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Mountaineering as affect regulation: the moderating role of self-regulation strategies

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Abstract

We investigated the change in mountaineers' affect from pre- to post-mountain route and the moderating role of self-regulation strategies in this process. First, we hypothesized that engagement in a high-risk sport such as mountaineering would lead to a decrease in negative affect and an increase in positive affect and that this affect regulation would be moderated by self-regulation strategies (*escape* from self-awareness and *compensation*). Second, we predicted that the self-regulation affect process would be specifically associated with high-risk sport rather than sport generally. One hundred and five mountaineers and 73 judokas completed the Risk and Excitement Inventory and the Positive and Negative Emotions Scale before and after completing their activity (mountain route or judo fight). Regression analyses revealed that anxiety significantly decreased from pre- to post-mountain route and that the self-regulation of escape from awareness yielded a significantly greater anxiety decrease. No such interaction emerged for the compensation strategy and no effects were revealed for judokas. Results are discussed in terms of the specificity of the high-risk sport domain in its ability to serve an affect regulation function for those individuals who seek to escape from self-awareness.

Key words: Affect change, anxiety, risk-taking, escape, compensation, high-risk sports

Mountaineering as affect regulation: the moderating role of self-regulation strategies

Much research has been devoted to understanding the adoption of the disinhibition behaviors associated with socially unacceptable volitional behaviors with a significant risk to one's health (e.g., dangerous driving, drug taking, promiscuous sex). Relatively sparse research, however, has been devoted to socially accepted behaviors in which the danger is recognized and controlled (e.g., high-risk jobs, high-risk sports; Turner, McClure, & Pirozzo, 2004). The focus of the current study is on this socially accepted end of the spectrum and more specifically on high-risk sports that are defined as sports where one accepts the possibility of severe injury or death as an inherent part of the activity (Breivik, 1995; Llewellyn & Sanchez, 2008).

Most studies of individual differences and the propensity to risk-taking have been conducted within a sensation seeking framework. In fact, the study of risk taking has become nearly synonymous with sensation seeking theory (Ferrando & Chico, 2001; Jackson & Maraun, 1996). Sensation seeking is viewed as a motivation for involvement in risk-taking behaviors inasmuch as these are an obvious way to experience various sensations that increase physiological arousal (Arnett, 1996; Zuckerman, 1994). A large body of research evidence confirms that sensation seeking is positively linked with the participation in a wide range of risk-taking behaviors including disinhibition activities (e.g., Hoyle, Fejfar, & Miller, 2000; Jelalian, Alday, Spirito, Rasile, & Nobile, 2000; Van Hasselt, Null-Tracy Kempton, & Bukstein, 1993) and high-risk sports (e.g., Llewellyn & Sanchez, 2008; Michel, Carton, & Jouvent, 1997; Zuckerman, 2007). Despite the popularity of sensation seeking theory, a number of concerns have been raised relating to its conceptual and empirical basis (Jackson & Maraun, 1996; Slanger & Rudestam, 1997). For example, although sensation seeking may partially explain risk-taking, the proportion of explained variance appears to be relatively small (Himelstein & Thorne, 1985; Horvath & Zuckerman, 1993). Furthermore, sensation seeking theory does not adequately

account for the full range of motives mentioned by risk takers themselves for participating in high-risk activities (Cazenave, Le Scanff, & Woodman, 2007; Ewert, 1994; Shapiro, Siegel, Scovill, & Hays, 1998; Woodman, Hardy, & O'Brien, 2005).

