

# The effect of wildlife-protection measures on winter-sports behaviour

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## *Introduction*

The appearance of outdoor recreation activities has increased significantly all over the world (Manning & Anderson, 2012) as well as in Switzerland (Hunziker et al., 2011). This development can lead to conflicts between winter-sports participants and native wildlife populations in subalpine areas, where protected species like the capercaillie (*Tetrao urogallus*) can be affected (Arlettaz et al., 2007; Ingold, 2005; Thiel et al., 2011). Therefore, to reduce the negative impacts on nature and wildlife populations, it is important to manage outdoor recreation, especially the activities of winter sports participants, while preserving high levels of recreation value. The nationwide campaign “Respektiere deine Grenzen” tries to accomplish this by steering the behaviour of people who engage in ski-touring and snow-shoeing in order to diminish the negative impact on native wildlife populations, especially in protected mountain areas.

However, it is not well known yet, if such steering instruments actually influence behaviour in a positive way. Therefore, this study aims to evaluate the effectiveness of the campaign in Switzerland. Furthermore, the evaluation enables to obtain knowledge about how to develop steering instruments for managing outdoor recreation in general. To reach this aim, the following research questions were to be answered:

1. What are the significant influencing factors on the desired behaviour of people who engage in ski touring and snow-shoeing?
2. What role does the “Respektiere deine Grenzen” campaign as a whole, with its general purpose "raising awareness" and with all its communicative measures, play in influencing the behaviour of winter-sports participants?
3. What effect do on-site interventions instruments (marking of protection zones, by barrier tapes and prohibitive signs) have on the behaviour of the winter-sports participants?

## *Methods*

To answer research questions 1 and 2, i.e., to achieve knowledge about the impact that the influencing factors have on behaviour and about the role of the campaign in general with its strategy of raising awareness, a survey was conducted at the starting points for ski and snow-shoe tours in six study areas within the Swiss Alps.

To answer research question 3, i.e., to obtain knowledge about the effectiveness of the on-site intervention instruments, the six areas were selected according to a treatment-control experiment design, i.e., the six areas represent different levels of protection-zone density and of presence of barrier tapes and prohibitive signs, allowing a comparison of the athletes' nature-protection related behaviours and interpreting it as a result of the on-site intervention measures.

## Results

The analysis of the assumed predictors for behaviour using multiple regression models shows that the campaign has significantly positive impacts on behaviour (Fig. 1): People who know the campaign and its communicative content more often state that they behave in accordance with the four campaign-mediated rules than people who do not know about the campaign. Furthermore, solution knowledge, which is also mediated by the campaign has positive impacts on the stated behaviour.

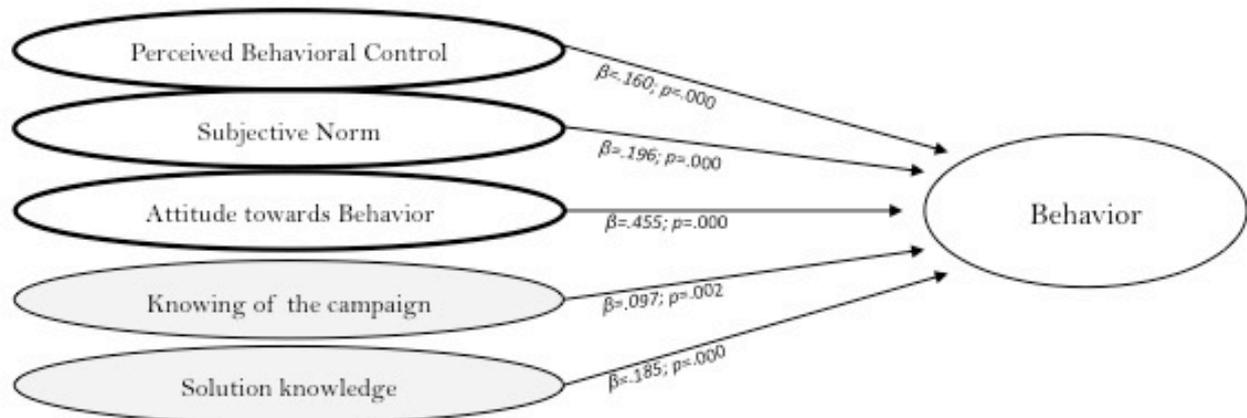


Figure 1: Significant predictors for stated nature-related behaviour of ski touring and snowshoeing according to multiple regression models. Perceived behavioural control, subjective norm, and attitude towards behaviour are defined based on the theory of planned behaviour (Ajzen 1991). Knowing the campaign is self-explaining, solution-knowledge means the knowledge how one can actually behave in a nature-related way.

The effectiveness of the on-site intervention instruments was evaluated using U-tests, based on Kruskal-Wallis. We aggregated the six study areas into a “treatment” area, a “control-1” area, and a “control-2” area, and then we analysed the differences of the stated behaviour between these aggregated areas. The analyses revealed that the stated nature-protection related behaviour did not significantly vary between treatment and control areas, i.e. that the on-site intervention instruments did not show an effect on the stated nature-related behaviour, whereas knowledge of the communicative contents of the campaign did so.

## Management implications

As attitude towards behaviour was revealed to be the strongest influencing factor on behaviour, steering instruments should, generally, try to influence the attitudes by informing, educating, and persuading the target groups in a tailor-made way. Solution knowledge as well as subjective norms are two other variables that are initial points for persuasion. This might be especially promising for target groups, such as the free-riders, whose attitudes can not be influenced easily. The presentation of role models show that the desired behaviour might, hopefully, convince peers. The result that on-site intervention instruments (barrier tapes and prohibitive signs) seem not to have an additional effect on behaviour suggests that winter-sports participants are more readily influenced during the planning phase of touring or at least at its starting point, but not when they have already decided where to go.

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