THESIS

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Bridging the gap between policy and public: Psychological antecedents predicting human acceptance of wolf management actions.

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Foreword

This thesis is the result of a journey that has deepened my understanding of human–wildlife interactions and the complex psychological antecedents that are related to human behaviour. In particular, this study explores the acceptance of wolf management actions and investigates the psychological antecedents that may potentially predict this acceptance. Since wolves are returning to landscapes where they were long absent, their presence not only challenges ecological systems but also evokes a wide range of societal discussions. By examining these reactions through a psychological lens, this study aims to contribute valuable insights to the development of well-informed wolf management strategies.

This research would not have been possible without the support, guidance, and critical insight of my supervisor, Dr. Maarten Jacobs. His expertise and encouragement throughout this process were essential in giving directions for the research. I am grateful for the opportunity to learn from his thoughtful approach to human-nature relationships. I also wish to express my appreciation to the respondents who took the time to share their opinion in the questionnaire.

With this thesis, I hope to contribute to a more nuanced understanding of the psychological mechanisms behind human acceptance of wolf management actions. It is my belief that such understanding is essential for building dialogue and trust in conservation efforts in an increasingly complex world.

Table of contents

List of figures

List of tables

Summary

Wolves returned to the Netherlands in 2011, after an absence of many decades. The return of this large carnivore evokes mixed emotions and reactions among the inhabitants. More and more human-wolf interactions happen, and these interactions are not always experienced as positive. The wolf is a protected animal by the Bern Convention (1979), which is why its management requires attention from public governments. The mixed reactions of humans to wolves feed the societal debate about how wolves should be managed.

This study examines human acceptance of wolf management actions by investigating psychological antecedents. These antecedents are derived from the cognitive hierarchy theory. These antecedents and examples of management actions are measured in a quantitative survey spread online to the Dutch population. This questionnaire was analysed to see which antecedents have predictive potential on human acceptance of wolf management actions. The findings suggest that domination is a better predictor than mutualism for human acceptance of wolf management actions. Negative perceptions toward wolves do not have a relationship with human acceptance toward wolf management actions, whilst positive perceptions do have a relationship. The stimulation of more positive perceptions among humans could potentially lead to more support for management actions. This requires a change in the discourse about wolves, whilst (social)media focusses abundantly more on the negative consequences of wolves.

The chosen antecedents from this study can predict up to 68% of the variance in acceptance towards wolf management actions. One could say there is an overlap between the measured concepts, this could be explained by the fact that humans do not clearly distinguish the concepts, like science does. The results also show that the more severe a situation is, the higher the support is for lethal control; the opposite is true for no-action. These findings robustly support the same claims as other research. Distance toward wolves was examined as a potential variable that affects human acceptance of wolf management actions, as this was concluded by studies in Sweden. Yet, the findings from this study suggest that distance does not have a relationship with wolf-specific dispositions.

1. Introduction

The wolf (*Canis lupus*) is recolonising previous habitats in Europe, immigrating from eastern or southern regions, forming packs and having successful reproduction (Randi, 2011; Herzog, 2018). At the beginning of this century, the wolf started advancing in Germany (Reinhardt & Kluth, 2007) and began exploring the Netherlands after the first sighting in 2011 (Groot Bruinderink et al., 2012). Organisation Bij12 tracks wolf records in a database with DNA samples of wolves in the Netherlands. In 2024, 11 packs have been identified, of which eight are located in the Veluwe (Gelderland), one around the Utrechtse Heuvelrug (Utrecht), and two packs in the province of Drenthe. 56 different wolves have been genetically identified, between May and mid-October 2024 (Bij12, 2024). The growth of wolf populations has also led to an increase in human-wolf interactions. From May – October 2024, 294 incidents of predation of livestock were reported, whilst from October 2020 - January 2021, 35 incidents were reported.

The increasing amount of human-wolf interactions evokes different reactions in society, ranging from enthusiastic to negative. Exposure to wolves, during their recolonisation, can result in high degrees of uncertainty, fear and perceived risks amongst humans and pets (Bisi et al., 2007; Houston et al., 2010; Mech, 1995). These perceived risks often receive more media attention than positive consequences of wolves, resulting in a one-sided media story that affects the societal discussion about human-wolf coexistence (Fernández-Gil et al., 2016, WolveninNederland, n.d.). The wolf has returned after 150 years, which is why most people are unfamiliar with wolves. Reactions and opinions are therefore not always based on knowledge or experience. De Wolven in Nederland (wolves in the Netherlands) project is a cooperation of multiple Dutch nature and wildlife agencies that aim for peaceful coexistence with wolves by educating and informing people about wolves. The return of the wolf also evokes positive reactions of people who wish to see the animal in real life because of wildlife appraisal or praise its return because of biodiversity enhancement (Ripple & Beschta, 2012).

However, the quest to find wolves in the wild results in human-wolf interactions, sometimes within close range. Recreational hikers or photographers purposely seek (close) interaction with wolves for pleasure. In October 2022, several photographers surrounded a wolf in the Veluwe and closely followed the animal (NOS, 2022). The mammal association responded furiously to this event because these photographers (unconsciously) encouraged this wolf to become accustomed to humans, scientifically referred to as human habituation (Linnell et al., 2021). The wolf is a protected animal and therefore, their natural behaviour should not be disturbed. Each province is responsible for monitoring these rules within its area, but it is unavoidable that some individuals ignore these rules. In May 2024, news reports showed evidence that humans portrayed meat in wolf habitats to feed wolves (NU, 2024). Wolf experts reported that in the same area, several wolves exhibited abnormal behaviour; wolves did not always avoid humans. A potential reason behind this abnormal behaviour might be that they were fed (NU, 2024). Human habituation and food habituation are seen as

causes of human-wolf conflicts and the root cause of the rare attacks that have taken place in Europe. Linnell et al. (2021) examined wolf attacks on humans over 18 years in Europe and only discovered 12 attacks. Most of these predatory attacks were associated with high levels of habituation; wolves were being seen or actively approached by people in the daytime.

Wolf attacks on humans are a rare phenomenon, but attacks on livestock occur more frequently. Predation of livestock is considered to be the most critical area of conflict in Europe. Sheep, goats, alpacas, or farmed fallow deer are most likely to fall victim to predation by wolves (Herzog, 2018). The predations cause economic losses to farmers (Muhly & Musiani, 2009) and present competition for hunters (Treves et al., 2013). Many European countries, including the Netherlands, provide subsidies to prevent livestock predation but also provide financial compensation in case of economic damage (Lammertsma et al., 2013). These management actions are examples of how governments try to mitigate negative consequences caused by wolves.

Lethal control is solely allowed when the conservation status is not impaired and when there are no satisfactory alternatives for ensuring public safety and minimising threats (Trouwborst, 2010), because of the Habitat Directive (1992) and Bern Convention (1979). However, from the 7th of March 2025, the wolf's status is changed from 'strictly protected' to 'protected' (European Commision, 2024). This status change provides Member States more flexibility in wolf management. However, Member States' conservation and management measures must maintain a favourable conservation status since the wolf remains protected. The European Commission emphasises in the same press release that "investments in appropriate damage prevention measures remain essential to reduce livestock predation".

