

Attitude change towards wildlife conservation and the role of environmental education

Masterthesis

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Can wildlife and people live successfully together?

Photo: <http://www.indiatouristspots.com/gifs/india-wildlife-tour.jpg>

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1. Summary

Many wildlife populations have shown an ability to live side to side with humans. However, conflicts in forms of depredation and fear still cause low tolerance among people toward wildlife, often resulting in lethal control. Positive attitudes among the public and locals may increase tolerance toward wildlife and is the first step to behavioural change. An attitude is a persistent evaluative bias of a certain object or issue and is based on beliefs and evaluations made out of underlying, personal values. Evaluations follow from emotional responses related to personal relevance and previous experiences with wildlife. Attitudes vary in strength and resistance to persuasion, which is determined by the degree of consistency and ambivalence in beliefs and evaluations. Strong attitudes are mediated by emotions and affect attention, perception, storage and retrieval of information from memory. Factors like age, gender and general education level cause variation in attitudes toward wildlife. A more direct influence on attitudes has personal relevance in terms of economic loss or gains, fear, affection for wildlife, or pleasure experienced from wildlife. Local factors such as the chance of encountering wildlife, agreement with the current wildlife management system, socially shared attitudes and cultural transmission of beliefs seem to have great impacts on attitude formation toward wildlife. Environmental education can help form and change attitudes in favour of wildlife coexistence and can be used to reach local people, the public and children at schools. Proper communication, understanding the attitudes held by the audience, and building environmental responsibility together with people helps foster positive attitudes. The provision of factual information alone rarely leads to attitude change, but positive experiences with wildlife linked to positive emotions do. Art can possibly reach a large proportion of the public and creativity orientated wildlife education can be readily applied in schools. Taken together, attitudes towards wildlife are formed and shaped by personally relevant factors, social and cultural factors and especially emotions.

2. Introduction

Growing concern about the decline of many wildlife populations and the increasing human population makes wildlife conservation currently an important topic. Several large mammal populations like the tiger, Iberian lynx and Prezwalski's horse, have showed a rapid decline over the past centuries (IUCN red list, <http://www.iucnredlist.org/>) and would have gone extinct without intensive conservation programs. However, wildlife management is often focused on management of particular populations in protected reserves, sometimes by literally placing a fence around a certain area and not touching it (Somers & Hayward, 2012). An example is the Oostvaardersplassen area in the Netherlands. This 'zoo-like' perspective of wildlife management could work for smaller animals, but especially large carnivore species need very large home ranges per individual (Linnell *et al.*, 2005). A protected area can maybe give place for a few individuals (Linnell *et al.*, 2005) and is therefore not capable of supporting a viable population in isolation.

It was often assumed that where the human population increases, wildlife populations decrease and that people and wildlife cannot share the same area (Linnell *et al.*, 2001). Wildlife and people, 'the public', were often regarded as two separate items (Manfredo, 2008; Bjerke & Kaltenborn, 1999). However, in Europe and North-America the carnivore and human population both increased (Linnell *et al.*, 2001). This illustrates that large carnivores can live together with humans. It also underlines the importance of proper management strategies and thus the behaviour of people in accepting wildlife in close proximity (Linnell *et al.*, 2001). However, coexistence with wildlife is seldom without conflicts. Depredation on livestock can result in substantial financial losses (Lagendijk & Gusset, 2008; Røskaft *et al.*, 2007, Kleiven *et al.*, 2004, Kaczensky, 2009) and even when it does not directly create serious economic problems, conflict levels can be high with social, symbolic and environmental factors as possible drivers (Thorn *et al.*, 2012).

Wildlife, and especially large carnivore, conservation becomes more and more a matter of managing people rather than managing wildlife (Manfredo, 2008; Bath, 1998). Public and local support is essential for success in wildlife conservation (Bath, 1998); as illustrated with coexistence of humans and carnivores in Europe and North-America (Linnell *et al.*, 2001) and wolves in Italy (Glikman *et al.*, 2011). Involvement of public opinions in wildlife management decisions is a first step towards successful coexistence (Mehta & Heinen, 2001). Positive attitudes toward wildlife and conservation are an important fundament (Heberlein, 2012) for furthering conservation efforts. Therefore it is essential to understand the factors involved in the formation and change of attitudes towards wildlife, and to understand how environmental education can contribute to this.

Environmental education has been a frequently used tool in an attempt to foster positive attitudes towards wildlife (Heberlein, 2012). Unfortunately, environmental education by providing objective information alone has had little to no success in a permanent attitude change. The idea to simply 'educate the public' with information does not seem to work (Heberlein, 2012). However, education based on experience and links to emotion may have a higher potential to success (Heberlein, 2012), but raises the ethical question in which degree an educator should set out to influence other people's values.

The central question of this essay will be to explore how attitudes towards wildlife are formed and what the role of environmental education is in attitude change favouring coexistence with wildlife. The hypothesis is that especially personal relevance in the form of gains or losses linked to wildlife coexistence and affection for wildlife are the important drivers of both negative and positive attitudes. Education will probably be most effective when it provides people information relevant for them, which helps them to solve local problems. It is also thought that becoming familiar with animals via information may create affection.

3. Definition and function of attitudes

3.1. Definition and operation of attitudes

Attitudes stand central in many studies regarding the human dimension of wildlife and can give a clear overview of public opinions about an issue (Manfredo, 2008). They are easily understandable and help to predict behaviour (Manfredo, 2008; Ajzen & Fishbein, 2005). Over the past decades, a great number of attitude studies have been done, but some different definitions of attitudes were used. A few examples of attitude definitions are:

“Feelings, beliefs and tendencies to act toward other persons, groups, ideas or objects” (Schafer & Tait, 1986, p3), or

“A psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor” (Eagly & Chaiken, 1993, p1).

Taken together are attitudes a consistent bias in the preference or aversion towards an "attitude object". An attitude object can for example be an object, person, wildlife population, issue or performance of specific behaviour (Ajzen, 2001).

Attitudes, as 'predispositions about an object', guide us in our daily life. This evaluative bias saves the brain the effort and time of going through the complex process of evaluation and weighing positive and negative outcomes of facing an attitude object, every time we face it (Ajzen, 2001; Manfredo, 2008; Tesser & Shaffer, 1990). Once an attitude (a bias of liking or disliking) towards an object is formed, it guides and quickens a reaction the next time a person is confronted with this object (Hudenko, 2012). Thus, attitudes simply reduce the cognitive load by retrieving evaluative information from memory (Ajzen, 2001; Hudenko, 2012). For example, a livestock keeper with a negative attitude towards large carnivores coming close to livestock might react quicker with shooting an approaching predator than a person with a positive attitude towards large carnivores. Positive attitudes are defined in this essay as 'in favour of human coexistence with wildlife'

3.2. The cognitive, emotional and behavioural components

The definition of a consistent evaluative bias suggests that the following factors play a key role in the operation of attitudes (fig. 1). Firstly, information about the attitude object stored in the memory as knowledge, secondly; affection in the form of liking or disliking an object and thirdly; behaviour, simplified as approach or avoidance of the object (Ajzen, 2001; Manfredo, 2008, Olson & Zanna, 1993). These three components are named and

described differently in many papers, but are mostly known as the cognitive or rational (knowledge), emotional, and behavioural components. The cognitive and emotional components follow separated neuronal paths in the brain, but interact with each other at several phases of processing (LeDoux, 2000). How the three attitude components are tied together is illustrated in figure 1 and by the following example. Farmers know that lynx are predators and can kill sheep (cognitive component). Lynx killed sheep results in reduced income and might make the farmer angry or worried (affective component). These negative emotions would cause disliking for lynx killing sheep and so a negative attitude is formed. This can even result in the farmer shooting lynx close to sheep (behavioural component), especially when the farmer has done this already before when he saw a lynx attacking a sheep (behavioural component).

3.2.1. Cognition, beliefs and knowledge

The cognitive component deals with information gained, stored and retrieved about an attitude object. This information forms a person's knowledge and is based on beliefs (that what a person assumes is true) and perceptions (Schafer & Tait, 1986; Pooley & O'Connor, 2000). Knowledge can come from direct experience via observation or the performance of a behaviour. However, more often beliefs are based on cultural transmission (Hudenko, 2012, Jacobs *et al.*, 2012) of information and can even be derived from myths (Lescureux *et al.*, 2011). For example, some Macedonian hunters and farmers believe that lynx are dangerous and bloodthirsty animals that attack people from trees (Lescureux *et al.*, 2011). This is a belief that is based on cultural transmission rather than information obtained from scientific facts or personal experience.

3.2.2 Affection and emotional experiences

An experience or belief that leads to a strong emotion is stored more detailed in the memory and is retrieved easier than a neutral experience (Dolan, 2002). Emotions drive attitudes and influence the chain of events associated with cognitive processing which extends from attention, through encoding, comprehension, interpretation and elaboration, to memory. (Dolan, 2002; Boninger *et al.*, 1993). Attitudes driven by emotions help the brain to filter out information consistent with the attitudes already held (Boninger *et al.*, 1995; Manfredi, 2008). For example a person with a fear of spiders and thus a negative attitude towards spiders, would notice a spider hanging in the toilet much quicker than somebody with a neutral attitude towards spiders.

The emotional component of attitudes is often named as the affective component. Both terms refer to the same emotional system in the brain. However, there are small differences between the terms emotion, affect and feeling, even though they are used inconsistently in the literature (Jacobs *et al.*, 2012). Manfredi (2008, p.69) describes emotions and affect as follows:

“Emotion is part of affect, or the feeling states, of individuals. Mood is the ongoing background affective state, while emotion is an event-specific spike of affect”

Emotional responses are evoked by a certain stimulus and are only present for a short time period. An emotional, physiological response is interpreted in a situation and leads to the *experience of emotions*; often regarded as *feelings* like happiness, fascination, anger or fear (Jacobs *et al.*, 2012). These experienced emotions (feelings) are linked to attitude objects via associative learning and may lead to positive or negative affection for the object

(Manfredo, 2008; Jacobs *et al.*, 2012). Affection is thus a learned, long term liking or disliking of an attitude object.

3.3. Generalizations

Whether people build up positive or negative affection for an attitude object also depends on the current situation and on previous experiences. For example, a distant encounter with a bear can be experienced as thrilling for some people, but as scary for other people. Previous experiences and beliefs are generalized, linked together and can evoke a positive or negative emotional response when faced with the attitude object (Hudenko, 2012). In the example of the bear, generalizations made about predators in general and indirectly gained information about bears (for example from nature documentaries) are linked together.

Generalizations can also link attitudes together, thereby forming a complex network of connected beliefs, emotions and concepts. Experiences can reinforce generalizations and these generalizations can strengthen an attitude (Hudenko, 2012). Attitudes in turn, reinforce generalization (Ledoux, 2000; Dolan, 2002), thereby creating a positive feedback loop. For example, a mountain lion has attacked a person; this person may now think that all mountain lions attack people and may form a negative attitude. When a mountain lion attacks somebody again, this event may reinforce the person's generalizations about mountain lions and thereby strengthen the attitude.

3.4. Attitudes and values

Attitudes can be vertically structured with values at the bottom, followed by beliefs linked to the values, evaluations of these value-based beliefs and with the resulting attitude at the top. This means that values and attitudes are closely related to each other.

Values are personal, subordinate goals that guide a person's life that may promote personal welfare and fitness (Manfredo, 2008). They can be described as follows:

"General feelings about what is desirable or undesirable" in Schafer & Tait, (1986) p.4.

