Perspective

Living with wolves: from psychology to management

Julia Bouwer[1*], Johanna Fritz

FVA-Wildlife Institute, Freiburg, Germany.

* Contact: Julia.bo@posteo.de

Introduction

In recent decades the wolf *(Canis lupus)* has been recolonising much of its former range in Europe [1]. In Germany and many other countries, it is strictly protected under national and international law with the goal of achieving species recovery and co-existence with human communities. Problems arise as people and wolves share landscapes [2]. Livestock protection measures are important tools to address such issues [3], but it is only with broad acceptance of these and other management interventions that long-term co-existence is likely to be achieved. To this end, knowledge of the human psyche, as well as of social dynamics, is necessary because humans are integral to the implementation of all these measures.

Here, we elaborate on a summary of the pertinent psychological background which we first prepared for the Forest Research Institute (FVA) in Baden-Württemberg, southern Germany, where wolves have recently settled [4]. The FVA's Lynx & Wolf unit[2] is responsible for monitoring wolves and advising livestock owners on herd protection. The unit places a strong focus on solution-oriented communication as well as transfer of knowledge.

Human dimensions of wildlife

The natural behaviour of wolves is part of the challenge of their co-existence with humans in modern cultural landscapes. When addressing social conflicts between people, however, direct encounters with the animal itself are not the central issue. Much more important is the contact between the people talking about it. The question of how to deal with wolves, and with nature in general, gives rise to differences of opinion between diverse human actors. It is more appropriate to view related disputes as 'human–human conflicts', or 'conservation conflicts', rather than 'human–wildlife conflicts' *per se* [5–7]. To find solutions, it is therefore essential to bring social sciences to the conversation as well as biology and technology.

The field of study that examines social aspects in relation to nature is called 'human dimensions of wildlife' [8]. Management interventions have a greater chance of achieving success if they are guided by an up-to-date understanding of research findings in this field. In the following sections, we begin by describing relevant individual human thought processes and then outline the

[1] Since writing this article Julia Bouwer has left the FVA.
[2] https://www.fva-bw.de/en/top-meta-navigation/departments/fva-wildlife-institute/lynx-and-wolf

development of human attitudes toward wolves as well as what factors influence attitudes and behaviour. Social dynamics resulting from differing attitudes are also addressed. Finally, we provide a comprehensive set of practical recommendations for the development and implementation of management measures.

We are all individuals (in groups)

We must first consider the prerequisite for human action, perception, which is crucial for any further interaction with the environment. Our brains learn early on in life to filter out a multitude of irrelevant stimuli and focus on what we require to understand the situation at hand [9]. The selection of which information our attention is directed to is influenced by current needs (e.g. hunger, fear) but also by our personal, deeply-rooted value orientations, experiences, attitudes and culture [10]. Therefore, we may not be consciously aware of information that does not correspond to our own current needs and experiences. Because we all have different upbringings, each person's world of experience is also different. The question of why someone perceives the wolf as a threat, for example, can only be answered more precisely by looking at the complex background.

Values are the foundation of our understanding of the world. With their help, we can quickly classify things and situations on a moral level: good or bad, precious or worthless, right or wrong, etc. Values are formed early in childhood and are very stable [11,12]. Human value orientations (patterns of basic beliefs) are an important factor influencing attitudes toward large carnivores [13]. In a wildlife context, mainly traditionalist and mutualist value orientations can be distinguished. 'Traditionalists' believe that wildlife should be controlled and utilised for the benefit of humans. 'Mutualists', on the other hand, recognise the needs and rights of wildlife and see humans as protectors of other creatures on an equal basis [14]. This distinction represents a continuum, with many people exhibiting some combination of traditionalism and mutualism. For example, an 'ambivalent wolf opponent' has positive associations towards the wolf that turn into rejection when the wolf is actually present (see below). According to the cognitive hierarchy model (Fig. 1), values, value orientations and attitudes build on each other hierarchically [15]. This can explain the factors on which approval or disapproval of management measures is based.

