

ARE THEY EXPERTS? SELF-ASSESSED BACKCOUNTRY SKILLS AMONG BACK-COUNTRY SKIERS IN NORWAY AND NORTH AMERICA

Mannberg A.^{1*}, Hendrikx J.², and Johnson J.^{3,2}

¹ School of Business and Economics, and Centre for Avalanche Research and Education, UiT – The Arctic University of Norway, Tromsø, Norway

² Snow and Avalanche Laboratory, Department of Earth Sciences, Montana State University, Bozeman, MT, USA

³ Department of Political Science, Montana State University, Bozeman, MT, USA

ABSTRACT: We analyze how backcountry skiers' perceived ability to manage avalanche terrain correlate with more objective measures of experience and skills, among 1209 backcountry riders in Norway and North America. We further analyze if self-assessed backcountry skills are affected by past experience of avalanches and close calls, risk attitudes, and demographics. Our results suggest that self-assessed skill to a large extent is a function of experience and knowledge, which is encouraging. However, we also find that men perceive their skills to be substantially higher than women when compared equally, at all levels of training and experience. Finally, we find that individuals with past experiences of avalanches and close calls rate their skills as higher than individuals without such experiences. Our findings provide suggestive evidence of a miss-match between perceived and actual skill, but more research is needed to control for selection effects and differences in objective skill levels.

KEYWORDS: Self-assessed skill, over-confidence, backcountry, decision-making

1. INTRODUCTION

Do backcountry skiers over-estimate their ability to make decisions that minimize unnecessary risk in the backcountry? In this paper, using a relatively large sample of skiers from Norway, United States, and Canada we analyze how self-rated skills in backcountry travel correlate with ability-enhancing factors, such as experience, and training. We also examine differences in gender in our analysis framework.

Our perceived ability to manage terrain, and mitigate risk in the backcountry is likely an important determinant for the type of terrain we choose to travel in, and under what hazard conditions (Krueger and Dickson, 1994). This link is relatively unproblematic as long as our self-assessed skills are realistically determined by our actual level of skill, knowledge, and experience. However, there is ample evidence that the link between perceived and actual ability is biased. More specifically, research in psychology show that we are often overly confident in our ability to make the right decisions, and

in our level of control (e.g., Fischhoff, Slovic, and Lichtenstein, 1977; Christensen-Szalanski and Bushyhead, 1981; Svenson, 1981; Zenger, 1992; Clayson, 2005). Overconfidence appears to be more common among men, and mainly be a problem when the task at hand is difficult (Pulford and Colman, 1997). In many situations in life, we receive direct feedback on our performance, which in theory, allows us to update our self assessment of our ability. In practice, however, we tend to rationalize our errors and therefore fail to learn from our mistakes (Aronson, 1989). This problem is likely exacerbated in a wicked learning environment (Hogarth et al, 2015) such as avalanche terrain, i.e., where the feedback mechanism between poor decisions and bad outcomes is weak.

2. METHODS

2.1 *Participants*

We collected data via the use of online surveys during two rounds: 1) March – May 2017 in Norway, and 2) January – April, 2018 in North America. Both surveys were distributed via social media, popular online platforms for backcountry skiers and, in North America, via AIARE, and 14 American avalanche centers. We also presented at several regional snow and avalanche workshops in the Western USA to solicit participation. Our sample consists of 1192 individuals over 18 years of age. Of these,

* Corresponding author address:

Mannberg, A. School of Business and Economics, UiT – the Arctic University of Norway, PO box 6050, Langnes, Tromsø, Norway
tel: +47 920-820-25
email: andrea.mannberg@uit.no

25 percent are female. Median age in the sample is 33 (Mean = 36.0, SD=11.2).

Our sample is relatively heterogeneous in terms of backcountry experience and training. Although a majority of the participants (54 percent) have five years or more experience of skiing the backcountry, a relatively large share (30 percent) have two years or less of backcountry experience, and 36 percent state that they ski on average ten days or less per season. Sixteen percent of the sample had no avalanche training at the time of the survey, 11 percent had participated in a day-course or a workshop, 55 percent had basic avalanche training (e.g., AIARE REC I or II), and 18 percent had advanced training (e.g., AIARE PRO I or II). Thirty-nine percent had experience with an avalanche accident or near miss.

2.2 Measurement instruments

We measure perceived backcountry travel skills by the use of an instrument developed by Hendrikx and Johnson (2014). The scale of the instrument runs from 1 (beginner) to 5 (extreme), and contains detailed descriptions for each level, see Table 1.

