

DIRECT AND INDIRECT AVALANCHE EXPERIENCES AMONG BACKCOUNTRY SKIERS: RELATIONSHIPS WITH RISK PERCEPTION AND USE OF SAFETY GEAR



Davide Marengo^{1,2,3}, Paola Dellavedova¹, Maria G. Monaci² and Renato Miceli^{2,3}

¹Fondazione Montagna sicura, Courmayeur, Italy

²Department of Social sciences and Humanities, University of Aosta Valley, Aosta, Italy

³Department of Psychology, University of Turin, Turin, Italy



INTRODUCTION

A relevant factor that may influence risk perception and self-protective behaviors related to natural hazard is personal experience (Weinstein, 1989; Slovic, 2004). Findings on recreational sports (e.g., scuba diving, rock climbing) indicate that individuals frequently engaging in high-risk recreation are prone to exhibit decreases in risk perception over time (Demirhan, 2005; Morgan & Stevens, 2008), as a result of habituation effects (Lima, 2004) and increases in self-efficacy and perceived competence in managing risk (Bandura, 1977). Studies investigating the impact of avalanche experiences on risk perception and behaviors among backcountry enthusiasts are missing. For this reason, the present study aimed at exploring the relationship between experiences with avalanche accidents and avalanche risk perception and adoption of safety gear while on backcountry tours. We operationalized avalanche experiences by distinguishing between recreationists' personal direct involvement in avalanche accidents (*direct experience*) and their witnessing of avalanche accidents resulting in adverse consequences for other recreationists (*indirect experience*). This choice relates to the psychological literature indicating direct and indirect behavioral experiences might have different effects on attitudes and behaviors (Fazio & Zanna, 1981).

MATERIAL & METHODS

SAMPLE

Participants were recruited online by publishing the link to a dedicated research page on both the website and Facebook page administered by Fondazione Montagna sicura, a nonprofit foundation dedicated to the study of safety issues in high-altitude mountain environments based in the Valle d'Aosta, Courmayeur, Italy. The research page included a link to an online questionnaire. Questionnaire administration took place between April and May 2015. All participants gave in-formed consent before filling the questionnaire. Inclusion criteria for the research were the following: legal age (Age ≥ 18 years) and involvement in backcountry freeride skiing during the last winter season. Professional mountain guides and avalanche professionals were excluded from participation in order to ensure that the sample only represented amateur backcountry recreationists. Eventually, 214 participants remained (84% male; age: $M = 39.55$, $SD = 10.07$, ranging from 20 to 68 years).

MEASURES

Avalanche risk perception. Nine statements describing potential consequences of avalanche accidents resulting in varying degrees of outcome severity. Using a 5-point Likert scale ranging from 1-low to 5-high, participants were asked to rate the probability of their involvement in each situation, as well as the degree of fear elicited by each event (Figure 1 reports the sample average score for each item). By summing participants' scores on the items, two total scores were obtained (Perceived probability: $M=20.70$, $SD= 6.96$; Fear: $M=35.43$, $SD= 7.43$). The scales showed adequate internal consistency (Perceived Probability: $\alpha = 0.91$; Fear: $\alpha = 0.89$) and a small positive correlation ($r=.13$).

Avalanche experiences. Direct experiences were investigated by asking participants to report the number of times they had been personally involved in avalanche events resulting in direct consequences for themselves (i.e., partial burial, complete burial and avalanche accident resulting in personal injury). Indirect experiences were investigated by asking participants to report the number of times they witnessed avalanche events resulting in consequences for other persons (i.e., partial/complete burial, injury or death). Figure 2 and 3 reports the percentage of participants indicating involvement in 1 or more avalanche event.

Use of safety gear. Participants were asked to report the frequency of use of the following safety gear during their backcountry tours (2015 winter season): avalanche beacon, standard rescue equipment (beacon, probe, shovel), and airbag (floatation) device. Participants reported frequency of use of safety gear using the following 3-point rating scale: 1-Never, 2-Some of the times, 3-During all backcountry tours. Figure 4 reports the percentage of participants indicating use of safety gear during all backcountry tours.

DATA ANALYSIS

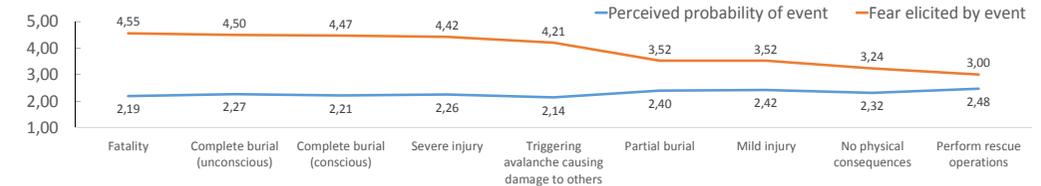
Relationships between the study measures were examined by means of Pearson's correlation coefficient (Figure 5). Association between variables was deemed significant when $p < .05$.

Contact info

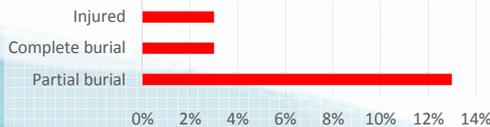
Davide Marengo, PhD. Department of Psychology, University of Turin. Via Verdi 10, 10124, Turin, Italy. Email: davide.marengo@unito.it

RESULTS

(1) Avalanche risk perception: average probability and fear scores per event



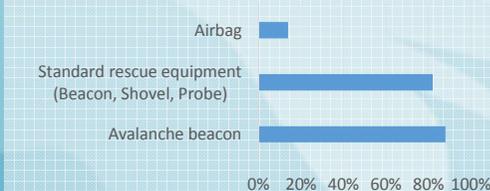
(2) Direct experiences (1 or more event)



(3) Indirect experiences (1 or more event)



(4) Used safety gear during all tours



(5) Correlation with Avalanche experiences

	Indirect Exp.	Direct Exp.
Avalanche risk perception		
Perceived probability of avalanche events	.12	.17*
Fear of avalanche events	-.08	-.14*
Use of safety gear		
Avalanche beacon	.18**	-.01
Standard rescue equipment	.16*	-.04
Airbag	.11	.17*

* $p < .05$, ** $p < .01$

DISCUSSION

In line with findings on general population (Leiter, 2011), we found past direct involvement in avalanche accidents to be positively associated with recreationists' cognitive appraisal of potential personal involvement in avalanche accidents. This finding suggests that availability of personal negative experiences might increase recreationists' perception of avalanche-related risk and behaviors directed at increasing personal safety (Slovic, 1982). In our study, this potential protective effect was also reflected in the presence of a positive association between availability of direct experiences and the use of the airbag safety device while skiing on avalanche terrain.

We also found a negative association between direct experiences with avalanches and participants' affective appraisal of avalanche risk. Consistent with what reported for other high-risk recreational sports (Demirhan, 2005; Morgan & Stevens, 2008), this finding suggests the existence of habituation and confidence-enhancing effects related to avalanche survival experiences. Combined, these findings seem to indicate that the availability of previous direct avalanche experiences is associated with an increase in recreationists' awareness of personal exposure, as well as in a decrease in their affective response to avalanche risk.

Findings on previous indirect avalanche experiences indicate the absence of significant association with recreationists' perception of personal exposure to avalanche risk. In turn, indirect experiences showed a significant positive association with adoption of avalanche beacon and the full standard rescue equipment (i.e., beacon, shovel, probe). These findings suggest that the exposure to avalanche accidents with adverse consequences for other persons could be related to an increase in the adoption of behaviors directed at improving both personal and other peoples' safety while on avalanche terrain.

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