Examples of values are: security, comfortable life, courage, a world of beauty (Heberlein, 2012, p18). The elements 'feeling' and 'desirable' or 'undesirable' in the definition of values reveals the presence of an emotional component, which links values and attitudes together. Values as subordinate goals guide evaluation of information (beliefs) about attitude objects in positive direction (in line with ones values) or in negative direction (in contrast with one's values) (Manfredo, 2008). For example, somebody who prioritizes security (value) and believes that wolves attack humans (belief) may experience fear when wolves are nearby (emotion). The situation of nearby wolves and the supported beliefs are in contrast with the value of security and thus evoke a negative emotion.

3.4.1 Value orientations and motives

To get a grip on the enormous diversity in values and to facilitate value-orientated research, values are often clustered into different value orientations (Manfredo, 2008; Manfredo *et al.*, 2009, 2009; Schultz & Zenezny, 1999). In human-wildlife relations, two major value orientations are used, namely mutualism and domination (Vaske *et al.*, 2009, Manfredo, 2008; Manfredo *et al.*, 2009). Values such as human-wellbeing and utilization

of the environment stand central in the domination orientation, while people with a mutualism orientation see wildlife as extended family with rights (Manfredo, 2008, Manfredo *et al.*, 2009; Vaske *et al.*, 2011).

Another way to describe value orientations is to quantify the motivation behind a person’s environmental concern via motives (Bruni *et al.*, 2012). Generally, motives are an alternative term for value orientations and both terms refer to the same concept. Some motives explored in relation to environmental concern and human wildlife relations are; egocentric, with the self-central; anthropocentric, with concern for other people; biocentric, with concern for individual animals and ecocentric, with concern for populations and ecosystems (Schutz & Zenezny, 1999; Stern & Dietz, 1994), These value-orientations or motives can be good indicators for attitudes. For example, most positive attitudes towards carnivores in Norway were held by people with ecocentric motives, while most negative attitudes were held by people with more anthropocentric motives (Bjerke & Kaltenborn, 1999).

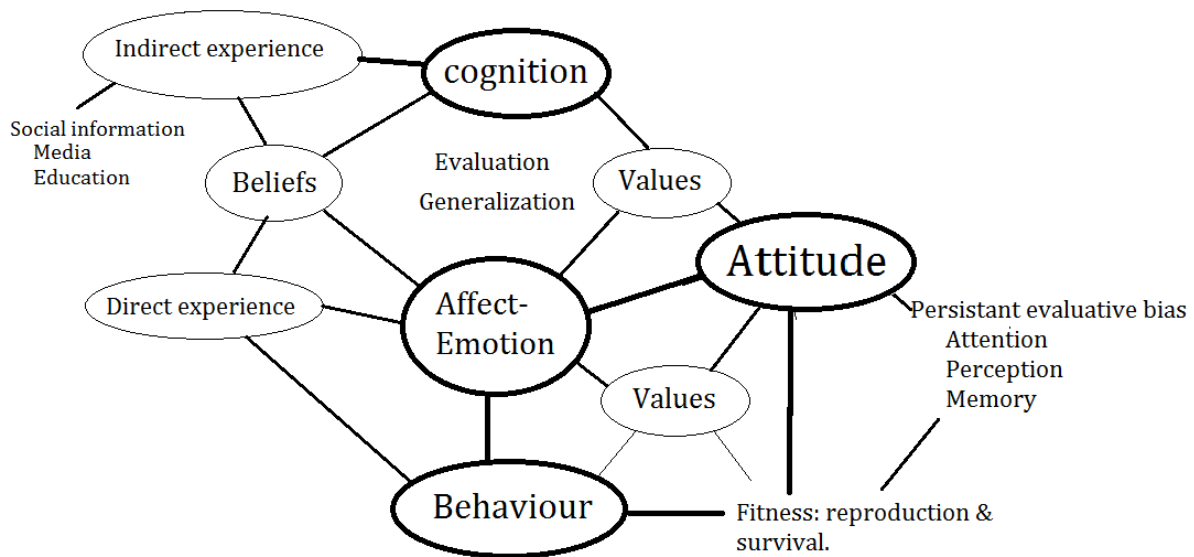


Figure 1: Overview of factors influencing attitudes. Illustration by M.v.Dalum.

4. Factors influencing attitudes held towards wildlife

Understanding how attitudes are driven by knowledge, emotions and behaviours and how this hangs together with values, gives insight into the reasons why people hold particular attitudes toward wildlife. All elements are important for creating positive attitudes toward wildlife. However, emotional responses seem to be the main drivers of attitudes and understanding people's emotional relation with wildlife is most important in the light of wildlife conservation (Jacobs *et al.*, 2012; Manfredi, 2008). Extensive research has revealed an enormous diversity of attitudes held towards wildlife and examining factors influencing this diversity helps understanding the formation and hopefully positive change of attitudes towards wildlife (fig.6).

4.1. Age, gender and level of education

Many surveys try to explain attitude variation in attitudes by correlating demographic parameters as gender, age, income, general education with different attitudes. This may not give a direct mechanistic reason for the variation, but is a starting point in exploring and understanding attitude patterns across populations.

4.1.1. Gender

The effect of gender in attitudes towards wildlife tends to explain some variation in wildlife attitudes. Men usually like more species than women (Kalterborg *et al.*, 2006) and like predatory species more than women (Røskoft *et al.*, 2007; Schlegel & Rupf, 2010; Kleiven *et al.*, 2004). Also, women tend to prefer lovable species and express more disliking for fearsome species (Schlegel & Rupf, 2010). Men also tend to have a more positive attitude towards conservation than women (Røskoft *et al.*, 2007; Butler *et al.*, 2003). From an evolutionary perspective were men generally more outgoing hunters and more eager to take risks, while women took a more care-taking role for children. The preference for more lovable species by women in Switzerland (Schlegel & Rupf, 2010), as for the more mutualistic value orientation in the Netherlands supports this idea of women and care-taking (Vaske *et al.*, 2011). The idea that men are more outgoing and hunting-orientated, is supported by the result that tolerance for hunting was much higher among boys and men (Borgerhoff Mulder *et al.*, 2009), as for their knowledge about species (Borgerhoff Mulder *et al.*, 2009).

4.1.2. Age

Next to the tendency that men have more positive attitudes, young people generally were more positive towards wildlife, conservation and carnivores than older people. This was the case in Norway (Røskoft *et al.*, 2007; Kleiven *et al.*, 2004), USA (Butler *et al.*, 2003) and Croatia (Majić & Bath, 2010; Majić *et al.*, 2011). Also in Uganda, young people were more positive towards problem chimpanzees (McLennan & Hill, 2012) and in the Netherlands, young people had a more mutualistic value orientation (Vaske *et al.*, 2011). This generation shift can possibly be explained by the increasing quality of education and more implementation of conservation facts (Legendijk & Gusset, 2008; Mehta & Heinen, 2001), more influence of modern media and the decreasing importance of tradition and cultural transmission of information (Jacobs *et al.*, 2012; Lescureux *et al.*, 2011). On the other hand, a survey of the environmental attitudes among parents and teenagers in Finland revealed that teenagers were less concerned about the environment than their parents

(Leppänen *et al.*, 2012). Especially the difference with boys was remarkable (Leppänen *et al.*, 2012). The authors explain this as possibly a cultural issue and that adolescents cannot rebel to their parents anymore in this aspect.

4.1.3. Education

A higher level of education correlates in many cases with more positive attitudes towards wildlife; like in Norway (Røskaft *et al.*, 2007), Macedonia (Lescureux *et al.*, 2011), Africa (Lagendijk & Gusset, 2008; Kideghesho *et al.*, 2007, Kaltenborn *et al.*, 2006), USA (Reiter *et al.*, 1999), Nepal (Mehta & Heinen, 2001), but not in the Netherlands (Vaske *et al.*, 2011). This may contribute to the positive attitude-shift toward wildlife among younger generations. Higher education may result in a generally better understanding of life and probably results in more knowledge based, and less feeling based attitudes. In contrary, people with lower levels of education may rely more on cultural transmission of beliefs via tradition and possibly even myths (Jacobs *et al.*, 2011; Lescureux *et al.*, 2011). Culturally shared information may be much more value-laden than information achieved at schools.

4.2. Personal relevance

A more direct reason than gender, education or age for holding a certain attitude toward wildlife is probably the personal relevance of wildlife. Wildlife can be relevant for people in both a negative light; via economic loss (fig.2) (Thorn *et al.*, 2012; Røskaft *et al.*, 2007) or fear (fig.3) (Lagendijk & Gusset, 2008; Lescureux *et al.*, 2011; Johansson & Karlsson, 2001), but also positively in the form of pleasure, recreation (fig.4) (Heberlein & Ericsson, 2005) and economic gain (Mehta & Heinen, 2001). Whether people judge the experience as positive or negative can be related back to the personal values and goals a person holds and one's emotional response on it (Manfredo, 2008; Schafer & Tait, 1986; Heberlein, 2012; Stern & Dietz, 1994). A person that holds domination orientated values may have more negative attitudes towards wildlife, since it can impede productivity for human good. On the contrary, one may hold more positive attitudes based on more mutualistic values; when wildlife is seen as equal sentient beings (Manfredo *et al.*, 2009).

4.2.1. Economic loss or gain

Utilization of nature and experience of economic gain and loss form a robust element in attitudes towards wildlife, since income has strong consequences for a person's life. Especially economic loss experienced from wildlife interactions (fig.2) pulls attitudes quickly in a negative direction (Thorn, *et al.*, 2012; Røskaft *et al.*, 2007; Lagendijk & Gusset; Kideghesho *et al.*, 2007). Negative emotions seem to play a greater role than positive emotions in the support or opposition of, for example, wolf conservation (Slagle *et al.*, 2012). Even though general wildlife attitudes in South Africa were positive and based on the right to exist value, economic loss was an important driver for negative wildlife attitudes (Kaltenborn *et al.*, 2006). This is also illustrated by the establishment of a reserve in Western Serengeti that opposed constraints for livestock keepers, which resulted in negative attitudes among local people (Kideghesho *et al.*, 2007). On the other hand, when people could get game meat from the reserve, attitudes were much more positive (Kideghesho *et al.*, 2007). Similarly, people in both Botswana and Kenya experience high levels of conflicts with wildlife, but people in Botswana hold much more positive attitudes than in Kenya (Sifuna, 2010). The difference is that in Botswana human welfare values stands central, while in Kenya only wildlife welfare is included in

conservation efforts. In Botswana, people could utilize wildlife for consumption and saw it as resource, while in Kenya wildlife was more regarded as a pest (Sifuna, 2010). Economic gain and personal advantages from wildlife can thus result in positive attitudes. Ecotourism can be another good source of income and has a positive future for wildlife populations as for the attitudes and economic benefits for local people (Mehta & Heinen, 2001). However, benefits of tourism around the Sariska tiger reserve in India is still only gained by people living very close to the reserve. Better regulation of the income may foster more positive attitudes so that more households can have the benefits of tourism (Sekhar, 2003).



Figure 2: Livestock depredation imposes economic loss for livestock keepers. Photo: Anita Hunstad

4.2.2. Safety and fear

Safety and health of people is another important reason for attitudes towards wildlife and has strong links with emotions. Especially fear lies behind many negative attitudes, mainly towards carnivores (fig.3) (Røskoft *et al.*, 2007; Lescureux *et al.*, 2011, Lagendijk & Gusset, 2008), or diseases that can spread from wildlife to humans (Manfredo, 2008). Fear of lions was for example, next to depredation on livestock, a driver for negative attitudes in Africa, even though attitudes towards lions were generally positive (Lagendijk & Gusset, 2008). The same was the case in Slovenia, where fear of bears was the key factor in explaining the few negative attitudes among the generally positive attitudes (Kaczensky *et al.*, 2003). One serious incident, where for example a mountain lion attacks a child, can result in a dramatic negative change in the previously positive attitudes towards mountain lions (DeStefano & Deblinger, 2005). Rumours spread quickly after an incident and the perceived risk of a subsequent attack, increases fear and decreases tolerance towards the predator (DeStefano & Deblinger, 2005). The actual chance of attacks might be much lower than perceived by people, indicating how strong fear affects tolerance and risk perception (Hudenko, 2012).