In addition to the management of arousal states, risk-taking behaviors can serve many different goals or functions (Cooper, Agocha, & Sheldon, 2000). For example, people may engage in these behaviors to regulate their affects (Cooper, Shapiro, & Powers, 1998). Although there are many proposed definitions of affect regulation, most include the notion that, in the process of monitoring and evaluating affective states, individuals take actions either to maintain or to change (enhance or suppress) the intensity of affect, or to prolong or shorten the affective episode (Gross, 1999; Parkinson, Totterdell, Briner, & Reynolds, 1996; Thompson, 1994). Affective states influence cognition, behavior, and experience (Bless & Forgas, 2000) and one function of affect regulation is thought to be to limit the residual impact of lingering emotions on subsequent behavior and experience (Larsen & Prizmic, 2004). Larsen (2000) posits that people regulate affect to achieve a super-ordinate goal: to maintain a global sense of subjective well-being. According to some authors (e.g., Diener & Seligman, 2002), subjective well-being has two affective components at its core, both of which are considered as aggregates over relatively long time periods. These two components are positive affect and negative affect. Affect regulation can thus be conceptualized as a 2 x 2 affect (positive and negative affect) and change (increase and decrease) model, in which the most obvious regulation strategies are to increase positive affect and to decrease negative affect (Larsen & Prizmic, 2004). Risk-taking behaviors may result from a desire to avoid or reduce negative affect and to pursue or enhance positive affect (Cooper et al., 2000). In this way, these behaviors may reflect a means of affect regulation that is not perceived to be readily available elsewhere (Barlow, Hardy, & Woodman, 2007; Taylor & Hamilton, 1997; Woodman et al., 2005; Woodman, Huggins, Le Scanff, & Cazenave, 2009). In fact, some authors

posit that high-risk sport may be more attractive than other sports for anxious individuals, as it affords them an opportunity to experience and subsequently control their intense anxiety (Fenichel, 1939; Woodman, Cazenave, & Le Scanff, 2008).

Several researchers have proposed models for the process of affect regulation. For example, self-regulation theory (Carver & Scheier, 1981) and its derivatives (Hamilton, Greenberg, Pyszczynski, & Cather, 1993; Pyszczynski, Greenberg, Solomon, & Hamilton, 1991) are based on the theory of objective self-awareness (Duval & Wicklund, 1972). One of the most important consequences of self-awareness is the activation of goal-directed behavior. The theory states that the awareness of discrepancies between one's goal in a particular situation or task and one's current status in relation to that goal leads to negative affect. Purposeful action is viewed as an attempt to reduce such discrepancies and any associated negative affect. Duval and Wicklund (1972) argued that the easiest way to reduce negative affect is to disengage from the failed task or activity and then to turn attention away from the self. In support of this position, these authors have shown that individuals who are exposed to contrived failure experiences engage in actions that reduce their level of self-awareness. However, according to Pyszczynski et al. (1991) there are two possible strategies for self-regulation. One can indeed escape from self-awareness, but one can also make a compensatory shift to another activity in which success is more likely, but which serves the same abstract goal as the failed activity (e.g., self-worth).

Based on Carver and Scheier's (1981) theory of self-regulation and its extensions (Hamilton et al., 1993; Pyszczynski et al., 1991), Taylor and Hamilton (1997) suggested that risk-taking behaviors may serve either of these two self-regulatory strategies, each with the same goal of maintaining a global sense of well-being (Larsen, 2000); some risk-taking behaviors may serve an escape function, whereas others may serve a compensation function. For example, involvement in socially unaccepted risk-taking behaviors such as alcohol abuse and drug taking

appear to serve largely an escape function because such activities allow individuals to shift attention away from their self-ideal discrepancy (Taylor & Hamilton, 1997). Conversely, more socially accepted risk-taking behaviors such as high-risk sports, which are activities that typically require careful training and preparation and in which risk is controlled, may serve more a compensation function (Taylor & Hamilton, 1997). These risk-taking activities provide a way for individuals to maintain a particular self-image, or to enhance self-esteem, which are benefits that they do not necessarily derive in other life domains (e.g., work, family; Barlow et al., 2007; Taylor & Hamilton, 1997). Recent research, however, suggests that the picture is not quite this straightforward and that high-risk sports may also serve an escape from self-awareness function (Cazenave et al., 2007; Lafollie & Le Scanff, 2007). There is thus a need to investigate these escape and compensation strategies within the high-risk sport domain rather than assuming that all high-risk sport participants engage in their sport for the same affect regulation purposes.