Until today, wolf management actions in central European countries have followed a passive "wait and see" strategy. Farmers and herdsmen would like to see this strategy change into a more active way of wolf management (Herzog, 2018). Research suggests that the severity of the situation is an influential factor in human-wolf coexistence. Majic and Bath (2010) concluded that humans exposed to increasing carnivore populations or living closer to carnivores (Karlsson & Sjöström, 2007), tend to have lower acceptance of these species. Other studies show that humans with direct experience with wolves are more likely to oppose the return of the wolf than humans without direct experience (Enck & Brown, 2002; Ericsson & Heberlein, 2003; Karlsson & Sjöström, 2007). In addition, previous research suggests that the acceptability of 'no-action' management decreases as problem severity increases and that the acceptability of lethal control increases as problem severity increases (Jacobs et al., 2014a; Wittmann et al., 1998). The 'wait and see' approach might be effective in the early stages of recolonising, but not after successful recolonisation or local expansion. After successfully establishing 11 packs, one might say that the early stages of recolonisation have passed in the Netherlands, and other management options, rather than 'wait and see', are receiving more attention. A pilot is being executed until May 2025 with wolf-resistant mobile wire grids in Drenthe to

measure whether this management measure can prevent wolf predation on livestock.

Herzog (2018) states examples of 'active' management measures: "total protection, local killings of problematic individuals, sustainable utilisation, prevention of diseases, herd protection measures and a management concept developed from a participatory process". However, not all of these management measures are universally accepted. European data is absent, but records in the US state that only slightly reduced or even increased predation rates occurred after the killing of single wolf individuals (Harper et al., 2008; Peebles & Wielgus , 2014). Although these studies refer to a few, partly uncontrolled interventions, it does not confirm that the killing of single individuals is a solution to the most prominent issue; predation of livestock. The new development of the European Commission to change the status of wolves allows governments to be more flexible and 'active' in wolf management. What kind of 'active' management actions should be employed to support human-wolf coexistence begs questions and adds to the polarised societal discussion.

Many researchers have tried to understand human acceptance towards management actions from different psychological perspectives. Zinn et al. (1998) investigated three influential factors on normative beliefs about management actions. They concluded that all three (a) the extremity of the situation, (b) the extremity of managers' response, and (c) the type of species influenced the normative beliefs. The same study also concluded that people with a pro-wildlife use orientation were more likely to accept lethal control in some situations than people with a pro-wildlife protection orientation. These orientations can be linked to wildlife value orientations: domination (animals should be used for human benefit) and mutualism (animals are part of an extended family, deserving their own rights and care). Vaske et al. (2011) used wildlife value orientations and demographics to understand how wildlife managers can gauge support for management policies. They concluded that wildlife value orientations indeed have predictive potential for management actions. These results were consistent with a report from Sijtsma et al. (2012). This report added to the existing literature that domination is seen as a better predictor of acceptability than mutualism within wildlife value orientations.

Wildlife value orientations are specific value orientations (patterns of basic beliefs). This concept has more predictive power on human dimensions than values, especially in accounting for variations in people's attitudes and norms (Vaske & Manfredo, 2012). Values are not specific but general constructs, which is why they account for less variance in human dimensions, whilst emotions, attitudes and risk perceptions are seen as more specific concepts. The attitude concept is often used to explain human behaviour (Fishbein & Ajzen, 2010). In recent decades, attitudes towards wolves have changed; conservation rather than extermination is the focal point of (inter)national management programs (Linnell et al., 2001). Just like attitudes, risk perceptions can be influenced by providing information on wildlife species (Flemming et al., 2018). This study concluded that risk perception was lower after the participant was provided with information (e.g., a leaflet). Gore et al. (2009) added to risk research how risk

can affect attitudes and behaviour, aimed at wildlife managers and their decision-making process. Although relatively underexplored, emotions account for variance in acceptance of management actions, too. Jacobs et al. (2014a) concluded that joy and disgust are better predictors for acceptance than fear, whilst fear is the most addressed emotion in human-wildlife research.

The EU's new development to diminish the wolf's protective status is a sign that more active management is allowed, but there is no consensus yet on how this should be designed. The growing number of human-wolf interactions results in a polarised national debate, and people´s opinions about wolves are very diverse in the Netherlands. Many researchers have tried to understand human acceptance towards wildlife management actions, but not all concepts are equally researched. It is important to understand how diverse opinions in the Netherlands are constructed to understand why people accept certain actions and why not. The limited studies in the Netherlands about human dimensions were executed in the starting phase of the recolonisation of the wolf, or prior to its return. At the time of this study, wolves had successfully reproduced and expanded their territory, which might provide new relevant insights compared to older studies. This study aims to understand to what extent people accept wolf management actions and what psychological antecedents predict this acceptance. Understanding the predictive potential of psychological antecedents can provide new knowledge for wolf management.

2. Literature review

Researchers have used several psychological concepts to understand human acceptance of wildlife management. This chapter elaborates on these relevant concepts to identify possible concepts relevant to the theoretical framework of this study. The relevant concepts that will be examined are constrained to the field of human-wildlife interaction.

2.1 Cognitive hierarchy

To understand the challenges and opportunities for human-wildlife coexistence, research on the human dimensions of large carnivore return to rural landscapes in Europe is essential (Bennett et al., 2016, 2017; König et al., 2020). Social scientists distinguish concepts based on the specificity of situations or objects being measured. In social psychology, an object can be anything that can be evaluated by humans' brains (e.g., a person, wildlife or management action) (Eagly & Chaiken, 1993). Cognitions are related to the mental actions and dispositions (e.g., values, beliefs or attitudes) humans use when understanding situations (Vaske & Manfredo, 2012). These cognitions can be best explained as a pyramid from general to more specific (*see figure 1*) (Vaske & Donnelly, 1991). The "hierarchy" explores the relation between general values/value orientations and specific attitudes/norms. Understanding the different human dimensions can provide insight into their relationship with human behaviour.

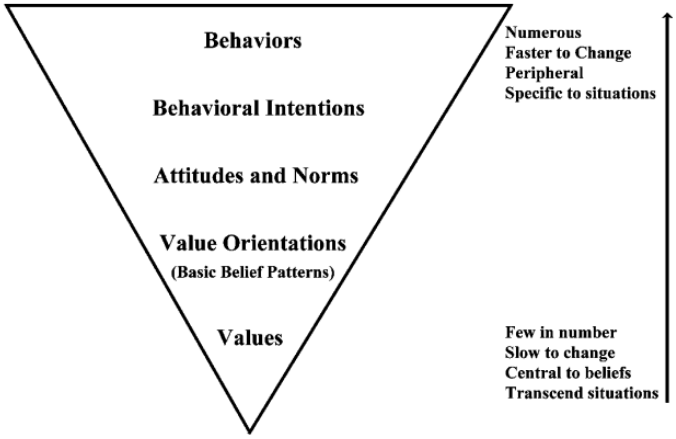

Figure 1: The cognitive hierarchy. Source: Vaske and Donnely (1991).