Table 1: Scale for backcountry travel skills

Level	Description
1. Beginner	Working to develop balance, body position and speed control with backcountry equipment on flat to moderate terrain.
2. Intermediate	Can negotiate all moderate runs confidently with backcountry equipment. Can negotiate most out of bounds terrain with confidence.
3. Strong	Can negotiate most all terrain on backcountry equipment. A Level III backcountry skier/rider should be able to negotiate a variety of terrain all day using a variety of skills such as traversing, side slipping and kick-turns if necessary. Proficient at self-arrest.
4. Expert	Can negotiate 90% of the terrain encountered on backcountry excursions with confidence. Can handle all snow conditions in all weather. Proficient with terrain management skills such as ski cutting. Can negotiate all terrain including steep chutes (up to 50 degrees).
5. Extreme	Can negotiate extreme terrain in all conditions. Completely comfortable and confident on long descents up to 50° with other potential challenges such as highly variable snow conditions and extreme weather. Proficient with rope skills and moderate climbing.

The survey did not contain de facto tests of backcountry skills (e.g. skill level with avalanche beacon). Instead, we proxy these skills via three variables: number of years as an “active” backcountry skier, average number of ski days per season during the past five years, and level of avalanche training. It should be noted that the question about years of backcountry is slightly different in the Norwegian and American survey: in the Norwegian survey, we asked respondents about the number of years with at least ten days of backcountry riding. In the American survey, we asked about the number of years as an active backcountry rider. In other words, the definition of being “active” was left to the respondent.

We measure attitudes to risk via an instrument developed by Dohmen et al (2011). Due to a revision of the survey between rounds, the scale of the Dohmen measure differed between Norway and North America: in the Norwegian survey, attitudes to risk were measured on a scale from 1 (completely unwilling to take risks to 7 (very willing to take risks), while in the American survey, the instrument was measured on a scale from 1 to 10. Since the end points were defined identically, we transform the variable into three categories: 1) unwilling to take risks (Norway: 1-2, North America: 1-3), 2) moderately willing to take risks (Norway: 3-5, North America: 4-7 and 3) willing to take risks (Norway: 6-7; North America: 8-10). All data was re-coded to a uniform scale for each question to permit accurate analysis across the data sets.

In order to test the correlation between self-assessed skills, backcountry experience and training, we use ordinary least squares and ordered logistic regression analysis.

3. RESULTS

Table 2 displays the distribution of self-assessed backcountry skills, in percentages, among individuals of different backcountry experience and training. We have collapsed self-assessed skill level 1 and 2, and level 4 and 5 respectively, to ease presentation. As expected, individuals with more years, and days per year, in the backcountry in general perceive themselves to be relatively skilled, while individuals with little experience to a higher extent regard themselves as beginners/intermediates. The same pattern is present for individuals with different levels of avalanche training. However, note that about 17 percent of individuals with 10 ski days or less per year, and nearly 9 percent of individuals with less than 1 year of backcountry riding,

and a final 16 percent of respondents with no avalanche training, rate themselves as experts.

Table 2: Self-assessed backcountry skills and experience

	Beginner/ Intermediate	Strong	Advanced/ Expert	Total
Ski days/season				
0-10	38,7%	44,2%	17,1%	428
11-20	12,9%	52,9%	34,2%	342
21-30	10,1%	41,0%	48,9%	188
more than 30	3,4%	25,6%	70,9%	234
Ski years BC				
Less than 1 year	19,5%	41,5%	8,5%	82
1-2 years	45,6%	46,6%	7,8%	193
3-4 years	19,2%	57,6%	23,2%	276
5 or more years	8,5%	34,9%	56,4%	641
Training				
No training	37,4%	74,8%	16,0%	187
Day course	19,3%	43,7%	37,0%	135
Basic formal	19,9%	45,9%	34,3%	656
Advanced formal	5,1%	28,0%	66,8%	214
Total	237	507	448	1192

Table 3 contains the results from an ordinary least square regression (column 1), and the marginal effects from an ordered Logit regression (columns 2,3 and 4). In general, the regression results confirm the hypothesis that perceived ability increases with experience and training, which is encouraging.

However, our results also suggest that the relationship may not always be linear, and that other factors play a role. Most notably, our results suggest a non-linear relationship between avalanche training and self-assessed backcountry travel skills: in comparison to individuals who've participated in a 1-day course or a workshop, individuals with no avalanche training rate their skills as significantly lower, and individuals with advanced training rate their skills as significantly higher. However, there is no statistical difference in the self-assessed skills of individuals with basic avalanche training (i.e. level 1) and individuals who have participated in a 1-day course/workshop. In other words, an individual in our sample with only a 1-day course or workshop is equally likely to rate him or herself as a strong or

expert backcountry traveler as an individual with basic formal avalanche training.