Although authors have suggested that high-risk sports might serve an affect regulation function (e.g., Cazenave et al., 2007; Michel et al., 1997; Taylor & Hamilton, 1997; Woodman, Hardy, Barlow, & Le Scanff, 2010), few studies have directly investigated this process. In fact, only two studies have reported a specific decrease in anxiety as a direct consequence of engagement in high-risk sport (skydiving), particularly for people with emotion difficulties (Woodman et al., 2008; Woodman et al., 2009). To the best of our knowledge, no study has investigated the effect of high-risk sport participation on other negative affects and more widely on the global model of emotional well-being (i.e., positive and negative affects; Diener & Seligman, 2002). Specifically, as noted by Woodman et al. (2008), it remains to be elucidated whether the high-risk sport domain serves only to reduce negative affect, or whether it also increases positive affect. Furthermore, the role of self-regulation strategies (Taylor & Hamilton,

1997) in this process has received no research attention. The aim of the current study is to bridge these gaps.

In the first hypothesis we predicted that engagement in a high-risk sport (e.g., mountain climbing) would lead specifically to a decrease in anxiety (cf. Woodman et al., 2008; Woodman et al., 2009), but also in other negative affect; and an increase in positive affect (Carver & Scheier, 1981; Cooper et al., 2000). Second, we hypothesized that this affect change would be moderated by self-regulation strategies. Specifically, according to Taylor and Hamilton (1997), high escape individuals have emotional distress (e.g., a general tendency to feel negative affects) that they attempt to cope with by engaging in a high-risk activity. Thus, we predicted that mountaineers high in escape motive would experience a decrease in their negative affective state, specifically in anxiety (Cazenave et al., 2007; Lafollie & Le Scanff, 2007; Woodman et al., 2009). Conversely, Taylor and Hamilton (1997) reported that compensation was not associated with emotional difficulties. Thus, we hypothesized that mountaineers high in compensation motive would enjoy an increase in positive affect linked to a sense of achievement in their sports activities. Finally, given that the high-risk sport domain may attract some individuals with emotion regulation difficulties specifically on the basis of its ability to induce intense anxiety (Fenichel, 1939; Woodman et al., 2008), we hypothesized that the anxiety self-regulation process would hold specifically for high-risk sport rather than for all sports.

Method

Participants

Two hundred and twenty sportsmen were approached in person and asked to take part in the study. Of the 189 persons who agreed to participate in the study, eight did not provide data at Time 2. After having further excluded three outlier participants, we obtained complete sets of

data from 178 sportsmen divided in two groups: one group of male mountaineers (n = 105; M_{age} = 29.07 years; SD = 5.46) and one group of male judokas (n = 73; M_{age} = 18.79 years; SD = 2.16).

Measures

Self-regulation strategies. Self-regulation strategies were measured with the Risk and Excitement Inventory (Taylor & Hamilton, 1997) validated in French by Lafollie, Le Scanff, and Fontayne (2008). This inventory comprises two subscales that assess two distinct self-regulation strategies: *compensation* (e.g., "I am more aware of myself as a person when engaged in exciting activities") and *escape* (e.g., "When I take risks I lose myself more than usual"). The final version of the French inventory contains 12 items (six for escape, and six for compensation), which are scored on a five-point Likert scale, ranging from 1 (*not at all true*) to 5 (*totally true*). This instrument showed acceptable internal reliability in the French validation study (Lafollie et al., 2008; Cronbach alpha of .77 for compensation and .69 for escape) as well as in the present study (.80 for compensation and .71 for escape).

Negative affectivity. Negative affectivity was assessed via the trait version of the two-factor Positive and Negative Emotionality Inventory (Pelissolo, Rolland, Perez-Diaz, Jouvent, & Allilaire, 2007), an affect self-report scale adapted from Diener, Smith, and Fujita (1995) questionnaire. We used only negative affectivity for the purpose of this study. The negative affectivity factor of this instrument comprises 18 items rated on a seven-point Likert scale from 1 (*never*) to 7 (*several times per day*), assessing individuals' general tendency to feel negative affects. This sub-scale showed good internal reliability in the validation study (Pelissolo et al., 2007; Cronbach alpha of .93) as well as in the present study (Cronbach alpha of .91).

