeda, & Hillman, 2011; Maller, Townsend, Brown, & St. Leger, 2002). For example, Herzog et al. (1997) found that an outdoor trip lasting only a few days decreased irritability, accidents, and mental fatigue, and

improved problem-solving ability and concentration. Studies of ‘green exercise’ have suggested there are additive benefits of physical activity in outdoor settings over and above those accrued by physical activity alone (e.g., Pretty et al., 2007). Pretty et al. reported that even viewing pleasant natural settings during physical activity had superior physical and psychological benefits compared to viewing other settings (e.g., pleasant urban). In an experimental design across indoor, urban, and natural settings, Ryan et al. (2010) found increases in subjective vitality associated with natural settings despite equivalent levels of physical activity in each setting. Nevertheless, the majority of experimental studies have focused on one-off nature experiences in terms of immediate restorative benefits, rather than investigating relationships between repeated experiences and diverse well-being outcomes (Hartig et al., 2014). In recognition of this knowledge gap, recent reviews have called for further evidence evaluating (a) the diverse processes through which nature may promote health (Frumkin et al., 2017) and (b) the therapeutic effects of nature-based health interventions (Buckley & Brough, 2017).

Fulfilling Psychological Needs. Another line of emerging research has focused on better understanding how ANS may actively support hedonic and eudaimonic well-being through the mechanism of basic psychological need fulfillment. ANS activities provide unique physical and psychological challenges resulting from the person-environment relationship, rather than other people or sporting situations that are ‘contrived’. Successfully creating and mastering these challenges can stimulate feelings of competence and positive affect, increase self-efficacy, and facilitate ‘optimal experiences’ (e.g., Brymer & Oades, 2009; Csikszentmihalyi & Csikszentmihalyi, 1990; Delle Fave, Bassi, & Massimini, 2003). In positive psychology models, these outcomes are recognised as essential components of well-being. The related concept of resilience, generally defined as a range of capacities that mitigate factors which threaten an

individual's health (e.g., Kaplan, 1999), has received increasing attention in positive psychology research. Adventure experiences in particular have been shown to foster resilience, which buffers the impact of stressful life events (e.g., D'Amato & Krasny, 2011; Ewert & Yoshino, 2011; Neill & Dias, 2001).

In addition to building resilience and fulfilling the psychological need for competence, ANS provide opportunities to satisfy needs for autonomy and relatedness (as outlined in self-determination theory; e.g., Ryan & Deci, 2011). There is evidence that adventure promotes autonomy, competence and relatedness both in the adventure context and in everyday life (Griffin, Meaney, & Podlog, 2015; MacGregor, Woodman, & Hardy, 2014; Sibthorp, Paisley, Gookin, & Furman, 2008; Wurdinger & Paxton, 2003). ANS participants arguably have greater opportunities for volitional choice about potential courses of action than they would in traditional sporting activities with more formalised 'rules'. These opportunities may support eudaimonic well-being by potentially increasing the salience of autonomous decision-making processes and personal meaning.

As ANS generally involve small groups working cooperatively in natural environments, it is also likely to support the need for relatedness in various ways. Nature itself has been shown to promote social connections (e.g., Maas et al., 2009), and ANS participants often work with others to reach common goals without the need to compete against others as traditional sports often require. For example, in a form of cooperative participation that Meier (1976) called the 'the kinship of the rope', rock climbers and mountaineers work together and trust climbing partners with their lives to complete difficult routes. Situations that necessitate cooperation are a common feature across ANS. Both the natural environment and the ANS activity pose unique challenges, ranging from physical discomfort or serious injury to psychological distress, that participants must

overcome together. Participants may also have prolonged contact with others in ANS contexts, as is common on multiday river, trekking, or mountaineering trips. Thus, adventurous nature sports have a number of characteristics conducive to forging strong, intimate connections to others that may not be as readily available in everyday social interactions. As meaningful connections to others has emerged as a fundamental dimension of health and well-being (Frunpkin et al., 2017; Kawachi et al., 2008), and one of the most important predictors of successful aging (e.g., Waldinger & Schulz, 2016), this aspect of ANS should be included in emerging frameworks and further investigated in relation to participant well-being.