In psychology, people's attitudes are captured by measuring their reactions to certain objects, which can include wild animals. Attitudes can be expressed both in thoughts (e.g. "Where the wolf hunts, the forest grows") and emotions (such as awe when encountering a wolf or fear of wolves) as well as through certain behaviours (protecting livestock, poaching, protesting, etc.) [16]. A distinction is also made between explicit attitudes, which humans can formulate consciously, and implicit attitudes, which occur as an automatic response to an object. Implicit attitudes are often not consciously perceived but are just as important as explicit attitudes in predicting behaviour [17]. For example, when people are asked directly if they have a particular prejudice, they often answer in the negative even though tests of unconscious (implicit) attitudes determine that they do. A prejudice toward a person or group is an attitude that is generated without thorough examination or consideration of facts and thus often has little basis in reality. As these cognitive processes reduce other people to one specific feature, irritations and con-

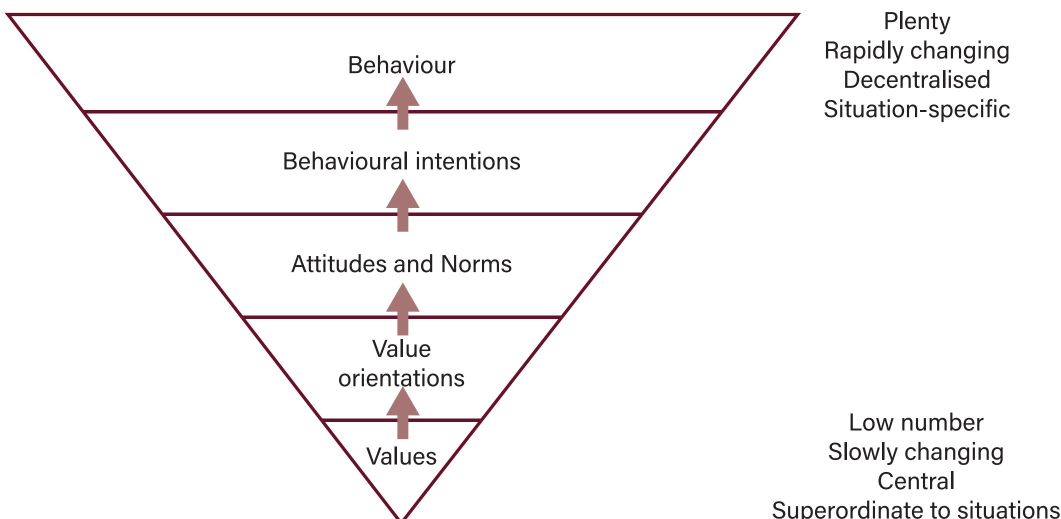

Fig. 1. The cognitive hierarchy model of human behaviour (Source: Vaske & Donnelly [15]).

flicts can arise which have a major impact on group dynamics.

The existence of different life histories, value orientations and attitudes enrich human societies, but also lead to the formation of groups with diverse interests or beliefs. We humans are 'social animals' who look for people similar to us in order to find mutual support and security as a community that gives us a social identity. We strive for our own group to be seen in a positive light and adhere to group norms so that we can remain part of it. Thus, group rules play a large role in an individual's behaviour [18]. Especially when little other information is available about a situation, we strongly rely on the behaviour of other members of our group [19]. Processes of social identification can be found in the field of wildlife management: when people with different attitudes towards an object like a large carnivore come together, a complex dynamic can emerge, especially when this object combines contradictory symbolism [20]. These processes will be discussed in the following section.

Attitudes to wolves and wolf recovery

Building on the general concept of how attitudes are formed, we will now consider how this applies to wolves. Rather than trying to convey a positive image of the wolf as widely as possible, our aim is to examine objectively all factors that are important for a comprehensive understanding of people's varied attitudes.

Symbolism

It is well known that the wolf is surrounded with strong symbolism that has arisen both through its biological characteristics and human socio-cultural development. Different roles and traits are assigned to the wolf through its presence in fairy tales, legends, religion, literature, movies, songs, art and media [21,22]. On the one hand, it is regarded as a divine, wise and mystical being, a mother and provider whose presence is a sign of a healthy forest [23]. The similarity of wolves to humans in terms of their social organisation and hunting behaviour favours identification with them and probably contributed to dog domestication [24]. On the other hand, the wolf is viewed as an ill-omened twilight figure, a symbol of uncontrolled wilderness, danger, aggression and hunger for dominance. This image formed especially in the Middle Ages, when the wolf was used as a bogeyman for difficult times of epidemic and famine [25]. Thus, the wolf combines multifaceted symbolism, positive as well as negative, which various groups still use for their purposes today.