Affective states. Affective states were measured with the state form of the Positive and Negative Emotions Scale (Pelissolo et al., 2007). This instrument contains 28 items assessing six specific affect states (joy, affection, anxiety, anger, shame, sadness). The measure contains

adjectives that describe these affective states, and participants indicate to what extent they feel each item *at this moment* using a seven-point Likert scale ranging 1 (*not at all*) to 7 (*very much*). This instrument showed adequate internal reliability in the validation study (Pelissolo et al., 2007; Cronbach alpha ranged from .81 to .93) as well as in the present study (Cronbach alpha .70 -.89).

Procedure

The initial contact with participants in the National French School of Skiing and Mountaineering and in two Judo French Poles included a brief presentation of the study purpose with an explanation of the procedure, and an assurance of confidentiality. Participants were told simply that the study was an investigation of affective states. The data were collected at two different times. First, after completing consent forms, a short demographic questionnaire, the Risk and Excitement Inventory and the Positive and Negative Emotions Scale Trait Form, participants were asked to complete the Positive and Negative Emotions Scale State Form a first time (T1) approximately 30 minutes before they started their activity (mountain route or judo fight). Second, we asked participants to complete the Positive and Negative Emotions Scale State Form a second time (T2) as soon as was feasible after the end of their activity (approximately one hour).

Results

The assumptions of parametric and multivariate analysis (cf. Tabachnick & Fidell, 2001) were satisfied for the present data set. Age was associated with some of the study variables (e.g., escape self-regulation strategy, $r = -.28$, $p < .01$) and the two groups differed significantly on age ($t(176) = 18.34$, $p < .001$). Consequently, we controlled for age in each subsequent analysis.

The descriptive statistics for mountaineers are presented in Tables 1 and 2. In line with Taylor and Hamilton (1997), escape was significantly correlated with negative affectivity (i.e., general tendency to feel negative affects, $r = .41$, $p < .001$) and compensation was not

significantly related with this emotional variable (r = .13, *ns*). Furthermore, the escape mean for mountaineers (M = 13.45, SD = 3.67) was not significantly different to that of judokas (M = 15.18, SD = 3.94) after controlling for age; $F(1, 175) = 0.08$, $p > .05$, but was significantly lower than that of the French norm (M = 17.00; SD = 4.87; Lafollie et al., 2008), t (104) = 9.91, $p <$ .001. The compensation mean for mountaineers (M = 23.19, SD = 4.16) was significantly higher than that of the judokas (M = 21.42, SD = 4.90) after controlling for age, $F(1, 175) = 4.97$, $p <$ .05, but was not significantly different to that of the French norms (M = 22.86, SD = 4.17; Lafollie et al., 2008); t (104) = 0.80).

The analyses were performed separately for each affective state (i.e., anxiety, anger, shame, sadness, joy and affection) and each self-regulation strategy (i.e., escape and compensation).

Mountaineers' change in affect

To investigate the overall effect of mountaineering on mountaineers' affective states, single-factor repeated measures (pre/post mountain route) ANCOVAs were conducted with each affect as the dependent variable and age as the covariate (see Table 2).

Negative affects. ANCOVAs revealed a significant difference for anxiety and not for the other negative affects (anger, shame, and sadness). Participants felt significantly less anxiety post-mountain route (M = 11.22, SD = 9.89) compared to pre-mountain route (M = 17.48, SD = 10.57), $F(1, 103) = 4.39$, $p < .05$, $\eta^2 = .04$.

Positive affects. ANCOVAs revealed no significant difference between pre- and post-mountain route for positive affect states (joy and affection).

The moderating role of self-regulation strategies in mountaineers' affective change

To examine the potential moderation of self-regulation strategies (escape and compensation) on mountaineers' affective change, we performed regression analyses following procedures explained by Judd, Kenny and McClelland (2001). All variables were centered before being subjected to regression analyses. For each regression analysis, age was controlled at Step 1 and self-regulation strategy (i.e., escape or compensation) was entered at Step 2.