Table 3: Results from Ordinary least squares, and ordered Logit regressions

	OLS	OLOG		
	Skill	Beginner	Strong	Expert
Risk attitudes				
Low	-0.274**	0.089**	0.054**	-0.144**
High	0.175*	-0.046**	-0.123*	0.170*
Avalanche training: Reference is day course/workshop				
No training	-0.247**	0.091**	0.050*	-0.141**
Basic	-0.066	0.022	0.026	-0.048
Advanced	0.238**	-0.053**	-0.142**	0.195**
	(0.084)	(0.030)	(0.024)	(0.046)
Ski days: Reference is more than 30 days				
0-10	-0.620**	0.168**	0.218**	-0.386**
11-20	-0.337**	0.066**	0.180**	-0.246**
21-30	-0.167*	0.032**	0.120**	-0.152**
BC experience: Reference is 5 years or more				
< 1 year	-0.599**	0.176**	0.134**	-0.310**
1-2 years	-0.632**	0.233**	0.111**	-0.344**
3- 4 years	-0.327**	0.094**	0.136**	-0.230**
Avalanche experience	0.162**	-0.040**	-0.052**	0.093**
Male	0.359**	-0.123**	-0.071**	0.193**
	(0.067)	(0.013)	(0.043)	(0.054)
Age	-0.005*	0.002**	0.002**	-0.003**
North America	0.152**	-0.043**	-0.046**	0.089**
N	1192	237	507	448
F/Chi square	62.803	645.426		
Adjusted r2	0.427			

Our results also suggest that individuals who state that they are relatively willing to take risks or have been involved in an avalanche accident or close call are **more** likely to rate themselves as expert backcountry travelers, than are individuals who state that they are relatively unwilling to take risks or have no avalanche experience.

The positive correlation between avalanche experience and self-assessed skills is present at all levels of backcountry experience. Figures 1a-1c, below,

show box plots for self-assessed backcountry skills among individuals with and without experience of avalanche accidents or close calls, at different levels of average ski days per season, and number of years travelling in avalanche terrain, respectively. The values shown in the figures control for differences in other control variables (e.g., gender, age, country, experience).

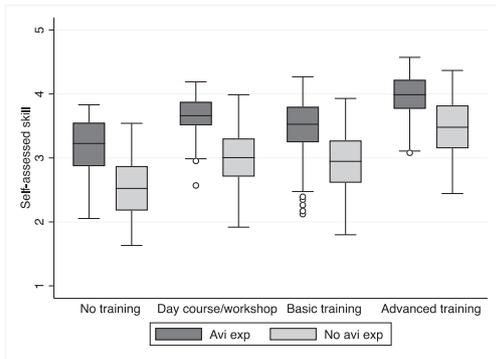


Figure 1a: Self-assessed skills, avalanche experience, and level of avalanche training

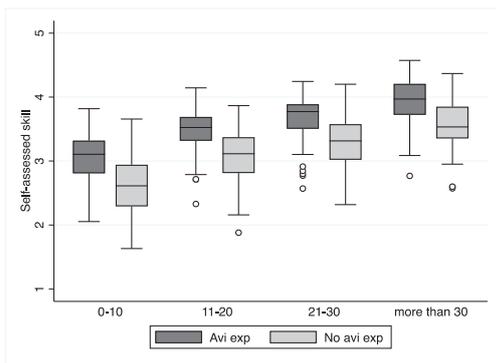


Figure 1b: Self-assessed skills, avalanche experience, and average number of ski days

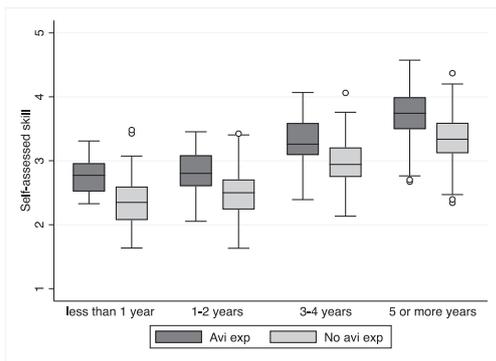


Figure 1c: Self-assessed skills, avalanche experience, and number of years as an active backcountry rider.

