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Using the Theory of Planned Behavior to Explore the Intention of Farmers to Use Livestock Protection Measures

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Livestock protection measures are necessary to protect livestock from wolf attacks but are highly controversial in the agricultural community. This qualitative study referred to the theory of planned behavior to explore the social elements that influence farmers' intention to use or reject livestock protection measures. Data were collected from 45 sheep farmers on 4 alpine pastures in the Alpine province of Bolzano, Italy, using semistructured interviews. Results show, first, a predominantly negative attitude toward livestock protection measures because of perceived technical constraints, excessive workload, and emotional stress. Second, family, friends, and other sheep farmers were the most important referent groups and could trigger social stress to support or hinder the use of protection measures. Third, perceived behavioral control was constrained by a lack of professional advice in the province regarding protection measures and a lack of funding for additional costs involved. Intentions to use these measures in the future were equally positive and negative, with the sheer inevitability of needing protection measures to allow continued grazing cited as the primary motivator. These findings underline the importance of considering social factors in management plans and conflict mitigation actions and serve as a basis for further, more detailed studies.

Keywords: *livestock protection measures; theory of planned behavior; wolves; alpine summer farming.*

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Introduction

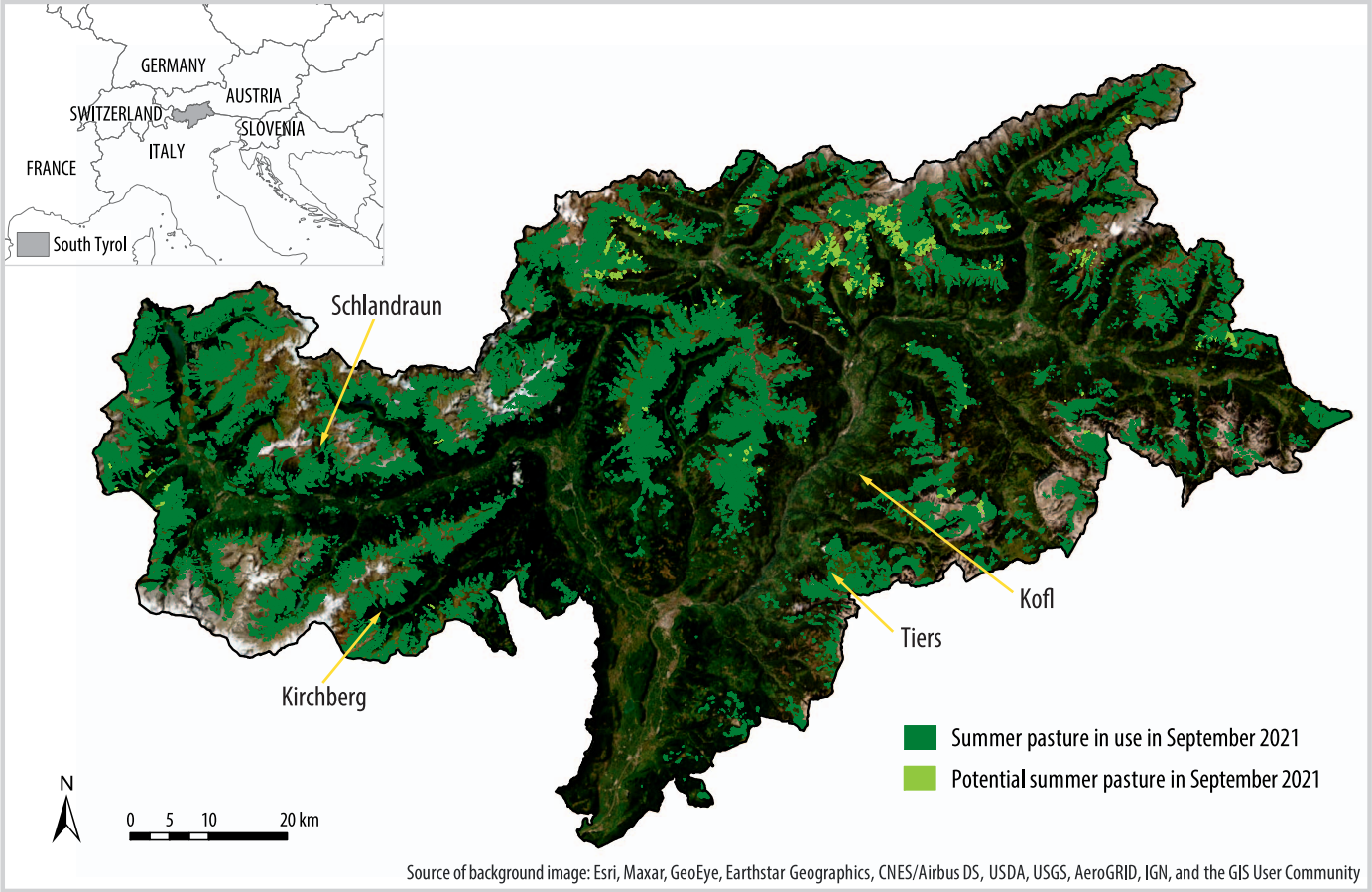
During the last decades, socioeconomic and agropolitical changes experienced by all European mountain areas led to land abandonment in mountainous areas (Linnell and Cretois 2018; Schuh et al 2022; Streifeneder et al 2022). These changes also affected the traditional movement of livestock to summer pastures in the European Alps through reduced livestock units, suboptimal management of stocking rates, concentration of livestock in the most favorable areas, and general marginalization on the market (Lombardi 2005; Lasanta et al 2017; Obweger 2018). The number of shepherds present daily to guide the animals and manage the pasture in an optimal way fell considerably because of low economic profitability, combined with high employee costs and low social recognition of the profession (Tasser et al 2012; CIPRA International 2021). The recent return of wolves and the necessity of using livestock protection measures form an additional challenge for alpine summer farming, raising questions about the future and adaptability of this system in the Alps (eg Mink and Mann 2022).