The hierarchy distinguishes values from value orientations. Values are general mental constructs that are not linked to specific situations or objects. According to Rokeach (1973), freedom, equality, and honesty are examples of values. Values are usually universally accepted by individuals and groups as modes of conduct or desired qualities of life. Values are often formed early in life or culturally constructed. They are connected to someone's identity, and difficult to change. Therefore, they are unlikely to account for much of the variability in specific behaviour. Values have been described as abstractions from which attitudes and behaviours are created (Teel & Manfredo, 2010). Values are usually defined as stable cognitions and affect-laden, enduring beliefs about life goals that humans strive to reach (Rokeach, 1973; Schwartz, 2006). People have a limited number of values, but they are central to one's cognitive structure (Rokeach, 1973). People can have the same values (e.g., 'being humane to all living things'), but their orientation can differ. On the one hand, a person can believe that this means people should not harm wildlife, whilst the other person may feel it is acceptable to kill wildlife for human benefit, under the condition that the killing is 'humane'. Although these two people have the same value, both

could act differently. This example shows two different value orientations: mutualism (wildlife as extended family, deserving of care and rights) and domination (human mastery over wildlife) (Manfredo et al., 2009). The 'cognitive hierarchy' shows that values influence value orientations and that value orientations influence attitudes and norms. Attitudes are positive or negative evaluations of an object, whilst norms form standards or judgements about what is appropriate in a specific situation (Wittmann et al., 1998; Zinn et al., 1998). Whilst attitudes and norms are fundamentally different, both can vary depending on the specificity of the situation (Whittaker et al., 2006)

2.2 Wildlife value orientations

Value orientations differ from values because they are related to a particular object, such as wildlife. Value orientations are a network of basic beliefs that form around values and provide contextual meaning to a specific object (Manfredo et al., 2009; Teel & Manfredo, 2009; Sponarski et al., 2016). Basic beliefs reflect thoughts about general levels of objects or problems (e.g., wildlife) and provide meaning to more global cognitions represented in values. Value orientations reflect the influence of ideology in the cognitive hierarchy (Schwartz, 2006). Ideology is a concept referring to universally held beliefs that enable the people who share them to define themselves, to understand meaning, and to relate to one another (Pratto, 1999). Wildlife value orientations are often split into a mutualism orientation and domination orientation. The orientation of a person depends on how they score on four types of beliefs; hunting belief, caring belief, appropriate use belief and social affiliation belief.

Humans with a domination value orientation believe wildlife should be managed to benefit humans. This group is more likely to put human well-being over wildlife in their attitudes and behaviours. They would also find management actions that result in death or harm to wildlife as acceptable (Teel & Manfredo, 2010). The pro-mutualism group is less likely to support management actions resulting in death or harm to wildlife, and is more likely to support welfare-enhancing behaviour for individual wildlife (Teel & Manfredo, 2010). International researchers in the Netherlands (Jacobs, 2007), China (Zinn & Shen, 2007) and Estonia (Raddick & Cottrell, 2007) suggest that domination and mutualism exist worldwide, although the ratio of mutualism versus domination orientation varies by country.

Within human dimensions of natural resources research, value orientations have been studied extensively. Manfredo and Teel (2010) studied the relation between wildlife value orientations and (post)materialist values, but also attitudes (e.g., support for hunting or acceptance of lethal control). They concluded that domination was positively associated with acceptance of lethal control and hunting participation. This wildlife value orientation was more associated with a materialist value set. The opposite applies to mutualism. Zinn et al. (1998) provided more evidence that individuals with a protectionist, or mutualist, wildlife value orientation were less likely to accept harming or killing animals (a normative belief). This study measured three different wildlife species in different situational contexts. Jacobs et al. (2012) studied acceptability of lethal control of geese and deer to minimise the impacts on agricultural crops in the Netherlands. This research used wildlife value orientation and demographics as predictors and

concluded that only wildlife value orientation was statistically significant as a predictor. Wildlife value orientation accounted for 39% (geese) and 37% (deer) of the variance. In the Netherlands, mutualism was the predominant orientation. Yet, for situations related to human–wildlife conflict, domination was more prevalent (Jacobs, 2007).

Different authors have constituted different terms to represent the concepts (e.g., environmental values, world views), but all these terms refer to patterns of basic beliefs that give direction to values in a particular domain, for instance, wildlife (Vaske & Manfredo, 2012). However, when humans develop more specific beliefs about specific objects (e.g., wildlife), their bundle of basic beliefs can fade towards the background and become less relevant for accounting for variance. The power of specific beliefs can increase when humans develop more specific knowledge.

The media in the Netherlands give a lot of attention to the wolf and the impact of its return, which feeds the societal debate about the positive and negative impact of wolves. People in the Netherlands are having more direct experiences with wolves and are obtaining more specific knowledge over the years. This study wishes to examine the predictive ability of wildlife value orientations on acceptance of wolf management actions now that people are developing more specific knowledge and beliefs about wolves. Comparing this to previous studies, when specific knowledge was less dominant, might result in new insights into how acceptance of management actions can be best predicted.

2.3 Attitudes

Attitudes are one of the most frequently used psychological concepts to understand conservation-related behaviour. Attitudes can be defined as dispositions to act with some level of preference, to a psychological object (Fishbein & Ajzen, 2010). For example, humans with a positive attitude towards hunting may not always partake in hunting, but people with a negative attitude towards hunting will never hunt (Heberlein, 2012). Attitudes have been a focal point in research to predict and explain human behaviour (Fishbein & Ajzen, 2010; Heberlein, 2012), both from a social perspective (Allport, 1935; Fiske & Taylor, 2013) and from an environmental perspective (Heberlein, 2012). Although attitudes do not always predict behaviour, because an attitude rarely includes all the specific characteristics of a specific situation (Heberlein, 2012). Therefore, attitudes are often researched in combination with other specific concepts and not as a single concept.

In the context of human-wildlife conflict, attitude research provides insight into stakeholder preferences for different management actions, for example the level of damage stakeholders are willing to accept (Kansky et al., 2014; Manfredo et al., 2009). Understanding these factors from stakeholders might increase support for management actions. In addition, interventions can be designed in a way that is more acceptable for stakeholders (Heberlein, 2012). Lischka et al. (2020) agree that attitude theory can identify factors that influence human behaviour to address human-wildlife conflicts, but in a limited scope. Emotions are an important component of attitudes (Eagly & Chaiken, 1992). In a study on attitudes towards wolves, most variance in attitudes was explained by emotional

factors alone (28%), and the best model, including all three groups of predictors (emotional, individual and regional factors), explained 57% of the variance. The strongest effects of emotional states on attitudes were those of anger and joy. Fear had only half the effect of joy on attitude (Arbieu et al., 2024). Other psychological factors, like beliefs, can improve the understanding of attitudes (Fishbein & Ajzen, 2010).

Attitudes have a level of favourableness (Manfredo, 2008) and can therefore vary amongst humans. Research on attitudes concluded that they affect human behaviour, and the interrelatedness of attitudes with other psychological factors is evident. In order to compare the findings of this study to other literature, it is important to measure (partly) the same concepts in order to define which psychological antecedent is the best predictor of acceptance towards wolf-management actions. This research studies attitude towards the presence of wolves rather than wolves in general to make a distinction from emotional dispositions, which are measured to wolves in general.

2.4 Norms

Norms can be seen as informal codes and beliefs to evaluate human behaviour towards objects (Sijtsma et al., 2012). Norms are often socially constructed and can be strong factors to influence individual behaviour (Schultz, 2011). Literature often distinguishes norms in different types: individual norms, social norms, descriptive norms and injunctive norms. Individual norms are seen as individual-level standards or criteria to judge objects. Individuals' norms guide their behaviour, and influencing these perceptions of norms can result in social change. All humans can perceive individual norms differently; thus, there is a lot of variance amongst humans related to norms. Individual norms are not formed in an unbiased manner but depend on many internal and external factors (Tankard & Paluck, 2016). Social norms can be defined as implicit or explicit rules or principles that are understood by members of a group, for example, within specific cultures. These norms guide behaviour without the force of laws to stimulate desired behaviour (Cialdini & Trost, 1998). By creating a shared understanding of what is acceptable and what is not, within a particular context, social norms inform behaviour and guide social interaction. Sherif (1937) concluded that group influence is informational rather than coercive. An individual might internalise the group's frame rather than their individual frame to evaluate objects, suggesting that social norms are more dominant than individual norms.