Based on interviews in Switzerland, where the wolf reappeared in the 1990s, Caluori & Hunziker [26] developed a typology in which they classified people according to their subjective interpretations of wolves. They identified three different ideal types, each of which gives the wolf a certain meaning. For the 'modern wolf opponent', the wolf is a symbol of wilderness in a negative sense, loss of control over morality and loss of economic and political security. The 'postmodern wolf advocate' sees the wolf as a symbol of positively valued wilderness, power, strength and resistance to environmental destruction. The 'ambivalent wolf advocate' stylises the wolf as a positively valued but also contradictory symbol, combining both socially conforming social behaviour as a pack animal and the aggressive assertiveness of the individual 'lone wolf'. This positive attitude seems to be unstable, turning into rejection when the wolf is actually present. The authors concluded that the majority of Swiss people could be assigned to this latter type, explaining why opinion polls find high levels of support for wolves but there is nevertheless resistance to their presence. When the wolf is present, the inner conflict of ambivalent wolf advocates becomes more apparent and they tend to orientate themselves more towards traditional values. This trend has also been observed in Germany, where surveys have consistently shown that while attitudes towards wolves are generally positive, the closer wolf recolonisation is to people's place of residence, the more negative their attitudes are [27,28].

Numerous other factors play roles in the formation of attitudes towards the wolf. Some are strongly correlated with each other and they can be grouped in different ways. Here, we distinguish personal characteristics from those related to information and knowledge.

Personal characteristics

Each person has their own particular associations with the wolf. As outlined above, these are formed from their cultural background and life experience. For example, negatively valued symbolism in the story of Little Red Riding Hood contributes to the wolf being perceived as a threat. Sociodemographic factors such as age, gender and education level also influence attitudes: older people and

those with lower levels of education typically view the wolf more critically. Women tend to have more negative attitudes than men, presumably because they are more afraid of wolves [28,29].

Place of residence is another influencing factor: the return of the wolf is more welcomed by people living in urban areas, whereas rural populations are more critical [28]. Residents are more likely to have negative attitudes when wolves are resettling an area that has no recent experience in dealing with them and individual negative events dominate discussions [27]. Awareness of direct impacts, such as predation on livestock, in a person's social surroundings or negative conversations increase personal concern and thus the wolf is perceived as more of a threat [27,28]. However, the longer a person is exposed to the presence of wolves, the more neutral their attitude [27]. Moreover, a recent survey in Germany found that personal, benign encounters with wolves were mostly perceived positively and people expressed a high tolerance of living in close vicinity to wolves [30].

Personal value orientation towards wildlife has a major influence. People with a mutualistic value orientation are more likely to accept wolf conservation efforts as they perceive them as less of a threat to their own control [31]. A more traditionalist orientation favours approval of stricter management measures such as lethal control [13]. Disputes about wolves are thus often representative of conflicts between different values [26].

Emotions influence attitudes as well as the acceptance of management measures to a significant degree [32]. For example, fear is hidden behind many derogatory reactions towards the wolf. A negative emotion such as fear can lead to people being less able to openly search for solutions and instead become fixated on problems [33]. Conversely, when positive emotions such as joy, interest and gratitude are generated, the focus can be directed toward finding creative solutions.

Information and knowledge

In general, it can be stated that higher, fact-based knowledge leads to more positive attitudes. The source from which knowledge is acquired is also important: people are more accepting of information if they trust the source [27]. Science-based information presented in books, films and local wolf information offices contributes to a more positive evaluation of the wolf. In contrast, mainstream information from media such as the press, television, internet and social media may have the opposite effect as they tend to feed fears in order to extent their reach [34].

The choice of words and topics in local media also contributes substantially: coverage that focuses on negative effects of wolf presence decreases acceptance. In this context, selective perception affects information transfer: people who are already critical are more likely to pay attention to critical articles [35]. Digital algorithms reinforce this effect by selectively displaying content with topics that were previously accessed. Furthermore, it has been demonstrated in many psychological, social and political studies that negative framing (the linguistic framework in which a message is embedded) has a greater impact on personal attitudes than positive information [36,37].

From attitude to behaviour

So far, we have looked at factors influencing attitudes, but attitudes only have impacts when put into action. A review of articles published in the journal Human Dimensions of Wildlife found that 62% of studies examined attitudes, values and norms whereas only 18% analysed behavioural factors such as concrete actions [38]. Some research suggests that specific attitudes and social norms influence behaviour more than basic value orientations [39,40]. However, long-term behaviour change can only occur if the associated constructs, such as value orientations or perceived personal concern, are also addressed (see Fig. 1).