The debate over livestock protection measures and summer pastures in South Tyrol

In the Italian province of Bolzano, also called South Tyrol (Figure 1), alpine summer pastures are a tourist attraction and a place of recreation and local livestock breeding traditions (Autonomous Province of Bolzano 2018; Streifeneder et al 2018). There are 1598 active pastures in South Tyrol, covering 33% of the provincial territory and providing grazing for more than 94,000 head of livestock, mainly young cattle and small ruminants (Autonomous Province of Bolzano 2021). In 2021, for example, about 80% of the province's total sheep stock ($n = 41{,}055$) grazed on these pastures (personal communication, 28 January 2022, Provincial Veterinary Service). The animals often spend the summer unattended or only sporadically monitored from the valley, because the permanent presence of shepherds is rare.

The reappearance of wolves prompted vehement reactions among the livestock farming sector, which publicly asked for the establishment of a "wolf-free South Tyrol" to protect the free-grazing traditions on alpine pastures and preserve the open landscape (ASTAT 2014; Autonomous Province of Bolzano 2018; Anonymous 2022). Although livestock protection measures are financed and promoted by the European Union and the local administration, their demand is limited to a few pasture areas or private initiatives (Autonomous Province of Bolzano 2022a). The rejection of these measures because of unwillingness to adapt to these new circumstances could have a long-lasting impact on the use of summer pastures. This is particularly likely if predation on unprotected livestock keeps increasing and more livestock owners decide to abandon summer grazing

