

Self-efficacy, risk taking and performance in rock climbing

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Received 15 January 2008; received in revised form 4 March 2008; accepted 11 March 2008

Abstract

Self-efficacy may be associated with high risk behaviors in climbers operating at outdoor venues, though little is known about climbers recruited at indoor venues or less risky forms of rock climbing. Two-hundred and one active rock climbers (163 male) aged 16–62 years were recruited at five outdoor and six indoor climbing venues in Britain in a retrospective study. The relationship of self-efficacy to the frequency and difficulty of high and medium risk rock climbing behaviors was modelled using linear regression. Climbers high in self-efficacy engaged in both high and medium risk forms of rock climbing more frequently ($\beta \geq 0.18$, 95% confidence interval [CI] 0.04–0.32) and at a higher level of difficulty ($\beta \geq 0.20$, 95% CI 0.04–0.36). These associations were attenuated slightly with adjustment for covariates, though all remained significant. The same pattern of associations was observed for climbers recruited at indoor and outdoor venues, and for male and female climbers. Rock climbers may therefore participate more frequently, take calculated additional risks and attempt harder climbs when they feel confident in their abilities and are high in self-efficacy. Researchers should not assume psychological or behavioral homogeneity within risk taking populations.

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Keywords: Self-efficacy; Social cognitive theory; Risk taking; Risk; Performance; Rock climbing; High risk sport

1. Introduction

The popularity of ‘high risk’ sports such as rock climbing has increased exponentially in Western societies in recent years despite the high prevalence of injuries and the potentially fatal nature of the activities (Florenthal & Shoham, 2001; Jones, Asghar, & Llewellyn, in press; Pain & Pain, 2005; Turner, McClure, & Pirozzo, 2004). Researchers have traditionally focused on the psychological and demographic characteristics that discriminate between risk takers and controls; however considerable heterogeneity may exist within risk taking populations (Celentano, Cohn, Davis, & Vlahov, 2002; Fave, Bassi, & Massimini, 2003; Zhao, Seibert, & Hills, 2005). Recent findings suggest that self-effi-

cacy may vary within high risk sports populations (Slanger & Rudestam, 1997), and that active outdoor rock climbers may take calculated additional risks to challenge themselves when they feel confident in their ability to manage those risks (Llewellyn & Sanchez, 2008). It is therefore important to examine whether self-efficacy and climbing behaviors are associated in climbers recruited at indoor venues, and examine the association between self-efficacy and medium risk forms of rock climbing behavior.

Bandura (1997) hypothesizes that people take risks and challenge themselves because they believe themselves capable of coping with the situation, and have feelings of self-efficacy. Self-efficacy refers to an individual’s “belief in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Bandura, 1997, p. 3). Those with high self-efficacy are more likely to set themselves challenging goals, expend effort, and persist in the face of adversity for longer (Bandura, 1997).

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Previous congruous studies suggest that mastery and accomplishment are important factors influencing the motivation to participate in high risk sports (Ewert, 1994; Slanger & Rudestam, 1997), and enactive mastery experiences are an important source of self-efficacy in high risk sports (Brody, Hatfield, & Spalding, 1988; Norris & Weinman, 1996). Similarly, high risk sports participants often mention the need to be in control, and risk taking itself appears to represent a challenge to some experienced climbers (Fave et al., 2003; Robinson, 1985). Self-efficacy beliefs are formulated by processing information derived from direct domain-specific engagement (enactive mastery experiences), and to a lesser degree verbal persuasion, vicarious experiences, and physiological states (Bandura, 1997). Hence, sports participants high in self-efficacy may be less likely to fear failure, and more likely to set themselves difficult goals and take calculated, as opposed to reckless risks (Kontos, 2004).

