AN EXPLORATION OF SELF-EFFICACY AS A MOTIVATION FOR ROCK CLIMBING AND ITS IMPACT ON FREQUENCY OF CLIMBS

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Abstract.—This study utilizes the theoretical framework of self-efficacy to explore the role it plays in rock climbing. Data were gathered from on-site self-administered surveys to rock-climbers in three different locations (N=72). A conceptual model was developed to consider the relationship between self-efficacy and frequency of rock climbing. The initial factor of self-efficacy did not hold, thus allowing us to reconceptualize the nature of the self-efficacy variables in relation to frequency of rock climbing. A discussion of how the results from this study support viewing self-efficacy as a stepwise process and how viewing self-efficacy in this manner can be useful to practitioners for programmatic purposes follows.

1.0 LITERATURE REVIEW

Sports that involve a potential for injury, or even death, have become increasingly popular around the world. These so-called "extreme sports" include mountaineering, canyoning, bungee jumping, BASE jumping, parachuting, hang gliding, sky diving, and rock climbing (Palmer, 2002; Slanger & Rudestam, 1997). The essence of extreme sports is that they take you higher, faster, and further; thus, these sports often have elements of sensation seeking and risk (Koerner, 1997; Slanger & Rudestam, 1997).

Although some researchers have maintained that sensation seeking and risk taking are the key elements of motivation to participate in rock climbing (Palmer, 2002), others have researched characteristics that are unique to rock climbers and set the rock climbing community apart from the other extreme sports (Kiewa, 2001; Slanger & Rudestam, 1997).

In order to investigate this notion of uniqueness, we sought to explore self-efficacy, a relatively unexplored motivation for rock climbing. The significance of this study is twofold: (a) self-efficacy as a construct has not been empirically tested; and (b) self-efficacy has not been specifically explored in rock climbers. Thus, the objectives of this study are to determine the underlying structure of self-efficacy (validity and reliability) and the relationship between self-efficacy and rock climbing.

1.1 Introduction to Rock Climbing

People have been rock climbing since prehistoric times but rock climbing was not recognized as a recreation activity until the 1970s (Feher et al., 1998; Li et al., 2001). Over the past 15 years, the number of rock climbers in the United States has increased fourfold (Schuster et al., 2001). Currently, there are more than 400,000 active climbers in the United States and that number is expected to continue to increase (Schuster et al., 2001). As the numbers of rock climbing participants grow, there is a need for natural resource managers to understand the motivations of rock climbers in order to implement appropriate management strategies.

Schuster et al.'s (2001) seminal study looked at attitudinal differences toward management among different types of rock climbers. The study measured

the differences between traditional and sport rock climbers and focused on their perceptions of attitudes toward natural resource management. However, they did not consider the possible management implications of climbers' motivations.

This study is part of a larger study that looked at six motivational subscales: (a) escape; (b) competition; (c) control; (d) self-efficacy; (e) sensation-seeking; and (f) socializing (Ackerman, 2006). The focus of our study is on the self-efficacy subscale.

1.2 Self-Efficacy

Self-efficacy as a theoretical framework was developed by Bandura (1977) who described self-efficacy as an individual's belief that he or she can complete a task that tests his or her ability, while experiencing risk. A person's level of self-efficacy derives itself from four areas: (a) mastery experience; (b) vicarious experience; (c) verbal persuasion; and (d) physiological states (Bandura, 1997). The construct of self-efficacy in this study contains items that address each of these areas.

Slanger and Rudestam (1997) concluded that the factor most responsible for the disinhibitions associated with risk taking appeared to be perceptions of self-efficacy (p. 366). By definition, self-efficacy is the notion that "the kinds of outcomes people anticipate depend on their judgments of how well they will be able to perform" (Slanger & Rudestam, 1997, p. 356; Bandura, 1997). One could argue that rock climbing by nature is a recreational activity that may be highly influenced by mastery of attempts and, thus, explained by self-efficacy.

2.0 METHODS

The instrument used for this study was an on-site self-administered survey. It was pilot tested at both The Rock Gym in Virginia Beach, VA, and Old Dominion University's Rock Climbing Club in Norfolk, VA. Forty pilot surveys were used to assess face validity, wording, and sequencing. Feedback from respondents was incorporated and slight modifications were made to the survey; the pilot surveys were excluded from analyses. Additionally, given Schuster's prior work with rock climbers, his expert opinion was sought as an additional check on face validity.

From the spring to the fall of 2006, data were collected on-site at two indoor rock climbing centers (Rockreation, CA and Prime Climb, CT) and one outdoor rock climbing area (New River Gorge, WV) in the United States using a convenience sample approach. This entailed face-to-face interviews with climbers at a climbing area, and distribution of surveys at indoor climbing gyms. Each participant in the study was given a brief description of the purpose of the study and had the opportunity to give verbal consent prior to survey administration. For purposes of confidentiality, all responses were kept anonymous and respondents were never asked to give their name or any other identifying information.