FIGURE 1 Inset map: Location of South Tyrol in the Alps. Large map: Distribution of summer pastures in South Tyrol and location of the 4 study areas. (Maps by Julia Stauder)



activities, as suggested by the local small ruminant association (personal communication, Barbara Mock, 16 March 2022). This development has not yet been verified in South Tyrol but should be monitored and taken seriously to preserve alpine pastures as an important provider of ecosystem services (Pachoud et al 2020). To date, scientific studies have often focused on attitudes and knowledge about wolves among different socioeconomic groups (eg Dressel et al 2014; Marino et al 2020; van Eeden 2021), whereas studies on livestock protection measures have focused on funding sources (Bautista et al 2019; Marsden and Hovardas 2020), effectiveness against wolf attacks (Bruns et al 2020; Oliveira et al 2021), and implementation examples in different countries (Reinhardt et al 2012; Tomaž et al 2020). To the author's knowledge, no previous study has considered the motivational influence of social psychological factors on the implementation of protection measures (Sok et al 2021). However, recent international investigations have emphasized the growing realization that farmers' decisions are not solely based on economic considerations but also include social psychological factors. This highlights the importance of a sound theoretical framework for related studies (eg Senger et al 2017; Villamayor-Tomas et al 2019; Qiu et al 2021).

Theoretical framework

The study is based on the theory of planned behavior, which has been used in other contexts to analyze farmers' decisions and behavior (eg Niles et al 2016; Bechini et al 2020; Buyinza et al 2020). The theory states that a behavior is determined by the intention to act when the right opportunity shows up (Figure 2). A behavioral intention includes 3 motivational influences, namely, attitude, subjective norm, and perceived behavioral control (Ajzen 1991). Attitude is defined as the personal evaluation of an object based on feelings and cognition (Fishbein and Ajzen 1975; Verplanken et al 1998). Subjective norm represents the perceived pressure from others to perform or not perform a certain behavior. Perceived behavioral control is defined as the perceived ease or difficulty of performing a behavior. According to the theory, the more positive these 3 elements are, the stronger the intention to perform a behavior (Ajzen 1991). Applied to

FIGURE 2 Theory of planned behavior (adapted from Ajzen 1991).

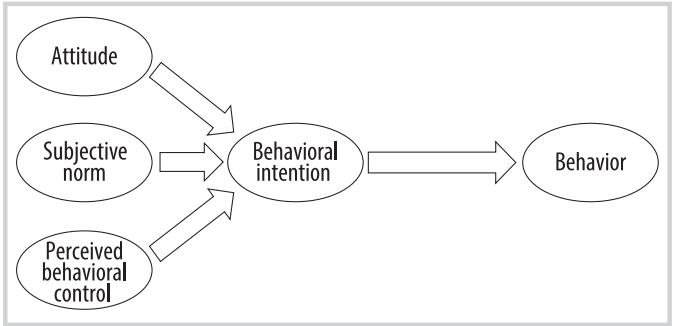


TABLE 1 Description of the situation on the pasture areas in 2021.

Descriptor	Tiers	Schlandraun	Kirchberg	Kofl
Location of shepherd's hut (GPS)	46°29′50.1″N; 11°35′20.1″E	46°40′34.0″N; 10°47′00.1″E	46°26′44.6″N; 10°50′05.4″E	46°39′03.9″N; 11°46′29.1″E
No. of farmers	13	23	14	9
No. of farmers interviewed	8	21	7	9
No. of sheep	195	600	300	360
Wolf damage before 2021	Yes	No	Yes	Yes
Livestock protection measures in use	Yes	Yes	No	Yes

this study, attitude explains how farmers evaluate the use of livestock protection measures, subjective norm describes the perceived social pressure on farmers in the use of protection measures, and perceived behavioral control identifies farmers' perceived ability to implement protection measures.

Aim of the study

The aim of this theory-grounded study was to explore the attitude, subjective norm, and perceived behavioral control of livestock farmers in South Tyrol in their intentions to use or reject livestock protection measures during the alpine summer season. A qualitative approach was used because of a lack of international and local reference research to identity salient context-related elements within the theory of planned behavior (Bryman 2016). The study concentrated on sheep farmers, because they are the sector most vulnerable to wolf damage and with the greatest need to adapt (Autonomous Province of Bolzano 2022a). Here, livestock protection measures were defined as electric fences, night enclosure, and the daily presence of a shepherd. Livestock guard dogs are still rarely used, are not subsidized by the authorities, and therefore are not considered in this study.