Which specific factors contribute to an individual performing behaviour that serves the co-existence of wolves and humans has not yet been conclusively investigated. However, many models exist that deal with the prediction of behaviour in general. According to the well-known theory of planned behaviour, the factors that influence behaviour are subjective norm, attitude toward the behaviour and perceived behavioural control [41,42]. Thus, whether someone performs a certain behaviour is primarily related to what norms prevail in their social environment, what attitude (positive/negative/neutral) they have toward the behaviour and whether the person sees themselves as being able to successfully perform their own behaviour. A more recent study identified psychological drivers of compliance with measures to promote risk-reducing behaviours and thereby mitigate human–bear

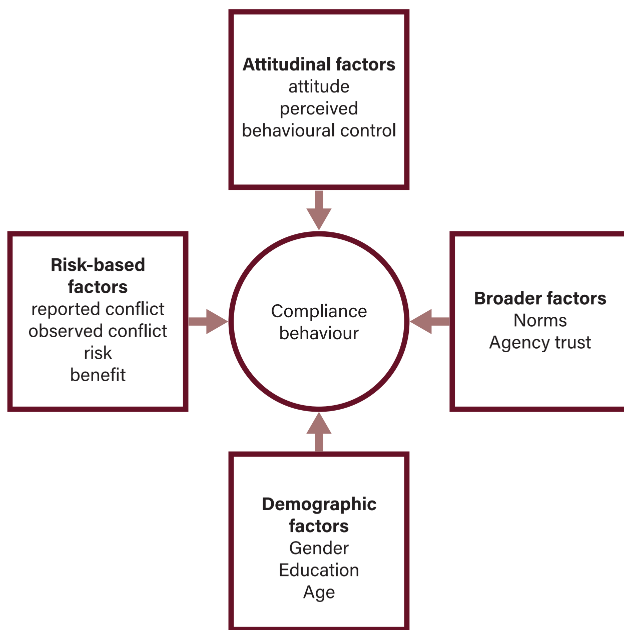

Fig. 2. Factors identified as influencing compliance behaviour (Source: Lischka et al. [43]).

conflict in North America [43]. Some of the drivers are the same as those that influence attitudes, but broader factors such as norms and agency trust are also included (Fig. 2). This model has the potential to be applicable in other wildlife-related contexts.

When people talk about wolves

As we have seen, wolves trigger very diverse associations, feelings and thoughts, so it is not surprising that debates about them are often highly emotional. Facts and myths become blurred, triggering fears and uncertainties [36]. Within these debates, processes can be observed that are typical of many challenges in wildlife conservation today. In addition to problems related to wolves and humans seeking to utilise the same resources (e.g. the threat of damage to livestock), social conflicts arise between groups of people holding different views.

These so-called conservation conflicts, mentioned earlier, are characterised by considerable complexity and dynamics. People feel that their own values are threatened by the attitudes of other groups. To deviate from one's own position is associated with a loss of identity and control, so people become rigid about their own opinions [44]. Due to a lack of willingness to engage in dialogue, disagreements intensify, trust in other groups declines and hardened fronts form that can eventually lead to open confrontation. The wolf itself takes a back seat as interactions between opposing groups become increasingly characterised by anger, at the expense of the relationship with each other [5]. Whereas factual disagreements were the initial cause of conflict, with escalation the focus increasingly shifts to conflict over conflict resolution, to the detriment of a factual resolution process [45]. This dynamic can lead to the conflict becoming more and more complex, extending to other aspects and becoming increasingly distant from the actual trigger (Fig. 3).

For example, rural communities face numerous complex challenges that exist independently of the wolf. The return of the wolf gives citizens in such areas reason to unite in opposition to a wide range of perceived threats to more traditional ways of life [46]. For pro-wolf groups, however, wolf recovery represents restoration of intact nature and a necessary rethinking of a society that has over-exploited wildlife for centuries [26]. This divide, characterised by the use of different symbolism and discussion of deeper values, can be found at regional, transregional, political and economic levels. These complex issues undermine the ability of the various stakeholders to find common ground and build consensus. Trying to solve the problem with technical fixes such as paying compensation for damaged livestock does not do justice to the complex social dynamics and is therefore unlikely to lead to satisfactory co-existence [46].

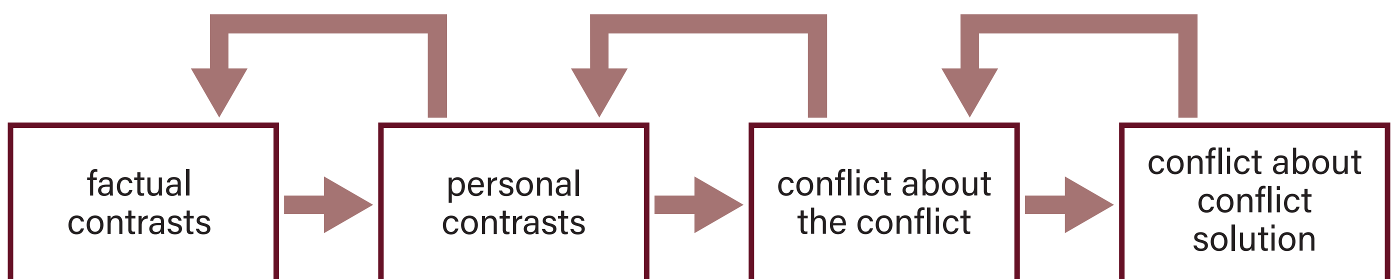

Fig. 3. The escalation of conflict (Source: Glasl [45]).

