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Self reported risk taking and risk compensation in skiers and snowboarders are associated with sensation seeking

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ABSTRACT

In alpine skiing, a controversial discussion has been taking place regarding the potential influence of wearing a ski helmet on the individual level of risk taking behaviour. The aim of this study was to evaluate whether self reported risk taking behaviour and self reported risk compensation are associated with the personality trait sensation seeking (SS) in alpine skiing and snowboarding. In total, 683 persons (36% males and 64% females) completed an online-survey about attitudes and use of protective gear in winter sports including the German version of the sensation seeking scale form V. A logistic regression analysis including gender, age, nationality, preferred winter sport, self reported skiing ability, mean skiing time per season, use of ski helmets, and SS total score was used to estimated adjusted odds ratios (ORs) and their 95% confidence intervals (95 CI) for self reported risk taking behaviour. Regression analysis revealed that a more risky behaviour increased with male gender (OR: 2.7), with an age < 25 years (OR: 1.6), with skiing (OR: 1.3), higher skill level (OR: 5.7), and a mean skiing time > 28 days per season (OR: 2.2). In addition, SS total score was significantly higher in more risky compared to more cautious people (23.8 vs. 20.3, $p < .001$). Ski helmet use was not found to be predictive for a more risky behaviour ($p > .05$). Also, skiers and snowboarders with self reported risk compensation while wearing a ski helmet had higher SS total scores compared to those who did not report risk compensation (23.8 vs. 20.9, $p = .001$). In addition, self reported risk compensation in helmet wearers increased with an age < 25 years (OR: 2.2), a higher skill level (OR: 2.5) and a mean skiing time > 28 days per season (OR: 2.1). In conclusion, self reported risk taking and self reported risk compensation are associated with higher sensation seeking total scores. The personality trait sensation seeking, not wearing of a ski helmet, appears to be associated with riskier behaviour on the ski slopes.

1. Introduction

In alpine skiing and snowboarding head injuries account for 9–19% of all injuries reported by ski patrols and emergency departments (Ruedl et al., 2010a; Russel et al., 2010). Severe head injuries include traumatic brain injury which is a leading cause of traumatic deaths among winter sport participants (Russel et al., 2010; Ruedl et al., 2011). However, the use of ski helmets has the potential to reduce the risk of head injuries up to 60% (Hagel et al., 2005a; Sulheim et al., 2006; Mueller et al., 2008; Ruedl et al., 2010a; Russel et al., 2010; Cusimano and Kwok, 2010). Nevertheless, a controversial discussion has been taking place regarding the potential influence of wearing a ski helmet on the individual level of risk taking behaviour (Hagel and Meeuwisse, 2004; Sulheim et al., 2006; Hagel et al., 2005b; Scott et al., 2007; Ruedl et al., 2010b). The so called risk compensation hypothesis is based on the assumption that safety appliances cause a false sense of security in their users resulting in an increased risk taking behaviour (Scott et al., 2007). Bürkner et al. (2009) reported that winter sport participants wearing safety devices have a higher level of risk taking compared to those not using such devices. Shealy et al. (2005) demonstrated that the average speed on ski slopes was significantly higher for helmet users compared to non helmet users (46 km/h vs. 41 km/h). In addition, Sulheim et al. (2006) showed that skiers who reported themselves as risk takers were more likely to wear a helmet than skiers who rated themselves as cautious skiers (43.3% vs. 29.2%; OR: 1.48). In contrast, Ruedl et al. (2010b) showed that self-reported risk taking skiers and snowboarders skied faster than cautious persons (53 km/h vs. 45 km/h) while helmet use was nearly equal in both groups (59.2% vs. 59.7%). In addition, the proportion of more skilled skiers was significantly higher (76.9% vs. 59.0%) in helmet users while the distribution of risk-taking behaviour was nearly equal (29.8% vs. 30.2%) compared to non-helmet users (Ruedl et al., 2010b). Also other studies showed that helmet use is higher in

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more skilled compared to less skilled skiers and snowboarders (Buller et al., 2003; Andersen et al., 2004; Sulheim et al., 2006; Ruedl et al., 2010c; Cundy et al., 2010) indicating that the use of a ski helmet is not necessarily associated with a higher level of risk taking but primarily with a higher skill level (Ruedl et al., 2010b). However, the studies by Sulheim et al. (2006) and Ruedl et al. (2010b) used a single question to assess self reported risk taking behaviour which has not been formally validated. Risk taking behaviour might be associated with the personality trait sensation seeking (SS) (Bouter et al., 1988). SS is a "trait defined by the seeking of varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risk for the sake of such experience" (Zuckerman, 1994). SS is commonly assessed by a standardized self-report questionnaire comprised of the four dimensions of thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility (Roberti, 2004).

Regarding risk compensation, Scott et al. (2007) asked ski helmet wearers whether they skied/snowboarded faster, slower or at about the same speed and whether they challenged themselves more, less or about the same compared when not wearing a helmet. Although Scott et al. (2007) found no support for the risk compensation hypothesis it is likely that some skiers and snowboarders do engage in more risk taking when wearing helmets. To our knowledge, no study has yet investigated whether or not an increase in risk taking is associated with the personality trait SS when wearing a ski helmet. Therefore, the aims of this study were to evaluate if and how self reported risk taking behaviour and self reported risk compensation are associated with SS in alpine skiing and snowboarding.

