

Research article

Differences in Sensation Seeking Between Alpine Skiers, Snowboarders and Ski Tourers

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Abstract

Despite different injury rates and injury patterns previous personality related research in the field of downhill winter sports did not subdivide between different alpine slope users. In this study, we tried to find out whether the personality trait sensation seeking differs between skiers, snowboarders and ski tourers. In a cross-sectional survey 1185 persons (726 alpine skiers, 321 snowboarders and 138 ski tourers comparable in age and sex) were electronically questioned with the sensation seeking scale (SSS-V) comprising the four factors thrill and adventure seeking, experiences seeking, disinhibition and boredom susceptibility. Kruskal-Wallis Tests revealed a significantly higher total score of the SSS-V for snowboarders in comparison to alpine skiers and ski tourers ($H(2) = 41.5, p < 0.001$). Ski tourers and snowboarders scored significantly higher in the dimensions “thrill- and adventure-seeking” and “experience-seeking” than alpine skiers. Furthermore, snowboarders showed higher scores in “disinhibition” related to alpine skiers and ski tourers and “boredom susceptibility” compared to alpine skiers. Data show differences in the personality trait sensation seeking in people practising different winter sports. As snowboarders showed higher SS-scores compared to alpine skiers and ski tourers prevention and information programs might benefit from a selective approach focusing on special characteristics of the respective group.

Key words: Sensation seeking, alpine skiing, ski touring, snowboarding.

Introduction

Downhill winter sports are very popular and are enjoyed by several hundred million people worldwide (Burtscher et al., 2013; Müller et al., 2011; Ruedl et al., 2013). In Austria, 3 different but related winter sport groups are alpine skiing (AS), snowboarding (SB) and ski touring (ST); all those groups are using ski slopes to practice their sport. While AS and SB are well-known winter sports, ST is walking up mountains with a special boot fixing-system including artificial skins before skiing down on slopes or in the free skiing area. ST increased in recent years on Austrian ski slopes (Ruedl et al., 2015). Although the injury risk of all these sports seems low, the total number of injuries per year remains high because of the huge population at risk. Furthermore, the possibility of severe injury or death as an inherent factor has led to the classification ‘high-risk sport’ for downhill winter sports in several studies (Castanier et al., 2010b).

There is some good evidence that injury rates in SB have fluctuated over time but currently remain higher

than in skiers (Kim et al., 2012; Russell et al., 2014). First data show a considerable high injury risk, especially keeping in mind a lower distance usually skied in slope tourers (Ruedl et al., 2015). These data on ST are preliminary and have to be considered with caution, but the differences in injury risk between downhill winter sport participants warrant further investigation (Abu-Laban, 1991; Kim et al., 2012).

One important research field in the understanding of injuries and accidents is risk-taking behavior (Bouter et al., 1988). Although many sportspeople minimize the associated risks as much as possible, others seem to engage deliberately in risk-taking behaviors within the sport [i.e. moving with high speed or under the influence of alcohol (Castanier et al., 2010b; Cherpitel et al., 1998)]. Personality is an important predictor of various risk-taking behaviors and Sensation Seeking (SS) is one of the most studied factors in this area (Eysenck et al., 1982; Zuckerman, 2007). Sensation Seeking is reported as being higher in high-risk compared to low-risk sport practitioners and non-athletes and it seems likely that aspects of Sensation Seeking would be related to risk-taking considering the excitement and risks of downhill sports (Gomà-i-Freixanet et al., 2012). 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, 1983). SS is commonly assessed by a standardized self-report questionnaire allowing to interpret the four dimensions thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility (Roberti, 2004; Zuckerman et al., 1964). Recent research suggested that the SS scale is a useful tool to assess and interpret individual differences in personality that exist between sportspersons practicing sports with different levels of risk (Gomà-i-Freixanet et al., 2012).

Ruedl et al. (2012) showed that a single question used for self-assessment of risk taking behavior when interviewing skiers and snowboarders on slopes was associated with SS. Based on these and other results (Thomson et al., 2013; Thomson et al., 2014; Zuckerman, 2007), SS might be discussed as an underlying driver for risk behavior in skiers and snowboarders. Despite different injury rates previous personality related research in the field of downhill winter sports did not subdivide between different slope sports (Thomson and Carlson, 2014). Keeping in mind that motivational as well as personality related aspects might be involved when selecting a sport (Eysenck et al., 1982; Sudeck and Conzelmann, 2011), prevention-oriented research might benefit from the study

for differences between personality traits in winter sport participants for a better planning of programs for accident and injury reduction. This becomes even more important as people are practicing their sport at the same time on the same runway.

Therefore, the aim of this study was to evaluate if there are differences in the SS-domains between alpine skiers, snowboarders or ski tourers.