Connections to the Natural World. Although the need for relatedness is generally discussed and studied in terms of relationships with other people, this need may be met in other ways. Enhanced connections to nature, in addition to other human beings, may be another way that ANS fosters eudaimonic well-being. Even in the riskiest ANS activities, such as BASE jumping, participants report strong eudaimonic motivations to connect deeply with nature (Brymer & Gray, 2010; Kerr & Houge Mackenzie, in press). Albrecht (2012, p. 243) refers to this intimate connection as *eutierria*, “a secular, positive feeling of oneness with the earth and its life forces where the boundaries between self and the rest of nature are obliterated and a deep sense of connectedness pervades consciousness.” Place attachment theorists maintain that these forms of intense emotional experiences and repeated visitation can facilitate strong bonds with the place(s) an activity occurs in, which in turn supports an individual’s sense of purpose and well-being (Morgan, 2010). ANS are likely to promote place attachment and place identity, a related construct, as the distinct settings upon which these activities depend provide participants unique opportunities to validate their identity and values (Twigger-Ross & Uzzell, 1996). Adventure participants report experiencing intense emotions during their activities and may repeatedly visit

the same place to participate (e.g., Houge Mackenzie, Hodge, & Boyes, 2011, 2013). These repeated experiences may facilitate identity formation and encourage connections to place and nature more generally. Put another way, positive hedonic experiences (e.g., positive emotions) can in turn foster positive eudaimonic experiences (e.g., place attachment, identity, *eutierria*) over time.

Studies of well-being and nature support these propositions and suggest that the outdoor context provides important affective, cognitive and experiential benefits (e.g., Zelenski & Nisbet, 2012). Relationships with nature have been linked to life satisfaction, high self-esteem, and subjective experiences of psychological well-being (Cervinka, Röderer, & Hefler, 2011; Zhang, Howell, & Iyer, 2014). Cleary et al. (2017) demonstrated how connecting with nature supports intrinsic value orientations (i.e., pursuing goals congruent with personal growth, intimacy and community), which are essential to well-being. Feeling connected to nature has been shown to significantly correlate with lower levels of anxiety and higher levels of well-being (Martyn & Brymer, 2016). Martyn and Brymer found that individuals who regularly engaged in outdoor physical activity had lower levels of somatic anxiety in comparison to participants engaged in indoor physical activity. Autonomy, a pillar of positive psychology research, significantly influenced this relationship. Thus, feeling connected to nature appears to support psychological well-being across multiple domains.

In summary, a growing number of studies show that ANS promote diverse hedonic and eudaimonic aspects of well-being. ANS appear to: (a) facilitate feelings of connection to nature; (b) foster physical and mental benefits associated with physical activity, (c) provide opportunities to overcome challenges and have optimal experiences; (d) increase positive psychological outcomes such as positive affect, self-efficacy, and resilience; (e) restore cognitive resources; (f)

provide opportunities to experience self-determination (e.g., via psychological need fulfilment and intrinsic value orientations); and (g) promote social connectedness. This body of research suggests that positive psychology approaches can be applied to conceptualise ANS as activities that facilitate positive person-environment relationships and well-being.

Conclusion

Traditional risk-focused models have treated ANS as niche activities involving a small population of participants with specific personality characteristics. Contemporary research suggests that risk-focused approaches are narrow and do not account for the full range of motivations and outcomes associated with adventurous nature sports. In light of these findings, the current analysis suggested how positive psychology can be applied to conceptualise ANS as health and well-being activities. Specifically, we examined how ANS can support both hedonic and eudaimonic dimensions of well-being. This conceptual shift has a number of important implications, including ANS activities being considered in terms of their public health benefits and potentially used to foster mental and physical well-being across a broad population base. This shift also suggests that, given the unique characteristics and benefits of ANS discussed herein, further evaluation of their potential to foster short and long-term well-being relative to traditional sports is merited. Adopting the proposed health and well-being perspective would also mean expanding ANS frameworks to encompass and explain: (a) under-researched eudaimonic outcomes; (b) relationships between hedonic and eudaimonic motivations; and (c) more heterogeneous participants with diverse motivations and experiences.