2. Subjects and methods

2.1. Data collection procedures

An online-survey about attitudes and use of protective gear in winter sports was conducted between January and March 2011 at the University of Innsbruck. The survey was distributed via the mailing list for students to more than 26,000 persons. Mean duration of the online-survey was about 15 min. The study was performed in conformity with the ethical standards laid down in the 2008 Declaration of Helsinki. Inclusion criteria were skiing or snowboarding as preferred winter sport and a completely filled out survey.

Demographic data (gender, age classes, nationality) as well as the preferred winter sport (snowboarding vs. skiing), self reported skiing ability (beginners, intermediates, advanced, experts) according to Sulheim et al. (2007), use of ski helmets, mean skiing time per season (≤7 vs. 8–14 vs. 15–21 vs. 16–28 vs. >28 days) and self reported risk taking behaviour (more cautious vs. more risky) according to Sulheim et al. (2006) and Ruedl et al. (2010b) were recorded. Furthermore, participants were divided into less skilled (beginners and intermediates) and into more skilled (advanced and experts) persons as a tendency was observed to underestimate individual skiing ability, especially among female skiers (Sulheim et al., 2007).

Sensation seeking was assessed with the German version of the sensation seeking scale form V (SSS-V; Beauducel et al., 2003). The SSS-V is a 40-item forced-choice questionnaire assessing the sensation seeking construct as a total score derived from the following four subscales (Bouter et al., 1988):

1. Thrill and adventure seeking (TAS): TAS-items indicate a desire to engage in risky and adventurous activities and sports providing unusual sensations.
2. Disinhibition (DIS): DIS-items describe the seeking of sensation through drinking, partying, gambling and sexual variety.
3. Experience seeking (ES): ES-items represent the seeking of stimulation through the mind and the senses, e.g. through music, art, travelling and drugs.
4. Boredom susceptibility (BS): BS-items represent an aversion to repetitive experience, whether in work or with other persons. Restlessness and boredom arise when such constancy is unavoidable.

The SS scale can range from 0 to 40 points and has proven to be both valid and reliable in previous research (Zuckerman, 1994). The internal consistency of the German version is acceptable as Beauducel et al. (2003) reported Cronbach's alpha for the total score of .82, although reliabilities for the subscales are somewhat lower (TAS: .80, DIS: .69, ES: .61, BS: .46).

In addition, regarding risk compensation according to the study by Scott et al. (2007), helmet wearers were asked whether they believe they ski/snowboard faster or in a more risky way by wearing a ski helmet (no vs. yes).

2.2. Analysis of data

For providing internal consistency of our data Cronbach's alpha was computed. Multiple logistic regression analysis including gender, age classes, nationality, preferred winter sport, self reported skiing ability, mean skiing time per season, use of ski helmets, and SS total score was used to estimated adjusted odds ratios (ORs) and their 95% confidence intervals (95 CI) for self reported risk taking behaviour.

To compare helmet wearers reporting risk compensation with helmet wearers not reporting risk compensation, multiple logistic regression analysis including gender, age classes, nationality, preferred winter sport, self reported skiing ability, mean skiing time per season, and SS total score was calculated. As an effect size parameter Cohen's d was calculated. All p-values were two-tailed and values below .05 were considered to indicate statistical significance.

3. Results

In total, the link of the survey was clicked by 2566 persons and 1898 surveys were sent back, respectively. With regard to inclusion criteria, 683 persons (36% males and 64% females) with skiing (69.7%) or snowboarding (30.3%) as preferred winter sport totally completed the online survey. In total, 81.1% of participants reported to use a helmet and 36.5% to be more risky on ski slopes, respectively. Cronbach's alpha for the total SS score was .79 and for the subscales somewhat lower (TAS: .72, DIS: .72, ES: .54, BS: .45).

Multivariate regression analysis revealed 6 factors to be predictive for a more risky behaviour: gender, age classes, preferred winter sport, skill level, mean skiing time per season, and sensation seeking total score (Table 1). Adjusted ORs indicated that a more risky behaviour increased with male gender (OR: 2.7, Cohen's $d = .58$), with an age < 25 years (OR: 1.6, Cohen's $d = .25$), with skiing (OR: 1.3, Cohen's $d = .13$), higher skill level (OR: 5.7, Cohen's $d = .96$), and a mean skiing time > 28 days per season (OR: 2.2, Cohen's $d = .43$). In addition, SS total score was significantly higher in risky compared to cautious people (23.8 vs. 20.3, $p < .001$, Cohen's $d = .61$). Although self reported helmet use was higher in risky compared to cautious people (88% vs. 78%), ski helmet use was not shown to be a predictive factor for a more risky behaviour ($p > .05$).

Regarding risk compensation, 24.7% of helmet users believed that they ski/snowboard faster or in a more risky way by wearing a ski helmet. Adjusted ORs indicated that risk compensation in