ROCZNIKI PSYCHOLOGICZNE/ANNALS OF PSYCHOLOGY
2020, XXIII, 2, 153–172
DOI: http://dx.doi.org/10.18290/rpsych20232-3

PIOTR PRÓCHNIAK
Institute of Psychology
University of Szczecin

COPING WITH STRESS AND PAIN IN HARD AND SOFT ADVENTURE MOUNTAIN ATHLETES

Several scales were used to assess the levels of coping with stress and pain of 97 Polish hard adventure mountain athletes (M_{age} = 30.50, *SD* = 9.45), who climb in winter using mountain ice axes, harnesses, hooks or ropes in high mountains, and 103 Polish soft adventure mountain athletes who summer hike in low mountains (M_{age} = 28.30, *SD* = 6.50). The results indicated significant differences between soft and hard adventure climbers in the ways climbers react to stress. The hard adventure climbing group had significantly higher means on the Preventive Coping, Proactive Coping, Task-Oriented Coping, Diverting Attention, Reinterpretation of Pain, Ignoring Pain, Coping Self-Statements and Behavioural Strategies than the soft adventure mountain athletes, but lower means on Emotion-Oriented Coping, Catastrophising and Praying/Hoping compared to the soft mountain athletes group. This study also examined the factor structure of the coping scales in the climbers' samples. The results suggested that the coping scales contain the following three factors: *Passive-Oriented Coping*, *Future-Oriented Coping* and *Appraisal-Oriented Coping*. The extracted factors discriminate between soft and hard adventure mountain athletes. The hard adventure mountain athletes had significantly higher means on the Future-Oriented Coping and the Appraisal-Oriented Coping, and a lower mean on Passive-Oriented Coping than the soft mountain athletes group.

Keywords: mountaineering; coping; stress; pain; adventure; athletes.

Correspondence concerning this article should be addressed to PIOTR PRÓCHNIAK, Institute of Psychology, University of Szczecin, ul. Krakowska 69, 71-017 Szczecin, Poland; email: piotr.prochniak@usz.edu.pl; ORCID: https://orcid.org/0000-0002-3725-0076

INTRODUCTION

While participation in many traditional sports is declining, the range of adventure sports practised in a natural environment is becoming more and more popular (Brymer, 2010). Puchan (2005, p. 177) believes that the growing popularity of adventure sports is a sign of the times—people are looking for a new lifestyle, the expression of their own needs and values, improving well-being, developing cognitive skills, learning risk taking, feeling free or deeply experiencing nature (Brymer & Schweitzer, 2017; Buckley, 2011; Ewert et al., 2013; Woodman et al., 2010). A popular type of adventure recreation is mountain sports. Every year, more and more people set off on a climbing adventure in different mountains around the world.

Soft and Hard Adventure Climbing

Mountain sports include two basic forms of adventure: soft adventure and hard adventure (Pomfret & Bramwell, 2016). Soft adventure climbing refers to activity in mountains with low levels of risk. This is usually less physically demanding and does not require specialised technical equipment such as mountain ice axes (Beedie, 2008; Hill, 1995; Millington et al., 2001). An example of soft adventure activity in mountains is hiking on safe trails. Soft adventure mountain athletes are driven by sidestepping routine, exploring new things or expanding their comfort zones. They do not require a significant amount of climbing experience.

Hard adventure climbing requires the use of specialised equipment, such as mountain ice axes, harnesses, hooks or ropes because the physical demands are quite high (Buckley, 2006; Lipscombe, 1995; Pomfret & Bramwell, 2016). It also includes winter expeditions, rock climbing, or strenuous treks (Millington et al., 2001). Hard adventure climbing is practised in mountain ranges such as the Tatra Mountains, the Alps, or the Himalayas. Hard adventure mountain athletes take high risks associated with the real possibility of serious injury or even death: possibilities of falls, intense cold, high winds and very low atmospheric pressure, rock falls or avalanches, or the potential failure of safety equipment (Schöffl et al., 2010). These risks can impact a climber's cognition, behaviours and emotions (Lazarus, 2000). Hard adventure mountain athletes must manage risk and fear of falling or injury, thus they must have high physical endurance, technical skills, and psychological resources to cope with said danger (Buckley, 2018; Morrison & Schöffl, 2007).

Sensation-Seeking in Climbing

Numerous theories have tried to explain why people voluntarily take high risks in the mountains (Ewert et al., 2013). In particular, the theory of sensation seeking proposed by Marvin Zuckerman explains the motivation to explore the dangers of nature (Zuckerman, 1994). Sensation seeking is defined as: "seeking varied, novel, complex and intense sensations and experiences and the willingness to take physical, social, legal, and financial risks for the sake of such experience" (Zuckerman, 1994, p. 27). Genetic and biological research suggests that sensation seeking is a temperamental trait (Zuckerman, 2015).

The sensation-seeking trait is related to participating in mountaineering. Research has regularly demonstrated a higher level of sensation seeking in groups of climbers and groups of individuals who did not engage in risky sports (Breivik, 1996; Cronin, 1991; Rossi & Ceratti, 1993). The risky behaviors undertaken by climbers have a crucial function of providing an optimal level of stimulation.

Sensation-seeking affects the perception of risk and it has stress-buffering effects (Anshel & Anderson, 2002; Ruedl et al., 2012; Frenkel et al., 2018). High sensation seekers differ from low sensation seekers with respect to perceived risks. Mountain athletes who are high sensation seekers do not consider their activities as very high risk; they subjectively control risk and perceive different dangerous situations in mountains as less threatening than controls did (Demirhan, 2005; Demirhan et al., 2014; Fave et al., 2003; Slanger & Rudestam, 1997).