Material and methods

Study area

The study was conducted in the Italian Alpine province of South Tyrol, which covers an area of 7400 km^2 and ranges from 230 to 3900 masl, with about 40% above 2000 masl. Of the provincial territory, 47% is forest, 24% is alpine land, 12% is agricultural areas, and 3% is artificial surfaces or waterbodies (Autonomous Province of Bolzano 2022b). Sheep are often kept over summer on large community pastures (Stauder et al 2023), which are managed by a local agricultural association (eg community of interest) or public entities. Their members decide on investments, for example, whether livestock protection measures are used, and are responsible for pasture management. In this study, 4 community pastures were selected based on farmers' willingness to participate (Figure 1; Table 1). A total of 59 livestock farmers keep their animals in the 4 pasture areas from May to October, depending on the weather. In 3 of the 4 areas, the farming community decided to implement livestock protection measures for the first time in 2021, including the daily presence of a shepherd and the use of electrified night pens. In 1 pasture, no protection measures were implemented because farmers considered that it was not technically feasible and too labor-intensive. Wolf attacks were recorded on 3 pastures before 2021, but the potential wolf presence applied to all 4 areas (Autonomous Province of Bolzano 2020).

Data collection and analysis

The interviewees were selected based on their willingness to participate. A total of 45 of 59 farmers were open to engaging in semistructured interviews. Interviews were conducted in person at the respondents' homes or by telephone because of COVID-19 restrictions between May and October 2021. Based on the theory of planned behavior, an interview guide was elaborated and adapted to the topic of livestock protection to address each element of the model (Table 2). In addition, moderating variables were included that addressed (1) sociodemography, (2) experiences with wolf predation, (3) attitude toward alpine summer farming, and (4) perceived future of alpine summer farming (Sok et al 2021). The interviews were recorded, transcribed, and translated into English. Subsequent coding and content analysis to select the most frequently mentioned responses (Bryman 2016; Sok et al 2021) were conducted by the same person for all interviews using NVivo software (QSR International 2022).

Results

Description of the sample

The sample consisted of 42 males and 3 females, most of whom were between 45 and 64 years of age (54%), followed by 35 to 44 years (21%), 65 years and older (16%), and 18 to 34 years (9%). Respondents had an average of 23 years of sheep husbandry experience, ranging from 2 to 70 years (when they had taken over directly from their parents). On average, a farmer keeps 25 animals, with the number of sheep decreasing (43%) or remaining the same (41%) in recent years for most respondents. Most (80%) reported keeping animals for personal interest, as a hobby, and for no economic reason, and almost all respondents (86%) classified their sheep-keeping as private part-time farming. More than half of the participants (63%) had a successor in sight in the family for their personal sheep-keeping. Half of the respondents had already lost animals through wolf attacks in the summer seasons before 2021. Attitudes toward alpine

TABLE 2 List of guiding questions to cover the social psychological elements of the theory of planned behavior to measure the motivational influences in the intention to use livestock protection measures.

Social psychological factor	Questions
Attitude	Tell me your feelings and thoughts about livestock protection measures.
	What are the negative impacts of livestock protection measures on alpine summer farming?
	What are the positive impacts of livestock protection measures on alpine summer farming?
Subjective norm	Does your close social environment support livestock protection measures? Is their opinion important to you?
	Do the other farmers on the pasture support livestock protection measures? Is their opinion important to you?
	Does the farmer association support livestock protection measures? Is their opinion important to you?
Perceived behavioral control	Do you feel prepared to use livestock protection measures?
	Do you feel supported to use livestock protection measures?
Behavioral intention	Do you intend to continue or start using livestock protection measures?
	Do you intend to continue alpine summer farming in the future?

summer farming were positive among all participants: all considered that it increased animal wellbeing and health, and for almost all (95%), it contributed to the preservation of the open landscape in the mountains. Most participants referred to it as a symbol of the local culture (77%), an important family tradition (73%), and a source of high-quality products for their own consumption or for the market (73%). Half of respondents also named advantages for the home farm, with less workload and lower running costs during the summer months. More than half of the participants (66%) were afraid that the return of wolves could cause the end of alpine summer farming within the next 10 years, because active farmers would give up and young people would not start under these conditions. Thereby, all livestock farmers in the Kirchberg pasture area and many (19 of 23) farmers who had already experienced wolf predation were convinced of negative future development.