Finally, we find that men rate their skills as significantly higher than women with similar backcountry experience, avalanche training, and risk attitudes. We depict the relationship between subjective backcountry skills and gender in Figures 2a-2c, below. As for Figures 1a-1c, the y-axis represent predicted values.

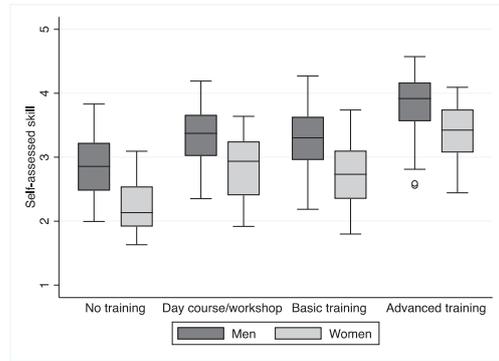


Figure 2a: Self-assessed skills, gender, and level of avalanche training

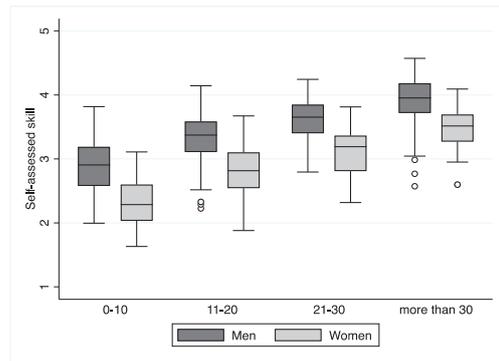


Figure 2b: Self-assessed skills, gender, and average number of ski days

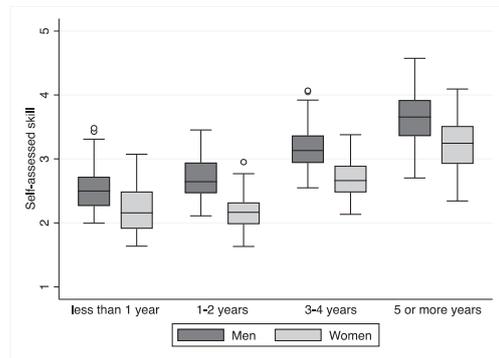


Figure 2c: Self-assessed skills, gender, and number of years as an active backcountry rider.

As can be seen in figures 2a, 2b, and 2c, women rate their backcountry skills as lower than men at all levels of experience and training.

4. DISCUSSION

Overconfidence can give rise to negative outcomes both at the individual, and societal level. In avalanche terrain, the consequences of an inflated perception of our abilities can be catastrophic. Our analysis does not prove that backcountry skiers are overconfident about their ability to manage risk in avalanche terrain nor does it suggest those who overestimate their skill level take unnecessary or careless risks. Rather, it highlights interesting correlations that should be researched further especially as it applies to avalanche education.

The jump in perceived backcountry skills between individuals without any avalanche training, and individuals with very limited training, points to the possibility that short courses may give rise to overconfidence. Our controls for backcountry experience suggest that the observed effect is not merely the case that more experienced individuals participate in workshops. Rather, the pattern seems to hold across the experience spectrum. However, with our data, we are unable to test if basic avalanche courses, such as AIARE REC I and II, provide individuals with significantly more knowledge than do workshops and 1-day course and if that knowledge is applied correctly in the field. Future research should therefore include de facto tests of skills at different levels of training.

The same recommendation holds for the observed difference between men and women. Although our results are in accordance with previous findings (e.g., Pulford and Colman, 1997), future researchers could investigate the different learning styles and different demands placed on avalanche educators between the two genders. It is also possible that some women seek different experiences from avalanche education courses than do some men, as supported by the work of Balent et al., (2016).

Finally, we observe that individuals, with experience of avalanche accidents or close calls, rate their skills as significantly higher than individuals without such experiences, and that this effect is present at all levels of backcountry experience. The latter implies that the observed effect is not merely a function of cumulative exposure. Our observed result has at least two potential explanations: 1) that individuals fail to update their beliefs from feedback on poor decisions, and 2) that individuals who perceive themselves to be skilled are more likely to have accidents. Both explanations are troubling.

Good progress has been achieved by the avalanche education community in raising the overall level of knowledge through the use of one day introductory workshops, refresher courses, and greater access to level one type education. Unresolved is the psychological affect on self-assessment post education. Our data indicate that indeed avalanche education may inflate one's sense of ability and lead to greater risk either through commission or omission. Further research and monitoring of avalanche education outcomes is needed to better understand these observed correlations.

Gender differences in self assessment should be further investigated to understand the potential differing nature and aspirations from avalanche education.

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