Reframing our understanding of ANS has important implications for how these activities are viewed and facilitated by educators, schools, youth development workers, health promotion agencies, urban planners, and the general public. Researchers and policy makers may be better

served by considering ANS as part of a broad well-being framework that promotes immediate hedonic benefits as well as long-term flourishing. From a practical perspective, ANS could be considered in preventative health approaches as vehicles for wellness promotion (Clough, Houge Mackenzie, Brymer, & Mallabon, 2016). This approach aligns with the movement toward ‘green prescriptions’ for health and may facilitate targeted well-being interventions for diverse populations (e.g., Buckley & Brough, 2017; Buckley, Westaway, & Brough, 2016). Better understanding the relationship between ANS and well-being can also inform the development of green environments and infrastructure in urban and rural areas. From a theoretical perspective, this shift is important in order to link nature sport research with existing bodies of work on motivation, well-being, health, and quality of life.

Given the wide range of ANS benefits identified in emerging literature, expanding our perspectives on these activities may have important implications for individual and social well-being. Although the current analysis focused on how positive psychology can be applied to conceptualise ANS from a health and well-being perspective, this represents one of many ways that ANS can be reconceptualised to better reflect participant experiences. For instance, a broader, more progressive framework of ANS might influence complementary avenues of theoretical development, such as skill development, leadership, and education perspectives. Future researchers should continue to critically examine traditional models of ANS and identify perspectives that can extend and strengthen these frameworks.

References

- Albrecht, G.A. (2012). Psychoterratic conditions in a scientific and technological world. In P. Kahn & P. Hasbach (Eds), *Ecopsychology: Science, totems, and the technological species* (pp. 241-264). Massachusetts: MIT Press.
- Baretta, D., Greco, A., & Steca, P. (2017). Understanding performance in risky sport: The role of self-efficacy beliefs and sensation seeking in competitive freediving. *Personality and Individual Differences, 117*, 161-165.
- Barlow, M., Woodman, T., & Hardy, L. (2013). Great expectations: Different high-risk activities satisfy different motives. *Journal of Personality and Social Psychology, 105*(3), 458-475.
- Berman, M. G., Jonides, J., & Kaplan, S. (2008). The cognitive benefits of interacting with nature. *Psychological Science, 19*(12), 1207-1212.
- Bowen, D. J., Neill, J. T., & Crisp, S. J. (2016). Wilderness adventure therapy effects on the mental health of youth participants. *Evaluation and Program Planning, 58*, 49-59.
- Brymer, E., Downey, G., & Gray, T. (2009). Extreme sports as a precursor to environmental sustainability. *Journal of Sport & Tourism, 14*(2-3), 193-204.
- Brymer, E., & Gray, T. (2009). Dancing with nature: Rhythm and harmony in extreme sport participation. *Journal of Adventure Education and Outdoor Learning, 9*(2), 135-149.
- Brymer, E., & Gray, T. (2010). Developing an intimate “relationship” with nature through extreme sports participation. *Leisure/Loisir, 34*(4), 361-374.
- Brymer, E., & Oades, L. (2009). Extreme sports: A positive transformation in courage and humility. *Journal of Humanistic Psychology, 49*(1), 114-126.
- Brymer, E., & Schweitzer, R. (2013). Extreme sports are good for your health: A phenomenological understanding of fear and anxiety in extreme sport. *Journal of Health Psychology, 18*(4), 477-487. doi: 10.1177/1359105312446770
- Brymer, E., & Schweitzer, R. D. (2017). Evoking the ineffable: The phenomenology of extreme sports. *Psychology of consciousness: Theory, research, and practice, 4*(1), 63-74. <http://dx.doi.org/10.1037/cns0000111>
- Brookes, A. (2003). A critique of Neo-Hahnian outdoor education theory. Part two: “The fundamental attribution error” in contemporary outdoor education discourse. *Journal of Adventure Education and Outdoor Learning, 3*, 119-132.
- Brown, M. (2009). Reconceptualising outdoor adventure education: Activity in search of an appropriate theory. *Australian Journal of Outdoor Education, 13*(2), 3-13.
- Brown, M. (2010). Transfer: Outdoor adventure education’s Achilles heel? Changing participation as a viable option. *Australian Journal of Outdoor Education, 14*(1), 13-22.
- Buckley, R. C., & Brough, P. (2017). Nature, eco, and adventure therapies for mental health and chronic disease. *Frontiers in Public Health, 5*, 220.
- Buckley, R. C., Westaway, D., & Brough, P. (2016). Social mechanisms to get people outdoors: Bimodal distribution of interest in nature?. *Frontiers in Public Health, 4*, 257.
- Castanier, C., Le Scanff, C., & Woodman, T. (2011). Mountaineering as affect regulation: The moderating role of self-regulation strategies. *Anxiety, Stress, & Coping, 24*(1), 75-89.
- Cervinka, R., Röderer, K., & Hefler, E. (2012). Are nature lovers happy? On various indicators of well-being and connectedness with nature. *Journal of Health Psychology, 17*(3), 379-388.
- Clark, M. (1986). The cultural patterning of risk-seeking behaviour: Implications for armed