The variables of interest for this study were those measuring self-efficacy and rock climbing. Self-efficacy was operationalized by asking respondents to answer this question: "A reason for participating in rock climbing as compared to other sports is that it allows me to …" This was then followed by five variables measuring self-efficacy (SE): (a) "to achieve a goal" (ACHV); (b) "to try harder next time" (HARD); (c) "to overcome a fear of failure" (OVCM); (d) "to be confident" (CONF); and (e) "to attempt climbs above my ability level," (LEVL). One additional non-self-efficacy variable was also included: (f) "to have a partner that motivates me" (PTNR). Answers were given on a seven-point scale, ranging from 'Not At All Like Me,' coded as "1" to 'A Lot Like Me,' coded as "7." The dependent variable (rock climbing) was an open-ended question operationalized by asking "How many days a month do you go climbing (CLMB)?" Thus our initial conceptual model was SE → CLMB, where SE is a construct consisting of six variables (Fig. 1).

3.0 RESULTS

3.1 Descriptive Statistics

A total of 72 surveys were collected; 62 percent of respondents were male. Respondents ranged in age from 18 to 67 years, with an average of 30.4 years. Rock climbing respondents were 86 percent White,

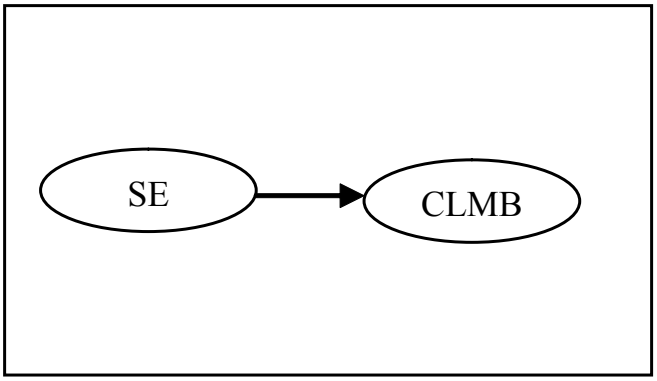

Figure 1.—Initial conceptual model.

6 percent Multi-Ethnic/Mixed Race, 3 percent Latino/Hispanic, 1 percent Asian, and 4 percent other. Participants were generally well-educated, with 25 percent having some college, 45 percent holding a Bachelor's degree, and 4 percent having completed some graduate school. The highest percentage of rock climbers (54 percent) claimed a total household income of under $24,000. Fifty-four percent were single, 40 percent married, 3 percent separated or divorced, and 5 percent were other. Participants climbed anywhere from zero to 30 times per month, averaging 8.11 times per month. The average years of experience was 5.8 years; 30 percent of the participants had one year or less of rock climbing experience.

3.2 Inferential Statistics

All analyses were performed using an alpha of .05 as our criterion. An exploratory factor analysis using Varimax Rotation was conducted to determine if the variables within the SE construct were valid measures of the underlying construct. Prior to statistical analysis, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was employed to evaluate the data. Sampling adequacy was confirmed using a KMO (>0.60) and Bartlett's Test of Sphericity ($p<0.05$) on the SE construct.

According to Tabacknick and Fidell (1996), values of 0.60 for the KMO, and $p<0.05$ for Bartlett's Test of Sphericity (BTS) is required for factor analysis. Additionally, reliability analyses were performed on each component to determine the deletion of any items that would decrease scale reliability. Due to the low *N* of 72, items with reliability coefficients below 0.60 (i.e., $\alpha <0.60$) were not retained. Guadagnoli and Velicer (1988) concluded that factors/constructs are well defined when they have factor loadings of 0.60 or higher. In summary, the criteria used for retention of components and variables/items were a KMO (>0.60), Bartlett's Test of Sphericity (BTS) ($p<0.05$), factor loadings (>0.60), and an overall component reliability ($\alpha <0.60$).

Initial Varimax rotation led to two dimensions of self-efficacy. As we were looking for a unidimensional fit, we deleted the two most problematic variables (LEVL and PTNR) and achieved unidimensionality with ACHV, HARD, OVCM, and CONF. Although BTS was adequate ($p<0.0001$), the KMO alpha was less than 0.60 ($\alpha = .58$). Thus, we had to look at these four as individual variables, rather than as one composite variable. We then turned to a correlation analysis to investigate the association between the independent variables (OVCM, ACHV, HARD, CONF) and the dependent variable (CLMB).

The only variable significantly correlated with CLMB was CONF ($\beta = 0.33$, $r^2 = .11$, $p < .05$). Similarly, the only variable correlated with CONF was HARD ($\beta = 0.40$, $r^2 = .16$, $p < .05$). Lastly, the only variable correlated with HARD was OVCM ($\beta = 0.46$, $r^2 = .21$, $p < .05$). ACHV did not correlate with any of the variables and was removed from the analysis. As a result of the correlation analysis, a new conceptual model emerged (Fig. 2): OVCM (.33) → HARD (.40) → CONF (.46) → CLMB.