Methods

After approval from the Institutional Review Board (IRB) the study was conducted as online-survey at the University of Innsbruck and was distributed via a mailing list for students asking to forward the link via electronic networks to friends and relatives. The mean duration of filling out the questionnaire was about 15 minutes. No incentives or contests were used to motivate participants; datasets with ten or more missing answers were omitted from the analysis. Inclusion criteria were alpine skiing, ski touring or snowboarding as preferred winter sport and age below 35; an age limit was chosen because there is evidence of different SS scores in different age groups (Zuckerman, 2007).

Demographic data (sex, age classes) as well as the preferred winter sport (skiing, ski touring or snowboarding), self-reported skiing ability (beginners, intermediates, advanced, experts) according to Sulheim et al. (2007), self-reported risk taking behavior (How would you describe your driving behavior on the slopes? with the answer options: more cautious vs. more risky) according to Sulheim et al. (2006) and Ruedl et al. (2010) as well as the frequency of accidents (operationalized as injury requiring medical care) directly associated with the preferred winter sport (never; one; more than one) were questioned. Sociodemographic and skiing-related characteristics of the sample was presented in Table 1.

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-items forced-choice questionnaire requiring a decision for one of two contradictory statements. The sensation seeking construct is assessed as a total score derived from the following four subscales (Bouter et al., 1988; Zuckerman, 1971):

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 has proven to be both valid and reliable in previous research (Gomà-i-Freixanet et al., 2012; Roberti et al., 2003). The reliability 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).

Statistical analysis

Chi-square tests were used to compare alpine skiers, snowboarders and ski tourers regarding age categories, sex, skill-level, risk-taking and accidents. As both, the assumption of normality (Kolmogorov-Smirnov tests) as well as the equality of covariance matrices (Levene tests) were not met, Kruskal-Wallis tests were used to test for differences between the 4 subscales and the total score of the SSS-V in AS, SB and ST (Field, 2013). Furthermore, Spearman coefficients were performed for identifying potential correlations between the 4 subscales or the total score of the SSS-V with the variables self-reported

Table 1. Sociodemographic and skiing-related characteristics of the sample*.

	Alpine Skiing (AS) (N=726)	Snowboard (SB) (N=321)	Ski touring (ST) (N=138)	Differences between 3 groups [†]
Sex, N (%)				
Females	327 (45)	144 (44.9)	81 (58.7)	$\chi^2 (2) = .67,$
Males	399 (55)	177 (55.1)	57 (41.3)	n.s.
Age classes, N (%)				
15-24 years	360 (49.6)	178 (55.5)	69 (50)	$\chi^2 (2) = 3.2,$
25-34 years	366 (50.4)	143 (45.5)	69 (50)	n.s.
Skiing ability, N (%)				
Beginner	13 (1.8)	4 (1.2)	3 (1.7)	
Intermediate	112 (15.4)	46 (14.3)	17 (12.3)	$\chi^2 (2) = 5.2,$
Advanced	409 (56.3)	194 (60.4)	90 (65.2)	n.s.
Expert	192 (26.4)	77 (24)	28 (20.3)	
Risk-taking, N (%)				
More cautious	411 (56.6)	177 (55.1)	84 (60.9)	$\chi^2 (2) = 1.5$
More risky	305 (42.0)	141 (43.9)	52 (37.7)	n.s.
Accidents, N (%)				
Never	524 (72.2)	209 (65.1)	114 (82.6)	$\chi^2 (2) = 18.0,$
One	141 (19.4)	69 (21.5)	19 (13.8)	p < .001
More	60 (8.3)	42 (13.1)	5 (3.6)	

*if sum is not equal to N or 100% the difference is due to missing answers
[†]results of Chi-square-tests

Table 2. Differences in Sensation Seeking*.

	Alpine Skiing (AS) (N=726)	Snowboard (SB) (N=321)	Ski touring (ST) (N=138)	Differences between 3 groups [†]	Posthoc analysis (p<.05)#
Sensation seeking total score					AS:SB
mean ±SD	21.1±6.1	23.7±5.2	22.3±5.4	$H(2) = 41.5,$	SB:ST
Median/Range	21/3-36	24/11-35	22/3-36	$p < .001$	AS:ST
Thrill and adventure seeking (TAS)					
mean ±SD	6.6±2.5	7.5±2.0	7.4±2.0	$H(2) = 30.8,$	AS:ST
Median/Range	7/0-10	8/1-10	8/1-10	$p < .001$	AS:SB
Disinhibition (DIS)					
mean ±SD	4.9±2.5	5.7±2.3	4.6±2.4	$H(2) = 32.6,$	SB:ST
Median/Range	5/0-10	6/0-10	5/0-9	$p < .001$	AS:SB
Experience seeking (ES)					
mean ±SD	5.8±1.9	6.5±1.7	6.5±1.7	$H(2) = 34.3,$	AS:ST
Median/Range	6/1-10	7/2-10	7/3-10	$p < .001$	AS:SB
Boredom susceptibility (BS)					
mean ±SD	3.7±1.9	4.0±1.8	3.8±2.0	$H(2) = 5.8,$	AS:SB
Median/Range	4/0-9	4/0-9	4/0-9	$p = .056$	