- conflict. In M. L. Foster & R. A. Rubinstein (Eds.), *Peace and war: Cross-cultural perspectives* (pp. 79-90). New Brunswick, NJ: Transaction Books.
- Cleary, A., Fielding, K. S., Bell, S. L., Murray, Z., & Roiko, A. (2017). Exploring potential mechanisms involved in the relationship between eudaimonic wellbeing and nature connection. *Landscape and Urban Planning, 158*, 119-128.
- Clough, P., Houge Mackenzie, S., Mallabon, L., & Brymer, E. (2016). Adventurous physical activity environments: A mainstream intervention for mental health. *Sports Medicine, 46*(7), 963-968. <http://www.ncbi.nlm.nih.gov/pubmed/26895993>
- Coon, J. T., Boddy, K., Stein, K., Whear, R., Barton, J., & Depledge, M. H. (2011). Does participating in physical activity in outdoor natural environments have a greater effect on physical and mental well-being than physical activity indoors? A systematic review. *Environmental Science and Technology, 45*(5), 1761-1772.
- Csikszentmihalyi, M., & Csikszentmihalyi, I. S. (1990). Adventure and the flow experience. In J. C. Miles & S. Priest (Eds.), *Adventure education* (pp. 149-155). State College, PA: Venture Publishing.
- D'Amato, L. G., & Krasny, M. E. (2011). Outdoor adventure education: Applying transformative learning theory to understanding instrumental learning and personal growth in environmental education. *The Journal of Environmental Education, 42*(4), 237-254.
- Davis-Berman, J., & Berman, D. (2002). Risk and anxiety in adventure programming. *Journal of Experiential Education, 25*(2), 305-310.
- Delle Fave, A., Bassi, M., & Massimini, F. (2003). Quality of experience and risk perception in high-altitude rock climbing. *Journal of Applied Sport Psychology, 15*, 82-98.
- Ewert, A., & Garvey, D. (2007). Philosophy and theory of adventure education. In D. Prouty, J. Panicucci, & R. Collinson. *Adventure education: Theory and applications* (pp.19-32). Leeds, UK: Human Kinetics.
- Ewert, A., & Hollenhorst, S. (1989). Testing the adventure model: Empirical support for a model of risk recreation participation. *Journal of Leisure Research, 21*(2), 124-139.
- Ewert, A., & Sibthorp, J. (2009). Creating outcomes through experiential education: The challenge of confounding variables. *Journal of Experiential Education, 31*(3), 376-389.
- Ewert, A., & Yoshino, A. (2011). The influence of short-term adventure-based experiences on levels of resilience. *Journal of Adventure Education and Outdoor Learning, 11*(1), 35-50.
- Fischer, S., & Smith, G. T. (2004). Deliberation affects risk taking beyond sensation seeking. *Personality and Individual Differences, 36*, 527-537.
- Foster, M. L. (1993). Reversal Theory and the institutionalization of war. In J. H. Kerr, S. J. Murgatroyd & M. J. Apter (Eds.), *Advances in Reversal Theory* (pp. 67-74). Amsterdam: Swets & Zeitlinger.
- Frumkin, H., Bratman, G. N., Breslow, S. J., Cochran, B., Kahn Jr, P. H., Lawler, J. J., ... & Wood, S. A. (2017). Nature contact and human health: A research agenda. *Environmental Health Perspectives, 125*(7), 075001. doi: 10.1289/EHP1663
- Gass, M. A., Gillis, H. L., & Russell, K. C. (2012). *Adventure therapy: Theory, research, and practice*. New York: Routledge.
- Griffin, K.L., Meaney, K.S., & Podlog, L. (2015). Climb to freedom: Autonomy, competence and relatedness in rock climbing, *SHAPE America National Convention and Exposition*. Seattle, WA, March 19, 2015. Reston, VA: SHAPE America.
- Hartig, T., Mitchell, R., De Vries, S., & Frumkin, H. (2014). Nature and health. *Annual Review of Public Health, 35*, 207-228.