Attitude toward livestock protection measures: advantages and disadvantages

In general, a negative attitude toward livestock protection measures prevailed among the participants (Table 3). Most respondents felt stressed and angry when thinking about livestock protection, with farmers from the Kirchberg area in particular expressing these negative feelings. In this context, all but 2 participants mentioned one or more aspects related to livestock protection that they felt had negatively affected alpine summer farming. More than half of the respondents named the excessive workload for the shepherds and the lack of technical feasibility in alpine terrain as 2 of the most crucial limitations for the implementation of livestock protection measures. Participants also criticized the stress that animals face with daily penning, which they believe results in reduced feeding time and associated lower weight gain, as well as increased risk of disease transmission in confined spaces. Many respondents classified livestock protection as an outdated practice and expected many livestock farmers to abandon or not even start summer farming under these conditions. Participants further criticized the lack of funding to cover the additional costs related to livestock protection measures. Some participants expected conflicts with recreational activities on summer pastures: they considered that the presence of fences reduced landscape attractiveness and formed a barrier for wildlife. All of these negative aspects were discussed particularly frequently with participants from the Kirchberg pasture area. A total of 40% of participants did not see positive impacts of livestock protection measures. This viewpoint was particularly held by respondents from the Kirchberg pasture area. The other 60% of participants mentioned permanent supervision by a shepherd and a lower number of wolf attacks as the most important positive aspects increasing animal welfare. In this context, they also mentioned a possible increase in the motivation of young farmers to continue alpine pasture farming if the protection measures showed a positive effect. Newfound public attention for the importance of their activity for cultural landscape preservation and for local products was also recognized by some participants as a positive effect of implementing livestock protection. In addition, the permanent presence of a shepherd could improve pasture management through guided grazing and control of shrub and forest expansion.

Subjective norm: supportive and unsupportive referents

In general, participants named more nonsupportive than supportive referents (Table 3). The close social environment was rated as predominantly against the use of livestock protection measures, and the opinion of this reference group was important for almost all participants (93%). Other livestock farmers from the same pasture area were mainly classified as nonsupportive, especially in the Kirchberg area, but here, a smaller proportion of participants (57%) considered their views important. Assessments of the farmer association were divided between some who rated it as a supporter of livestock protection and some who were convinced of its rejection. Only a small group of participants (24%) considered the opinion of the farmer association important.

TABLE 3 Implementation of livestock protection measures: Key concepts of the theory of planned behavior, themes with number of times mentioned, and example quotations across the study sample ($n = 45$). (Table continued on next page.)