Descriptive norms refer to beliefs about (in)formal customs that are expected to be followed or common behaviour, for instance a dress code. Descriptive norms influence human behaviour by providing established principles that are commonly accepted (Cialdini, Kallgren & Reno, 1990). However, norms can be contradictory, and violation of descriptive norms is often tolerated (Chung & Rimal, 2016). Injunctive norms refer to beliefs about others' expectations in a social context (Chung & Rimal, 2016). These norms are in place when the desired answer is objectively verifiable, claiming that there is normative influence by groups. Injunctive norms refer to desired behaviour by society and can be categorised into ´good´ and `bad´. The different types of norms cannot be perfectly distinguished from each other and have some overlap. What all types of

norms have in common is that they vary amongst humans and have an influence on human behaviour, whether this is in an individual or group setting.

Norms are often used in social science as an organising concept for understanding visitor experiences and human behaviour (Manning, 2013). Although relatively underexplored in conservation contexts (St John et al., 2010), norms can predict behaviours such as littering (Cialdini et al., 1991), retaliatory killing of predators (St John et al., 2015), and commercial fishing (Gezelius, 2002). Contradictions in norms are often addressed in literature to express differences within humans, and these differences are examined to explain behaviour. Gezelius (2002) highlighted this in a case study with Uerhavn's Fisherman. The obligation to obey the law was supported by a "loyalty norm" that every fisherman has to follow the same rules to create fair competition. However, not obeying this law did not always lead to a sanction. It was universally agreed that fishermen have the moral right to ensure a viable income, and if breaking the "loyalty norm" was needed to obtain this income, then this was allowed.

This study aims to measure the acceptability of wolf management actions. Acceptability of management actions can be seen as an expression of people's norms. If the object is ''the acceptability of lethal control of deer in the Netherlands in 2010", its evaluation reflects a specific context and time frame, and thus reflects a specific norm (Sijtsma et al., 2012). This study will use a similar approach as Sijtsma et al. to measure the acceptability of wolf management actions.

2.5 Risk perceptions

Although not visually shown in figure 1, risk concepts are often used in combination with other human dimensions, like attitudes or wildlife value orientations, to understand conservation-related behaviour. Risk perception is referred to as intuitive judgments about the cognitive (probability of occurrence and impact severity) and affective (elicited feelings) dimensions of a potential threat (Gore et al., 2005; Sponarski et al., 2016). Risk perceptions have been applied in science to study gender and human-wildlife conflict by Gore et al. (2009). Researchers conclude that risk perceptions differ amongst men and women (Flynn et al., 1994). The variance of gender on risk perception is dynamic and complex. Women and men may perceive the same risks differently; they may perceive different risks, and they may give different meanings to what appears to be the same risk, also in wildlife context (Gustafson, 1998). In addition, existing literature confirms that gender is not the only cause for variations but also unequal power relations and different levels of trust in authorities and institutions (Verchick, 2004).

Sponarski et al. (2016) examined the relationship between wildlife value orientations, evaluative beliefs about coyotes, and perceived risks. A positive evaluation of coyotes was negatively associated with perceived risks, and domination orientation was associated with greater perceived risks towards the species. Cognitive and affective dimensions of perceived risk originate from beliefs about a species and past experiences with the animal (Carter, Riley, & Liu, 2012). This research supports the causal relationships hypothesised by the

cognitive hierarchy about values, basic beliefs, emotions, attitudes, and perceived risks.

Moreover, other studies in Sweden reveal that the presence of wolves in an area leads to higher risk perceptions and significantly affects the daily lives of individuals inhabiting wolf territories. (Ericsson & Heberlein, 2003; Johansson et al., 2012). However, risk perceptions often carry a negative connotation and can yield one-sided results, which this research aims to prevent. This aligns with previous research suggesting a negativity bias amongst wildlife management research (Buijs & Jacobs, 2021). Although there is an increased focus on coexistence management, research on human–wildlife interactions still predominantly focuses on conflict situations and acceptance of wildlife (Soulsbury & White, 2015). Due to this specific focus, combined with scarce research on benefits, it is likely that the negative aspects of human–wildlife interactions are exaggerated (Soulsbury & White, 2015).

Risk perceptions can lead to behavioural changes when individuals have had negative experiences or when they perceive that this might happen. In a wolf context, people might believe wolves pose a threat to their safety or others' and therefore perceive risk and adjust their behaviour. In addition, risk perceptions can be influenced by media and norms and can be shared and transferred within a community (Gore et al., 2009). Risk perceptions are often negatively associated, and this study wishes to reduce the negativity bias that is present in society in the Netherlands. Therefore, although not extensively explored in literature, more positive consequences of wolves are added to the risk literature to examine both positive and negative perceptions of consequences towards wolves in the Netherlands.

2.6 Emotions

Emotions were one of the first mental capacities to emerge in human evolution, and the capability of using language and abstract thinking emerged later. Therefore, emotions can be considered as essential aspects of human life (Jacobs, 2009). A universal definition of emotions does not exist, and emotions are a complex phenomenon that can be interpreted in many ways. (Izard, 2007). Emotions can be perceived as states or traits. While states reflect how you are, traits reflect who you are (Hamaker et al., 2007). Unlike states, traits are always present, whether activated or not. Emotional experiences are considered states and often control the mind and behaviour (Jacobs et al., 2012; LeDoux, 1996). Emotional experiences are evaluations of bodily and physiological responses by humans' brains, constituting conscious experiences, in addition to the automatic appraisal mechanism (Jacobs & Vaske, 2019). Emotional experiences (the interpretation of an emotional response) consist of several components: (a) physiological reactions (e.g., erection of body hair), (b) expressive reactions (e.g., smiling), (c) behavioural tendencies (e.g., approaching) and (d) emotional experiences (e.g., interpreting the situation) (Kleinginna & Kleinginna, 1981; Izard, 2007; Jacobs et al., 2012). They also serve the survival instinct and the well-being of humans and animals. The erection of body hair makes a prey look bigger and might prevent an attack by the predator. This automatic fear response occurs without conscious deliberation (Damasio, 1999; LeDoux, 1996). An

increased heartbeat stimulates the bodily conditions for fight-or-flight behaviour (LeDoux, 1996). Emotional bodily responses can only be adaptive if they are responses to specific stimuli or objects. A specific stimulus in a wildlife context is often an encounter with an animal.

The emotional processing in the human brain encountering a stimulus to emotional experiences is represented in a basic model of the operation of emotions; stimulus onset –> automatic emotional appraisal –> physical emotional response –> emotional experience (Jacobs & Vaske, 2019). Research claims that emotions have evolved as adaptive responses that stimulate survival and well-being (LeDoux, 1996). The automatic appraisal mechanism in the human brain evaluates relevant stimuli and automatically initiates bodily or psychological responses (increased heartbeat); this happens unconsciously (LeDoux, 1996; Damasio, 1999). However, the automatic appraisal mechanism is not immutable. Conditioning is a psychological mechanism that can change the appraisal mechanism (LeDoux, 1996; Jacobs, 2009). If a neutral stimulus repeatedly gets associated with an emotional stimulus, the neutral stimulus can reform into an emotional stimulus and thus can initiate a different emotional response.