- Hattie, J., Marsh, H. W., Neill, J. T., & Richards, G. E. (1997). Adventure education and Outward Bound: Out-of-class experiences that make a lasting difference. *Review of Educational Research*, 67(1), 43-87.
- Henderson, L. W., & Knight, T. (2012). Integrating the hedonic and eudaimonic perspectives to more comprehensively understand wellbeing and pathways to wellbeing. *International Journal of Wellbeing*, 2(3), 196-221. doi:10.5502/ijw.v2i3.3
- Herzog, T. R., Black, A. M., Fountaine, K. A., & Knotts, D. J. (1997). Reflection and attentional recovery as distinctive benefits of restorative environments. *Journal of Environmental Psychology*, 17, 165–170.
- Houge Mackenzie, S., Hodge, K., & Boyes, M. (2011). Expanding the flow model in adventure activities: A reversal theory perspective. *Journal of Leisure Research*, 43, 519-544.
- Houge Mackenzie, S., Hodge, K., & Boyes, M. (2013). The multiphasic and dynamic nature of flow in adventure experiences. *Journal of Leisure Research*, 45(2) 214-232.
- Huppert, F. A., & So, T. T. (2013). Flourishing across Europe: Application of a new conceptual framework for defining well-being. *Social Indicators Research*, 110(3), 837-861.
- Huta, V., & Ryan, R. M. (2010). Pursuing pleasure or virtue: The differential and overlapping well-being benefits of hedonic and eudaimonic motives. *Journal of Happiness Studies*, 11(6), 735-762.
- Kamijo, K., Takeda, Y., & Hillman, C. H. (2011). The relation of physical activity to functional connectivity between brain regions. *Clinical Neurophysiology*, 122, 81-89.
- Kaplan, H.B. (1999). Toward an understanding of resilience: A critical review of definitions and models. In M.D. Glantz & J.L Johnson (Eds.) *Resilience and development* (pp. 17–83). New York: Kluwer Academic.
- Kawachi I., Subramanian, S.V., & Kim, D. (Eds.). (2008). *Social capital and health*. New York: Springer.
- Kerr, J. H. & Houge Mackenzie, S. (2012). Multiple motives for participating in adventure sports. *Psychology of Sport and Exercise*, 13, 649-657.
- Kerr, J. H., & Houge Mackenzie, S. (2014). Confidence frames and the mastery of new challenges in the motivation of an expert skydiver. *The Sport Psychologist*, 28, 221-232.
- Kerr, J. H. & Houge Mackenzie, S. (in press). I don't want to die. That's not why I do it at all": Multifaceted motivation, psychological health, and personal development in BASE jumping. *Annals of Leisure Research*. DOI: 10.1080/11745398.2018.1483732
- Kopp, M., Wolf, M., Ruedl, G., & Burtcher, M. (2016). Differences in sensation seeking between alpine skiers, snowboarders and ski tourers. *Journal of Sports Science & Medicine*, 15(1), 11-16.
- Krein, K. J. (2014). Nature sports. *Journal of the Philosophy of Sport*, 41(2), 193-208.
- Lomas, T., & Ivtzan, I. (2016). Second wave positive psychology: Exploring the positive negative dialectics of wellbeing. *Journal of Happiness Studies*, 17(4), 1753-1768.
- Lupton, D., & Tulloch, J. (2002). 'Life would be pretty dull without risk': Voluntary risk-taking and its pleasures. *Health, Risk & Society*, 4(2), 113-124.
- Lyng, S. (2005). Sociology at the edge: Social theory and voluntary risk taking. In S. Lyng (Ed.), *Edgework: The sociology of risk-taking* (pp. 17-50). New York: Routledge.
- Maas, J., van Dillen, S.M.E., Verheij, R.A., & Groenewegen, P.P. (2009). Social contacts as a Possible mechanism behind the relation between green space and health. *Health Place*, 15(2), 586–595.
- MacGregor, A., Woodman, T., & Hardy, L. (2014). Risk is good for you: An investigation of the