The sensation-seeking trait can reduce psychological anxiety in dangerous situations. Climbers who are sensation seekers have lower scores on anxiety traits than the norm (Egan & Stelmack, 2003; Robinson, 1985). They less frequently experience anxiety during climbing and can control for it. For extreme climbers, anxiety is a natural element of their experiences. Furthermore, anxiety in confrontation with nature supports their responsibility (Brymer & Schweitzer, 2013). Castanier, Scanff, and Woodman (2010) claim that mountaineering decreases levels of fear. These authors suggest that mountaineering is attractive to climbers because they give them a chance to manage their fear (Woodman et al., 2010).

Besides showing a psychological response to stress, sensation seeking regulates physiological responses to dangerous situations (Campbell & Ehlert, 2012). High sensation seekers have lower baseline levels of cortisol (Shabani et al., 2011). Risk takers have also an attenuated cortisol response to stress (Couture

et al., 2008). This means that high sensation seekers can tolerate stressful experiences better than low sensation seekers (Frenkel et al., 2018).

Sensation-seeking affects perception of lower risk, anxiety, and cortisol in response to environmental stress suggesting low reactivity in a group of risk seekers. Unfortunately, low reactivity does not predict the specific and different cognitive ways climbers react to mountain-related stress such as possibilities of falls or severe weather conditions (Frenkel et al., 2018). Therefore, it seems that the perspective of coping research is a more adequate explanation of dealing with stress among climbers.

Stress-Coping Strategies

Coping is defined as the specific efforts, both behavioural and psychological, which people make in order to reduce or minimise stressful events (Aldwin, 2007; Ben-Zur, 2009; Dias et al., 2012; Folkman, 2010; Lazarus & Folkman, 1984; Skinner & Zimmer-Gembeck, 2007). In each stressful situation, a person requires the use of a specific coping strategy (Greenglass, 2002). The predominance of one strategy over another is determined by both individual traits and the nature of the event in question (Skinner et al., 2003). The same strategy can be effective in one situation and ineffective in another (Folkman & Moskowitz; 2004; Lazarus & Folkman, 1984; Skinner & Zimmer-Gembeck, 2009). Usually people use a mixture of different coping strategies, which may change over time (Aldwin, 2007).

There are various ways of classifying coping strategies. One of the most common is a problem-focused strategy and emotion-focused strategy. The former focuses on endeavours to engage in activity in order to eliminate stressful circumstances. The latter involves attempts to regulate the emotional consequences of these circumstances. The next distinction in coping identified in source literature is between active and avoidance coping (Cohan, 2006; Endler & Parker, 1990). Active coping strategies involve confronting the source of stress and deliberately attempting to reduce it. Avoidance coping strategies are mechanisms characterised by efforts to evade having to deal with the stressor (Carver & Connor-Smith, 2010). Appraisal-focused coping involves the re-evaluation of a situation to reduce its importance and refers to strategies such as situation restructuring (Cox & Ferguson, 1991; Dias et al., 2012). Schwarzer (2001) distinguishes forms of future-oriented coping: preventive coping (the aim of this strategy is to minimise future stress through taking preventive measures in the present) and proactive coping (this strategy is related to future challenges).

Surprisingly, climbing studies have very rarely focused on examining the coping process. Research on coping among climbers analysed affective processes during climbs such as levels of anxiety or fears. For example, high anxiety is related to jerky movements, rigid posture and taking longer to complete a climb (Pijpers et al., 2003; Sanchez et al., 2010). Low anxiety is correlated with self-confidence, positive affects, and feelings of control (Jones et al., 2009). Furthermore, low anxiety is likely related to facilitating success in climbing (Giles et al., 2014).

Guan-Jang Wu (2013) interviewed three very experienced mountaineers in the context of stress and coping. The findings indicate that mountaineers experience various levels of stressors, such as emotional burdens associated with long separation and a fear of death. In addition, the results suggest that a range of internal and external stress-coping strategies such as denial, religion, self-help, and technology have been used to overcome these hurdles successfully.

Pain-Coping Strategies

Pain is one of the most universal types of stress. Williams and Craig (2016) have updated the definition, describing pain as "a distressing experience associated with actual or potential tissue damage with sensory, emotional, cognitive, and social components" (p. 2420). Cognitive and behavioural reactions to pain may affect pain, functional capacity, and psychological functioning. These reactions to pain are studied under the category "pain coping." Kraaimaat and Evers (2003) define coping strategies as "people's behavioural and cognitive attempts to manage or tolerate pain and its effects" (p. 344). These authors distinguish between cognitive and behavioural strategies in coping with pain. This distinction served as the basis for the Coping Strategies Questionnaire (CSQ). CSQ measures six cognitive-coping strategies (reinterpreting pain, ignoring pain, diverting attention, coping self-statements, praying/hoping and catastrophising) and two behavioural-coping strategies (increasing activity level and increasing pain behaviours). A further conceptualisation in pain coping differentiates active from passive strategies. Active coping refers to strategies to relieve, control, and function with pain using one's own resources. Passive strategies include withdrawal, avoidance and negative self-statements about pain (Boothby et al., 1999). Coping with pain can also be classified into problem-focused strategies (strategies involving direct attempts to cope with pain) versus emotion-focused strategies (strategies involved in managing the emotional reactions to pain) (Allen et al., 2010) whilst other classifications divide positive and negative strategies (Jensen et al., 1995; Rosenstiel & Keefe, 1983).

Little is known about the potential coping strategies that are related to pain behaviour in adventure sports; however, research on traditional sports athletes (for example boxers, runners) have dominated the coping with sport pain literature. Coping strategies in traditional sports include using dissociative-coping strategies (Lind et al., 2009), ignoring pain (Deroche et al., 2011), avoiding thinking about pain, seeking social support, catastrophising, self-medicating, or reappraisal (Nicholls et al., 2007; Tricker, 2000; Wiese-Bjornstal, 2010).

In a recent study McDougall (2018) compared pain tolerance, pain-coping strategies, and pain appraisals among elite and non-elite rock mountain athletes. Elite mountain athletes had better pain tolerance and used less distraction coping in laboratory settings than novice mountain athletes. Elite mountain athletes also reported more control and less distraction than non-elite mountain athletes in a recent, painful climb.