According to some researchers, automatic emotional appraisal can happen subconsciously and might explain why people fear the wolf. Humans have evolved and might have adapted the fear response of our ancestors. The automatic appraisal mechanism is inclined to respond with fear to wolves; people become aware of this tendency and thus also consciously fear wolves in general. However, this model cannot explain people who fear wolves in the wild and who do not fear wolves in a zoo (Jacobs & Vaske, 2019). Jacobs (2009) states that the cognitive abilities of humans to evaluate stimuli give a second opinion and can be used to overrule the automatic appraisal mechanism, although this takes time (Jacobs et al., 2012). Bodily fear responses can then be restrained against the automatic appraisal mechanism (Jacobs, 2009).

2.7 Emotional dispositions

Besides emotional experiences as states, research has identified emotional dispositions as relatively stable traits. Being scared by a snake is a temporary state that can switch on and off, and differs in severity of the situation. On the other hand, a disposition to fear snakes, an entire species, is usually stable but is adaptive to change. Emotional dispositions can be seen as the bridge between the study of emotions and cognitions related to wildlife (e.g., wildlife value orientations), since cognitions are also mental dispositions. Current literature uses two fundamentally different concepts to define "emotional dispositions". First, the term can reflect emotionally laden "personality traits" (Digman, 1990; Hamid & Cheng, 1996). Within this concept, emotional dispositions refer to the general tendency to be happy or sad. This concept uses a continuum of two extremes, usually positive to negative.

Second, the term can refer to emotional dispositions used as criteria to judge the emotional relevance of stimuli (Frijda, 1986; Lerner & Keltner, 2000). Specific objects, events, or situations trigger human emotions. According to Scherer (1999), the objective nature of a stimulus does not determine the emotional

response. A process of emotional appraisal takes place when specific objects trigger emotions. For this reason, two people can react differently to the same spider. Appraising the stimulus, for instance a spider, produces an emotional response. This process implies that criteria exist before appraisal, and those criteria are emotional dispositions. Emotional appraisal is only possible because of emotional dispositions (Frijda, 1986).

Depending on the severity of the situation, you can activate emotional dispositions, like being scared by a bear. For humans, it is challenging to overcome phobias, which showcases the stability of emotional dispositions. Emotional dispositions are therefore seen as an internal cause of emotional responses. Emotions have a particular level of abstraction. For example, a dispositional fear of bears is abstract because "bears" is an abstract category that reflects a collection of species. Coexistence is easier with species for which humans have positive emotional dispositions, and more difficult with species for which humans have negative emotional dispositions. Slagle et al. (2012) claim that emotion-driven dispositions influence humans' decisions about wildlife-related behaviours. Emotions influence the direction of human dispositions (negative to positive) and intensity (weak to strong) towards species. Thus, emotions (partly) explain the position of an individual on the scale from conflict to coexistence and are thus fundamental in understanding human-wildlife relationships (Manfredo, 2008; Jacobs et al., 2012).

2.8 Discrete and dimensional emotions

Discrete emotions distinguish qualitatively different emotions such as joy, sadness, fear, and anger (LeDoux, 1996), although different studies add surprise and disgust to this list (Ekman, 1992). These basic emotions are shared among people and can be culturally constructed (Izard, 2007). Existing literature often addresses fear as the most important emotion (Johansson et al., 2012; Frank et al., 2015). Fear for large carnivores might be important as a catalyst in public debates, and fear was found to predict willingness to pay for large carnivore policy (Johansson et al. 2012). Although the wolf is part of the fear-relevant group of animals, this does not automatically result in fear being the dominant emotion. A study has addressed the predictive potential of emotions towards wolves for the acceptability of lethal wolf control, in three different scenarios: wolves are present, wolves attack sheep, and wolves kill a hiker (Jacobs et al., 2014a). The discrete emotions of joy and disgust were significant predictors in all situations. The predictive power of fear was lower and only constrained to two scenarios. These findings indicate that fear towards wolves has limited relevance for understanding the acceptability of lethal control. However, these results do not suggest that people do not feel fear towards wolves: the average level of fear was approximately three on a scale from 0 (no fear) to 6 (intense fear). However, the average level of joy towards wolves was slightly higher.

The dimensional perspective differentiates emotions based on valence and arousal. Approach versus avoidance tendencies and submissiveness versus dominance are occasionally mentioned as additional dimensions. Valence (the pleasure–displeasure dimension) and arousal (the activation–deactivation dimension) are used to classify emotional states or traits (Russell, 2003). Both perspectives are not mutually exclusive and can be used to understand emotions

in a wildlife context (Izard, 2007; Jacobs et al., 2012). Studies show that valence is a more significant predictor for acceptance of management actions than arousal (Jacobs et al., 2014a). The same study concluded that assessing arousal is more difficult through self-reported measures than assessing valence (Bradley & Lang, 2000).

2.9 Emotional diversity amongst humans

Literature suggests that humans evaluate the emotional relevance of stimuli in terms of five dimensions: (a) *novelty* (is there anything new?), (b) *valence* (is it relevant?), (c) *goals* (are there consequences?), (d) *agency* (can I cope?), and (e) *norms* (is it normatively significant?) (Ellsworth & Scherer, 2003; Scherer, 1999; Smith & Ellsworth, 1985). These appraisals usually occur in order, although people are not consciously aware of this order because emotional appraisal takes place quickly (Ellsworth & Scherer, 2003; Sander et al., 2005). As an example, the return of wolves to previous habitats might evoke strong emotions because the situation is new (novelty), might be seen as relevant (valence), might be seen as having consequences for what people usually want to do (goals), might be judged as an event that can be hard to cope with (agency) and might be seen as normatively significant if people find it not compatible with existing norms (Jacobs & Vaske, 2019).

Variation amongst emotional dispositions exist, for example object vs. situation disposition. Object-oriented dispositions are relatively state-independent (e.g., a dispositional fear of specific species); situation dispositions are relatively state-dependent (e.g., a criterion goal; what are the consequences?). For example, most humans respond positively towards deer, but farmers might have negative emotions towards deer because deer can damage agricultural crops. In this example, the situation influences humans' disposition. All these components within the evaluation of a stimulus cause variance amongst humans, and it is thus expected that emotions account for variance in acceptability of management actions.

2.10 Literature on emotions

Research on emotions is relatively underexplored in social scientific research regarding human–wildlife relationships (Manfredo, 2008; Jacobs et al., 2012). Some researchers explored generic emotion theory (Manfredo, 2008) to explore the psychological processes that form the basis of emotional responses to wildlife (Jacobs, 2009). Other researchers have used self-reported measures to study specific emotions towards particular animals, most notably fear (Johansson et al., 2012). Other research has used animals (e.g., snakes and spiders) as stimuli to understand fear reactions (Öhman & Mineka, 2001; Öhman et al., 2001; Öhman, 2009). When emotions are triggered, they can influence the mind and behaviour (LeDoux, 1996). Emotions influence other mental processes and dispositions, such as memories (Talarico & Rubin, 2003), motivation (Frijda, 1986; Izard, 2009), decision making (Damasio, 1999; Loewenstein & Lerner, 2003; Winkielman et al., 2007), and perception (Dolan, 2002). The power of emotions influences how humans are attracted to wildlife (Manfredo, 2008) and their motivation to view wildlife (Jacobs, 2009).

Understanding the working of emotions and the different concepts surrounding emotions is essential to measure the impact on human behaviour. Due to the complexity of emotions and the variance amongst humans, it is expected that emotions play a role in acceptance of wolf management actions. This study uses a questionnaire to gather data on several human dimensions, including emotional dispositions, to examine acceptability of management actions. This research method entails online questions that have to be answered on a Likert-scale. Therefore, emotions are measured as dispositions and not as experiences. Past studies have shown that dimensional emotions are more difficult to self-report, which is why discrete emotions will be used in the questionnaire. In addition, dimensional emotions are scored from positive to negative, which is the same scale that is used to measure attitudes.