Theme	Example quotation
Attitude	
Negative	
Stress ($n = 28$)	"It's such an extra effort, it costs you so much time and nerves, and then you still don't know if the fence is enough. During the night, I often think about that and cannot sleep."
Anger ($n = 27$)	"How should I feel? Our local sheep breed is going extinct because of this beast. And when I think that we who suffer are also supposed to do herd protection, I could go crazy."
Technical/workload limitations ($n = 25$)	"It's impossible on our pasture; it's too steep and rocky. How do you think a shepherd can carry around fences here?"
Reduced feeding time ($n = 25$)	"The animals are stressed when you must round them up every day. They must run free; otherwise, they come back thinner than in spring."
Disease transmission ($n = 24$)	"If you leave the sheep in the pen for 12 hours, it will just take a few weeks until we have the first sick ones. We can directly send the veterinarian up there now, I promise you."
Outdated practice ($n = 20$)	"This practice worked 100 years ago, when you would send children up there to guard the animals. But now you cannot do that anymore."
Farmers abandon alpine summer farming ($n = 20$)	"A lot of farmers will give up; herd protection is not working!"
Additional costs not covered ($n = 19$)	"The shepherd would have to work 24 hours.... That's not possible, so we need more shepherds, and who pays for that? It's not that we make money with sheep products."
Conflict with recreational activities ($n = 19$)	"A shepherd and fences are feasible, but guard dogs are impossible—they bite the sheep and cause only trouble with hikers and tourists."
Reduced landscape attractiveness ($n = 13$)	"These fences ruin the landscape; anyway, if you want to make them well secured, you have this material lying around everywhere. And I don't want this plastic in the mountains."
Fences barrier for wildlife ($n = 11$)	"These fences are not good. I saw it with my own eyes, how a roe deer strangled itself; horrible, I tell you."
Positive	
Animal welfare ($n = 18$)	"Of course, the presence of a shepherd is good for the animals, especially when there are lambs."
Less predation ($n = 16$)	"Well, I hopefully lose fewer animals."
Farmers continue alpine summer farming ($n = 15$)	"We must do herd protection; there is no other way. I need the fodder on the summer pastures; otherwise, the animals cost me too much and I will stop livestock farming."
Public attention ($n = 11$)	"Wolf and livestock protection forces people to talk again more to each other and about summer pasture farming. That is good for summer farming; it creates attention."
Better pasture management ($n = 9$)	"The shepherd can also improve the pasture, when he pulls out tree shoots, as they did when I was a child. Then this got lost. Maybe he can start doing it again."
Subjective norm	
Unsupportive	
Close social environment ($n = 21$)	"Ha-ha, when I talk to my wife about herd protection, she gets angrier than me. She wants our animals protected but would choose another way, you understand?"
Other livestock farmer on the pasture ($n = 19$)	"I don't believe the others want to do livestock protection—why should they? It's only an extra effort for us, not more."
Farmer association ($n = 13$)	"The farmer association is too political and only talks.... It's too weak and leaves us alone."
Supportive	
Close social environment ($n = 12$)	"Well, they are not happy about it, but as long as we can protect our animals, I guess it's ok."
Farmer association ($n = 10$)	"They want us to do it. Just yesterday, I read something about it. As long as we can't shoot the wolves, it's our only way, isn't it?"

TABLE 3 Continued. (First part of Table 3 on previous page.)

Theme	Example quotation
Perceived behavioral control	
Perceived obstacle	
Costs ($n = 34$)	"The sheep are my hobby; I don't make money out of them and now I should spend a lot of money for fences and to pay a shepherd? Never will I do that; with what money? We need more funding."
Lack of advisory services ($n = 30$)	"There are no experts in South Tyrol. And the people sitting in their offices don't know anything."
Perceived encouraging factor	
Support to peers ($n = 34$)	"Yeah, if all decide to try it, I will not say 'no.' At least 1 year I will leave my animals on that pasture; then we will see how it goes."
Behavioral intention	
Continue alpine summer farming ($n = 36$)	"Of course, I want to continue. Even if it's getting harder every year, but it is a simple part of my farming activities."
Use of livestock protection measures ($n = 19$)	"Do we have another option? Would be easier without but we are forced to use it."
Rejection of livestock protection measures ($n = 19$)	"I will never use it; it's a nonsense, it doesn't make sense, and I'm not going to be swayed here."

Note: Quotations are analogously translated from the local German dialect.