- processes and outcomes associated with high-risk sport. *Journal of Exercise, Movement, and Sport*, 46(1), 175.
- Martyn P. & Brymer E. (2016). The relationship between nature relatedness and anxiety. *Journal of Health Psychology*, 21(7), 1436-1445.
- Maller, C., Townsend, M., Brown, P., & St. Leger, L. (2002). *Healthy parks, healthy people: The health benefits of contact with nature in a park context*. Report to Parks Victoria and the International Park Strategic Partners Group. Deakin University: Melbourne.
- McKenzie, M. D. (2000). How are adventure education program outcomes achieved? A review of the literature. *Australian Journal of Outdoor Education*, 5(1), 19-28.
- Meier, K. V. (1976). The kinship of the rope and the loving struggle: A philosophic analysis of communication in mountain climbing. *Journal of the Philosophy of Sport*, 3(1), 52-64.
- Melo, R., & Gomes, R. (2017). Nature sports participation: Understanding demand, practice profile, motivations and constraints. *European Journal of Tourism Research*, 16, 108-135.
- Mental Health Commission of NSW. (2017). *Wellbeing language and definitions guide*. Retrieved from <https://wbcnsw.files.wordpress.com/2017/09/language-and-definitions-guide-web.pdf>
- Morgan, P. (2010). Towards a developmental theory of place attachment. *Journal of Environmental Psychology*, 30(1), 11-22.
- Neill, J. T., & Dias, K. L. (2001). Adventure education and resilience: The double-edged sword. *Journal of Adventure Education & Outdoor Learning*, 1(2), 35-42.
- Nietzsche, F. (1974). *The Gay Science* (W. Kaufmann, Trans.). New York, NY: Vintage.
- Outdoor Foundation. (2017). *Outdoor recreation participation topline report*. Retrieved from https://outdoorindustry.org/wp-content/uploads/2017/04/2017-Topline-Report_FINAL.pdf
- Pain, M. T., & Pain, M. A. (2005). Risk taking in sport. *The Lancet: Medicine and Sport*, 366(1), S33-S34.
- Pearson, D. G., & Craig, T. (2014). The great outdoors? Exploring the mental health benefits of natural environments. *Frontiers in Psychology*, 5, 1178.
doi: 10.3389/fpsyg.2014.01178
- Pretty, J., Peacock, J., Hine, R., Sellens, M., South, N., & Griffin, M. (2007). Green exercise in the UK countryside: Effects on health and psychological well-being, and implications for policy. *Journal of Environmental Planning and Management*, 50(2), 211-231.
- Priest, S., & Bunting, C. (1993). Changes in perceived risk and competence during whitewater canoeing. *Journal of Applied Recreation Research*, 18(4), 265-280.
- Pryor, A., Carpenter, C., & Townsend, M. (2012). Outdoor education and bush adventure therapy: A social-ecological approach to health and wellbeing. *Australian Journal of Outdoor Education*, 9(1), 3-13.
- Priest, S. & Gass, M.A. (2018). *Effective leadership in adventure programming* (3rd Ed.). Champaign, IL: Human Kinetics.
- Puchan, H. (2004). Living 'extreme': Adventure sports, media and commercialisation. *Journal of Communication Management*, 9(2), 171-178.
- Ramsing, R., & Sibthorp, J. (2008). The role of autonomy support in summer camp programs: Preparing youth for productive behaviors. *Journal of Park and Recreation Administration*, 26(2), 61-77.
- Ryan, R.M. & Deci, E.L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, 52, 141-166.