3. Theoretical framework

This chapter outlines the theoretical foundation that underpins the study, providing a conceptual model for understanding the relationships among key concepts and guiding the development of the hypotheses. By establishing a coherent and theoretically grounded framework, this chapter sets the stage for the methodology of the study, ensuring that the research is both conceptually robust and logically structured.

3.1 Relationships between concepts

Cognitive hierarchy theory supports the causal relationships between values, fundamental beliefs, emotions, attitudes, and perceived risks. Values and value orientations influence cognitive and affective perceptions of risk and evaluations of wildlife (Carter, Riley & Liu, 2012). The cognitive hierarchy starts with the broadest cognition: values. Since wolves were distinct for a long time, the Dutch population grew up without wolves and formed values. It is unlikely that these values changed because of the return of the wolves. Therefore, values are unlikely to account for much of the variability in specific behaviour like human acceptance towards management actions. Therefore, values are not taken into account in this study.

Value orientations, on the other hand, are more specific in the cognitive hierarchy. Wildlife value orientations have been studied intensively concerning human behaviour and within wolf context (Bright & Manfredo, 1996; Ericsson & Heberlein, 2003). Wildlife value orientations can vary amongst humans. Due to this variation, different attitudes and behaviours exist. The relation between wildlife value orientations and attitudes has frequently been researched and has shown predictive potential. Because of its proven predictability and interrelatedness with specific cognitions, wildlife value orientations will be researched again in this study to build on existing literature. Previous literature measured wildlife value orientations towards wolves in the Netherlands, but wolves were not present back then. This ensures a new variable in this current study and thus also potentially provides new information (Vaske et al., 2011).

While value orientations are usually limited to a limited number (e.g., mutualism–domination), humans can have numerous norms. Norm theory has proven relevant for predicting human behaviour, but is often seen as contradictory. Due to the scope of this study, specific norms will not be measured, but the expressions of norms (e.g., acceptance of wolf management actions) will be examined. This approach is in line with Sijtsma et al (2012) where acceptability of management actions is seen as an object.

Since the wolf's return, new information has been made available to humans, and more interactions have occurred. Previous research has suggested that providing information on wildlife species can influence attitudes and risk perceptions (Flemming et al., 2018). Due to this new information and interactions, humans can develop more specific beliefs about specific objects like wolves. Creating more specific beliefs might make wildlife value orientations less relevant for accounting for variance. This interesting view will be researched by including attitudes and risk perceptions in the conceptual model. Moreover, risk

perceptions can lead to behavioural changes, are subject to (social) media attention, and can be transferred to others in a community. Because of these characteristics, it can be valuable to measure risk perceptions now that the wolf has returned. However, risk perceptions can be seen as a negatively associated concept. This conceptual model will therefore include positive consequences to existing risk perception theory, to reduce the negativity bias within this concept. Using perceptions of consequences instead of risk perceptions does not have much proven validity in current literature, but doing something new and out-of-the-box could potentially lead to new insights and add on to existing literature.

In recent decades, attitudes towards wolves have changed; conservation rather than extermination is the focal point of (inter)national management programs (Linnell et al., 2001). Measuring attitudes now that the wolf has returned might provide new insights and can thus add to existing literature. Besides that, attitudes have been included in the conceptual model because of the proven causal relationship with risks in the decision-making process on wildlife (Gore et al., 2009) and the interrelatedness with emotions.

Research on emotions is relatively scarce in social scientific research regarding human–wildlife relationships. However, emotions have been proven to have predictive potential in attitudes (Jacobs et al., 2014b) and are considered one of the first mental capacities to emerge in human evolution (Jacobs, 2009). Because of the chosen research method, (discrete) emotional dispositions will be used in order to measure stable emotions of humans.

No single psychological concept accounts for all the variance of human acceptance towards management actions. Combining several concepts is key to understanding human acceptance of wolf management actions. One of these variables that might have predictive potential but is not linked to the cognitive hierarchy is distance towards wolves. As other research suggests, the predictive potential of emotional dispositions towards wolves for the acceptability of lethal wolf control differed amongst scenarios (Jacobs et al., 2014a). Research has shown that the more severe the problem caused by wildlife, the greater is the acceptance of lethal methods for managing wildlife (Vaske & Needham, 2007). Majic and Bath (2010) concluded that humans exposed to increasing carnivore populations or living closer to carnivores (Karlsson & Sjöström, 2007) tend to have lower acceptance of these species. Therefore, the conceptual model includes a separate hypothesis to investigate whether distance towards wolves have a relationship with the psychological antecedents.

3.2 Conceptual model

Figure 2 shows the conceptual model based on the literature review. The goal of this study is to understand, to what extent, people accept wolf management actions and what psychological antecedents predict this acceptance. Understanding the predictive power of psychological antecedents can provide new knowledge for wolf management. The conceptual model uses specific and more general concepts from the cognitive hierarchy theory. Existing literature has often researched values and value orientations and has concluded that both have predictive potential. However, most of this research was done prior to the return of wolves. Since the wolf's return, information from social media,

interactions, and personal experiences has increased. People have started to gain more knowledge about wolves. It is expected that the more knowledge people obtain about an object, the more predictive power specific cognitions have on acceptability. Both values, as emotional dispositions, are measured regarding wildlife value orientations to confirm these expectations. From the conceptual model, hypotheses are generated.

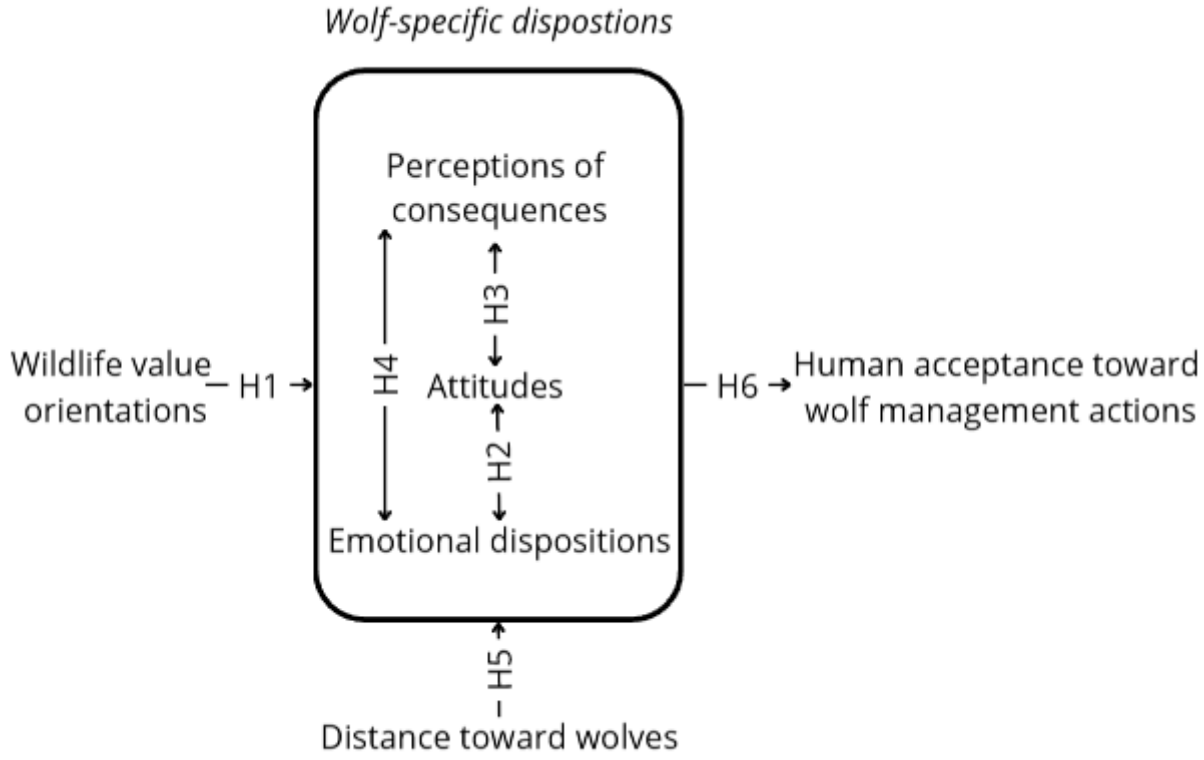

Figure 2: Conceptual model.