Figure 3: The presence of wolves evokes fear in many people. Photo: Åke Åronson

On the other hand, the experience and history of human-wildlife coexistence and the cultural value of wildlife mediates tolerance of wildlife and may particularly overshadow the negative impact of fear on attitudes (Legendijk & Gusset, 2008). For example, experience in the form of having learned to behave when encountering a wild carnivore (Johansson & Karlsson, 2011) and replacement of false fear-inducing beliefs by actual information about risks, may potentially reduce fear and increase wildlife tolerance and positive attitudes (Hudenko, 2012). Although, repeated exposure and experience is probably needed to reduce fear, since fear based negative attitudes towards snakes did not change after providing information and brief experiences only (Morgan & Gramann, 1989).

4.2.3. Positive experiences with wildlife

Economic loss and risk for safety are considered as negative drivers of wildlife attitudes in the light of personal relevance. Not only negative, but also positive experiences with wildlife are relevant and these can be seen as rewarding (Schafer & Tait, 1986). Outdoor, wildlife related recreation is a good example of this. The attitude towards wildlife, conservation and hunting of



Figure 4: Hunting is an important form of wildlife related recreation. Photo: © NINA.

rural people in Sweden was more positive than the attitude of urban people (Heberlein & Ericsson, 2005). Urban people spend more time working rather than in outdoor recreation, while rural people came easier in contact with activities like hunting and fishing (fig.4)(Heberlein & Ericsson, 2005). Wildlife recreation, also in the form of ecotourism is increasing (Manfredo, 2008; Reynolds & Braithwaite, 2001) and the experience of excitement with encountering wildlife is an important reason for holding positive attitudes (Røskaft *et al.*, 2007; Hudenko, 2012).

4.2.4. Empathy and affection for wildlife

People may regard the presence of wildlife and affection for wildlife as important, also personally. Affection is possibly rooted in empathy and projections of human-feelings on other species (Schultz, 2000; Marseille *et al.*, 2012). Many self-related emotions and feelings of empathy were expressed when people watched polar bears (fig 5.) in Dutch zoos (Marseille *et al.*, 2012). Examples were sadness and feeling sorry for the bears, due to the status of the wild polar bear and welfare concerns of bears in zoos, but also, though to a lesser degree, love and feelings of bonding (Marseille *et al.*, 2012). People with a mutualistic, ecocentric or biocentric value-orientation see wildlife as an extended family, with the right to exist and in a varying degree equal to humans (Manfredo *et al.*, 2009; Schultz, 2000). Manfredo *et al.*, (2009, p.412) described the mutualistic value orientation as follows:

'As similar life forms, wildlife is perceived as capable of relationships of mutual understanding with humans and as deserving of equal consideration'

Mutualism orientated people may feel more empathy for other animals, hold more positive attitudes and are more likely to support wildlife conservation and animal rights organizations (Manfredo *et al.*, 2009).

The growing affection for wildlife in western countries can be caused by the indirect experience of animals in symbols (Jacobs *et al.*, 2012), nature documentaries and highly anthropomorphic projected animals in movies and series (Jacobs, 2009). Affection is especially expressed for familiar mammals and birds among Swiss students, where girls showed more preference for lovable species than boys (Schlegel & Rupf, 2012). Children in Guyana, however, are raised close to wildlife and showed as much affinity for fish as for large mammals and had no preference for flagship species like jaguars and tapirs (Borgerhoff Mulder *et al.*, 2009). Familiarity with wildlife species can thus be an important factor of affection for these species (Schlegel & Rupf, 2012; Borgerhoff Mulder *et al.*, 2009).



Figure 5. Watching polar bears in a zoo can evoke empathy and affection among people. Here the example of the popular 'Knut' in the zoo of Berlin. Photo: Arnd Wiegmann / Reuters

4.3. Local, social and cultural environment

4.3.1. Local situation: distance to wildlife matters

As discussed above, the type of experience people have with wildlife, the personal relevance and thus the link to either positive or negative emotions, determines particularly the attitude outcome. However, the type of interaction and the chance of coming in contact with wildlife is not the same at every place. Local differences like the abundance and density of the wildlife population and human population are strong additional factors in shaping the direct or indirect experiences people may have with wildlife (DeStefano & Deblinger, 2005; Kaltenborn *et al.*, 2006). Tolerance towards wolves in Sweden is for example more a matter of distance towards the nearest wolf territory than being hunter, livestock owner or being member of a nature conservation organization (Karlsson & Sjöström, 2007). This is supported by the increasingly negative attitudes of people toward larger, growing carnivore populations in Norway (Røskaft *et al.*, 2007). These findings both imply that an increasing risk of encounter with a carnivore is generally perceived as negative, probably with fear and livestock depredation as reasons.

This chance of coming in contact with wildlife and influence on attitudes is further underlined by the difference in attitudes between urban and rural people (Heberlein & Ericsson, 2005). Generally, wildlife attitudes (especially towards predators) of urban residents are more positive than of rural residents in Scandinavia (Karlsson & Sjöström, 2007; Røskaft *et al.*, 2007; Kleiven *et al.*, 2004), the USA (Manfredo *et al.*, 2009; Reiter *et al.*, 1999) and India (Agarwala *et al.*, 2010). The chance for encounter and direct interactions is logically larger in rural areas, especially for farmers and hunters (Lescureux, *et al.*, 2011; Heberlein & Ericsson, 2005). However, with increasing populations of both humans and wildlife; rural as well as urban residents became less tolerant to wildlife related problems in New York (Butler *et al.*, 2003). This was regardless a trend towards a more protectionist- and mutualistic value orientation and increased support for conservation over the period from 1984-1996 (Butler *et al.*, 2003). Especially

when the chance for direct encounters is linked to fear and economic loss, this pattern is present. This reveals that both, personal relevance of wildlife and the chance of coming in contact with wildlife matters. This is also the case in a more positive light. For example, rural people in Sweden enjoyed wildlife recreation (fig.4) more than urban people and were therefore more positive toward wildlife (Heberlein & Ericsson, 2005).

4.3.2. Social influence and culture

The social and cultural environment is just as important as the local wildlife situation. Attitudes shared by a group play important roles for individuals (Schafer & Tait, 1986; Boninger *et al.*, 1995; Heberlein, 2012), which means that the social and cultural environment can shape attitudes and tolerance towards wildlife (Heberlein, 2012; Manfredi, 2008; Thorn *et al.*, 2012). Tolerance of wildlife living nearby, sometimes followed by livestock or crop depredation has been shown to be to certain degree a social issue and varies per culture (Manfredi, 2008). These differences between for example rural Norwegians versus Swedes can possibly be linked to cultural differences. Norwegian farmers, who have the tradition to let livestock graze freely (Kaczynski, 1999), generally experience high financial losses due to depredation while Swedish farmers place livestock safely behind fences (Kaczynski, 1999).

Generally, farmer orientated cultures tend to support the more domination value orientation, while hunter-gather based cultures tend to be more mutualistic (Manfredi, 2008), but this is not always as clear and discrete. An interview survey on 9 Mongolian rural inhabitants revealed materialistic, domination orientated values towards wildlife but they also saw themselves as 'one with nature' and showed mutualistic orientations as well (Kaczynski, 2007). This aspect of mutualistic value orientation and culturally rooted respect and appreciation for wildlife also caused relatively high tolerance towards problematic behaviour of chimpanzees in Uganda (McLennan & Hill, 2012). Rural children in Guyana and rural people living near the Manveleti Game reserve in Africa also showed a generally positive attitude and appreciation for wildlife (Borgerhoff Mulder *et al.*, 2009; Legendijk & Gusset, 2008). Culturally shared information about wildlife and a long history of successful coexistence (Glikman *et al.*, 2012; Jacobs *et al.*, 2012) may finally result in social acceptance and thus positive attitudes, also among rural people.

On the other hand, negative attitudes can also be more a social issue, rather than a matter of fierce conflicts with wildlife (Thorn, *et al.*, 2012), as illustrated by the decreasing tolerance towards bears among Croatian inhabitants (Majić, *et al.*, 2011). This was mainly due to a more centralized bear management strategy and local people having less feeling of control over bears (Majić, *et al.*, 2011). Public involvement and support for wildlife management strategies is thus an important step toward successful coexistence with wildlife (Bath, 1998)

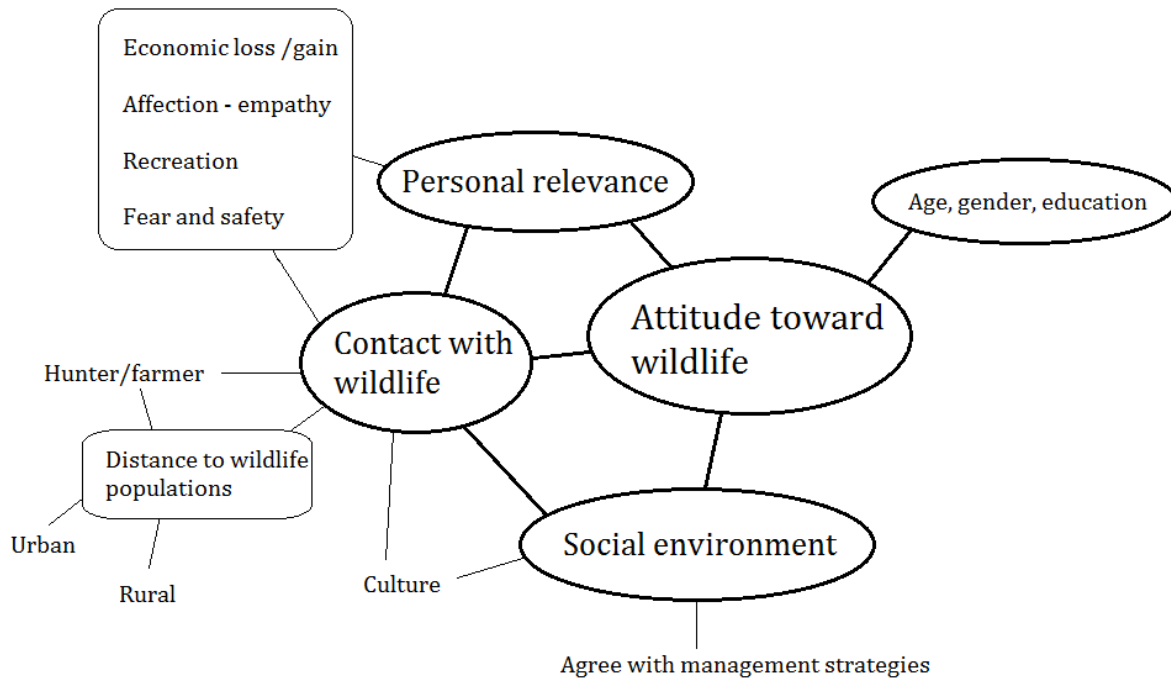


Figure 6. Factors influencing attitudes toward wildlife, illustration by M.v.Dalum.

5. Attitude strength and change

Once attitudes are formed they are relatively resistant to change and persistent over time (Heberlein, 2012; Manfredi, 2008; Ajzen, 2001). However, attitudes can change due to new experiences, insights and other social environments (Heberlein, 2012; Olson & Zanna, 1993). Mostly, attitudes shift slowly over years and these shifts are the consequence of a long-term buildup of experiences and insights (Heberlein, 2012). Nevertheless, attitudes can change rapidly, especially in situational changes when emotion and personal needs are involved, or when attitudes are associated with other, stronger attitudes, rooted in identity tied values (Heberlein, 2012) (fig.7).