The above research indicates that mountaineering has rarely been studied in the context of coping with stress and pain. Previous studies in this area have focused on perception of risk or psychological and physiological responses to stress. The achieved results indicate that hard mountain climbers minimise risk, subjectively control risk, experience lower anxiety in dangerous situations in natural environments, and better tolerate pain than in controls. Surprisingly, we know little about coping with stress and pain in groups of adventurous athletes (Frenkel et al., 2018). Does taking high risks among hard climbers relate to more problem and proactive focusing in stressful situations or preventive and avoidance-oriented coping in this group of athletes? Do hard climbers use other strategies of coping with pain than soft climbers? Answers to these questions will be examined in the following paragraphs. Thus, the first aim of the study is to conduct an analysis of the methods of coping with stress and pain among soft and hard mountain climbers to uncover any inter-scale correlations which might exist amongst the different ways of coping with stress and pain. The second aim of the study is to analyse the structure of ways of coping with stress and pain among climbers, using factor analysis. This can help us to better understand the most important factors of coping in the groups of climbers.

Based on previous studies, it was hypothesised that hard adventure mountain athletes use problem-focused coping, proactive-focused coping with stress, and active-coping strategies with pain more often than the soft adventure mountain athletes. High-risk takers use emotion-focused coping and passive strategies with pain less often than athletes engaging in low risk activities during exploration of mountains.

METHOD

Participants

The sample included two groups. The first group of 97 Polish hard adventure mountain athletes who voluntarily participated were all men (M_{age} = 30.50, SD = 9.45). The average length of winter climbing experience was 7.45 years. Each participant in this group climbs mountains during the winter and risks being killed by an avalanche or dying from exposure and has personal experience in climbing in the Tatra mountains; forty eight mountaineers from this group also have personal experience in climbing in the Alps or the Himalayas.

The second group was 103 Polish men who practised lower risk climbing (M_{age} = 28.30, SD = 6.50). Mountain athletes in this group have personal experience on safe hiking trails in the Beskid Mountains in Poland during the summer season.

Procedure

The author contacted climbers during their stays in mountain huts. Those who agreed to participate in the research completed a questionnaire anonymously. Participation was voluntary.

The hard adventure mountain climbers were selected based on the specific criteria. They climbed in high mountains during the winter season using specialist equipment such as mountain ice axes, harnesses, hooks or ropes, and had more than five years climbing experience. Finally, they were interested in participating in the research and were men. Hard mountains athletes filled in questionnaires during their stays in mountain huts in the Tatra National Park during the winter season. Furthermore, they were asked about climbing in other more elevated areas such as the Alps or the Himalayas.

The soft adventure mountain climbers hiked in the Beskidy mountains during the summer season and did not use specialist climbing equipment such as mountain ice axes, harnesses, hooks or ropes. They had no personal experience in climbing during the winter season in high mountains. Soft mountains athletes filled in questionnaires during their stays in mountain huts in the Beskidy mountains during the summer season (the Beskidy Mountains are quite low mountains and climbing does not require any special equipment such as ropes, helmets or ice axes).

Measures

Coping Inventory for Stressful Situations (CISS). The CISS contains three 16-item scales which assess Task-Oriented Coping (Task scale) (Cronbach's α = .90), Emotion-Oriented Coping (Emotion Scale) (Cronbach's α = .82), and Avoidance-Oriented Coping (Avoidance Scale) (Cronbach's α = .78) (Endler & Parker, 1990; Polish adaptation: Szczepaniak et al., 1996). In this study, the response is a 5-point Likert scale (1 = *never*, 5 = *always*)

Proactive Coping Inventory (PCI). The Proactive Coping Inventory is a multidimensional inventory consisting of 55 items grouped in seven sub-scales (Greenglass et al., 1999; Polish adaptation by Pasikowski et al., 2002). The subscales are broken down into the following categories: the Proactive Coping Scale, the Preventive Coping and Reflective Coping Scale, the Strategic Planning, the Preventive Coping, the Instrumental Support Seeking, the Emotional Support Seeking, and the Avoidance Coping. In this study respondents were asked to indicate how often they engage in various activities in which they encounter stressful situations and answer each item ranging from 1 (*never*) to 5 (*always*).

Because five of the seven scales of *PCI* (the Reflective Coping Scale, the Strategic Planning, the Preventive Coping, the Instrumental Support Seeking, the Emotional Support Seeking, and the Avoidance Coping) are congruent with the three scales of the *Coping Inventory for Stressful Situations*, only the Proactive Coping subscale (Cronbach's α = .87) and the Preventive Coping subscale (Cronbach's α = .79) from *PCI* were used in the current study.

The Coping Strategy Questionnaire (CSQ). The coping strategy questionnaire (Polish adaptation by Juczyński, 2000) consists of 42 items assessing the self-rated use of cognitive and behavioural strategies to cope with pain (Rosenstiel & Keefe, 1983). It comprises six subscales for cognitive strategies (Diverting Attention, Reinterpretation of Pain, Catastrophising, Ignoring Pain, Praying/Hoping, and Coping Self-Statements) and a scale for behavioural strategies. The reliability of most subscales is Cronbach's α > .80. Only two scales are characterised by a lower reliability: scale for diverting attention: Cronbach's α = .64, and the scale for behavioural strategies: Cronbach's α = .63. On a scale ranging from 1 to 5, subjects are asked to indicate how often they use a particular item when they experience pain (1 = *never*, 5 = *always*).

RESULTS

The hard adventure and the soft adventure mountain athlete groups were compared on each measure using the Student's *t* test (see Table 1).