Mutual trust between partners is one of the most fundamental foundations for dialogue and a key element in addressing conservation conflicts [47]. A trusting relationship is characterised by its positive conditional nature: those involved are mutually dependent on each other and this is generally seen as positive. Trust can arise primarily where people have a similar understanding of a situation. If common understanding is missing, the ability to agree on goals and solve problems is also lacking; consequently, trust is difficult to establish [48]. Cooperative management (co-management), i.e. participatory development of solutions and joint decision-making, can make an important contribution here, especially when there are already controversies about large carnivores in society [49].

Recommendations for management

The following section is a list of recommendations for developing and implementing measures to facilitate co-existence. It is derived from the principles described

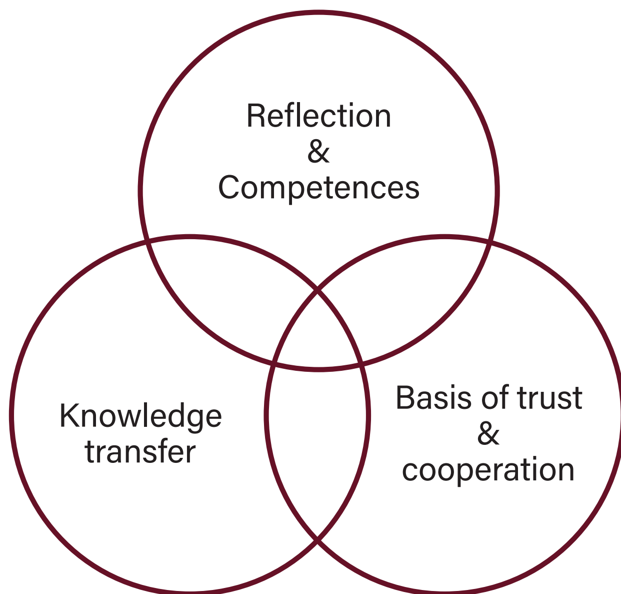

Fig. 4. Categorisation of recommendations for developing management measures.

above as well as other psychological theories and models. The recommendations are categorised into three dimensions (Fig. 4). The first focuses on the individual, who should be supported in his or her reflectivity and competencies. The second dimension is in the social sphere, aiming to build a good basis for trust and cooperation. The third set of recommendations addresses the psychological conditions for successful transfer of knowledge. Livestock protection tools, while essential for co-existence, are not considered here due to their technical nature.

1(a) Stimulate reflection skills

- Nurture awareness of one's own attitudes and value orientations.
- Teach about the emergence of prejudices, group and conflict dynamics and build understanding of and openness to other perspectives.
- Identify what the respective causes of conflict are, who the actors are, at which stage of escalation they are and what the context is.
- Encourage the recognition of deliberate use of symbolism. Recognise underlying patterns of interpretation in the symbolism of the wolf among individuals, become aware of different symbolism.
- Teach how to separate opinions from facts.
- Promote reflection and regulation of emotions in those involved [50].
- Teach about biases in risk perception since, for example, the likelihood of wolf attacks is often significantly overestimated [51].
- Raise awareness of the situation and needs of the groups involved: the general public should be informed about the material as well as the psychological burden on some groups such as livestock owners. Tell real stories and promote contact.

1(b) Promote competence and control

- Improve media skills: recognising misinformation in social media (e.g. fact checking), stimulate critical analysis of sources and content [52].
- Increase the perceived controllability of the situation: equip target groups with adequate knowledge to create a factual basis for discussion and consideration of realistic options for action.
- Promote communication and conflict resolution skills, especially through understanding: actively listen and summarise what is said. Provide training about communication theories and skills for people involved.