5.1. Weak and strong attitudes

5.1.1 Weak attitudes

When speaking about public attitudes, it implies that everybody holds attitudes towards everything. The contrary is actually the case; people do not hold attitudes for every single object and for most objects, people have only weak, relatively neutral attitudes. They have more opinions or no attitude at all (Heberlein, 2012; Manfredi, 2008). Opinions and weak attitudes are often based on a single belief or a few beliefs and a weak evaluation (Heberlein, 2012). These weak attitudes or neutral attitudes can relatively easily change in positive or negative directions but are less persistent over time after change (Heberlein, 2012; Olson & Zanna, 1993; Ajzen, 2001). New, factual information has little effect on neutral attitudes. The contrary is the case for affective experiences and links to deeply rooted values. These can quickly push a neutral attitude in a positive or negative direction (Heberlein, 2012)

5.1.2. *Personal relevance in attitudes*

By linking positive or negative experiences (via emotions) to attitude objects, a neutral attitude can change via associative learning (Olson & Zanna, 1993). The strength of the emotion and personal relevance may greatly affect the degree in which an attitude can change (Olsen & Zanna, 1993; Schafer & Tait, 1986; Heberlein, 2012). The degree of conflict and fluctuating wildlife population sizes can swing public attitudes from positive to negative and vice versa. An example with beavers described by DeStefano & Deblinger (2005) shows how attitudes fluctuate with conflict levels, tightly linked to personal relevance. Beavers were regarded as an important species for the ecosystem in Massachusetts and the small population was protected until it reached 300 animals in 1946. Further banning of trapping caused the beaver population to rapidly increase, with high human-beaver conflicts as consequence between 1990 and 2000. Beavers were seen as pests and attitudes towards beavers became negative.

Weak attitudes can shift radically when a weak attitude is linked to another, already strongly formed attitude rooted in personal values (Heberlein, 2012; Heberlein & Stedman, 2009). People in Wisconsin (USA) have strong attitudes towards deer and deer hunting, but hardly any attitude toward chronic wasting disease (CWD). However, when this disease was discovered among deer and the fear for the disease got spread through the media, people suddenly developed strong attitudes towards the disease (Heberlein, 2012; Heberlein & Stedman, 2009). This shows how a weak attitude object can rapidly be strengthened via linking to an already present strong attitude.

5.1.3. *Strong attitudes*

On most objects we hold only weak attitudes. However, to some aspects we hold strong, very robust, and nearly unchangeable attitudes rooted in many beliefs and strong emotions (Heberlein, 2012; Ajzen, 2001). The stronger an attitude is, the more persistent over time and the greater the resistance to persuading messages (Heberlein, 2012; Olson & Zanna; Ajzen, 2001). Rural people in USA (Wisconsin) and India (Solapur) hold negative attitudes towards wolves and even though a compensation payment is paid for wolf depredation, attitudes towards wolves remained negative (Agarwala *et al.*, 2010)

5.1.4. *Implicit and explicit attitudes*

Strength of attitudes is affected by the way an attitude is formed (Manfredo, 2008). Attitudes merely formed with careful cognitive processing and consideration of information are called explicit attitudes (Manfredo, 2008). Formation of explicit attitudes is thus a relatively conscious and time taking process (Manfredo, 2008; Ajzen, 2001). Implicit attitudes, on the contrary, are tied to strong emotions and tend to be stronger than explicit attitudes. Implicit attitudes are more unconsciously formed and highly based on linking and generalizing feelings rooted in values (Manfredo, 2008). These implicit attitudes are often strong and people have difficulties explaining the reason for their attitude (Manfredo, 2008). These strong emotions imply high personal relevance in either personal gains or losses, or in values important to one's identity and personal goals (Manfredo, 2008, Jacobs *et al.*, 2012). Strong emotional relevance facilitates picking up and remembering (emotionally) relevant information (Dolan, 2002; Boninger *et al.*, 1995; Schafer & Tait, 1986). In the case of strong, affection based attitudes, this information is consistent with one's attitude. This may even block any openness to information not in line with one's strong attitude (Ajzen, 2001, Schafer & Tait, 1986).

5.2. Accessibility and ambivalence of beliefs

5.2.1. Accessibility of beliefs

The more beliefs that support an attitude, the stronger an attitude tends to be. However, not all beliefs are equally important in a situation when evaluative judgment is demanded, and thus the attitude is activated (Ajzen, 2001; Olson & Zanna, 1993). The importance of certain beliefs over others is called accessibility of the beliefs. Only the most accessible beliefs influence attitudes at a given moment (Ajzen, 2001, Manfredo, 2008). More accessible beliefs tend to be 'ready for use' in the memory. This also implies that repeating the same situations and contexts can bring some beliefs more to the foreground and push others more to the background, which can either strengthen or weaken an attitude (Ajzen, 2001).

5.2.1. Ambivalence

The beliefs that support attitudes do not have to be all consistent with each other either. In strong attitudes, beliefs held are often in a high degree consistent and only highly consistent beliefs may be readily accessible (Ajzen, 2001; Olson & Zanna, 1993). However, it is not unusual that attitudes are supported by contradicting beliefs, thereby speaking about ambivalent attitudes (Ajzen, 2001; Olson & Zanna, 1993). An example of rural people in Mongolia illustrates this. They hunt wolves, often with pleasure, and regard wolves as serious threat for livestock (Kaczensky, 2007). At the same time they believe that wolves are intelligent and beautiful animals with an important role in the ecosystem (Kaczensky, 2007). Here the positive beliefs and evaluations of intelligent and beautiful are in contrast with negatively evaluated belief of wolves killing livestock.

A high degree of ambivalence makes evaluative judgment and a possible behavioural response slower and more unpredictable (Ajzen, 2001, Manfredo, 2008; Ajzen & Fishbein, 2005). The contractive beliefs have to be weighed and evaluated more carefully than when beliefs and evaluations are consistent, which demands more rational thinking about pro's and contra's (Ajzen, 2001, Manfredo, 2008). The cognitive component of attitudes is thus generally more active in ambivalent than in consistent attitudes, which are often more emotionally controlled (Ajzen, 2001). Ambivalent attitudes are less resistant to persuasion (Ajzen, 2001, Heberlein, 2012) and can possibly make people more open to new information and experiences to bring more consistency in their attitude.

5.3. Towards attitude change

5.3.1 Cognitive dissonance and attitude change

Another form of inconsistency occurs when people act against their attitudes.

An example described by Manfredo (2008, p.85) illustrates this well; an animal rights activist enjoys a fishing tour with friends. This person may adjust the attitude and may believe that animal rights are not applied on fish. This is called cognitive dissonance: it weakens the strength of an attitude and may pull it more towards neutral or even change (Manfredo, 2008).

When attitudes actually have changed suddenly, these changes are rarely persistent over longer time (Heberlein, 2012; Olson & Zanna, 1993). The new, changed attitude is less

neuronal 'hardwired' in the brain than the previous attitude. The newly gained experience and beliefs can slowly fade to the background again, if they are no longer activated by the situation (Heberlein, 2012; Manfredi, 2008). Old, much more 'hardwired' beliefs and attitudes may take over the newly established beliefs and attitudes. People may fall back to the old attitude when the new one is no longer reinforced (Manfredi, 2008). Therefore, a persistent attitude change is a time taking process, which needs constant reinforcement and may even take several generations (Heberlein, 2012; Manfredi, 2008). Attitudes towards wolves in Utah, USA, remained relatively constant and generally positive, between 1994 and 2003 (Bruskotter *et al.*, 2007). More active positive portrayal of wolves in the media and a decline in hunter participation did not have a major effect and the authors emphasize that attitudes probably have slowly drifted towards positive before this period.

5.3.2. Social environment and heritability of attitudes

The time taking process of attitude change over generations raises the question in which degree attitudes are heritable; socially or genetically. The need for social identification brings uniformity in attitudes shared by a group, indicating how social pressure may shape attitudes (Schafer & Tait, 1986). This social identification may also be strong in family contexts. Parents form an important source of information for children and are likely to play a role in early formation of attitudes. Highly heritable attitudes tend to be stronger and more resistant than low heritable attitudes (Tesser *et al.*, 1998). The relative proportions and mechanism of genetic or socially learned factors on attitude strength and change are a point of discussion, which is not discussed further here. Certain is at least that social influences, like attitudes of family, friends or other social groups a person is involved in, may have a great effect on the formation and change of attitudes.

Correlation of environmental attitudes between parents and adolescents was present in both Denmark (Grønhøj & Thøgersen, 2009) and Finland (Leppänen *et al.*, 2012). Interesting was that in both studies parents were more environmentally concerned than adolescents; which is in contrast with the general tendency of more positive attitudes towards wildlife among younger generations. This may be due to the more unworried life of adolescents (Grønhøj & Thøgersen, 2009) and the tendency to rebel and go against ideas of parents (Leppänen *et al.*, 2012). Maybe attitudes may grow more pro-environmentally after adolescence, when becoming independent, being more self-responsible, and more exposed to environmental concerns. Social influences on individual attitudes are clearly illustrated by an example of a conservation culture created in a public high school in USA. Everybody, both teachers and students, were involved in performing pro-environmental behaviours and reinforced each other in doing so (Schelly *et al.*, 2012). This resulted in commonly shared positive environmental attitudes (Schelly *et al.*, 2012)

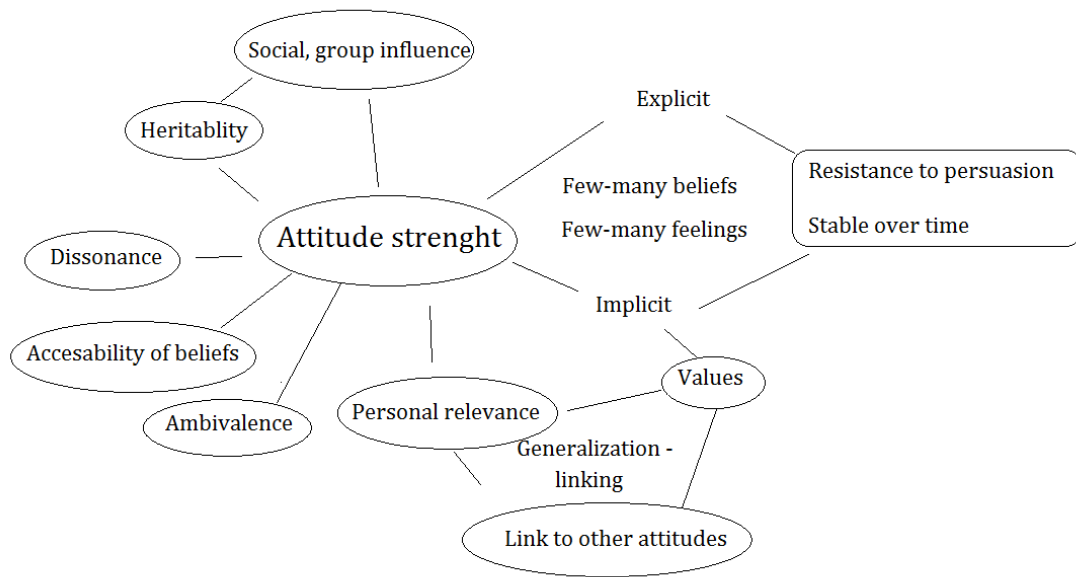


Figure 7. Factors influencing attitude strength. Illustrated by M.v.Dalum.