Escape. Of all the affects (anxiety, anger, shame, sadness, joy, and affection), only the regression analysis for anxiety revealed a significant Escape × Time interaction (see Table 3). After controlling for age, regressing each anxiety score on escape yielded $\hat{Y}_{1i} = 1.74 + 1.02\ Escape_i$ and $\hat{Y}_{2i} = 6.26 + 0.15\ Escape_i$. In the first equation, *Escape* was a significant predictor of Y_1 (i.e., pre-mountain route anxiety), $t(102) = 3.68$, $p < .001$, $\eta^2 = .12$; in the second equation (i.e., post-mountain route anxiety), the slope for *Escape* was not significantly different from zero, $t(102) = 0.56$, $p > .50$, $\eta^2 = .00$. Regressing the anxiety difference, Y_d (Y_2 - Y_1), on *Escape* yielded the following equation: $\hat{Y}_{di} = 4.53 - 0.87\ Escape_i$. Here the slope for *Escape* was significantly different from zero, $t(102) = 3.06$, $p < .01$, $\eta^2 = .08$. The test of whether this slope differs from zero is equivalent to showing that the slope for *Escape* in the Y_2 equation differs from the slope for *Escape* in the Y_1 equation. This significant Escape × Time interaction shows that higher escape profiles yielded greater decreases in anxiety from pre- to post-mountain route, as hypothesized.

Compensation. The regression analysis revealed no significant Compensation × Time interactions for any affects (see Table 3).

Specificity of high-risk sport in anxiety self-regulation

To investigate the specificity of high-risk sport (i.e., mountaineering vs. judo) in anxiety change, a 2 (Activity: mountaineers/judokas) x 2 (Time: pre/post activity) ANCOVA with

repeated measures on the second factor was conducted with anxiety as the dependent variable and age as covariate. The analysis revealed a significant main effect for Time, $F(1, 175) = 6.97$, $p < .01$, $\eta^2 = .04$, such as participants felt significantly more anxiety before than after activity. Conversely, no significant main effect appeared for Activity, $F(1, 175) = 0.02$, $p > .05$. Of more central interest, the ANOVA revealed a significant Activity x Time interaction, $F(1, 175) = 5.80$, $p < .05$, $\eta^2 = .03$; the mountaineers experienced a greater decrease in anxiety ($M_{T1} = 17.48$, $SD = 10.57$ to $M_{T2} = 11.22$, $SD = 9.89$, $p < .001$) than did the judokas ($M_{T1} = 15.99$, $SD = 5.13$ to $M_{T2} = 12.70$, $SD = 4.92$, $p < .01$).

To test the specificity of high-risk sport in the process of anxiety self-regulation, we performed moderated hierarchical regression analyses on the anxiety difference, Y_d ($Y_2 - Y_1$), following procedures described by Aiken and West (1991). All variables were centered before being subjected to regression analyses. For the purpose of these analyses the sport group variable (judo and mountaineering) was dummy-coded. For each analysis, age was controlled at Step 1, self-regulation strategy (i.e., escape or compensation) and sport group were entered at Step 2 and the self-regulation strategy × sport group interaction term was entered at Step 3.

Escape. After controlling for age in the first step ($\beta = -.08$, *ns*), the analysis revealed an incremental proportion of variance ($\Delta R^2 = .07$, $p < .01$) at the second step, with significant contributions of escape strategy ($\beta = -.21$, $p < .01$) and sport group ($\beta = -.30$, $p < .05$). The escape strategy × sport group interaction term further accounted for a significant proportion of variance over and above the main effects, $\Delta R^2 = .04$, $p < .01$. The slope for the escape strategy × sport group interaction was significantly different from zero, $t(173) = 2.61$, $p < .01$, $\eta^2 = .04$. In the *mountaineering* equation, *Escape* was a significant predictor of the anxiety decrease, $t(173) = 3.79$, $p < .01$, $\eta^2 = .08$. Conversely, in the *judo* equation, the slope for *Escape* was not

significantly different from zero, $t(173) = 0.06$, $p > .50$, $\eta^2 < .01$. This significant escape strategy × sport group interaction shows that higher escape profiles yielded greater decreases in anxiety for mountaineers only, as hypothesized.