Perceived behavioral control: obstacles and encouraging factors

The most frequently cited obstacles to using protection measures were lack of funding and lack of professional consultancy in the province (Table 3)—both of which were particularly raised by farmers from the Kirchberg and Kofl areas. With regard to funding, participants criticized the limited support measures provided by the authorities and expected to be abandoned in the long term after the political and public attention for their problems wanes and initial monetary support runs out. The scarcity of professional consultancy from private experts and public bodies is an additional limiting factor for the use of protection measures, especially for the possible use of livestock guard dogs. In this context, participants also criticized the lack of technical information on protection options on the websites of the responsible authorities. Nevertheless, the chance to support peers willing to try livestock protection, and to help maintain summer grazing on their pasture, was considered a factor that encourages the use of these measures.

Behavioral intention

Willingness to use livestock protection measures in the future varied widely (Table 3). There were as many participants who were willing to implement them as those who rejected them. The qualitative analysis revealed less motivation to implement these measures in the Kirchberg and Kofl areas, as well as among individuals who had experienced wolf attacks in the past. However, most participants intended to continue summer grazing in the future (Table 3), and this conviction was notable in all 4 study areas. In addition, "sheer necessity" was cited as the primary motivator for using protection measures. However, again, some individuals who had experienced predation expressed less motivation to continue summer grazing and had more doubts about the compatibility of this farming system with recent developments regarding the return of wolves and the need to use of livestock protection measures.

Discussion

This study was a first attempt to explore South Tyrolean farmers' intention to implement livestock protection measures using the theory of planned behavior. Overall, these findings provide unique insights to better understand cultural beliefs and motivational influences related to the use of protection measures. In terms of attitude, negative emotional responses such as anger and stress, technical constraints and workload, and perceived negative impact of night pens on animal welfare emerged most prominently. Anger or additional stress in livestock farmers because of wolf return (Zahl-Thanem et al 2020; Rode et al 2021) or the need to use protection measures (Sjölander-Lindqvist et al 2021; Flykt et al 2022) has already been confirmed in other studies. The same applies to technical limitations and the poor cost–benefit ratio, which have already been the subject of analyses in other geographical contexts where wolves have returned (Hackländer et al 2019; Moser et al 2019). These problems nourish negative attitudes toward livestock protection and call for a quick solution at administrative, scientific, and political levels to reduce farmers' concerns, regain their trust, and increase their willingness to use protection measures (Young et al 2016; Linnell and Cretois 2018). The importance of working on these aspects was underlined by the low perception of positive aspects of livestock protection measures, such as the increase in animal wellbeing because of the presence of shepherds or less predation. This last result is particularly interesting when considering that the entire discussion about livestock protection was based on the need to reduce predation by wolves. This could be interpreted as a basic recognition of