6. Environmental education and attitude change toward wildlife

6. 1. Ethics and philosophy behind environmental education

6.1.1. Environmental education or advocacy?

Attitudes towards wildlife can change due to newly developed ideas, values, insights and changes in experiences. These changes are not always in the direction of sustainable coexistence with wildlife. Many efforts have been made to educate people with a view to changing attitudes in favour of wildlife conservation. However, what is actually the aim of education, and how is it interpreted in relation to environment and wildlife? The definition of education is described by Mappin & Johnson, 2005, p.2 as follows:

'The development of the mind's capacities and character through acquisition of knowledge and abilities to assess and evaluate this knowledge',

Environmental education is, on the other hand, often meant to elicit behavioural change, personal change or social change (Mappin & Johnson, 2005). Here, education rather has the aim to change attitudes and behaviour. It becomes more a matter of teaching *for* rather than *about* the environment (Disinger, 2005). Education for the environment suggests creating conservation friendly behaviours and generating pro-conservation attitudes (Palmer & Muscara 1991), thereby actually manipulating people. These forms of 'education' become much more value-laden than only the communication of scientific facts (Disinger, 2005). The question here is who decides what the right behaviour is and which underlying values, philosophies and even ideologies lay behind it.

The separation between education and advocacy becomes rather vague since advocacy is described by Mappin & Johnson (2005, p.2) as follows:

'Advocacy infers the act of pleading a cause, or encouraging someone to support, speak or write in favour of a particular behaviour or action'

Advocacy can even move towards indoctrination when no alternative options and opinions are provided and when the content is taken to be self-evident or true (Mappin & Johnson, 2005). This raises the ethical question of freedom and democracy in environmental education (Mappin & Johnson, 2005).

The purpose of science is providing objective information and the question is how this can be applied in education and in solving local problems with wildlife. Even science and science communication cannot be 100% objective. Selection and interpretation of information makes it already subjective and value-laden (des Jardins, 2005). The same is the case for education; educators hold values themselves and may select and interpret information based on this (Jickling, 2005). An educator should be aware of a certain degree of subjectivity and manipulation. Thereby it is important is to find a balance between ethics, emotion, science, political arguments and underlying values (Jickling, 2005).

6.1.2. The aim of education in this essay

Environmental education will here be reviewed with the purpose to change attitudes towards sustainable coexistence with wildlife. A certain degree of value-laden communication can be accepted when benefits of coexistence with wildlife is taken into account from the four main environmental value-orientations. Environmental education will therefore take in account personal gains (egocentric), benefits for future generations and the community (anthropocentric), wildlife welfare and rights (biocentric) and biodiversity and ecosystem productivity (ecocentric) (Schultz & Zenezny, 1999).

6.2. The audience and communication

Effective education starts with public involvement and choosing the audience. Different groups may demand different purposes, approaches and ways of communication (Schafer & Tait, 1986; Mappin & Johnson, 2005). The motivation to change, openness to new information and willingness to participate in environmental education is crucial for positive attitude changes toward wildlife (Crano & Pristlin, 2006; Olson & Zanna, 1993)

6.2.1. Schools and young people

Young people are willing to explore new ideas and are building up their personal values and attitudes (Heberlein, 2012; Leifländer *et al.*, 2012). Especially before the age of 11 years, environmental education can create great success in fostering pro-environmental attitudes and affection for wildlife (Leifländer *et al.*, 2012; Kidd & Kidd, 1996). Schools are therefore a good place to apply environmental education (Schelly *et al.*, 2012; Kidd & Kidd, 1996).

The primary purpose of schools is to provide students with knowledge that helps them understanding and participate in society (Stevenson, 2007). The idea of caring for the environment and wildlife could be included in teaching social responsibility (Disinger, 2005; Stevenson, 2007). Students at schools are easily approachable via classroom programs, but also via more practical, outdoor experiences with wildlife (Easler-Dettman & Pease, 2010). The social surroundings in schools can work in advantage for positive attitudes. In groups there is a tendency towards uniformity in attitudes, mutually reinforced by teachers and students (Schelly *et al.*, 2007; Schafer & Tait, 1986; Chaiken & Stangor, 1987).

6.2.2. The general public

The general public is more difficult to reach than students in schools, since participation in environmental education is more dependent on motivation and the possibility to participate. The purpose of environmental education is here to generate more positive attitudes, by increasing awareness of benefits gained from wildlife and creating a general understanding of wildlife.

Most people hold relatively neutral attitudes toward wildlife but attitudes can vary from strongly positive to strongly negative (Manfredo, 2008; Heberlein 2012; Røskaft *et al.*, 2007; Jacobs, 2009). The motivation to participate in environmental education programs may be highest among people who already have a positive attitude (Heberlein, 2012; Mosler & Martens, 2008). However, also relatively neutral or slightly positive attitudes can be pulled in favour of coexistence with wildlife. Here the general level of education, gender and age may matter and can help understanding or selecting the audience for participation in environmental education.

Different ways to approach the general public include media, like television and internet (Jacobs, 2009), zoos (Marseille *et al.*, 2012), outdoor education programs (D'Amato & Krasny, 2011) and ecotourism (Tisdell & Wilson, 2005). These last two options demand a certain degree of interest in wildlife and the environment to make people participate. An education program for bear conservation in Ecuador reached the public via workshops, a project newsletter, a radio program and a 'Bear Day' with interactive educational activities (Epinosa & Jacobson, 2012). This program was however, directed to people living within the reserve and can maybe be more regarded as local than the public.

6.2.3. Local people

Many educational programs are directed to local people in conflict areas. These programs are often focused on solving wildlife related problems or increasing tolerance (Thorn *et al.*, 2012; Sifuna, 2010; Zajac *et al.*, 2012). Hereby it is especially important to provide relevant information and take into account the cultural and historical background of the

residents (Manfredo, 2008). This may be difficult when cultural traditions cause for example high degrees of depredation like in Norway, and alternating traditional ways of livestock keeping could particularly solve the problem (Kaczensky, 1999).

Also looking at the economic and social situation of local people must be taken into consideration. Poor people are more negative towards conservation when it imposes economic costs, but are not necessarily less concerned about wildlife and the environment (Shrestha & Alavalapati, 2006). On the other hand, providing economic and personal benefits from conservation could shift these people towards more positive attitudes (Kideghesho *et al.*, 2007). Local people can be approached best via one-to-one, personal communication or in small groups (fig. 8). This is more effective in collaboration and fostering positive attitudes than large group or mass-media orientated education programs (Heberlein, 2012; Mosler & Martens, 2008; Lescureux *et al.*, 2011).

6.2.4. Understanding the audience

The next step is to examine the attitudes held in the target group and the potential for change (Schafer & Tait, 1986). Too many education programs have been started without actually understanding the audience's attitudes and motivations to hold this attitude; resulting in a waste of time and money (Heberlein, 2012). Underlying values, personal needs and social, cultural and situational influences need to be addressed.

In the case of teaching young people the focus may be more on understanding the cultural background and attitudes of the parents and the teachers at schools. When orientating more towards the public, a larger variety of attitudes may be present. Here, the focus on neutral or slightly positive attitudes may be more effective (Heberlein, 2012; Manfredo, 2008). For example, communication of future environmental problems works only on future orientated people, who already are concerned and for whom the environment is personally relevant (Carmi, 2012).

When knowing the attitudes held by the target group, the educator should not differ too much in opinion from the audience (Schafer & Tait, 1986). This may enhance credibility among the audience. Distrust among local people for educators or scientists, is a commonly encountered problem in communication with local people (Lescureux, *et al.* 2011). Especially when local information has passed through several generations and is assumed to be the truth, people can be rather skeptical towards science (Lescureux *et al.*, 2011; Heberlein, 2012). Showing respect for, and interest in local people is in any case crucial (Chaiken & Stangor, 1987; Schafer & Tait, 1986; Lescureux *et al.*, 2011). Good contact with locals and eventually asking a local person with status to present the topic can be a good strategy (Lescureux *et al.*, 2011; Heberlein, 2012; Schafer & Tait, 1986). For example, acceptance of black bears was rather dependent on the feeling of trust toward bear management in rural communities. In urban communities, on the other hand, the focus on personal control over negative interactions with bears was more important (Zajac *et al.*, 2012). In any case, good communication between educators and the public is crucial for moving towards successful coexistence with wildlife (fig. 8) (Zajac *et al.*, 2012). People need to have a feeling of control and freedom to keep their own opinions. The public must feel important and there must be space for interaction and discussion (Schafer & Tait, 1986; Kaczensky *et al.*, 2003; Bath, 1988; Majić *et al.*, 2011). Especially when focused on attitude change, it can be important to offer the public different points

of views with argumentations (Jicklings, 2005). This may help people to think critically and creatively. It can help them to solve a local problem concerning wildlife and may thereby possibly change attitudes.



Figure 8. Active involvement and respect for local people is essential or successful education and conservation programs. Photo: John Linnell

6.2. Information orientated education

6.2.1 Providing information?

When problems with wildlife occur and conservation biologists or educators try to solve it, it is often thought that just 'educating the public' will fix the problem (Heberlein, 2012). This is frequently done through the provision of scientific facts, but its effect is worth discussing.

Existing attitudes influence attention, selection and interpretation of information and can strengthen both positive and negative attitudes (Manfredo, 2008; Olson & Zanna, 1993; Ajzen, 2001). People who already hold a positive attitude are eager to strengthen and support their attitudes with more beliefs in line with their existing attitude (Mosler & Martens, 2008; Heberlein, 2012). The same can happen for negative attitudes (Heberlein, 2012; Ajzen, 2001). Objective information about wildlife can reveal that for example that depredation is more serious, or the population size of a conflict species is larger than previously believed. This might result in the opposite effect than intended and so even create more negative attitudes than positive attitudes (personal communication J.D.C.Linnell).

6.2.2. Drawing attention and awareness

On the other hand, information can draw attention to a problem related to wildlife like a conflict or decline of wildlife populations. It may give insight and awareness which people otherwise would not have seen. Promoting flagship species in wildlife conservation can for example increase awareness (Schlegel & Rupf, 2010). However, being aware of a problem does not mean being concerned about a problem (Kollmus & Agyeman, 2010), but awareness is at least a first step towards concern. Creating attention and awareness for wildlife implies coverage of a large group of people and usage of media or education programs at schools may be options.

6.2.3. Replacement of wrong beliefs

When attitudes are based on misinformation, information provision can be enough to change neutral or already slightly positive attitudes, when no other personal needs are involved (Schafer & Tait, 1986). Information can also clarify a lot of culturally transmitted beliefs and myths that evoke fear. Fear is an important driver of negative attitudes, especially towards large carnivores (Lescureux, 2011; Røskoft, 2007; Kaczensky, 2003). Information about the behaviour of animals, but more importantly, how people can behave when confronted with a predator can reduce experiences of fear remarkably (Hudenko, 2012). This information can help when general attitudes are already positive (Kaczensky, 2003) but may not be sufficient when attitudes are negative. Information only could for example not reduce fear for snakes (Morgan & Gramann, 1989).

6.2.4. Problem relevant information

Objective scientific information can be used to solve problems locally. Hereby it is especially important to take the situation of local people into account and listen to their opinions (Schafer & Tait, 1986). Educators can provide scientific facts and help people to interpret it and translate it into action in favour of both wildlife and humans (Mappin & Johnson, 2005). Providing information about for example benefits of bear conservation and the actions that can be taken to reduce conflicts, increased tolerance towards bears (Slagle *et al.*, 2013). As discussed earlier, this form of education becomes less objective and more value-laden, since educators decide to foster wildlife tolerant attitudes and select information based on this goal (Mappin & Johnson, 2005). Education focused on solving environmental problems with the help of education can also be applied on schools and may build responsibility among students (Jickling, 2005; Stevenson, 2007; Schelly *et al.*, 2012).