3.3 Hypotheses

H1: Wildlife value orientations are associated with wolf-specific dispositions.

- *H1.1: Wildlife value orientations are associated with attitudes towards the presence of wolves in the Netherlands*
- *H1.2: Wildlife value orientations are associated with perceptions of consequences of wolves*
- *H1.3: Wildlife value orientations are associated with emotional dispositions towards wolves in general*

H2: Emotional dispositions towards wolves in general are associated with humans' attitudes towards the presence of wolves in the Netherlands.

H3: Perceptions of consequences are associated with humans' attitudes towards the presence of wolves in the Netherlands.

H4: Perceptions of consequences are associated with emotional dispositions towards wolves in general.

H5: Distance towards wolves accounts for variance in wolf-specific dispositions towards wolves

- *H5.1: Providence of residence accounts for variance in wolf-specific dispositions.*
- *H5.2: Distance toward wolves accounts for variance in attitudes towards the presence of wolves in the Netherlands.*
- *H5.3: Distance toward wolves accounts for variance in perceptions of consequences toward wolves in the Netherlands.*
- *H5.4: Distance toward wolves accounts for variance in emotional dispositions toward wolves in general.*

H6: Each psychological antecedent accounts for variance in human acceptance towards wildlife management actions.

- *H6.1: Attitudes towards the presence of wolves in the Netherlands accounts for variance in human acceptance towards wildlife management actions.*
- *H6.2: Perception of consequences of wolves accounts for variance in human acceptance towards wildlife management actions.*
- *H6.3: Emotional dispositions towards wolves in general account for variance in human acceptance towards wildlife management actions.*
- *H6.4 Wildlife value orientations account for variance in human acceptance towards wildlife management actions.*

4. Methodology

This chapter outlines the research design and methods employed to study the research questions. It describes the approach taken to collect and analyse data, the rationale behind the data collection and sampling method. By providing a clear and systematic explanation of the research process, this section aims to ensure transparency, reproducibility, and the overall reliability of the findings.

4.1 Research design

This study employs a quantitative approach, utilizing quantitative methods including a questionnaire, to test theories in a large sample (Creswell, 2002; Biggam, 2008). Other researchers have related quantitative research to measuring the quantity of a specific phenomenon. This study aims to test an existing theory by using the cognitive hierarchy as groundwork. However, it also includes new components, like perceptions of consequences, that aim to fill a gap in the literature, trying to add new knowledge to existing theories. Using a large sample is a characteristic of quantitative research; this ensures that results can be generalized and resemble an entire population. Wildlife management actions can potentially affect the entire population, which is why it is important that the results of this research can be generalized. Human dimensions are underexplored in existing literature; studying these dimensions can lead to new contributions in the literature about the relationship between human dimensions and human acceptance of wolf management actions in the Netherlands. Although this study aims to obtain results that provide a qualitative understanding of a specific case, the methods employed are predominantly aimed at quantifying data, which is why quantitative research is the primary focus.

4.2 Sample

A questionnaire's "target population" refers to the people researchers aim to generalize their findings to (Rahman et al., 2022). The target population of this study consists of residents in the Netherlands who are over 18 years old. 18 is considered a threshold, as, according to Dutch law, individuals over 18 are considered adults. The research aims to measure the acceptability of management actions, as children may not fully understand the consequences of these actions. Given the scope of this study, the researcher is aware that it is impossible to find a sampling frame that exactly resonates with the entire group of residents in the Netherlands since a sampling frame is more specific than an entire population (Rahman et al., 2022). However, the researchers aim to sample 400 people living in different parts of the Netherlands to best reflect the Dutch population.

The two main sampling techniques are probability sampling and non-probability sampling (Elfil & Negida, 2017; Shorten & Moorley, 2014). Simple random sampling is part of probability sampling. This method ensures that everyone in a population has an equal chance of participating (Thomas, 2020). Simple random sampling is a proven method when the study's goal is to generalize findings that can be applied to the entire population, which is the case for this study (Rahman et al., 2022). However, due to practical reasons and a limited budget, random sampling is not an option. Network sampling, also known as convenience sampling, is a method that begins with a few units as ‘seeds’, sequentially

leading to the selection of additional units from the researcher's network. Within network sampling, a specific subtype is considered snowball sampling, where several connected networks are tied and an increasing group of respondents is reached and further specified (Vehovar, Toepoel, & Steinmetz, 2016). The questionnaire for this study will be distributed through the researcher's online social network, and can thus be considered to be part of non-probability sampling. The researcher lives and studies in Gelderland but works in Zuid-Holland, ensuring the questionnaire can be distributed across different provinces.

The researcher will utilize online platforms to disseminate the survey to various provinces across the Netherlands. This results in more equal changes of participation across the Netherlands, but it is still an example of non-probability sampling. Examples of these platforms include Deventer hospital and various Facebook groups dedicated to wolves in the Netherlands. In addition to the researcher's network, the project supervisor will utilize his network to disseminate the survey and expand its reach. This is also considered a non-probability sampling method. However, the project supervisor is substantively involved in specific wolf expert groups and associations and thus targets more specific groups within the population. Due to the geo-location focus and the fact that all platforms are online accessible, this study does not provide an equal opportunity for all inhabitants to participate. People who do not use social media are unfortunately excluded.

If the questionnaire does not have enough responses online, the researcher can include paper surveys as an additional data collection method. Providing both paper and online questionnaires will increase the inclusivity of the data collection method. On the one hand, the distribution of paper-based surveys is more geographically localized than that of online surveys, which can be more easily disseminated across the country, resulting in a sample that may be location-restricted. On the other hand, this ensures that the researcher can have geo-located samples within the larger sample, allowing for comparison from a geo-located perspective rather than a country-wide perspective.

A potential obstacle for this research is that the sample will be too small to generalise the research results. The researcher can easily check how often the questionnaire is filled out online. When the researcher notices that the completion ratio is behind schedule, additional measures can be taken to increase the survey's reach and completion ratio. Instagram, Facebook, WhatsApp, Wageningen University and Deventer hospital will be the primary platforms to spread the survey. Another message on the same platforms can be posted as a reminder to increase the completion ratio. Another bottleneck of using a questionnaire as a primary data collection method is that the data is only viable if the questionnaires are complete. This obstacle can be tackled relatively easily with online surveys. Suppose the questionnaire is designed so the participant can only proceed after completing all the required questions. In that case, the participant cannot accidentally forget to answer one question. Additionally, SPSS 30, the researcher's preferred analysis tool, can filter out incomplete surveys from the original data pool.