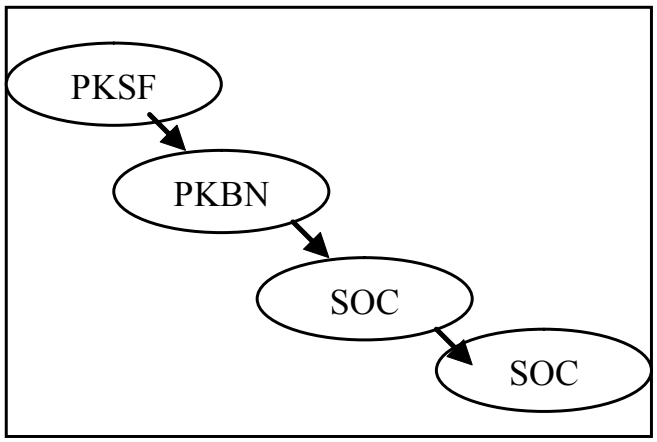

Figure 2.—Final conceptual model.

The reader should note that in a causal model, where there is only one preceding predictor variable for another variable in the path (e.g., OVCM only is associated with/predicting HARD), the correlation associated with the variables is equivalent to the standardized beta weight. Furthermore, once correlations/beta weights are found to be significant, the beta weight can be squared (regression coefficient) to determine percent of variance explained or causality. Also, because we are looking at beta weights, we can compare the relative impact that the variables have on each other. Thus, one can see that as the causal chain continues, the relationship amongst consequent variables have more "weight," where the strongest relationship is between confidence and climbing, relative to the other relationships in the revised model.

4.0 DISCUSSION AND CONCLUSIONS

The results indicate that self-efficacy, as a construct, was not unidimesional, nor was it a valid construct for these individuals. However, three variables (OVCM, HARD, and CONF) originally hypothesized as indicators of SE did prove useful in the analysis of motivations.

The correlation analysis suggests that overcoming one's fears highly influences one's ability to try harder the next time, and that this in turn causes one to be confident and consequently participate in rock climbing more frequently.

Overcoming fear directly parallels two of the four sources of SE (enactive mastery and physiological/ affective states). Furthermore, once an individual tries harder (e.g., exerts more effort during a previously failed attempt on a route) and becomes more confident, he or she is more likely to continue rock climbing. Confidence is one of the cornerstones of SE, and it was the only variable to have a direct impact on frequency of rock climbing. Rather than these variables working together in tandem, our analysis indicates that a progression of "self-efficacy steps" lead to actual rock climbing.

This information clarifies the conceptual nature of SE and practitioners can use it to their advantage. For example, knowing that fear is a critical factor to overcome, trainers or programmers should work to alleviate any fears that most people have about rock climbing. This could be done by creating an informational flyer of the "common misconceptions of rock climbing," or "how to take the fear out of rock climbing," or "successful steps for becoming a rock climbing pro" prior to, or in the initial stages of, participation in rock climbing. Making the brochure available dispels myths and more importantly creates goodwill among prospective participants.

When the individual feels comfortable enough, programming should incorporate a "development of skills" component to master more difficult or technical aspects of rock climbing. Progression through these skill sets can culminate in a "test" of knowledge of skills. This test or certification can act as a catalyst for confidence, which this study supports and which will then encourage more rock climbing.

5.0 CITATIONS

Ackerman, A. (2006). **Differences in motivation for participation and attitudes toward management among rock climbing sub groups.** Unpublished master's thesis, Old Dominion University, Norfolk, VA.

Bandura, A. (1977). **Self-efficacy: toward a unifying theory of behavioral change.** Psychological Review, 84, 191-215.

Bandura, A. (1997). **Self-efficacy: the exercise of control.** New York: W.H. Freeman and Company.

Feher, P., Meyers, M.C, & Skelly, W. A. (1998). **Psychological profile of rock climbers: state and trait attributes.** Journal of Sport Behavior, 21, 167-180.

Guadagnoli, E., & Velicer, W.F. (1988). **Relation of sample size to the stability of component patterns.** Pyschological Bulletin, 103, 265-275.

Kiewa, J. (2001). **Control over self and space in rock climbing.** Journal of Leisure Research, 33, 1-15.

Koerner, B. (1997, June 30). **Extreeeme: the peril, the thrill, the sheer rebellion of it all. High-risk sports add spice to the humdrum of American lives.** U.S. News & World Report, 122, 50-59.

Li, F. X., Margetts, S., & Fowler, I. (2001). **Use of 'chalk' in rock climbing: sine qua non or myth?** Journal of Sports Sciences, 19, 427-432.

Schuster, R.M., Thompson, J.G., & Hammitt, W.E. (2001). **Rock climbers' attitudes toward management of climbing and the use of bolts.** Environmental Management, 28, 403-412.

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

Tabacknick, B.G. & Fidell, L.S. (1996). **Using multivariate statistics** (3rd ed.). New York: Harper Collins, 880 p.