Table 1. *Comparisons of Coping with Stress and Pain in Hard and Soft Mountain Athletes*

	Hard adventure mountain athletes		Soft adventure mountain athletes		*t*(198)	*p*
	M	*SD*	*M*	*SD*		
Preventive Coping	2.92	0.60	2.60	0.40	4.46	.001
Proactive Coping	3.23	0.49	2.56	0.42	10.22	.001
Task-Oriented Coping	3.89	0.65	3.35	0.57	6.15	.001
Emotion-Oriented Coping	2.63	0.85	3.02	0.57	–3.81	.001
Avoidance-Oriented Coping	2.99	0.88	3.00	0.64	–0.12	.903
Diverting Attention	3.31	0.88	3.24	0.72	0.54	.589
Reinterpretation of Pain	3.17	0.96	2.96	0.79	1.71	.088
Catastrophising	2.43	1.19	2.99	0.77	–3.92	.001
Ignoring Pain	3.65	0.84	3.27	0.75	3.36	.001
Praying/Hoping	2.89	1.10	3.34	0.81	–3.28	.001
Coping Self-Statements	4.06	0.68	3.58	0.70	4.88	.001
Behavioral Strategies	3.61	0.76	3.34	0.64	2.76	.006

The hard adventure climber group had a significantly higher means on the Preventive Coping, Proactive Coping, Task-Oriented Coping, Diverting Attention, Reinterpretation of Pain, Ignoring Pain, Coping Self-Statements, and Behavioural Strategies than the Soft Adventure Mountain athletes group, but lower means on Emotion-Oriented Coping, Catastrophising and Praying/Hoping than the soft mountain athletes group.

Exploratory factor analysis was conducted for the scales of coping with stress and pain to diagnose the main coping factors of mountain athletes. The maximum-likelihood method of parameter estimation was chosen (Cudeck, 2000). The KMO index was found to be .785. Additionally, BTS reached statistical significance $\chi^2(66) = 1160.669$ $p < .01$. The KMO and BTS results indicated that the data satisfied the psychometric criteria for factor analysis to be performed. Exploratory factor analysis using the maximum-likelihood method of parameter estimation indicated a three-factor solution upon observing the scree plot (see Table 2).

Table 2. *Exploratory Factor Analysis for the Coping with Stress and Pain Scales*

Variables	Factor – 1	Factor – 2	Factor – 3
Emotion-Oriented Coping	.77		
Avoidance-Oriented Coping	.64		
Diverting Attention	.70		
Catastrophising	.84		
Praying / Hoping	.80		
Preventive Coping		.77	
Proactive Coping		.83	
Task-Oriented Coping		.80	
Reinterpretation of Pain			.69
Ignoring Pain			.84
Coping Self-Statements			.79
Behavioral Strategies			.64
Explaining variance (%)	33.33	21.87	13.54
Eigenvalue	3.99	2.62	1.62

Additionally, in determining the optimal number of factors to extract, Parallel Analysis (PA) was used (Ledesma & Valero-Mora, 2007). The parallel analysis also showed a strong three-factor solution as demonstrated in Table 3.

Table 3. *Parallel Analysis for Coping With Stress and Pain Scales*

	PCA	PA
1	**3.99**	**1.41**
2	**2.62**	**1.30**
3	**1.62**	**1.22**
4	0.79	1.13
5	0.59	1.07
6	0.50	1.01
7	0.45	0.95
8	0.37	0.89
9	0.33	0.83
10	0.29	0.77
11	0.24	0.71
12	0.15	0.64

Note. PCA = Principal Component Analysis; PA = Parallel Analysis.

The first factor, which accounted for 33% of the variance (eigenvalue = 3.99), represents the dimension of *Passive-Oriented Coping* (subcomponents: Emotion-Oriented Coping, Avoidance-Oriented Coping, Diverting Attention, Catastrophising, Praying/Hoping). The second factor, which accounted for 22% of the variance (eigenvalue = 2.62), is labelled *Future-Oriented Coping* (Preventive Coping, Proactive Coping, Task-Oriented Coping). The last factor, which accounted for 13.50% of the variance (eigenvalue = 1.62), is labelled *Appraisal-Oriented Coping* (subcomponents: Reinterpretation of Pain, Ignoring Pain, Coping Self-Statements, Behavioural Strategies).

Table 4 presents the scores on the three factors of coping extracted in the factor analysis between hard and soft mountain athletes.

Table 4. *Comparisons of Coping with Stress and Pain Factors in Hard and Soft Mountain Athletes*

Factors	Hard adventure mountain athletes		Soft adventure mountain athletes			
	M	*SD*	*M*	*SD*	*t*(198)	*p*
Passive-Oriented Coping	2.85	0.80	3.12	0.50	–2.84	.004
Future-Oriented Coping	3.35	0.46	2.84	0.36	8.55	.001
Appraisal-Oriented Coping	3.63	0.67	3.30	0.58	3.73	.001

The hard adventure mountain athletes had significantly higher means on the *Future-Oriented Coping* and the *Appraisal-Oriented Coping* scales and lower means on *Passive-Oriented Coping* than the soft mountain athletes group.

In the final step, a discriminant function analysis (DFA) was applied to determine which variables best discriminate between the hard adventure and soft adventure mountain athletes. The variables for the group differences were included in the discriminant function analysis. The variables were: *Passive-Oriented Coping, Future-Oriented Coping*, and *Appraisal-Oriented Coping.*

One significant function was identified with an eigenvalue of .55 and canonical correlation of .59, $F(3, 196) = 36.37$, $p < .01$. Table 5 indicates that 78.50% of the group cases were correctly classified, with this being 73.20% of the hard group and 83.50% of the soft group.

Table 5. *Classification Results of Hard and Soft Mountain Athletes*

Cases		Predicted group	
		Hard $p = .485$	Soft $p = .515$
Original Count	Hard	71	26
	Soft	17	86
% Classified	Hard	73.2	26.8
	Soft	83.5	16.5

Note: 78.50 % of the original grouped cases are correctly classified.

The Discriminant Function Analysis revealed that three factors of coping with stress and pain contributed significantly to the multivariate discrimination between the mountain athletes (see Table 6).