6.3. Persuasion and experience based education

6.3.1. Persuasive messages

The degree to which neutral, objective information about general biology of a species, contributes to the constitution of positive attitudes towards wildlife is very low (Heberlein, 2012). People with neutral attitudes often do not care about information and a lack of interest and personal, emotional relevance might prevent effective processing and remembering of information (Heberlein, 2012; Jacobs, 2009; Jacobs *et al.*, 2012). Persuasion, on the other hand, involves strategies to manipulate people's attitude and do include more than only objective information. Persuasive messages are frequently presented by a single speaker who has to appear trustworthy and credible (Olson & Zanna, 1993; Schafer & Tait, 1993). Persuasive messages can be given indirectly by giving hints and pushing people in the desired direction by giving affective cues. This is often described as the peripheral way of persuasion and avoids direct confrontation with the issue, while the central way of persuasion directly confronts people with the issue (Chaiken & Stangor, 1987). The central way of persuasion involves active, message relevant, thinking (Chaiken & Stangor, 1987).

Persuasive messages focused on key beliefs resulted in more positive attitudes among hunters for the regulation of lead shot (toxic shot in small game hunting) in USA (Schroeder *et al.*, 2012). The message supported the idea that the ban of lead shot would have benefits for wildlife, improves the hunting opportunity for hunters, the image of hunters and that it avoids unnecessary governmental regulation (Schroeder *et al.*, 2012).

Structuring the message may determine effectiveness, as for including affective, personally relevant information (Olson & Zanna, 1993). For example, placing the most important argument last works best when the audience is already interested, but placing this first works best when the audience is neutral or uninterested (Olson & Zanna, 1993).

6.3.2. Learning by experience

Experience and affection are some of the key factors driving attitudes, and can be used effectively in environmental education. Early outdoor experiences among children did not explain individual variation in environmental attitudes (Ewert *et al.*, 2005). However, people who actively participated in outdoor adventure education programs did experience personal growth and changes in more pro-environmental behaviours (D'Amato & Krasny, 2011). However, these effects are often not persistent over time (Heberlein, 2012). After education focused on being 'in' nature (fig. 9), students had more positive attitudes than with in-class education only (Dettmann-Easler & Pease, 1999). These positive attitudes were also present after 3 months, while this effect was not present for classroom education only. These effects of a more persistent pro-environmental attitude were especially prominent in children below the age of 11 (Leifländer *et al.*, 2012).



Figure 9: Outdoor education about fish and wildlife in Idaho.

<http://dev.ifwf.org/wp-content/uploads/2012/02/WildlifeEducation.jpg>

Adult-focused experience based education can include wildlife related workshops (Epinosa & Jacobson, 2011), which can be relevant in promoting coexistence with wildlife at a local level. This can for example be practical workshops in alternative ways of protecting livestock or learning how to behave when confronted with a predator. Education can also be implemented in wildlife recreation experiences, of which ecotourism is a good example (Tisdell & Wilson, 2005). The problem with ecotourism is that only people who are already interested engage in these activities and educational values depend on many other factors (Reynolds & Braithwaite, 2001). However, positive experiences through ecotourism can be spread among friends and family and may raise interest and curiosity, which may possibly contribute to a more positive attitude toward wildlife.

6.4. Affection based education and the role of art

Affection for wildlife may mediate how outdoor and experienced based education may influence attitudes. The implementation of affection and emotional experiences in environmental education strongly reduces the objectivity, but may increase the effectiveness, of fostering positive attitudes toward wildlife.

6.4.1. Preferences for particular animals

Positive emotional experiences of seeing a wild animal or coming in contact with a wild animal are the consequence of conditioning. The emergence of positive emotions is linked to an animal as a stimulus (Jacobs, 2009). Next, and maybe more importantly is the recognition of emotions in other animals, thereby creating empathy for the animal's feelings (Jacobs, 2009). Humans have the tendency to anthropomorphize with other animals, which can lead to misinterpretations of behaviour but can also strengthen emotional bonds (Jacobs, 2009). Innate predispositions for liking or disliking can enhance conditioning of emotional reactions towards some animals, which might explain the strong fear responses for snakes, spiders or large predators and the affective reactions on more 'lovable' species and young animals (Schlegel & Rupf, 2009).

6.4.2. Indirect experiences

Conditioning of positive experiences can be implemented in education programs. Especially at schools young children can become familiar with animals by for example petting them under the supervision of adults (Kidd & Kidd, 1996). Also modern media and more indirect experiences can shape attitudes towards wildlife. Television and internet cannot only be used to create awareness and draw attention, but may also work to create more affection. Hereby the focus can lie especially on showing animals familiar to the public and by showing similarities between wild animals and pets or humans (Jacobs, 2009). This does not directly have to involve anthropomorphism, but can be based on the increasing evidence for similarities in emotions and cognition between humans and other animals (Manfredo, 2008). This argument caused for example high tolerance to problem chimpanzees, since they were seen as 'like people' (McLennan & Hill, 2012)

6.4.3. Art and creation of affection

Several forms of art can be good ways to create affection for wildlife, based on indirect experience. Art can reach people via paintings, photography, music, stories, movies and nature documentaries. The effect of wildlife related art forms has not been explored in detail yet, but may be promising in the future. Viewing, but especially creating art evokes emotions and stimulates linking emotions, deeper lying personal values, past experiences and beliefs together (Lawrence, 2008). Thus via art, feelings towards wildlife can be linked with other personal feelings, which may give a deeper meaning to wildlife. This can make wildlife more emotionally relevant. Since emotional relevance promotes storing and remembering of information better, wildlife related art can enhance learning about wildlife (Lawrence, 2008).

A visual artist can portray animals in a different way than in reality and can evoke an emotional response in the viewer via communicating his/her own fascination for animals through the artwork. Aesthetical experiences activate emotion related areas in the brain, while a neutral stimulus does not (Cupchick *et al.*, 2009). Humans also have an innate affection for biological movement, which can be implemented in art and evoke aesthetical

experiences (Jacobs, 2009). Also showing emotions (fig.10c) of especially 'lovable' animals can be depicted excellently via art by showing for example mothers with offspring, animals showing affection for each other or an animal in the battle of survival. A point of discussion can be the degree of anthropomorphism that is accepted in order to make people learn about wildlife via art. This can be a very effective way in generating empathy, but also in learning about a species via recognizing human-elements in it (Jacobs, 2009; Manfredi, 2008). However, when learning about behaviour and becoming familiar with other animals stands central, it may be best to stay close to reality, which forms a challenge for the artist.

6.4.4. *Forms of art suitable for education*

Another way to connect people with wildlife is via written stories (fig. 10d) as well as movies. Stories can create strong identification with the main character which can be a non-human animal (Bigger & Webb, 2010). Many children visiting zoos get excited by seeing clownfish, the species of the main character in the animation movie 'Finding Nemo' (fig. 10a) (Jacobs, 2009). Non-human animals as main characters in stories, demand a high degree of anthropomorphism, but are a powerful way to make children learn about wildlife (fig.10ab). Wildlife related creativity could be promoted more at schools, for example in the form of creating wildlife related stories (Bigger & Webb, 2010), a wildlife film-making project (Harness & Drossman, 2011) or through photography (Farnsworth, 2011).

Other ways of bringing people in contact with art can be via links to other interests like traveling and recreation. Wildlife art can be placed in travel brochures to promote ecotourism. Zoos are also a more general form of entertainment and are not exclusively visited by environmentally concerned people (Marseille *et al.*, 2012). Art exhibitions at zoo's can thus potentially reach a reasonable proportion of the public.

Important with art is, in the light of the discussion around indoctrination and advocacy, that it is free to be interpreted by the viewer and the artist (Lawrence, 2008). It helps people to understand and interpret their environment and helps exploring their own personal and emotional relevance of wildlife. Art can therefore be a fair medium to foster positive attitudes towards wildlife and may have a promising future.

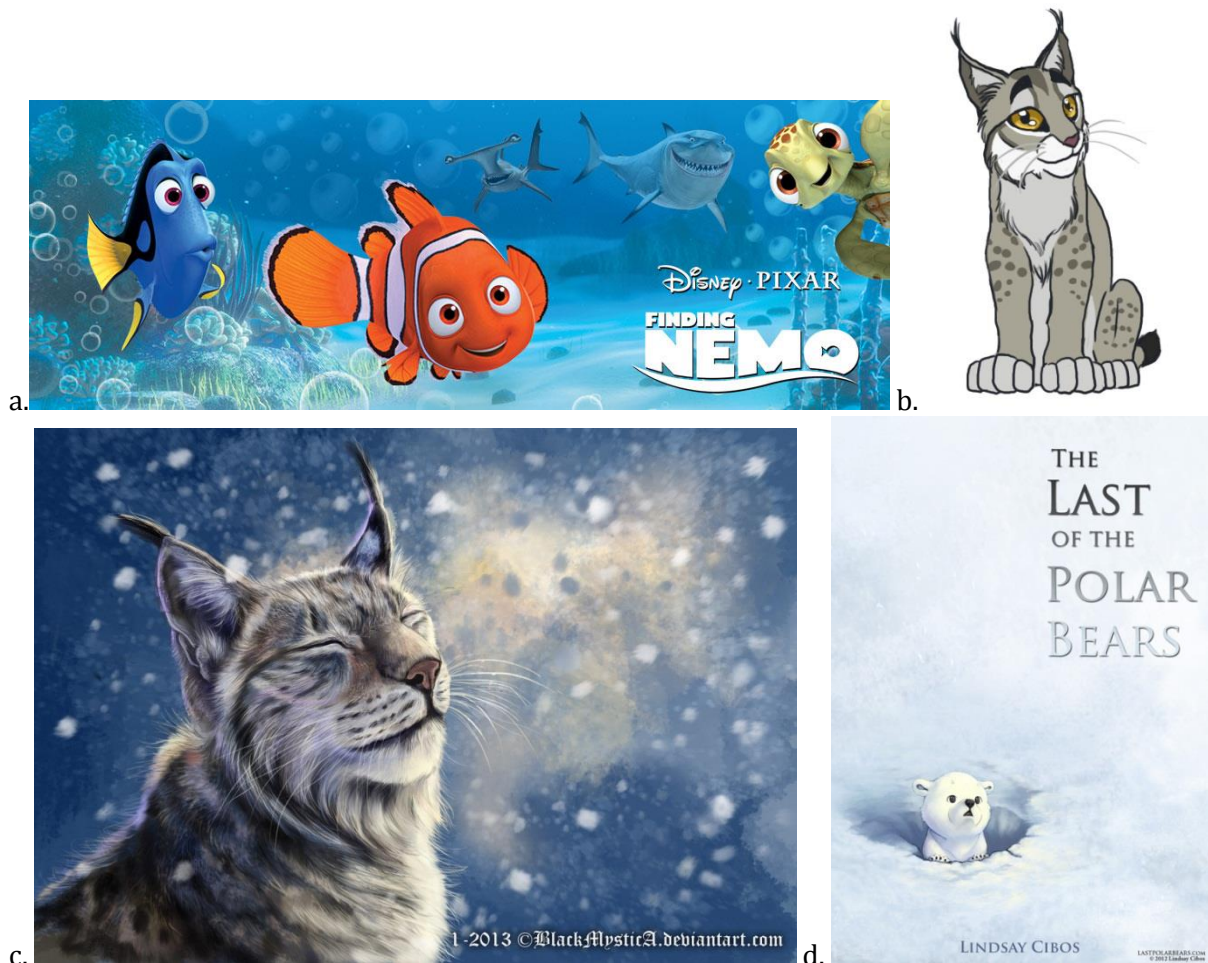


Figure 10. Examples of art that could create affection. Animation movies, with anthropomorphized animals in the main role (a), cartoon animals (b), realistic paintings of animals showing emotions (c) and comic stories with cutely drawn animals (d). *Finding Nemo*: @Disney, Lynx (b,c) by M.v.Dalum, polar bears by Lindsey Cibos.