2(a) Create a basis for trust and dialogue

- Create a common understanding among all stakehold-

ers about responsibilities, contents and tasks and about the symbolism of the wolf; develop common goals and ensure long-term commitment.
- Identify similarities in values and interests (e.g. preservation of the cultural landscape, love of nature) and highlight them repeatedly.
- Recognise different attitudes and values, include expertise from local actors, communicate in an appreciative way.
- Acknowledge the emotions of all participants: recognise and verbalise fears and take them seriously as they have a strong influence on problem-solving skills. Respond to emotions with empathy and factual information.
- Maintain neutrality and objectivity:
  - » Decision-makers and those responsible for monitoring or consultation on livestock protection must not allow themselves to be influenced by certain interest groups. Actively live and continuously communicate this.
  - » Legal proceedings against poaching should be done by neutral and independent third parties, not wildlife management staff.
  - » Provide objective, neutral information to inform fact-based discussions with a long-term view.
- Establish and maintain transparency:
  - » Explain decision-making processes in wildlife management.
  - » Make scientific data (e.g. from monitoring) comprehensible and as widely accessible as possible.
  - » Ensure that knowledge is kept up-to-date by publishing new information (e.g. changes in wolf occurrence) rapidly and regularly.
- Remain flexible in the choice of options and the degree of participation (co-management); constantly evaluate and re-evaluate the effectiveness of any measures taken and adapt them if necessary.

2(b) Strengthen cooperation among stakeholders

- Promote co-management/participation: involve all interest groups in decision-making processes. Clearly communicate any limits to participation (e.g. legal frameworks).
- Seek cooperation among the different interest groups: meet individuals from other groups to reduce prejudices. Encourage personal contacts and discussions in a respectful atmosphere.
- Provide exchange platforms:
  - » Establish modern and regular exchange opportunities that can take place in the absence of the media, locally and digitally.
  - » Build on existing municipal and local networks.
- Develop a regional scale. Take regional characteristics into account. Get recognised persons of influence on board, provide multifaceted training and maintain close, personal exchanges. Ensure neutral, professional moderation at local information events.
- Find compromises without questioning the values, identity and action space of the groups.
- Know and use the influence of social norms: establish positive/appreciative solution-oriented group norms together with influential group members and spread these through the group.
- Strengthen cooperation with the media. Maintain personal contacts with media professionals. Use reliable, established contacts. Provide neutral, high-quality, transparent and up-to-date facts. Promote proactive work with the media, communicating the relevance of positive stories and providing examples of best practice. Where appropriate, provide word choice recommendations on technical wildlife topics to help press representatives.

3 Consider psychological conditions of knowledge transfer

- Undertake large-scale knowledge transfer and communication activities as early as possible, preferably before wolves become established in the area.
- Identify the existing knowledge, characteristics and needs of the target groups; process knowledge to fit the respective requirements.
- Ensure that the knowledge to be transferred is at an appropriate level of difficulty that neither over- nor under-challenges the respective target group.
- Promote optimal information processing:
  - » Use matching image and text information, graphics and visualisations [53].
  - » Present knowledge on different channels (visual/auditory = images/videos) and make it visually ap-

pealing. Integrate visual attributes that convey trustworthy action and transparency and create excitement or draw attention.
  - » Present information in a consistent and recognisable format, preferably limiting content to a few essential points.
  - » Include active and interactive elements to stimulate prior knowledge and information processing. In this way, new knowledge can be linked to and integrated with existing knowledge [54].
- Consider the context of the knowledge presented: pay attention to what associations the choice of words evokes. Prioritise neutral, fact-based words. Keep in mind that negative information tends to have a much greater impact.
- Ensure transfer to the real world: the knowledge presented must be applicable and specific. Give plenty of examples.
- Include positive stories (e.g. successful testing of methods) which demonstrate feasible knowledge for action that has a high level of relevance to the target audience. Promote positive symbolism and benefits [55]. The knowledge conveyer should have many things in common with the recipient so that identification takes place.
- Use knowledge sources in a well-targeted manner. Focus on high-quality, science-based information. If social media are used, this should be to disseminate science-based information.

Conclusions

Social sciences have much to contribute to human–wildlife co-existence in general and wolf management in particular. Psychological theory and models have improved our understanding of the multitude of factors that form people's attitudes, drive their behaviour and underpin social conflicts between diverse groups, as well as providing pointers towards how such conflicts may best be addressed.

The recommendations in this article can be applied both for the development of management actions and for improving interactions and dialogue among diverse interest groups and individuals. Actions within the context of livestock protection can use the recommendations to ensure that knowledge reaches the intended target audience and the conditions for consensus-oriented communication are created. Equally, our recommendations are intended to empower wolf managers and conservationists to consider the perspectives of livestock breeders so that acceptable solutions can be found collaboratively.

For individual professionals and practitioners, knowledge of the mechanisms of one's own psyche can contribute to reflection and self-empowerment while coping with the stress of conflictual situations and increasing personal perceptions of control and competence. Additionally, social sciences have a key role to play in ongoing research on conservation conflicts in an effort to unify previous findings in an integrative model that further advances the development of strategies for co-existence.