Table 6. *Summary of Discriminant Function Analysis*

Factors	Wilks' lambda	Partial lambda	F-to-remove (1, 196)	p-level	Tolerance	1 Tolerance (R^2)
Future-Oriented Coping	.84	.75	62.37	.001	.99	.00
Passive-Oriented Coping	.70	.91	18.80	.001	.84	.15
Appraisal-Oriented Coping	.69	.92	16.84	.001	.84	.15

DISCUSSION

The possibility of falls, avalanches, intense heat and cold, high winds, and very low or high atmospheric pressure can create challenging situations for mountain athletes. As such, the question of how mountaineers cope in these circumstances would appear to be intriguing. Surprisingly, though, the theories on outdoor adventure and the research into this have not focused on the individual coping methods which regulate climbers' activities in mountain conditions.

The aim of the present study was to examine forms of coping with stress and pain among mountain athletes. Analysis showed three coping factors which discriminate the hard adventure mountain athletes from the soft adventure mountain athletes group.

The most important factor is *Passive-Oriented Coping.* This factor explains the highest percent of variance in the psychological coping forms of mountain

athletes and includes the following subscales: Emotion-Oriented Coping, Avoidance-Oriented Coping, Diverting Attention, Catastrophising, and Praying/Hoping. It seems that this factor describes affective-oriented coping in climbers. The hard climbers achieved lower scores on this factor compared to soft climbers. The hypothesis in this part was confirmed. A lower mean on the passive-oriented coping factor in the hard adventure climber group suggests that this group can control stress more effectively than the soft adventure mountain athletes. This group of hard climbers probably seeks less support and thinks in a more wishful manner than the second group (soft climbers). The hard adventure mountain athletes panic less frequently in the face of adversity and less frequently create catastrophic visions, or they are less likely to pray in situations of physical difficulties compared to the soft adventure mountain athletes. Additionally, this result suggests the hard adventure mountain athletes process information more effectively in a threatening situation compared to the soft adventure mountain athletes. The results also suggest that the hard adventure mountain athletes are probably less "sensitive" to distress signals and their personal safety is perceived as being less at risk in dangerous situations than the soft adventure mountain athletes. Thus, the hard adventure mountain athletes will tend to take longer to withdraw from exploring the threat or wilderness compared to the soft adventure mountain athletes. The current findings are consistent with the results of Brymer and Schweitzer (2013). In this work, extreme athletes managed fear and treated fear as a natural part of practising adventure in the wilderness.

The lower mean in the *Passive-Oriented Coping* factor in the group of hard climbers also suggests that this group is less reactive than the soft climbers. It is likely the hard climbers achieve optimum stimulation later are more active and experience lower stress, and react significantly less often with negative emotions in mountain conditions when similar conditions are experienced by soft mountain climbers. This hypothesis should be tested in future studies.

The second factor to emerge was labelled *Future-Oriented Coping*. This factor includes the following subscales: Preventive Coping, Proactive Coping and Task-Oriented Coping. This factor describes the specific efforts, both behavioural and cognitive, which mountain athletes make in order to reduce or minimise stressful events in the wilderness and includes strategies which involve trying to change the nature of the wild nature stressor itself (Carver & Connor-Smith, 2010; Lazarus & Folkman, 1984). The hard adventure climbers scored higher compared to soft adventure mountain athletes, thus the hypothesis was confirmed.

This result suggests that the hard adventure athletes have a positive attitude towards future new events which demand risk taking, perceiving them as a challenge. They perceive dangers as less stressful because they have more resources at their disposal to cope with risks and try to influence the outcomes of the events, both positive and negative. Furthermore, they probably precisely plan behaviour, concentrate on goals, and effectively use time. These cognitive skills can minimise feelings of stress in the hard adventure group and this does not then interfere with the implementation of plans for outdoor recreation.

The obtained result is convergent with the theory of flow (Csikszentmihályi, 1990) or the proposals of Mortlock (1984) and Priest (1990). These authors emphasise the basic role of one's own skills in the practice of adventure sports.

In summary, it seems that the behaviours of mountain athletes that can be characterised as real, coherent, organised, and future-oriented play a significant role in undertaking risky behaviour when in close contact with nature. It is the basic requirement to adapt to the threats at times presented by the natural world.

The last factor is labelled *Appraisal-Oriented Coping* (subcomponents: Reinterpretation of Pain, Ignoring Pain, Coping Self-Statements, Behavioural Strategies). The hard adventure mountain athletes scored higher on this factor compared to the soft adventure mountain athletes. This result suggests that the hard adventure mountain athletes do not avoid pain, but they modify the way they think about pain. They try to distance the pain or ignore it and try to change their mindset or revise their thoughts about pain. Previous research indicates that distancing pain and ignoring pain can increase pain tolerance and attenuate physiological discomfort and psychological distress (Cioffi, 1991). High scores on appraisal-focused coping in the group of hard adventure climbers may also suggest acceptance of pain more often than the soft adventure group. To the soft adventure mountain athletes, pain is more often correlated to an unpleasant feeling and they have problems ignoring pain compared to the hard adventure mountain athletes.

This lower score on *Appraisal Oriented Coping* in the group of hard climbers indicates also that this group views pain as something that is natural and necessary. They are likely to interpret it as a sign that they are working hard and achieving peak performance. Mountain athletes must learn to be comfortable being uncomfortable. They cannot change the source of pain but can change their thinking about the pain. The soft adventure mountain athletes more often interpret pain as threatening. When they experience pain, they probably focus on the pain rather than concentrate on climbing. In this way, the pain will increase and interfere with climbing (McDougall, 2018).

This result also suggests that the hard adventure mountain athletes are accustomed to experiencing pain during climbs due to the intense physical effort (Hainline et al., 2017). The continuous exposure to pain may help their adaptation to physical pain levels and it can also decrease pain sensitivity in the hard adventure mountain athletes group. In summary, it seems that hard adventure mountain athletes may have a greater potential than the soft adventure mountain athletes for pain tolerance.