7. Conclusions and discussion

The central question was how attitudes towards wildlife are formed and what the role of wildlife education is in fostering positive attitudes towards coexistence with wildlife. It was expected that especially personal relevance in terms of gains and losses and affection towards wildlife stand central. It was also expected that information provision can change attitudes by creating new insights and possibilities to solve problems. Increased familiarity with animals via information was also expected to create more affection for wildlife.

Personal relevance was an important factor in shaping and forming attitudes. Especially when economic losses or emotions as fear are involved, attitudes turned negative (Røskaft *et al.*, 2007; Thorn *et al.*, 2012; Lagendijk & Gusset, 2008; Kaczensky *et al.*, 2003). On the other hand, economic gains, positive emotions of contact with wildlife and empathy for wildlife foster more positive attitudes. It is interesting that especially negative emotions are stronger than positive emotions in shaping attitudes (Slagle *et al.*,

2012). From an evolutionary perspective and in the light of survival, avoiding negative stimuli is more important than approaching positive stimuli. This seems also to shine through in attitudes. However, seen from a relatively safe environment, where conflict levels are low, these negative biases can be overshadowed by positive emotions for wildlife. Generally, there is tendency toward more positive attitudes with increasing distance to wildlife populations; for example in cities (Karlsson & Sjöström, 2007; Røskaft *et al.*, 2007).

The cultural and social environment has a stronger effect on attitudes than actually expected. Especially the cultural transmission of beliefs and attitudes is strong, which could be explained by social norms (Manfredo, 2008; Heberlein, 2012) and the tendency towards attitude uniformity in groups (Schafer & Tait, 1986). This underlines also that most attitudes are indirectly formed, without direct experience with the attitude object – in this case wildlife (Jacobs *et al.*, 2012). This may again explain why attitudes of people living close to wildlife often are different than attitudes of city residents and why western cultures differ from African, South-American or for example Mongolian cultures in their view on wildlife (Kaczensky, 2007; Kaltenborn *et al.*, 2006; Borgerhoff Mulder *et al.*, 2009; Manfredo *et al.*, 2009). Western countries are more exposed to modern media than minority groups living close to wildlife, like in Mongolia (Kaczensky, 2007). This makes information spreading about wildlife, without ever coming in contact, more possible in Western countries (Jacobs *et al.*, 2012). This may in turn shape other attitudes than when coming directly in contact with wild animals. Indirect experiences probably caused the public attitudes to slowly drift towards a more positive view (Vaske *et al.*, 2011; Manfredo *et al.*, 2009; Butler *et al.*, 2003; Glikman *et al.*, 2012;) towards wildlife in western cultures and may have contributed to the growing support for conservation.

However, problems still occur frequently in less developed countries, where general education levels are low and people come more often in contact and conflict with wildlife. Many negative attitudes are the result of economic loss. Though, losses can be substantial, it does not always impose a serious crisis (Thorn *et al.*, 2012; Lagendijk & Gusset, 2008; Kaczensky, 1999). The cultural influence on attitudes plays an important role in many cases. Especially where rural people have a long history of coexistence with wildlife and when wildlife has cultural values in terms of respect, attitudes tend to be positive (Kaczensky, 2007; Glikman *et al.*, 2012; Lagendijk & Gusset, 2008; McLennan & Hill, 2012). It seems especially a matter of culturally shared attitudes and the degree of tolerance that affects how people experience conflicts. Agreement with current management strategies and implementation of human rights in wildlife conservation seems to greatly increase tolerance to wildlife (Slagle *et al.*, 2012, Zajac *et al.*, 2012; Bath, 1988; Majić *et al.*, 2011). This means that involvement of the public and giving a feeling of control are necessary ingredients for successful coexistence with wildlife.

It was also expected that that provision of mainly facts-based information via environmental education, could create more positive attitudes and promote acceptance of wildlife. This is actually not the case because people with strong negative attitudes are highly selective in their attention, perception and willingness to remember information (Heberlein, 2012; Boninger *et al.*, 1995; Manfredo, 2008). However, already positive attitudes toward wildlife can be strengthened by the provision of information. It may provide more arguments for maintaining the attitude (Ajzen, 2001; Manfredo, 2008;

Mosler & Martens, 2008). People with neutral attitudes are more open for change but seem not to care about only neutral information (Heberlein, 2012). More than only information is needed in environmental education. This opens up the ethical question to which degree it is accepted to influence and manipulate people by persuasion instead of providing objective scientific facts. The aim of education and the purpose has therefore to be carefully considered by the educator (Schultz & Zenezly, 1999).

Education can contribute in fostering positive attitudes and promoting tolerance among local people. Information about how problems can be solved can provide benefits for both wildlife and people (Sifuna, 2010; Slagle *et al.*, 2013; Zajac *et al.*, 2012). Especially in developing countries where conflict levels are high the need for change may be high. Education can possibly make people aware of how to utilize benefits from wildlife and how losses can be avoided or reduced. Using affective cues and positive experience-based education can build affection for wildlife among the public (Heberlein, 2012). A good start is at schools, where young people come together with the purpose of learning and where attitudes can be formed and reinforced (Schelly *et al.*, 2012). Where children learn to respect other people, the step towards respect for other species is not large (Jickling, 2005; Stevenson, 2007). This should be built in regular education programs. Learning via art can be a fair way to communicate affection for wildlife (Lawrence, 2008; Song, 2012). Art-based learning can effectively be added in regular education programs at schools. Art can evoke emotional responses and make people link personal values and experiences to each other (Lawrence, 2008). Wildlife related art can evoke feelings of empathy and connection to animals (Jacobs, 2009) and can possibly have a good future in fostering more affection and positive attitudes towards wildlife.

The role of culture in shaping and forming attitudes towards wildlife can be an interesting topic for future research. For example how myths and legends shape beliefs and how they influence values and attitudes shared by the population. Myths and legends are a small step toward art. Art may have a great potential in environmental education since it can reach many people and can give a deeper meaning to personal values, experiences and emotions (Lawrence, 2008). How art historically has played a role in the formation of attitudes toward wildlife may be an interesting topic for further research. This information may be a good fundament for future research toward the role of art in fostering positive attitudes toward wildlife.

Taken together, the conclusion of this essay is that attitudes towards wildlife are formed and shaped by personally relevant factors, social and cultural factors and maybe most important by emotions. The information provided here can help understanding conflicts between humans and wildlife and gives an overview of factors that influence attitudes. Understanding of these fundamentals forms the key for successful environmental education programs and the suggestions for education can be implemented in current and future programs to promote coexistence with wildlife.

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9. References

- Agarwala, M., Kumar, S., Treves, A., Naughton-Treves, L., 2010.** Paying for wolves in Solapur, India and Wisconsin, USA: comparing compensation rules and practice to understand the goals and politics of wolf conservation. *Biological Conservation* 143: 2945-2955.
- Ajzen, I., 2001.** Nature and operation of attitudes. *Annual Review of Psychology* 52: 27-58.
- Ajzen, I., Fishbein, M., 2005.** The influence of attitudes on behavior. In: D. Albarracín, B. T. Johnson, M. P. Zanna, *The handbook of attitudes* (pp. 173-221). Mahwah, NJ: Erlbaum.
- Ajuran, M., Holmes, C., Puyravaud, J.-P., Davidar, P., 2006.** Do developmental initiatives influence local attitudes toward conservation? A case study from the Kalakad-Mundanthurai Tiger Reserve, India. *Journal of Environmental Management* 79: 188-197.
- Bath, A.J., 1998.** The role of human dimensions in wildlife resource research in wildlife management. *Ursus* 10: 349-355.
- Bigger, S., Webb, J., 2010.** Developing environmental agency and engagement through young people's fiction. *Environmental Education Research* 16: 401-414.
- Bjerke, T., Kaltenborn, B., 1999.** The relationship of ecocentric and anthropocentric motives to attitudes towards large carnivores. *Journal of Environmental Psychology* 19: 415-421.
- Boninger, D.S., Krosnick, J., Berent, M., 1995.** Origins of attitude importance: self-interest, social identification, and value relevance. *Journal of Personality and Social Psychology* 68 : 61-80.
- Borgerhoff Mulder, M., Schacht, R., Caro, T., Schacht, J., Caro, B., 2009.** Knowledge and attitudes of children in Rapununi: Implications for conservation in Guyana. *Biological Conservation* 142: 879-887.
- Bruni, C.M., Chance, R.C., Schultz, W.P., 2012.** Measuring value-based environmental concern in children: an environmental motives scale. *Journal of Environmental Education* 45: 1-15.
- Bruskotter, J.T., Schmidt, R.H., Teel, T.L., 2007.** Are attitudes towards wolves changing? A case study in Utah. *Biological Conservation* 139: 211-218.
- Butler, J.S., Shanahan, J., Decker, D.J., 2003.** Public attitudes towards wildlife are changing: a trend analysis of New York residents. *Wildlife Society Bulletin* 31: 1027-1036.
- Carmi, N., 2012.** Caring about tomorrow: future orientation, environmental attitudes and behaviors. *Environmental Education Research*: 1-15.
- Chaiken, S., Stangor, C., 1987.** Attitudes and attitude change. *Annual Review of Psychology* 38: 575-630.
- Crano, W.D., Prislin, R., 2006.** Attitudes and persuasion. *Annual Review of Psychology* 57: 345-74.
- Cupchik, G.C., Vartanian, O., Crawley, A., Mikulis, D.J., 2009.** Viewing artworks: contributions of cognitive control and perception facilitation to aesthetic experience. *Brain and Cognition* 70: 84-91.
- D'Amato, L.G., Krasny, M.E., 2011.** Outdoor adventure education: applying transformative learning theory to understanding instrumental learning and personal growth in environmental education. *Journal of Environmental Education* 42: 237-254.
- DeStefano, S., Deblinger, R.D., 2005.** Wildlife as valuable natural resources vs. intolerable pests: a suburban wildlife management model. *Urban Ecosystems* 8: 179-190.