Acknowledgements

We thank the FVA-Wildlife Institute at Baden-Württemberg Forest Research Institute for their support. We are particularly grateful to Micha Herdtfelder of the Lynx & Wolf unit for his advice during development of this article as well as to Stefan Ehrhart and Anne Ulrich for their valuable suggestions.

References

[1] Chapron G et al. (2014) Recovery of large carnivores in Europe's modern human-dominated landscapes. Science 346: 1517–1519.
[2] Mech LD (2017) Where can wolves live and how can we live with them? Biological Conservation 210: 310–317.
[3] Salvatori V & Mertens AD (2012) Damage prevention methods in Europe: experiences from LIFE nature projects. Hystrix 23(1): 73–79.
[4] Bundesamt für Naturschutz (2022) Wolfsvorkommen in Deutschland im Monitoringjahr 2021/2022. https://www.bfn.de/daten-und-fakten/wolfsvorkommen-deutschland.
[5] Redpath SM et al. (2015) Conflicts in conservation: navigating towards solutions. Cambridge University Press, Cambridge.
[6] Redpath SM et al. (2015) Tilting at wildlife: reconsidering human–wildlife conflict. Oryx 49(2): 222–225.
[7] Dickman AJ (2010) Complexities of conflict: the importance of considering social factors for effectively resolving human–wildlife conflict. Animal conservation 13(5): 458–466.
[8] Jacobs MH et al. (2012) Human dimensions of wildlife. In: Steg L et al., eds. Environmental psychology: An introduction. Wiley-Blackwell, pp. 77–86.