Contact with severe weather conditions or the possibility of falls in mountains is often associated with extensive physical involvement. Behaviour in heavy rain, extreme temperatures or high wind is thus determined by the psychological traits rooted in biology. In this context, temperament plays an important part. According to Strelau (2013), temperament performs the function of a moderator with an influence on difficult situations when there are implications of possible death. Temperamental theories persuasively explain why people seek risk in the wilderness and feel fewer negative emotions in stressful environments. However, it does not explain what risk takers think in a difficult situation, how they treat the different risks, and what strategies they use for pain tolerance, though they are aware of it. It seems that the results of the current study show that not only biologically determined traits are important in one's exploration of the wilderness. Cognitive skills are also necessary to function effectively in demanding natural environments.

LIMITATIONS OF THE STUDY AND FUTURE DIRECTIONS

An important limitation of the present study is that the respondents were only climbers—this fact limits the generalisability of results for other groups of risk takers in natural environments. Therefore, in future research it will be important to assess not only climbers but other groups of mountain risk takers. It could be interesting to compare mountain climbers and mountain kayakers, canoeists, or downhill athletes. It would be also interesting to compare the coping mechanisms of climbers with other risky, non-mountain athletes, i.e., skydivers or scuba divers. The specifics of adventure sports may result in different risk coping-profiles.

The current study does not control for the levels of reactivity of climbers. This is a limitation of this study. Future research should analyse the relationship between reactivity and coping strategies in groups of soft and hard climbers.

All climbers in this study were men. Previous research indicates that gender plays an important role in the perception of risk and risk taking among adventurous people: women perceive higher risk in natural environments compared to men (Demirhan, 2005; Demirhan et al., 2014; Kontos, 2004). In this context, it would be interesting to compare hard women mountain athletes and hard men mountain climbers with respect to coping with stress and pain. Do gender differences exist in coping strategies between these groups of mountain athletes?

The current study analysed only a part of the personal resources of climbers. It seems that future studies should concentrate not only on the ways of coping with stress or pain. For instance, it could be possible to study the personal resources of climbers from such perspectives as Core Self-Evaluation (Judge, 2002) or Psychological Capital (Luthans et al., 2007).

CONCLUSIONS

Research on climbers very often focuses on the motivational aspects of a risky activity. The excitement of the mountains, the demand for new and stimulating experiences, an escape from the monotony of everyday life or the need for freedom are very often the motives of people who seek adventure in the wild world of mountains (Brymer & Schweizter, 2017; Buckley, 2011; Ewert et al., 2013; Pomfret & Bramwell, 2016). Motivation theories can explain why people want to explore mountains, but these theories say little about adaptation and coping in dangerous natural environments. In the analysis of climbing behaviour, one should consider, apart from motives, the personal resources that determine adaptation and functioning in the demanding world of wild nature. In this way the analysis of mountain athletes' activities will allow us to understand mountaineering more fully.

REFERENCES

Aldwin, C. M. (2007). *Stress, coping, and development: An integrative perspective* (2nd ed.). Guilford Press.

Allen, K. D., Oddone, E. Z., Coffman, C. J., Keefe, F. J., Lindquist, J. H., & Bosworth, H. B. (2010). Racial differences in osteoarthritis pain and function: Potential explanatory factors. *Osteoarthritis Cartilage, 18*, 160–167.

Anshel, M., & Anderson, D. (2002). Coping with acute stress in sport: linking athletes' coping style, coping strategies, affect, and motor performance. *Anxiety Stress Coping, 15*, 193–209.

Beedie, P. (2008). Adventure tourism as a 'new frontier' in Leisure. *World Leisure Journal, 50*(3), 173–183.

Ben-Zur, H. (2009). Coping styles and affect. *International Journal of Stress Management, 16*(2), 87–101.

Boothby, J. L., Thorn, B. E., Stroud, M. W., & Jensen, M. P. (1999). Coping with pain. In R. J. Gatchel & D. C. Turk (Eds.), *Psychosocial factors in pain* (pp. 343–359). Guilford Press.

Breivik, G. (1996). Personality, sensation seeking and risk taking among Everest climbers. *International Journal of Sport Psychology, 27*, 308–320.

Brymer, E. (2010). Risk and extreme sports: A phenomenological perspective. *Annals of Leisure Research, 13*(1–2), 218–239.

Brymer, E., & Schweitzer, R. D. (2013). The search for freedom in extreme sports: A phenomenological exploration. *Psychology of Sport & Exercise, 14*(6), 865–873.

Brymer, E., & Schweizter, R. D. (2017). Evoking the ineffable: The phenomenology of extreme Sports. *Psychology of Consciousness: Theory, Research, and Practice, 4*(1), 63–74.

Buckley, R. (2006). Adventure tourism research: A guide to the literature. *Tourism Recreation Research, 31*(2), 75–83.

Buckley, R. (2011). Rush as a key motivation in skilled adventure tourism. *Tourism Management, 33*(4), 961–970.

Buckley, R. (2018). To Analyze Thrill, Define Extreme Sports. *Frontiers in Psychology, 9*, 1–11.

Campbell, J., & Ehlert, U. (2012). Acute psychosocial stress: Does the emotional stress response correspond with physiological responses? *Psychoneuroendocrinology, 37*, 1111–1134.

Carver, C. S., & Connor-Smith, J. (2010). Personality and Coping. *Journal of Annual Review of Psychology, 61*, 679–704.

Castanier, C., Scanff, C. L., & Woodman, T. (2010). Who takes risks in high-risk sports? A typological personality approach. *Research Quarterly for Exercise and Sport, 81*(4), 478–484.

Cioffi, D. (1991). Sensory awareness versus sensory impression: Affect and attention interact to produce somatic meaning. *Cognition and Emotion, 5*(4), 275–294.

Cohan, S. L., Jang, K. L., & Stein, M. B. (2006). Confirmatory factor analysis of a short form of the coping inventory for stressful situations. *Journal of Clinical Psychology, 62*, 273–283.

Couture, S., Brown, T. G., Ouimet, M. C., Gianoulakis, C., Tremblay, J., & Carbonneau, R. (2008). Hypothalamic-pituitary-adrenal axis response to stress in male DUI recidivists. *Accident Analysis and Prevention, 40*, 246–253.