livestock protection benefits in the context of animal safety but as a de facto rejection, because the associated changes are still perceived as too significant and negative. Social reference people were predominantly classified as rejectors of livestock protection measures. The close social environment seemed to have the greatest impact on farmers' perceptions, followed by other livestock farmers in the same pasture area. This clearly underlines the important role of family and close friends in the decision to behave in a certain way and confirms the studies of Hansson et al (2013), Borges et al (2014), and Senger et al (2017), who stressed that the closer individuals are to farmers, the greater their influence on their decisions. This result could be of special importance in an area like South Tyrol, where more than 90% of farms are run as a family farming business with a special attachment to group values (Vogel et al 2007; Tappeiner et al 2020). The influence of other livestock farmers advocates the use of peers' trustworthiness to overcome social distance when interacting with this social group as a nonmember (Villamayor-Tomas et al 2019; Qiu et al 2021). Increased awareness of the benefits of livestock protection measures among these 2 referent groups could create social pressure and affect farmers' behavior, because they perceive these others as sources of information (Senger et al 2017). The multiple mentions of obstacles and encouraging factors suggest that farmers' perceptions of their own ability to successfully implement protection measures played an important role in their intention to use them. Here, the unaffordable costs and lack of competent advice were the most limiting factors, whereas the support given to peers increased their motivation. Other studies suggest that targeted funding for livestock farmers willing to use these measures could counteract additional costs and motivate others to start the adoption process (Wanner et al 2021; Autonomous Province of Bolzano 2022a; BLW 2022). This financial support is mainly provided by the European Union and could be used to a larger extent by member states like Italy (Marsden and Hovardas 2020; Oliveira et al 2021). Farmers' sense of control over the use of livestock protection measures could be strengthened by accessible and professional advisory services in the field and information on websites. A peer-to-peer approach could reinforce this empowerment, because farmers usually trust the experience and knowledge of other group members in similar situations (Sutherland and Marchand 2021). At the same time, motivation could be fostered by peer support, which, as mentioned earlier, is associated with a sense of belonging to a social group. Looking at the future, sheer necessity seems to be the main motivation to try protection measures. This need could be based on awareness that these measures are the best solution available to protect animals (van Eeden et al 2017; Bruns et al 2020), positive attitudes toward alpine summer farming as part of participants' self-identity (Junge and Hunziker 2013), and strong intentions to continue this tradition (Garde et al 2014; Herzog and Seidl 2018). These 3 elements may be additional predictors of intention that complement the basic model of the theory of planned behavior and should be further explored in future research (Rise et al 2010; Sok et al 2021). The high standing of alpine summer farming was particularly evident here, and the participants were especially aware of the positive effects on animal welfare, landscape preservation, local tradition, and high-quality products, awareness that is in line with a similar study in Switzerland (Lauber et al 2014). Vogel et al (2007) observed this high value of tradition and a special attachment to the territory, livestock, cultural landscape, and summer pasturing among mountain farmers in South Tyrol. Here, the future vision of alpine summer farming was dominated by the conflict with wolves, which was identified as the main problem, as observed by Wanner et al (2021). This finding should receive further attention, because first studies have shown a link between wolf return and agricultural abandonment in other areas (Garde et al 2014; Hinojosa et al 2018; Mink and Mann 2022). The concerns of livestock farmers must be taken seriously by the entire society, because abandonment of these farming areas with high nature value may negatively affect different ecosystem services provided to the public (Pachoud et al 2020).

Limitations

The qualitative approach was useful for a first explorative study to create basic knowledge about the beliefs and intentions of farmers in the region. Nevertheless, there were several limitations. Because of the limited sample size and country-specific framework conditions (eg impact of funding schemes on perceived behavioral control), the findings cannot be generalized. The results also showed some differences between pastures with and those without protection measures, as well as those that had and those that had not experienced predation, but reliable comparisons are not possible because of the limited sample size. Background factors that may be important for understanding differences in beliefs and may alter the relationships among the theory of planned behavior components were also missing (Sok et al 2021). However, the major strength of the study was its unique approach to exploring the topic and the pioneering work in this context. This knowledge of social factors and the corresponding expectations form the basis for promoting the behavior in question.

Conclusion

From these results, it can be concluded that different social factors play important roles in the decision to implement or reject protection measures. Elements of attitude, subjective norm, and perceived behavioral control were more likely to be disapproving than approving, as reflected in the low motivation to use livestock protection measures in the future. In terms of further research, more in-depth investigations to determine the relative importance of these components on behavioral intentions are strongly recommended. For the study area of South Tyrol, the high standing of summer pasture farming could be decisive in motivating livestock farmers to at least attempt to adapt to this new situation. The implementation of a better communication strategy within the management authorities, to avoid emotional and subjective discussions; the elaboration of technically feasible protection concepts case by case; and the dissemination of veterinary guidelines, to avoid diseases in night pens, could be focal points in the future. Transparent and detailed information on the authorities' websites about individual protection measures, such as different types of fencing, and quick and direct consultation could further convince farmers to adopt protection. Quick access to information, technical equipment, and funding sources with little bureaucracy may

be critical to avoiding the impression of wasting time while beginning to implement these measures. In addition, visiting best practice examples on pastures that are successfully implementing protection measures and hearing firsthand experiences from peers could create an encouraging atmosphere. The coming years will be critical in driving adaptation to the wolf's return and the need for livestock protection, and action is needed at political, administrative, and societal levels to support farmers in embracing these changes.

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