Compensation. After controlling for age in the first step, the analysis revealed an incremental proportion of variance ($\Delta R^2 = .03$, $p < .05$) at the second step, with a significant contribution of sport group only ($\beta = -.32$, $p < .05$). Entered in the third step, the compensation strategy × sport group interaction term did not account for a significant proportion of variance over and above the main effects, $\Delta R^2 = .00$, *ns*.

Discussion

The aim of the present study was to investigate the change in affect intensity from before to after a risk-taking sport activity and the moderating role of self-regulation strategies therein. The hypotheses were partially supported. Anxiety significantly decreased from pre- to post-mountain route and the more mountaineers used escape strategy the more their anxiety decreased. This result suggests that mountaineers who participate for escape motives derive an important emotional benefit from completing a mountain route. This emotional benefit was limited to a decrease in negative affect (i.e., anxiety) and did not extend to an increase in positive affect.

In line with Taylor and Hamilton (1997), escape was significantly correlated with mountaineers' general tendency to feel negative affects (i.e., negative affectivity). Given the generalized negative affect for escape mountaineers, the elevated anxiety before the mountain route for these persons was likely somewhat linked to general affective distress rather than to the anxiety that might be provoked specifically by the mountain climb. In this way, one could argue that mountaineering serves an anxiety regulation function for those individuals who seek to escape from self-awareness and not to think of their ill-being (Cazenave et al., 2007; Lafollie &

Le Scanff, 2007; Woodman et al., 2009). Thus, high-risk sport involvement for these individuals might be motivated specifically by the desire to decrease anxiety.

The findings revealed that high-risk sport participation served specifically to regulate anxiety rather than globalized negative affect. Mountaineering is a sport where the possibility of severe injury or death is an inherent part of the activity (Breivik, 1995; Llewellyn & Sanchez, 2008). Thus, the danger of mountaineering induces external and specific fear that may allow escape-motivated individuals to move their non-specific and internal source of anxiety to a more externally-derived anxiety (Fenichel, 1939; Woodman et al., 2008). Moreover, mountaineering is a demanding activity that involves aerobic and strength capacities, and requires a high level of physiological activation (Fyffe & Peter, 1997). Thus, as high-risk sports allow one to regulate the physiological arousal associated with anxiety, involvement in these activities would be a better emotion regulation strategy for anxious individuals than disinhibition behaviors such as substance abuse.

Conversely, low escape participants had relatively low negative affectivity and experienced low and stable anxiety throughout the mountain route. This seems to suggest that the underlying motive for engagement in mountaineering for low escape individuals was not the desire to regulate negative affect. Thus, it would be misleading to view these risk-taking activities as a unitary phenomenon that is associated with poor psychological functioning and notably emotional distress (Taylor & Hamilton, 1997). For certain individuals the involvement in high-risk sport might represent psychologically healthy and fulfilling goal-directed behavior.

No significant relation was revealed between mountaineers' compensation strategy and affect change, which suggests that the compensation strategy is not directly linked to affect regulation in high-risk sport. According to Taylor and Hamilton (1997), the compensation self-regulation strategy is enacted by individuals with a healthy self-concept comprising multiple

independent sources of self-worth and is unrelated to indicators of psychological distress. The present data support this lack of association between compensation and negative affect. It seems, therefore, that compensation-oriented persons do not need to engage in high-risk sport in order to regulate their affect. For such individuals the engagement in high-risk sports likely serves another compensation function such as self-image regulation. This is likely an important motive specifically for mountaineers given their elevated compensation scores in relation to more traditional and competitive sports (i.e., judo). Clearly, further research is necessary to understand the motives underlying low escape persons' and high compensation persons' participation in high-risk activities.