Cox, T., & Ferguson, E. (1991). Individual differences, stress and coping. In C. L. Cooper & R. Payne (Eds.), *Personality and stress: Individual differences in the stress process* (pp. 7–30). Chichester: Wiley & Sons.

Cronin, Ch. (1991). Sensation seeking among mountain climbers. *Personality and Individual Differences, 12*(6), 653–654.

Csikszentmihályi, M. (1990). *Flow: The psychology of optimal experience.* Harper & Row.

Cudeck, R. (2000). Exploratory factor analysis. In H. E. Tinsley & S. D. Brown (Eds.), *Handbook of applied multivariate statistics and mathematical modeling* (pp. 266–296). Academic Press.

Demirhan, G. (2005). Mountaineers' risk perception in outdoor-adventure sports: A study of sex and sports experience. *Perceptual and Motor Skills, 100* (3 Pt 2), 1155–60.

Demirhan, G., Asci, F. H., Kangalgil, M., & Saracbasi, O. (2014). Perception of risk and attractiveness of extreme sports among Turkish university students. *Hacettepe Journal of Sport Sciences, 25*(1), 11–22.

Deroche, T., Woodman, T., Stephan, Y., Brewer, B., & Le Scanff, C. (2011). Athletes' inclination to play through pain: A coping perspective. *Anxiety, Stress, & Coping, 24*(5), 579–587.

Dias, C., Cruz, J. F., & Fonseca, A. (2012). The relationship between multidimensional competitive anxiety, cognitive threat appraisal, and coping strategies: A multisport study. *Journal of Sport Exercise Psychology, 10*, 52–65.

Egan, S., & Stelmack, M. R. (2003). A personality profile of Mount Everest climbers. *Personality and Individual Differences, 34*(8), 1491–1494.

Endler, N. S., & Parker, J. D. A. (1990). Multidimensional assessment of coping: A critical evaluation. *Journal of Personality and Social Psychology,* 58, 844–854.

Ewert, A. W., Gilbertson, K., Luo, Y. & Voight, T. A. (2013). Beyond "because it's there": Motivations for pursuing adventure recreational activities. *Journal of Leisure Research, 45*(1), 91–111.

Fave, A. D., Bassi, M. & Massimini, F. (2003). Quality of experience and risk perception in high-altitude rock climbing. *Journal of Applied Sport Psychology, 15*, 82–99.

Folkman, S. (2010). Stress, coping, and hope. *Psycho-Oncology, 19*(9), 901–908.

Folkman, S., & Moskowitz , J. (2004). Coping: Pitfalls and Promise. *Annual Review of Psychology, 55*, 745–774.

Frenkel, M. O., Heck, R. B., & Plessner, H. (2018). Cortisol and behavioral reaction of low and high sensation seekers differ in responding to a sport-specific stressor. *Anxiety, Stress, & Coping 31*, 580–593.

Giles, D., Draper, N., Gilliver, P., Taylor, N., Mitchel, J., Birch, L., Woodhead, J., Blackwell, G., & Hamlin, M. (2014). Current understanding in climbing psychophysiology research. *Sports Technology, 7*(3–4), 108–119.

Greenglass, E. R. (2002). Proactive coping and quality of life management. In E. Frydenberg (Ed.), *Beyond coping: Meeting goals, visions, and challenges* (pp. 37–62). Oxford University Press.

Greenglass, E., Schwarzer, R., Jakubiec, D., Fiksenbaum, L., & Taubert, S. (1999, July 12–14). *The Proactive Coping Inventory (PCI): A multidimensional research instrument.* Paper presented at the 20th International Conference of the Stress and Anxiety Research Society (STAR), Cracow, Poland.

Hainline, B., Turner, J. A., Caneiro, J. P., Stewart, M., & Moseley, G. L. (2017). Pain in elite athletes—neurophysiological, biomechanical and psychosocial considerations: a narrative review. *British Journal of Sports Medicine, 51*(17), 1259–1264

Hill, B. J. (1995). A guide to adventure travel. *Parks and Recreation, 30*(9), 56–65.

Jones, M., Meijen, C., McCarthy, P. J., & Sheffield, D. (2009). A Theory of challenge and threat states in athletes. *International Review of Sport and Exercise Psychology, 2*(2), 161–180.

Juczyński, Z. (2000). Poczucie własnej skuteczności – teoria i pomiar [Self-efficacy—theory and *measurement*]. *Acta Universitatis Lodziensis, 4*, 11–24.

Judge, T. A., Erez, A., Bono, J. E., & Thoresen, C. J. (2002). Are measures of self-esteem, neuroticism, locus of control, and generalized self-efficacy indicators of a common core construct? *Journal of Personality and Social Psychology, 83*, 693–710.

Jensen, M. P., Turner, J. A., Romano, J. M., & Strom, S. E. (1995). The Chronic Pain Coping Inventory: Development and preliminary validation. *Pain, 60*, 203–216.

Kontos, A. P. (2004). Perceived risk, risk taking, estimation of ability and injury among adolescent sport participants. *Journal of Pediatric Psychology, 29*, 447–455.

Kraaimaat, F., & Evers, A. (2003). Pain-coping strategies in chronic pain patients: Psychometric characteristics of the Pain-Coping Inventory (PCI). *International Journal of Behavioral Medicine, 10*, 343–363.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping*. Guilford Press.

Lazarus, R. S. (2000). How emotions influence performance in competitive sports. *The Sport Psychologist, 14*, 229–252.

Ledesma, R. D., & Valero-Mora, P. (2007). Determining the number of actors to retain in EFA: An easy-to-use computer program for carrying out Parallel Analysis. *Practical Assessment*, *12*(2), 1–11.

Lind, E., Welch, A., & Ekkekakis, P. (2009). Do "mind over muscle" strategies work? Examining the effects of attentional association and dissociation on exertional, affective and physiological responses to exercise. *Sports Medicine, 39*(9), 743–764.