Slanger and Rudestam (1997) examined the relationships between self-efficacy, sensation seeking and risk taking among male high risk sports participants including skiers, rock climbers, kayakers and stunt flyers. Participants were categorized into 'extreme' and 'high' risk taking groups depending upon their sport-specific behaviors. For example, climbers who ascended routes without protective ropes (soloing) were extreme risk takers, whereas those who only climbed using ropes were high risk takers. Self-efficacy was measured using a Physical Self-Efficacy Scale (PSES) developed by them to assess self-efficacy in high risk sports, and sensation seeking was assessed using the Sensation Seeking Scale V (Zuckerman, 1994). Their results indicated that extreme risk takers had higher levels of self-efficacy than high risk takers, though no association with sensation seeking was observed. They concluded that high risk sports participants with elevated levels of self-efficacy were more likely to take greater risks due to greater mastery needs and the ability to manage their emotional states (Slanger & Rudestam, 1997). Participants also named confidence specifically as the most important disinhibiting factor in qualitative items. However, the number of risk takers in this study was small ($N = 40$), risk taking was operationalized in a simplistic way, and the exclusively male sample did not allow the study of female high risk sports participants.

Recently Llewellyn and Sanchez (2008) investigated risk taking and individual differences in 116 active outdoor rock climbers (24% women). They found that risk taking in rock climbing was relatively common as only 22% of climbers avoided risky forms of climbing (i.e. soloing and traditional leading). Self-efficacy was measured using the PSES, and impulsivity and sensation seeking were assessed using the Impulsive-Sensation Seeking Scale (Zuckerman, 1994). Those high in self-efficacy and males were most likely to take risks in climbing. Small associations with sensation seeking, impulsivity and age were also observed though these were not in the hypothesized direction or significant after adjustment for potential confounders. They

concluded that to challenge themselves, active outdoor rock climbers may take calculated additional risks when they feel confident in their ability to manage those risks (Llewellyn & Sanchez, 2008).

Taken together previous findings suggest that self-efficacy may be the key to understanding risk taking in high risk sports. However, it is not known whether these results generalize to active indoor climbers, or whether self-efficacy is also associated with medium risk forms of rock climbing. The purpose of the present study was therefore to investigate the relationship between self-efficacy and a wide range of rock climbing behaviors in active rock climbers recruited at both indoor and outdoor venues.

2. Methods

2.1. Participants

Of the 205 active British rock climbers approached following institutional ethics approval, 201 (98%) gave written informed consent, and completed a self administered anonymous questionnaire. Climbers were recruited from five outdoor climbing venues ($N = 100$), and six indoor climbing facilities ($N = 101$) in Britain. The 163 male climbers ($M = 35.2$, $SD = 11.8$ years of age) and 38 female climbers ($M = 35.1$, $SD = 10.7$ years of age) did not differ significantly in age. There was no significant difference in years climbing experience between men ($M = 13.9$, $SD = 11.8$) and women ($M = 11.6$, $SD = 9.2$).

2.2. Rock climbing behaviors

Detailed information regarding the frequency of participation in key forms of rock climbing (i.e., soloing, traditionally protected leading, indoor sport leading, outdoor sport leading, and bouldering) in the last 12 months was obtained. Soloing is where a climber ascends without a rope, and is completely unprotected in the event of a fall. Traditionally protected leading is where climbers place pieces of climbing protection as they progress up a rock face outside. In this case the outcome of a fall is determined by the nature of the climb and the skill of the climber, though may be serious. Sport or bolt-protected leading (both outdoors and indoors) is similar to traditionally protected leading, though expansion bolts are prearranged as protection, and the consequences of a fall are typically less serious. Bouldering is where a climber tackles particularly difficult problems on very short climbing routes close to the ground. The difficulty (climbing grade) at which they could consistently perform each type of climbing technique over the last 12 months was also recorded, giving domain specific measures of technical difficulty accomplished. Climbers rated difficulty using the British climbing grading system, which we assigned values ranging from 1 for the easiest (*Moderate*) to 16 for the hardest (*Extremely Severe* 9) for all forms of leading and soloing, and 1 for the easiest (*4a*) to 11 for the hardest (*7a*) for bouldering (Fyffe & Peter,

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