- Des Jardins, J.R., 2005.** Scientific ecology and ecological ethics: the challenges of drawing ethical conclusions from scientific facts. In: Mappin, M.J., Johnson, E.A., *Environmental Education and Advocacy*. Cambridge University Press.
- Dettmann-Easler, D., Pease, J.L., 1999.** Evaluating the effectiveness of residential environmental education programs in fostering positive attitudes toward wildlife. *Journal of Environmental Education* 31: 33-39.
- Disinger, J.F., 2005.** The purposes of environmental education: perspectives of teachers, governmental agencies, NGO's, professional societies and advocacy groups. In: Mappin, M.J., Johnson, E.A., *Environmental Education and Advocacy*. Cambridge University Press.
- Dolan, R.J., 2002.** Emotion, Cognition, and Behaviour. *Science* 298: 1191-1194.
- Glikman, J.A., Vaske, J.J., Bath, A.J., Ciucci, P., Boitani, L., 2012.** Residents' support for wolf and bear conservation: the moderating influence of knowledge. *European Journal of Wildlife Research* 58: 295-302.
- Grønhøj, A., Thøgersen, J., 2009.** Like father, like son? Intergenerational transmission of values, attitudes and behaviours in the environmental domain. *Journal of Environmental Psychology* 29: 414-421.
- Eagly, A. H., Chaiken, S., 1993.** The psychology of attitudes. *FortWorth, TX: Harcourt Brace Jovanovich*.
- Ewert, A., Place, G., Sibthorp, J., 2005.** Early-life outdoor experiences and an individual's environmental attitudes. *Leisure Sciences* 27: 22-239.
- Farnsworth, B.E., 2011.** Conservation photography as environmental education: focus on the pedagogues. *Environmental Education Research* 17: 769-787.
- Harness, H., Drossman, H., 2011.** The environmental education through filmmaking project. *Environmental Education Research* 17: 829-849.
- Heberlein, T.A., 2012.** Navigating environmental attitudes. *Oxford University Press*.
- Heberlein, T.A., Stedman, R.C., 2009.** Socially amplified risk: attitude and behaviour change in response to CWD in Wisconsin deer. *Human Dimensions of Wildlife* 14: 326-340.
- Heberlein, T.A., Ericsson, G., 2005.** Ties to the countryside: accounting for urbanites attitudes toward hunting, wolves and wildlife. *Human Dimensions of Wildlife* 10: 213-227.
- Hudenko, H.W., 2012.** Exploring the influence of emotion on human decision making in human-wildlife conflict. *Human Dimensions of Wildlife* 17: 16-28.
- Jacobs, M.H., 2009.** Why do we like or dislike animals? *Human Dimensions of Wildlife*: 14: 1-11.
- Jacobs, M.H., Vaske, J.J., Roemer, J.M., 2012.** Towards a mental systems approach to human relationships with wildlife: the role of emotional dispositions. *Human Dimensions of Wildlife*: 17: 4-15.
- Jickling, B., 2005.** Education and advocacy: a troubling relationship. In: Mappin, M.J., Johnson, E.A., *Environmental Education and Advocacy*. Cambridge University Press.
- Johansson, M., Sjöström, M., Karlsson, J., Brännlund, R., 2012.** Is human fear affecting public willingness to pay for management and conservation of large carnivores? *Society and Resources* 25: 6010-620.

- Kaczensky, P., 1999.** Large carnivore depredation on livestock in Europe. *Ursus* 11: 59-71.
- Kaczensky, P., Blazic, M., Gossow, H., 2003.** Public attitudes towards brown bears (*Ursus arctos*) in Slovenia. *Biological Conservation* 118: 661-674.
- Kaczensky, P., 2007.** Wildlife value orientations of rural Mongolians. *Human Dimensions of Wildlife* 12: 317-329.
- Kaltenborn, B.P., Bjerke, T., Nyahongo, J.W., Williams, D.R., 2006.** Animal preferences and acceptability of wildlife management actions around Serengeti National Park, Tanzania. *Biodiversity and Conservation* 15: 4633-4649.
- Kidd, A.H., Kidd, R.M., 1996.** Developmental factors leading to positive attitudes toward wildlife and conservation. *Applied Animal Behaviour Science* 47:119-125.
- Kideghesho, J.R., Røskaft, E., Kaltenborn, B.P., 2007.** Factors influencing conservation attitudes of local people in Western Serengeti, Tanzania. *Biodiversity Conservation* 16: 2213-2230.
- Karlsson, J., Sjöström, M., 2007.** Human attitudes towards wolves, a matter of distance, *Biological Conservation* 137: 610-616.
- Kleiven, J., Bjerke, T., Kaltenborn, B.P., 2004.** Factors influencing the social acceptability of large carnivore behaviours. *Biodiversity and Conservation* 13: 1647-1658.
- Kollmuss, A., Agyeman, J., 2002.** Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behaviour? *Environmental Education Research* 8: 239-260.
- Legendijk, D.D.G., Gusset, M., 2008.** Human-carnivore coexistence on communal land bordering in Greater Kruger Area, South Africa. *Environmental Management* 42, 971-976.
- Lawrence, R.L., 2008.** Powerful feelings: exploring the affective domain of informal and arts-based learning. *New directions for adult and continuing education, special issue: Adult learning and the emotional self* 120: 65-77.
- LeDoux, J.E., 2000.** Emotion circuits in the brain. *Annual Review Neuroscience* 23:155-185.
- Leppänen, J.M., Haahla, A.E., Lensu, A.M., Kuitunen, M.T., 2012.** Parent-child similarity in environmental attitudes: a pairwise comparison. *Journal of Environmental Education* 43: 162-176.
- Lescureux, N., Linnell, J.D.C., Mustafa, S., Melovski, D., Stojanov, A., Ivanov, G., Avakatov, V., Arx, M., Breitenmoser, U., 2011.** Fear of the unknown: local knowledge en perceptions of the Eurasian lynx *Lynx lynx* in western Macedonia. *Oryx*, 45: 600-607.
- Linnell, J.D.C., Nilsen, E.B., Lande, U.S., Herfindal, I., Odden, J., Skogen, K., Andersen, R., Breitenmoser, U., 2005.** Zoning as a means of mitigating conflicts with large carnivores: principles and reality. In: Woodroffe, R., Thirgood, S. & Rabinowitz, A.: *People & Wildlife, conflict or co-existence?* (pp. 162-175). Cambridge University Press.
- Linnell, J.D.C., Swenson, J.E., Andersen, R., 2001.** Predators and people: conservation of large carnivores is possible at high human densities if management policy is favourable. *Animal Conservation*, 4: 345-349.
- Majić, A., Marino, A., de Bodonja, T., Huber, Đ., Bunnefeld, N., 2011.** Dynamics of public attitudes towards bears and the role of bear hunting in Croatia. *Biological Conservation* 144: 3018-3027.

- Majić, A., Bath, A.J., 2010.** Changes in attitudes towards wolves in Croatia. *Biological conservation* 143: 255-260.
- Manfredo, M.J., 2008.** Who cares about wildlife? *Springer Science + Business Media, LLC*.
- Manfredo, M.J., Teel, T.L., Henry, K.L., 2009.** Linking society and environment: a multilevel model of shifting wildlife value orientations in the western United States. *Social science quarterly* 90 (2): 407-427.
- Mappin, M.J., Johnson, E.A., 2005.** Changing perspectives of ecology and education in environmental education. In: Mappin, M.J., Johnson, E.A., 2005: *Environmental Education and Advocacy, Cambridge University Press*.
- Marseille, M.M., Elands, B.H.M., van den Brink, M.L., 2012.** Experiencing polar bears in the zoo: feelings and cognitions in relation to a visitor's conservation attitude. *Human Dimensions of Wildlife* 17: 29-43.
- McLennan, M.R., Hill, C.H., 2012.** Troublesome neighbours: Changing attitudes towards chimpanzees (*Pan troglodytes*) in a human-dominated landscape in Uganda. *Journal for Nature Conservation* 20: 219-227.
- Mehta, J., Heinen, J.T., 2001.** Does community-based conservation shape favorable attitudes among locals? An empirical study from Nepal. *Environmental management* 28: 165-177.
- Morgan, J.M., Gramann, J.H., 1989.** Predicting effectiveness of wildlife education programs: a study of student's attitudes and knowledge toward snakes. *Wildlife Society Bulletin* 17: 501-509.
- Mosler, H.-J., Martens, T., 2008.** Designing environmental campaigns by using agent-based simulations: strategies for changing environmental attitudes. *Journal of Environmental Management* 88: 805-816.
- Olson, J.M., Zanna, M.P., 1993.** Attitudes and attitude change. *Annual Review of Psychology* 44: 54-117.
- Palmer, C.N., Muscara, C., 1991.** Educating for the environment. *Educational Leadership* 48: 65-66.
- Pooley, J.A., O'Connor, M., 2000.** Environmental education and attitudes: emotions and beliefs are what is needed. *Environment and Behavior* 32: 711-723.
- Reiter, D.K., Brunson, M.W., Schmidt, R.H., 1999.** Public attitudes towards wildlife damage management and policy. *Wildlife Society Bulletin* 27: 746-758.
- Reynolds, P.C., Braithwaite, D., 2001.** Towards a conceptual framework for wildlife tourism. *Tourism Management* 22: 31-42.
- Røskoft, E., Händel, B., Bjerke, T., Kaltenborn, B.P., 2007.** Human attitudes towards large carnivores in Norway. *Wildlife Biology* 13: 172-185.
- Schafer, R.B., Tait, J.L., 1986.** A guide for understanding attitudes and attitude change. *North Central Regional Extension Publication* 138: 1-11.
- Schelly, C., Cross, J.E., Franzen, W., Hall, P., Reeve, S., 2012.** How to go green: creating a conservation culture in a public high school through education, modeling and communication. *Journal of Environmental Education* 43: 143-161.
- Schroeder, S.A., Fulton, D.C., Penning, W., Doncarlos, K., 2012.** Using persuasive messages to encourage hunters to support regulation of lead shot. *Journal of Wildlife Management* 76:1528-1539.
- Schlegel, J., Rupf, R., 2009.** Attitudes towards potential animal flagship species in nature conservation: a survey among students of different educational institutions. *Journal for Nature Conservation* 18: 278-290.
- Schultz, P.W., Zenezny, L., 1999.** Values as predictor of environmental attitudes: evidence for consistency across 14 countries. *Journal of Environmental Psychology* 19: 255-265.

- Schultz, W.P., 2000.** Empathizing with nature: the effects of perspective taking on concern for environmental issues. *Journal of Social Issues* 56: 391-406.
- Shrestha, R.K., Alavalapati, J.R.R., 2006.** Linking conservation and development: an analysis of local people's attitude towards Koshi Tappu wildlife reserve, Nepal. *Environment, Development and Sustainability* 8: 69-84.
- Sekhar, N.U., 2003.** Local people's attitudes towards conservation and wildlife tourism around Sariska Tiger Reserve, India. *Journal of Environmental Management* 69: 339-347.
- Sifuna, N., 2010.** Damage and its impact on public attitudes towards conservation: a comparative study between Kenya and Botswana, with particular reference to Kenya's Laikipia region and Botswana's Okavango Delta Region. *Journal of Asian and African Studies* 45: 274-297.
- Slagle, K.M., Bruskotter, J.T., Wilson, R.S., 2012.** The role of affect in public support and opposition to wolf management. *Human Dimensions of Wildlife* 17: 44-57.
- Slagle, K., Zajac, R., Bruskotter, J., Wilson, R., Prange, S., 2013.** Building tolerance for bears: a communications experiment. *The journal of wildlife management* 77: 863-869.
- Somers, M.J. & Hayward, M., 2012.** Fencing for conservation. *Springer Science*.
- Stern, P.C., Dietz, T., 1994.** The value basis of Environmental concern. *Journal of Social Issues* 50: 64-84.
- Stevenson, R.B., 2007.** Schooling and environmental education: contradictions in purpose and practice. *Environmental Education Research* 13: 139-153.
- Tesser, A., Shaffer, D.R., 1990.** Attitudes and attitude change. *Annual Review of Psychology* 41: 479-523.
- Tesser, A., Whitaker, D., Martin, L., Ward, D., 1998.** Attitude heritability, attitude change and psychological responsiveness. *Personality and Individual Differences* 24: 89-96.
- Tisdell & Wilson, 2005.** Perceived impacts of ecotourism on environmental learning and conservation: turtle watching as a case study. *Environment, Development and Sustainability* 7: 291-302.
- Thorn, M., Green, M., Dalerum, F., Bateman, P.W., Scott, D.M., 2012.** What drives human-carnivore conflict in the West-Province of South America? *Biological Conservation* 150, 23-32.
- Vaske, J.J., Jacobs, M.H., Sijtsma, M.T.J., 2011.** Wildlife value orientations and demographics in the Netherlands. *European Journal of Wildlife Research* 57:1179-1187.
- Zajac, R., Bruskotter, J.T., Wilson, R.S., Prange, S., 2012.** Learning to live with black bears: a psychological model of acceptance. *Journal of Wildlife Management* 76: 1331-1340.