The results revealed that the anxiety self-regulation process was specific to high-risk sport. Only escape mountaineers derived an immediate emotional benefit (i.e., a decrease in anxiety) from their activity. No such effect was revealed for the judokas. These results suggest that it is the high-risk specificity of mountaineering that allows one to regulate anxiety in the sport domain. Indeed, the high level of attention required in high-risk sport would allow individuals to shift attention away from their internal anxiety (Taylor & Hamilton, 1997). Moreover, according to Fenichel's (1939) counter-phobic theory the risk-taking domain may be attractive to individuals who have high anxiety, as it affords them an opportunity to initiate and experience a more externally-derived anxiety. That is, the individual's negative, non-specific, and internal source of anxiety may be transferred to an external and specific task (e.g., mountaineering) thus allowing him/her to experience some respite from the internal fear (see also Woodman et al., 2008). Thus, the practice of high-risk-sport may be a means of anxiety regulation, allowing some people to experience an emotional benefit that they do not experience elsewhere (Barlow et al., 2007; Taylor & Hamilton, 1997; Woodman et al., 2009).

Despite promising results, the current study has some limitations that should be considered in further research. First, the nature of the anxiety that is experienced needs closer attention. In the present line of research, the anxiety that was of interest was of a more general nature than is typically investigated in sport settings. Specifically, in the current study, we were interested in how mountaineering might help mountaineers deal with their emotions and specifically their anxiety. This was clearly not *competitive* anxiety and measuring competitive anxiety would clearly have been inappropriate. However, the anxiety typically experienced in sport is largely thought to be directly related to the impending competition and researchers typically thus investigate the different dimensions of the competitive anxiety response. These include cognitive anxiety, somatic anxiety, physiological arousal, concentration disruption, and perceived control (cf. Cheng, Hardy, & Markland, 2009; Grossbard, Smith, Smoll, & Cumming, 2009; Woodman & Hardy, 2001). Future research on the anxiety benefits of mountaineering should also consider a more fine-grained measurement of anxiety.

Moreover, the data should be interpreted with some caution given that they were collected over a relatively short period of time with no information about the affective experience during the activity itself. Certainly, it remains empirically unclear whether the high anxiety of escape individuals before the mountain route is linked to global emotional distress, to the specific situation, or both. Furthermore, our data do not allow us to establish what the perceived (failure and success) experiences are that might lead people to engage in mountaineering in the first place. There are some early signs that some of the perceived failure may be in feelings of limited agency in personal relationships, which may go some way to explaining why people engage in such an emotion-inducing activity rather than other activities that may provide self-worth (e.g., judo). In other words, there may be some sort of emotional transfer of anxiety from personal relationships to the high-risk domain (Barlow et al., 2007). As Lester (1983; 2004) pointed out,

some mountaineers perceive personal relationships and interactions as more stressful than a very difficult and dangerous situation in the mountains. Although this theoretical link is very much related to the present data, these data do not allow us to draw such conclusions with any confidence. Thus, future research should be conducted to investigate this interesting question.

A further limitation of the present study is that we obtained no information about the duration of the affective benefits after completion of the mountain route. As the escape strategy is positively related to trait anxiety (Taylor & Hamilton, 1997), escape mountaineers may return to their high-anxiety base level shortly after completing the route. In line with Woodman et al. (2008), the affect regulation function of high-risk sport may not serve a long-term regulation function for individuals with emotional distress, and they might feel the need to repeat the activity to derive a continued renewed sense of emotional benefit (see also Fenichel, 1939). The pre-occupation with, and the continued involvement in, an activity despite potential negative consequences is typically viewed as behavior addiction (Price & Bundesen, 2005). To address these questions future research should consider affect states over longer periods of time, before and after participation in high-risk sport.

Contrary to many high-risk sports such as skydiving or downhill skiing, mountaineering is an activity that can last several hours, days, or weeks and during which much can happen. This specificity of mountaineering makes it difficult to generalize the results to other high-risk sports. Thus, other sport activities and indeed other less socially acceptable risk-taking activities (e.g., dangerous driving) warrant further specific investigation within the affect regulation framework outlined here. Furthermore, because the population study included only male athletes, we cannot generalize the results to more global populations (see also Cazenave et al., 2007; Woodman et al., 2008).

In summary, the current study revealed that only escape from self-awareness as a self-regulation strategy resulted in significant changes in negative affect intensity, specifically a decrease in anxiety, from pre- to post-mountain route. These results contribute to an ongoing in-depth understanding of the affect regulation function that high-risk sport might serve, especially for persons with emotional difficulties.