* to enhance comparisons with future studies we displayed scores from our data for nonparametric as well as parametric analysis

† SSS-V-subscales and total score per group followed by results of Kruskal-Wallis-tests

Mann-Whitney-Tests were used for post-hoc-comparisons; between listed groups (i.e. AS:SB) differences were significant on a 5%- level.

risk-taking, self-rated skiing ability as well as self-reported accidents within the 3 groups. All p-values were two-tailed and values below 0.05 were considered to indicate statistical significance.

Results

In total, 1185 persons with skiing (n = 726), snowboarding (n = 321) or ski touring (n = 138) as preferred winter sport completed the online survey. The obtained frequencies seem to be representative for winter sports in the Austrian Alps (Philippe et al., 2014).

Accidents were significantly more frequent in snowboarders compared with alpine skiers and ski tourers as well as in alpine skiers compared with ski tourers.

Kruskal-Wallis tests revealed a significantly higher total score of the SSS-V for snowboarders in comparison to alpine skiers and ski tourers; total score was also found to be higher in ski tourers compared to alpine skiers. Ski tourers and snowboarders scored significantly higher in the dimensions “thrill- and adventure-seeking” and “experience-seeking” than alpine skiers. Furthermore, snowboarders showed higher scores in “disinhibition” related to alpine skiers and ski tourers and “boredom susceptibility” compared to alpine skiers. Differences in Sensation Seeking was presented in Table 2.

Regarding within group correlations, we found a small but significant positive relationship between self-reported risk-taking and sensation-seeking (total score, thrill and adventure seeking, disinhibition and boredom susceptibility) in all groups [AS (r = 0.293, for total score, r = 0.298 for thrill and adventure seeking, r = 0.252 for disinhibition and r = .188 for boredom susceptibility, all ps < 0.001); ST (r = 0.289, p < 0.001 for total score, r = 0.248, p < 0.001 for thrill and adventure seeking, r = 0.175, p < 0.05 for disinhibition and r = 0.188, p < 0.05 for boredom susceptibility); SB (r = 0.328 for total score, r = 0.296 for thrill and adventure seeking, r = 0.315 for disinhibition and r = 0.211 for boredom susceptibility, all ps < 0.001)].

Positive small relationships between skiing ability and sensation-seeking were obtained for total score, thrill and adventure seeking, disinhibition and boredom susceptibility in AS and SB [AS (r = 0.315 for total score, r = 0.404 for thrill and adventure seeking, r = 0.201 for disinhibition and r = 0.171 for boredom susceptibility, all ps < 0.001); SB (r = 0.210, p < 0.001 for total score, r = 0.248, p < 0.001 for thrill and adventure seeking, r = 0.165, p < 0.01 for disinhibition and r = 0.126, p < 0.05 for boredom susceptibility)]; in ski tourers only the dimension thrill and adventure seeking was related to skiing ability (r = 0.196, p < 0.05).

Again, positive small relationships between injuries requiring medical care and sensation-seeking were obtained for total score (r = 0.185, p < 0.001), thrill and adventure seeking (r = 0.183, p < 0.001), disinhibition (r = 0.145, p < 0.001) and boredom susceptibility (r = 0.107, p < 0.05) in alpine skiers; in snowboarders positive relationships were detected for total score (r = 0.183, p < 0.001), experience seeking (r = 0.199, p < 0.001) and boredom susceptibility (r = 0.142, p < 0.05). In ST no dimension was related to accidents.

Regarding socio-demographic and skiing-related variables we found in the entire winter-sport group significant correlations demonstrating that self-reported risk-taking is associated with higher skiing ability (r = 0.389, p < 0.001), more accidents (r = 0.223, p < 0.001) and male sex (r = 0.300, p < 0.001).

Discussion

The aim of this study was to evaluate if there are differences in sensation seeking operationalized by the SSS-V between alpine skiers, snowboarders or ski tourers.