- Ryan, R. M., & Deci, E. L. (2011). A self-determination theory perspective on social, institutional, cultural, and economic supports for autonomy and their importance for well-being. In V. I. Chirkov, R. M. Ryan & K. M. Sheldon (Eds.), *Human autonomy in cross-cultural context: Perspectives on the psychology of agency, freedom, and well-being* (pp. 45-64). Dordrecht, Netherlands: Springer.
- Ryan R.M., Huta V., Deci E.L. (2013). Living well: A self-determination theory perspective on eudaimonia. In A. Delle Fave (Ed) *The exploration of happiness* (pp 117-139). Dordrech: Springer.
- Ryan, R. M., Weinstein, N., Bernstein, J., Brown, K. W., Mastella, L., & Gagne, M. (2010). Vitalizing effects of being outdoors and in nature. *Journal of Environmental Psychology*, 30, 159–168.
- Ryff, C.D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, 57, 1069–1081.
- Seligman, M. E., & Csikszentmihalyi, M. (2014). Positive psychology: An introduction. In *Flow and the foundations of positive psychology* (pp. 279-298). Springer: Netherlands.
- Sibthorp, J., & Arthur-Banning, S. (2004). Developing life effectiveness through adventure education: The roles of participant expectations, perceptions of empowerment, and learning relevance. *Journal of Experiential Education*, 27(1), 32-50.
- Sibthorp, J., Paisley, K., Gookin, J., & Furman, N. (2008). The pedagogic value of student autonomy in adventure education. *Journal of Experiential Education*, 31(2), 136–151. doi:10.5193/JEE.31.2.136
- Stevenson, A., & Waite, M. (Eds.). (2011). *Concise Oxford English Dictionary*. Oxford: Oxford University Press.
- Twigger-Ross, C. L., & Uzzell, D. L. (1996). Place and identity processes. *Journal of Environmental Psychology*, 16(3), 205–220.
- Varley, P., & Semple, T. (2015). Nordic slow adventure: Explorations in time and nature. *Scandinavian Journal of Hospitality and Tourism*, 15(1-2), 73-90.
- Waldinger, R.J., & Schulz, M.S. (2016). The long reach of nurturing family environments: Links with midlife emotion-regulatory styles and late-life security in intimate relationships. *Psychological Science*, 27(11), 1443-1450.
- Waterman, A. S., Schwartz, S. J., & Conti, R. (2008). The implications of two conceptions of happiness (hedonic enjoyment and eudaimonia) for the understanding of intrinsic motivation. *Journal of Happiness Studies*, 9(1), 41-79.
- Willig, C. (2008). A phenomenological investigation of the experience of taking part in extreme sport. *Journal of Health Psychology*, 13, 690-702.
- Woodman, T., Cazenave, N., & Le Scanff, C. (2008). Skydiving as emotion regulation: The rise and fall of anxiety is moderated by alexithymia. *Journal of Sport & Exercise Psychology*, 30, 424-433.
- Woodman, T., Hardy, L., Barlow, M., & Le Scanff, C. (2010). Motives for prolonged engagement high-risk sports: An agentic emotion regulation perspective. *Psychology of Sport and Exercise*, 11, 345-352.
- Wurdinger, S., & Paxton, T. (2003). Using multiple levels of experience to promote autonomy in adventure education students. *Journal of Adventure Education & Outdoor Learning*, 3(1), 41-48.
- Zhang, J. W., Howell, R. T., & Iyer, R. (2014). Engagement with natural beauty moderates the

- positive relation between connectedness with nature and psychological well-being. *Journal of Environmental Psychology*, 38, 55-63.
- Zelenski, J. M., & Nisbet, E. K. (2014). Happiness and feeling connected: The distinct role of nature relatedness. *Environment and Behavior*, 46(1), 3-23.
- Zuckerman, M. (Ed.) (2007). *Sensation seeking and risky behavior*. Washington: American Psychological Association.