[9] Johnston WA & Dark VJ (1986) Selective attention. Annual Review of Psychology 37(1): 43–75.
[10] Driver J (2001) A selective review of selective attention research from the past century. British Journal of Psychology 92(1): 53–78.
[11] Kochanska G & Thompson RA (1997) The emergence and development of conscience in toddlerhood and early childhood. In: Grusec JE & Kuczynski L, eds. Parenting and children's internalization of values: A handbook of contemporary theory. John Wiley & Sons Inc., pp. 53–77.
[12] Kohn ML et al. (1986) Social stratification and the transmission of values in the family: A cross-national assessment. Sociological Forum 1(1): 73–102.
[13] Hermann N et al. (2013) Wildlife value orientations as predicting factors in support of reintroducing bison and of wolves migrating to Germany. Journal for Nature Conservation 21(3): 125–132.
[14] Fulton DC et al. (1996) Wildlife value orientations: A conceptual and measurement approach. Human Dimensions of Wildlife 1(2): 24–47.
[15] Vaske JJ & Donnelly MP (1999) A value-attitude-behavior model predicting wildland preservation voting intentions. Society & Natural Resources 12(6): 523–537.
[16] Schacter DL et al. (2009) Psychology. Macmillan.
[17] Devine PG (1989) Automatic and controlled processes in prejudice: The role of stereotypes and personal beliefs. Lawrence Erlbaum Associates, Inc.
[18] Tajfel H & Turner JC (1986) The social identity theory of intergroup behavior. In: Worchel S & Austin LW. Psychology of intergroup relations. Nelson-Hall, Chicago.
[19] Manfredo MJ et al. (1997) Understanding voter behavior on wildlife ballot initiatives: Colorado's trapping amendment. Human Dimensions of Wildlife 2(4): 22–39.
[20] Lüchtrath A & Schraml U (2015) The missing lynx—understanding hunters' opposition to large carnivores. Wildlife Biology 21(2): 110–119.
[21] Bowen-Jones E & Entwistle A (2002) Identifying appropriate flagship species: the importance of culture and local contexts. Oryx 36(2): 189–195.
[22] Lorimer J (2007) Nonhuman charisma. Environment & Planning D: Society & Space 25(5): 911–932.
[23] Lopez B (1978) Of wolves and men. Scribner, New York.
[24] Radinger E (2019) The wisdom of wolves: How wolves can teach us to be more human. Penguin Random House, UK.
[25] Pluskowski A (2006) Wolves and the wilderness in the Middle Ages. Boydell & Brewer.
[26] Caluori U & Hunziker M (2001) Der Wolf: Bedrohung und Lichtgestalt – Deutungsmuster in der Schweizer Bevölkerung. Forest Snow and Landscape Research 76(1): 169–190.
[27] Arbieu U et al. (2019) Attitudes towards returning wolves *(Canis lupus)* in Germany: Exposure, information sources and trust matter. Biological Conservation 234: 202–210.
[28] Randler C et al. (2020) Attitudes toward and knowledge about wolves in SW German secondary school pupils from within and outside an area occupied by wolves *(Canis lupus)*. Animals 10(4): 607. https://doi.org/10.3390/ani10040607.
[29] Dressel S et al. (2015) A meta-analysis of studies on attitudes toward bears and wolves across Europe 1976–2012. Conservation Biology 29(2): 565–574.
[30] Arbieu U et al. (2020) The positive experience of encountering wolves in the wild. Conservation Science and Practice 2(5): e184.
[31] Jacobs MH et al. (2014) Predictive potential of wildlife value orientations for acceptability of management interventions. Journal for Nature Conservation 22(4): 377–383.
[32] Jacobs MH et al. (2014) More than fear: Role of emotions in acceptability of lethal control of wolves. European Journal of Wildlife Research 60(4): 589–598.
[33] Spering M et al. (2005) The role of emotions in complex problem solving. Cognition and Emotion 19(8): 1252–1261.
[34] Westerman D et al. (2014) Social media as information source: recency of updates and credibility of information. Journal of Computer Communications 19: 171–183.
[35] Garrett RK (2009) Politically motivated reinforcement seeking: Reframing the selective exposure debate. Journal of Communication 59(4): 676–699.
[36] Jürgens UM & Hackett PMW (2017) The big bad wolf: the formation of a stereotype. Ecopsychology 9: 33–43.
[37] Soroka SN (2006) Good news and bad news: asymmetric responses to economic information. J. Polit. 68: 372–385.
[38] Vaske JJ et al. (2006) Bibliometric reflections on the first decade of Human Dimensions of Wildlife. Human Dimensions of Wildlife 11(2): 79–87.
[39] Manfredo MJ (2008) Who cares about wildlife? Social science concepts for exploring human-wildlife relationships and conservations issues. New York, Springer.
[40] Vaske JJ & Manfredo MJ (2012) Social psychological considerations in wildlife management. In: Decker DJ et al., eds. Human dimensions of wildlife management. The Johns Hopkins University Press, Baltimore, pp. 43–57.
[41] Ajzen I & Madden TJ (1986) Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control. Journal of Experimental Social Psychology 22(5): 453–474.
[42] Ajzen I (1991) The theory of planed behavior. Organizational Behavior and Human Decision Processes 50(2): 179–211.
[43] Lischka SA et al. (2020) Psychological drivers of risk-reducing behaviors to limit human–wildlife conflict. Conservation Biology 34(6): 1383–1392.
[44] Lüchtrath A (2011) Bewertung von Bestrebungen zum Schutz großer Beutegreifer durch betroffene Bevölkerungsgruppen am Beispiel des Luchses. Dissertation. Albert-Ludwigs-Universität Freiburg. https://freidok.uni-freiburg.de/data/8347.
[45] Glasl F (1982) The process of conflict escalation and roles of third parties. In: Bomers GBJ & Peterson RB, eds. Conflict management and industrial relations. Springer, Dordrecht, pp. 119–140.
[46] Schraml U (2019) Wildtiermanagement für Menschen. In: Heurich M. Wolf, Luchs und Bär in der Kulturlandschaft. Konflikte, Chancen, Lösungen im Umgang mit großen Beutegreifern. Stuttgart, Eugen Ulmer Verlag, 113–148.
[47] Young JC et al. (2016) The role of trust in the resolution of conservation conflicts. Biological Conservation 195: 196–202.
[48] Egestad PS (2002) Trustful relations: a perspective on trust in actor relations in forestry. Doctoral dissertation, Albert-Ludwigs-Universität, Freiburg.
[49] Linell P & Marková I (2013) Dialogical approaches to trust in communication. IAP.
[50] Johansson M & Karlsson J (2011) Subjective experience of fear and the cognitive interpretation of large carnivores. Human Dimensions of Wildlife 16(1): 15–29.
[51] Decker DJ et al. (2002) Human-wildlife conflict management. A practitioner's guide. Human Dimensions Research Unit, Cornell University Ithaca, New York.
[52] Iosifidis P & Nicoli N (2020) Digital democracy, social media and disinformation. Routledge, London.
[53] Mayer RE, ed. (2005) The Cambridge handbook of multimedia learning. Cambridge University Press, Cambridge.
[54] Hailikari T et al. (2008) The relevance of prior knowledge in learning and instructional design. American Journal of Pharmaceutical Education 72(5): 113.
[55] Bruskotter JT & Wilson RS (2013) Determining where the wild things will be: using psychological theory to find tolerance for large carnivores. Conservation Letters 7: 158–165.