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Winter recreationists' self-reported likelihood of skiing backcountry slopes: Investigating the role of situational factors, personal experiences with avalanches and sensation-seeking

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ABSTRACT

The present study investigated how information about situational characteristics typically encountered by backcountry recreationists influenced their perceived likelihood of skiing backcountry slopes exposed to avalanche danger. Sensation seeking and previous direct and indirect experiences with avalanche accidents were evaluated as relevant individual predictors. Data was collected by implementing randomized textual scenarios, using a sample of 376 backcountry recreationists from North-Italy (84% male; age: M = 39.68, SD = 9.72). Results of multilevel analyses indicated that forecasted avalanche danger level and slope inclination were associated with lower self-reported likelihood of skiing the slopes, while sensation-seeking, familiarity with the slope area, the availability of safety equipment and the presence of tracks on the slope were positively related with selfreported likelihood of skiing. Previous direct involvement in avalanche accidents was also positively associated with perceived likelihood of skiing, suggesting the existence of confidence-enhancing effects related to avalanche survival experiences.

1. Introduction

The assessment of environmental risks and hazards represents an important field of study in environmental psychology. Studies in this field have highlighted the multifaceted nature of risk perception, as well as the relevant impact it exerts on individuals' ability to prepare for, and survive, natural hazards (e.g., Kung & Chen, 2012; Miceli, Sotgiu, & Settanni, 2008). Among these is the involvement in fatal avalanche accidents, which is a severe, if relatively infrequent, outcome of winter recreational activities performed on backcountry slopes, such as freeride skiing and ski mountaineering (Schweizer & Lütschg, 2001). In contrast to what is usually reported about other natural hazards, such as floods, hurricane and earthquakes, however, avalanche-related deaths are usually the consequence of events triggered by recreationists themselves (Grímsdóttir & Mcclung, 2006; McClung & Schaerer, 1993, p. 271; McClung, 2002; Techel, Zweifel, & Winkler, 2015). Indeed, while avalanche accidents result from a combination of both human and environmental factors, the failure to appraise environmental risk correctly is generally the most common source of decision-making errors in avalanche terrain (McCammon, 2009). The availability of accurate avalanche-related information, as well as the knowledge to interpret it, are both of primary importance in planning a safe backcountry tour (Haegeli, Haider, Longland, & Beardmore, 2010). Based on these considerations, the present study aims at examining the role that information about different situational characteristics winter recreationist might encounter on backcountry slopes may exert on their decision-making choices. The role of situational characteristics is evaluated using a simulated approach based on textual scenarios. The impact of relevant individual factors, such as previous experience with avalanche accidents and sensation-seeking, is also examined. In doing this, we aim at providing additional knowledge concerning recreationists' decision-making skills and limitations that may be useful in the development of interventions and campaigns aimed at improving safety and awareness of avalanche danger among backcountry enthusiasts.

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1.1. The role of information and the heuristic "traps"

Over the last decades, the growing recognition of the importance of information in promoting avalanche awareness and preventing fatal accidents has resulted in the wide adoption of regional-level weather and avalanche bulletin services covering alpine areas, such as those implemented in Europe (Etter, Stucki, Zweifel, & Pielmeier, 2008) and North America (Alberini, Leiter, Rheinberger, McCormick, & Mizrahi, 2009). Avalanche forecast bulletins provide backcountry users with regional-level avalanche hazard information, usually conveyed by means of numerical scales, which operationalize avalanche danger as a combination of expected likelihood, size, and distribution of avalanches in the covered areas (e.g., the European Avalanche Danger scale, Meister, 1995; the North-American Public Avalanche Danger scale, Statham et al., 2010). A commonly recognized shortcoming of regional avalanche forecast services is that they generally fail to provide accurate avalanche information on a small-scale level, e.g., specific slope areas, which nonetheless represent essential information for recreationists aiming to enter avalanche terrain. To counteract this important limitation, several local-level decision support tools have been proposed over the years (e.g., Munter's "reduction method", 2003; the Avaluator decision support tool, Haegeli, McCammon, Jamieson, Israelson, & Statham, 2006). Local-level decision support tools usually consist of simple algorithms providing recreationists' with timely assessment of potential local-level avalanche hazard based on a set of situational factors (e.g., terrain complexity, slope inclination, avalanche and weather forecasts). Both regional and local-level prevention methods rely on the assumption that given precise estimates about avalanche danger, recreationists should be able to use this information in an effective way.