Overall, we found relevant differences between alpine winter sport groups regarding sensation seeking, with higher scores on these behavior relevant subscales especially in snowboarders. Whereas one might argue, that higher scores in thrill and adventure seeking as well as experience seeking in ski tourers might be related to this

sport itself, taking place in free mountain areas at least to some extent, the high SS-scores (mean: 23.7) of snowboarders are an interesting result of this study. Well in accordance, Jack and Ronan (1998) reported a mean SS total score of 23.0 among high-risk sports participants (hang-gliders, mountaineers, sky-divers, automobile racers) and of 20.3 among low-risk sports participants (golfers, swimmers, marathon runners, aerobics), what comes closer to our group of alpine skiers (mean: 21.1), respectively. Zuckerman (2007) stated that risk taking is a correlate of sensation seeking. High-sensation seekers appraise the environment as less threatening while low-sensation seekers generally appraise risky or stressful situations as threatening and leading to negative consequences (Zuckerman, 2007). In comparison to alpine skiers snowboarders scored significantly higher on all dimensions of the SSS-V. As both groups are using ski slopes together and high SS is likely to foster risk behaviors (i.e. speedy boarding), snowboarders seem to be a group on which personality and risk-taking related research should focus on more in the future. Groups did not differ regarding sex, age classes, self-reported skiing ability and risk-taking. Of interest is the higher rate of accidents in snowboarders which is frequently discussed as a sport-immanent phenomenon and consequence of more falls in snowboarders compared to skiers (Philippe et al., 2014; Russell et al., 2014). The observed differences in sensation seeking scores may broaden this view as follows: in addition to a higher frequency of falls directly associated with the kind of sports, snowboarders probably may underestimate the risk of being injured in favour of seeking more arousal while practicing their sport compared to skiers. Therefore, underlying motivational mechanisms associated with personality traits like SS when choosing a favourite winter sport might be an important research topic for the future (Barlow et al., 2013; Carrol et al., 1982; Sudeck and Conzelmann, 2011). As personality is 'rediscovered' in recent years as an important matter of health behavior (Ferguson, 2013), this type of research could lead to new insights into underlying mechanisms of risky behavior, what could be useful for the prevention of accidents.

Furthermore, the observed differences in SS between alpine skiers and snowboarders might be associated with reported conflicts between these main-slope-user groups (Vaske et al., 2004). Future research might include qualitative, interview-based approaches to replicate the differences obtained in this cross sectional approach in order to improve prevention and information programs; successful approaches (Cusimano et al., 2013) might benefit from focusing on risk-taking behavior including special attitudes and norms of snowboarders.

Like in earlier studies (Ruedl et al., 2013; Ruedl et al., 2010) we found a significant positive association of self-reported risk-taking in males with higher skill-levels as well as more accident experience. Furthermore, self-reported risk-taking correlates with the SS-dimensions thrill and adventure seeking, disinhibition and boredom susceptibility. Regarding the frequency of self-reported accidents we found more correlations with SS-dimensions in skiers and snowboarders compared to ski tourers. Overall, the number of self-reported accidents was lower

than expected in ST (Ruedl et al., 2015). One might argue that we should have taken into account the frequency of practicing the sport in groups investigated, but due to different frequencies especially between ski tourers and snowboarders as well as alpine skiers this might have led to misleading interpretations. However, there were more signs for the total group that regular winter sport participants who are more skilled also tend to go faster and therefore, may be more likely to describe their style as risky compared to the answer option cautious in a forced choice question.

The survey approach used to studying this problem entails some inherent limitations: our survey data are cross-sectional. Items were self-report and examined patterns of behavior. The online survey was conducted at the University of Innsbruck. Therefore, practising the preferred winter sport could not be proved. In addition, a possible selection bias cannot be excluded because most participants studying at the University of Innsbruck may have a higher grade of education compared to the average winter sport population; furthermore, this study approach may attract avid sportsmen more than other slope users. As no data were collected to health status, risk compensation and other personality characteristics potentially confounding variables may have been neglected in this study. In addition, the item of the SSS-V regarding homosexuality and the forced-choice format were criticized by some participants. Future studies may benefit from adapting and validating modified items and providing different answer options by using Likert-scales. Furthermore, there is evidence that SS is not the one and only psychological mechanism to keep in mind when focusing on risk-taking (Castanier et al., 2010a; Barlow et al., 2013).

Conclusion

This study revealed higher sensation seeking scores in snowboarders compared with alpine skiers and ski tourers. This finding may be an important additional aspect contributing to a higher injury rate in snowboarders (Kim et al., 2012; Russell et al., 2014). We suggest a more selective approach in skiing safety research as well as in information campaigns by addressing different groups of winter sport participants who might not be comparable in risk-behavior relevant personality traits despite showing no differences in skills or in wearing protective gear.

Acknowledgements

The authors declare that they have no conflict of interest.

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Key points

- It is the very first research trying to identify differences between different types of winter sport slope users
- Obtained results show higher sensation seeking scores in snowboarders
- These results might stimulate new approaches in educational campaigns to reduce accident rates in winter sports

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