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Table 1

*Correlations between variables study for mountaineers (*N *= 105).*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Age	-														
2. Escape	-.27	-													
3. Compensation	-.10	.21	-												
4. Negative affectivity	-.16	.41	.13	-											
5. Anxiety T1	-.06	.35	-.02	.45	-										
6. Anger T1	-.04	.20	.02	.32	.47	-									
7. Shame T1	-.18	.19	.15	.39	.43	.63	-								
8. Sadness T1	-.18	.18	.05	.39	.46	.50	.66	-							
9. Joy T1	.04	.01	.06	.04	.04	-.04	.02	-.02	-						
10. Affection T1	.11	.02	.05	.01	.09	.09	.16	.19	.69	-					
11. Anxiety T2	.04	.04	.03	.27	.46	.26	.27	.21	-.01	-.03	-				
12. Anger T2	.06	.06	.09	.24	.27	.41	.33	.20	-.05	-.09	.40	-			
13. Shame T2	-.11	.18	.12	.35	.42	.34	.65	.47	-.06	.05	.54	.61	-		
14. Sadness T2	-.17	.18	.03	.35	.35	.22	.35	.67	-.08	.04	.44	.26	.55	-	
15. Joy T2	.02	.12	.09	.08	.03	.03	.01	-.06	.66	.48	.04	-.15	-.12	-.07	-
16. Affection T2	.07	.05	.04	.04	.11	.08	.20	.16	.60	.87	.09	-.04	.11	.11	.62

Note: All correlations ≥ |.20| are significant at $p < .05$.

Table 2

*Single-factor repeated measures (pre/post activity) ANCOVAs with each affect as the dependent variable and age as the covariate for mountaineers (*N = *105) and for judokas (*N = *73)*

	Pre-mountain route		Post-mountain route		*F* (1, 103)	η^2
	M	*SD*	*M*	*SD*		
Anxiety	17.48	10.57	11.22	9.89	4.39*	.04
Anger	3.22	5.31	2.65	4.83	1.23	.01
Shame	4.62	6.18	4.42	5.96	1.46	.01
Sadness	6.14	7.70	4.88	7.34	0.45	.00
Joy	50.41	13.85	50.12	15.12	0.03	.00
Affection	43.47	19.59	41.11	20.19	0.04	.00
	Pre- judo fight		Post- judo fight		*F* (1, 71)	η^2
	M	*SD*	*M*	*SD*		
Anxiety	15.99	5.13	12.70	4.92	2.35	.03
Anger	2.89	3.48	2.92	4.11	0.03	.00
Shame	7.03	3.23	5.19	4.77	0.27	.00
Sadness	7.93	3.72	8.74	4.39	0.01	.00
Joy	48.74	4.93	49.59	5.06	1.43	.02
Affection	37.78	4.65	41.05	4.97	0.05	.00

Note: * $p < .05$

Table 3

*Regression analyses for each affect type of mountaineers (*N *= 105) on self-regulation strategy (i.e., escape or compensation) after controlling for age.*

	T1 affect		T2 affect		T2-T1 affect	
	B	*t*(102)	*B*	*t*(102)	*B*	*t*(102)
Escape moderation						
Anxiety	1.02	3.68**	0.15	0.56	-0.87	-3.06**
Anger	0.35	1.95	0.12	0.87	-0.18	-1.03
Shame	0.33	1.87	0.20	1.04	-0.14	-0.79
Sadness	0.37	1.78	0.29	1.47	-0.08	-0.45
Joy	0.08	0.21	0.57	1.35	0.49	1.46
Affection	0.31	0.57	0.41	0.73	0.10	0.37
Compensation moderation						
Anxiety	-0.06	-0.24	0.08	0.33	0.14	0.55
Anger	0.02	0.16	0.11	0.98	0.09	0.70
Shame	0.19	1.33	0.16	1.16	-0.03	-0.23
Sadness	0.05	0.29	0.03	0.18	-0.02	-0.15
Joy	0.22	0.66	0.35	0.99	0.14	0.48
Affection	0.30	0.65	0.23	0.48	-0.07	-0.29

Note: ** $p < .01$