Lipscombe, N. (1995). Appropriate adventure for the aged. *Australian Parks and Recreation, 31*(2), 41–45.

Luthans, F., Youssef, C. M., & Avolio, B. J. (2007). *Psychological capital.* Oxford University Press.

Lyng, S. (2005). Edgework and the risk-taking experience. In S. Lyng (Ed.), *Edgework: The sociology of risk-taking* (pp. 17–49). Routledge.

Mcdougall, J. (2018). *Examination conditioned pain modulation in non-elite and elite rock climbers: The influence of pain coping strategies and cognitive appraisal* (Unpublished manuscript). University of British Columbia, Vancouver, Canada. https://doi.org/10.14288/1.0371156

Millington, K., Locke, T., & Locke, A. (2001). Occasional studies: adventure travel. *Travel and Tourism Analyst, 4*, 65–97.

Morrison, A. B, & Schöffl, V. R. (2007). Review of the physiological responses to rock climbing in young climbers. *British Journal of Sports Medicine, 41*, 852–861.

Mortlock, C. (1984). *The adventure alternative*. Cicerone Press.

Nicholls, A., Polman, R., Levy, A., Taylor, J., & Cobley, S. (2007). Stressors, coping, and coping effectiveness: Gender, type of sport, and skill differences. *Journal of Sports Sciences, 25*(13), 1521–1530.

Pasikowski, T. Sęk, H., Greenglass, E., & Taubert, S. (2002). Proactive Coping Inventory—Polish adaptation. *Polish Psychological Bulletin, 33*(1), 41–46.

Pijpers, J., Oudejans, R., Holsheimer, F., & Bakker, F. (2003). Anxiety–performance relationships in climbing: A process-oriented approach. *Psychology of Sport and Exercise, 4*, 283–304.

Pomfret, G., & Bramwell, B. (2016). The characteristics and motivational decisions of outdoor adventure tourists: A review and analysis. *Current Issues in Tourism, 19*(14), 1447–1478.

Priest, S. (1990). The adventure experience paradigm. In J. C. Miles & S. Priest (Eds.), *Adventure recreation* (pp. 157–162). State College, PA: Venture Publishing.

Puchan, H. (2005). Living "extreme": Adventure sports, media and commercialization. *Journal of Communication Management, 9*(2), 171–178.

Robinson, D. W. (1985). Stress seeking: Selected behavioural characteristics of elite rock climbers. *Journal of Sport Psychology,* 7, 400–404.

Rosenstiel, A. K., & Keefe, F. J. (1983). The use of cognitive coping strategies in chronic low back pain patients: Relationship to patient characteristics and current adjustment. *Pain, 17*(1), 33–44.

Rossi, B., & Ceratti, L. (1993). The sensation seeking in mountain athletes as assessed by Zuckerman's Sensation Seeking Scale. *International Journal of Sport Psychology, 24*, 417–431.

Ruedl, G., Abart, M., Ledochowski, L., Burtscher, M., & Kopp, M. (2012). Self reported risk taking and risk compensation in skiers and snowboarders are associated with sensation seeking. *Accident Analysis and Prevention, 48*, 292–296.

Sanchez, X., Boschker, M., & Llewellyn, D. (2010). Pre-performance psychological states and performance in an elite climbing competition. *Scandinavian Journal of Medicine and Science in Sports, 20*, 356–363.

Schöffl, V., Morrison, A. B., Schwarz, U., Schöffl, I., & Küpper, T. (2010). Evaluation of injury and fatality risk in rock and ice climbing. *Sports Medicine, 40*, 657–679.

Schwarzer, R. (2001). Stress, resources and proactive coping. *Applied Psychology, 50*, 400–407.

Shabani, S., Dehghani, M., Hedayati, M., & Rezaei, O. (2011). Relationship of serum serotonin and salivary cortisol with sensation seeking. *International Journal of Psychophysiology, 81*, 225–229.

Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Journal of Psychological Bulletin, 129*, 216–269.

Skinner, E. A. & Zimmer-Gembeck, M. J. (2007). The development of coping. *Annual Review of Psychology, 58*, 119–144.

Skinner, E. A. & Zimmer-Gembeck, M. J. (2009). Challenges to the developmental study of coping. *New Directions for Child and Adolescent Development, 124*, 5–17.

Slanger, E., & Rudestam, K. (1997). Motivation and disinhibition in high risk sports: Sensation seeking and self-efficacy. *Journal of Research in Personality, 31*, 355–374.

Strelau, J. (2013). *Psychologia temperamentu* [*Psychology of temperament*]. PWN.

Szczepaniak, P., Strelau, J., & Wrześniewski, K. (1996). Diagnoza stylów radzenia sobie ze stresem za pomocą polskiej wersji kwestionariusza CISS Endlera i Parkera. [Assessment of stress-coping styles using Endler and Parker's CISS: Polish version]. *Przegląd Psychologiczny, 39*(1), 187–210.

Tricker, R. (2000). Painkilling drugs in collegiate athletics: Knowledge, attitudes, and use of student athletes. *Journal of Drug Education, 30*(3), 313–324.

Wiese-Bjornstal, D. (2010). Psychology and socioculture affect injury risk, response, and recovery in high-intensity athletes: A consensus statement. *Scandinavian Journal of Medicine and Science in Sports, 20*(S2), 103–111.

Williams, A., & Craig, K. (2016). Updating the definition of pain. *Pain, 157*(11), 2420–2423.

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.

Wu, G.-J. (2013). The dark side of adventure: Exploring the stress-coping strategies of mountaineers' significant others regarding high altitude mountaineering expeditions. *Applied Research in Quality of Life, 8*(4), 449–465.

Zuckerman, M. (1994). *Behavioral expressions and biosocial bases of sensation seeking.* Cambridge University Press.

Zuckerman, M. (2015). Models of adults temperament. In M. Zentner & R. L. Shiner (Eds.), *Handbook of Temperament* (pp. 41–66). Guilford Press.