Still, lack of information is rarely the only source of recreationists' decision-making error on backcountry slopes (Atkins, 2000). Findings indicate that when faced with potential avalanche danger, even expert recreationists may resort to simple cognitive heuristics that may disrupt the accuracy of their evaluations (i.e., heuristic "traps", McCammon, 2004). In particular, retrospective studies conducted on accident reports (McCammon, 2004) and simulation studies (Furman, Shooter, & Schumann, 2010) indicate that situational factors such as high familiarity with the excursion area (i.e., the "familiarity" heuristic), attractive snow conditions, such as those typical of untracked slopes (i.e., the "scarcity" heuristic), or the presence of other recreationists on the slopes (i.e., the "social proof" heuristics), may negatively influence recreationists' perception of avalanche danger, favoring their involvement in avalanche-related injuries and fatalities. Similarly, studies suggest that when equipped with avalanche rescue gear (e.g., avalanche beacons), backcountry recreationists tend to overestimate their ability to survive potential avalanche events, and thus behave less cautiously on the slopes than they do when they are not equipped (Björk, 2007; Chamarro, Marti, Rovira, Carola, & Fernández-Castro, 2013).

1.2. The role of attitude and personal experiences

Recent findings indicate that recreationists' positive attitude toward risk may also reduce their perceived likelihood of risk (Ajcardi & Therme, 2008), thus potentially interfering with their ability to assess avalanche hazards (Furman et al., 2010). In particular, a vast, decades-long literature exists demonstrating significant links between sensation-seeking (i.e., "the need for varied, novel, and complex sensations and experiences and the willingness to take risks for the sake of such experiences" Zuckerman, 1979, p. 10), and the involvement in risk taking behaviors and injuries among winter recreationists, especially among young males (Breivik, 1996; Ruedl, Abart, Ledochowski, Burtscher, & Kopp, 2012; Sole & Emery, 2008; Thomson & Carlson, 2015; Zuckerman, 1983). The link between sensation-seeking and decision-making in avalanche terrain is still largely unexplored in literature; still, based on previous evidence on winter sports, it can be hypothesized that a tendency for sensation-seeking may lead recreationists to underestimate avalanche danger and exhibit risky behaviors when skiing in avalanche terrain.

Another relevant factor that may affect risk perception and self-protective behaviors related to natural hazard is personal experience (Slovic, 2004; Weinstein, 1989). The role of prior experience with negative life events has been mainly studied for natural disasters, events beyond human/individual control or responsibility (Eiser et al., 2012). Evidence has generated mixed and even contradictory results. In their review of studies related to natural hazards, Wachinger, Renn, Begg, and Kuhlicke (2013) highlighted that direct experience mainly has positive effects on risk perception, and reinforce precautionary behavior, but it might also have negative effects, with what they call the risk perception paradox. Seldom-experienced events low in severity and associated with an absence of personal damages may produce a sense of security or misjudgment of ability to cope. In of case of voluntary exposure to risky activities, such as backcountry skiing, people weight the pros and the cons of a given risk and then act in a way that maximizes benefits and minimizes potential costs. This comparison between expected benefits, and the perceived likelihood of the risk, is the determinant of the decision to engage or not engage in risky activities (Eiser et al., 2012). Domain specific differences also exists: people mainly dislike risk in some domains (e.g., financial decisions) but likes risk in other domains (e.g., recreational activities; Weber, Blais, & Betz, 2002). A further distinction needs to be made between direct and indirect experience with risk. Recent studies indicate that direct experiences have a stronger influence on the development of environmental knowledge, attitudes, and behaviors than indirect experiences (Duerden & Witt, 2010; Viscusi & Zeckhauser, 2015), despite the fact that the indirect experiences are probably more extensive, and therefore could be much more informative, exerting a role similar to the effects of media communication, warnings, public information. Concerning avalanche danger, a study on a large sample of residents from Tyrol, Austria, found exposure to adverse consequences of avalanche events to be a positive predictor of individuals' perception of personal exposure to avalanche risk, in particular among skiers (Leiter, 2011). Results from Leiter's study appear to be in line with findings on other natural hazards (e.g., earthquakes, Kung & Chen, 2012; flood, Miceli, et al., 2008; climate change, van der Linden, 2014), suggesting the influence of availability heuristics (i.e., tendency of people to evaluate risks as more likely if similar events are easy to recall because they are known or are imaginable, Slovic, Fischhoff, & Lichtenstein, 1982, Slovic and Peters, 2006; Tversky & Kahneman, 1982). To the best of our knowledge, studies investigating the impact of avalanche experiences on risk perception and behaviors among backcountry enthusiasts are missing. Findings on other recreational sports (e.g., scuba diving, rock climbing) indicate that individuals engaging in high-risk recreation tend to exhibit decreases in sensitivity to risk over time (Demirhan, 2005; Morgan & Stevens, 2008). This effect may relate to changes in self-efficacy (i.e., increases in perceived mastery and control over events, Bandura, 1977), as well as habituation effects (i.e., decrease in risk perception due to familiarity with risk, Lima, 2004). These results may also apply to winter sports performed in avalanche terrain. On one hand, in accordance with availability heuristics, it can hypothesized that recreationists with prior personal experience with avalanche accidents might be less prone to take risks in avalanche