4.3 Questionnaire structure

The six-part questionnaire includes (a) a validated scale on wildlife value orientations (Teel & Manfredo, 2010), (b) attitudes towards presence of wolves (Slagle et al., 2012) (c) Emotional dispositions towards wolves in general (Jacobs et al., 2014b), & (d) Perceptions of consequences (Slagle et al. 2012) and (e) acceptability of management strategies (Jacobs et al. 2014a) (f) demographics (e.g., age, gender, place of residence). The questionnaire guide can be found in Appendix I and the corresponding codebook in Appendix II.

The questionnaire must cater to convenience, maximizing the chance that as many people as possible will complete the survey. Creating a questionnaire that takes no longer than 10 minutes has a higher potential to be filled out than a questionnaire that takes 20 minutes to complete. Additionally, demographic questions are pertinent to this research. However, participants often find these questions confronting or boring, so the researcher prefers to put these questions at the end of the survey instead of at the beginning. Participants might feel inclined to stop the survey when they see the demographic questions at the beginning.

4.3.1 Wildlife value orientations

The 19 wildlife value orientation statements encompass two ideologies: domination (including statements on hunting and utilization/use beliefs) and mutualism (including statements on social affiliation and caring beliefs), as derived from Teel and Manfredo (2010). Respondents could rate on a 7-point Likert scale how much they agreed with each statement from −3 = 'strongly disagree' to +3 = 'strongly agree' with zero as a neutral point. The original items from the list are in English, but this survey will be in Dutch. Translations from wildlife value orientations items are derived from previous research, where the items were tested and approved for reliability (Jacobs et al., in press).

4.3.2 Acceptability of wildlife management actions

Previous research assessed the acceptability of three management strategies—lethal control, educating the public, and doing nothing (hereafter referred to as 'no-action') —in relation to three scenarios of human-wolf conflicts that were increasing in severity (Jacobs et al., 2014a; Sijtsma et al., 2012). However, when this research was carried out, wolves were not as abundantly present and settled as they are at the time of this study. This prompts the researcher to reassess previous methods in established studies, considering whether they remain relevant or if new developments have occurred. That is partly why this survey does not contain 'education' as a measurement action, as was done in the study of Jacobs et al. (2014a). Instead, this survey includes 'containment' as a management action. This action is derived from the current pilot in Drenthe, where electric fences are used to prevent wolves from entering specific areas (Bij12, n.d.). With high social media attention, education has become a less dominant management strategy.

The three management actions were measured in four potential scenarios. The four scenarios present three levels of problem severity for humans: wolves are present, wolves kill sheep, wolves attack humans, and wolves kill a human (Jacobs et al., 2014a; Sijtsma et al., 2012). Human casualty is a scenario that

represents an extreme situation, which is highly controversial and rare, but it is included to represent a fuller range of potential scenarios. It is also derived from the fact that some people actually fear wolves for potentially killing people (Jacobs et al., 2014a), although this has never happened before in the Netherlands. For each scenario, respondents were asked to rate the acceptability of management actions on a 5-point Likert scale (−2 = 'very unacceptable' to +2 = 'very acceptable', with zero as the neutral point). The three management actions are: no-action, containment, and lethal control.

4.3.3 Emotional dispositions

Existing literature has measured emotional dispositions both through discrete and dimensional perspectives. Previous research concluded that arousal is difficult to self-report and did not demonstrate acceptable reliability against the accepted cutoff point of 0.70, which is why this dimension was excluded from further analyses in research on wolves in the Netherlands (Jacobs et al., 2014b). Valence toward wolves has stronger predictive potential for the acceptability of lethal wolf control than any discrete measure of emotion (Jacobs et al., 2014b). However, this research already includes attitudes towards the presence of wolves in the Netherlands, which are based on a positive/negative dimension, similar to what valence measures. Including another positive/negative dimension would perhaps overshadow the other psychological antecedents. Therefore, valence is not included in this study.

Regarding discrete emotions, respondents were asked to rate their emotional dispositions toward wolves in general on a 7-point Likert scale with 'not at all' to 'very strong'. Ekman (1992) proposes six basic emotions; : joy, fear, surprise, anger, disgust, sadness and has generated some evidence for their universal existence. Izard (2007) has added interest, claiming this is the most basic emotion.

4.3.4 Attitudes

Slagle et al. (2012) researched attitudes toward wolves. His research included four items: like/dislike and harmful/beneficial. These items use a positive and negative extreme to measure the attitude. Analysis from previous research has shown that these four dimensions are correlated and exhibit similar characteristics. The researcher chose to include a single item on attitudes towards the presence of wolves in the Netherlands, as it would be too much for the respondent to complete all four items. As mentioned earlier, keeping the survey as brief as possible is crucial to maximize the response rate. Question 6 (Q) specifies measuring attitudes towards the presence of wolves in the Netherlands rather than wolves in general to make a distinction from questions on emotional dispositions aimed at wolves in general.

4.3.5 Perceptions of consequences

Perceptions of consequences are a new concept in this research. It is partly derived from risk perceptions, which have been explained in the cognitive hierarchy. These perceptions or consequences encompass both risk perceptions and perceptions of positive consequences. By including positive consequences, this research wishes to prevent a negativity bias. Since this dimension is

relatively new, no reliable and valid theory encompasses all positive consequences. Therefore, the existing literature has been utilized to identify potential positive consequences, which are measured in the questionnaire in conjunction with the risk perceptions of Slagle et al. (2012).

Linnell et al. (2001) studied the positive effects of wolf presence and concluded that deer and boar populations would be better regulated, stimulating a more balanced ecosystem. Nuisance caused by boars and deer can thus also be reduced, which is seen as a positive effect. In addition, Ripple et al. (2014) claim that animal behaviour (indirectly) changes due to the wolf's return, which may result in the restoration of vegetation and increased biodiversity. Treves and Karanth (2003) discussed how the wolf, a 'charismatic megafauna symbol', can contribute to conservation and education, increasing public support for conservation measures. It also enhances the sense of 'pure nature' among humans. Linnell et al. (2012) suggest that the presence of wolves can promote ecotourism, generating economic benefits for local communities through tourism and nature-based experiences. These are four potential positive consequences of the wolf's return and human-wolf coexistence. The researcher knows that the existing literature on these topics is scarce, so comparing the results to other studies may be challenging. However, by incorporating this new dimension and perspective, the researcher aims to advance science and stimulate further research on this topic and perspective.

4.3.6 Demographics

Demographics will be included in the survey to examine whether the sample is representative of the entire population and whether results of the study can be generalized. Existing methods and surveys often address age, gender, education, and income. Income is often considered sensitive for respondents, so it was not included in this survey. The other three topics are not as sensitive and therefore part of this survey.

For the scope of human-wildlife dimensions, the area of residence is often included; this can vary between rural and urban areas or be specified to areas where wolves are habituated (Sijtsma et al., 2012). The respondents were asked to indicate which province they live in and the number of inhabitants in their area of residence. This provides data that can be used to determine whether the sample is representative of the Dutch population, but also to test whether wolf-specific dispositions and acceptance of wolf management actions differ by area of residence. The final question asks the respondent to indicate the expected distance between their area of residence and the closest wolf habitat. The researcher is aware that respondents may not fill in the answers perfectly. However, this question helps determine whether the proximity of wolves have a relationship with the acceptance of wolf management actions. Even though, the answer might be 50 kilometres off, the respondent answered all questions based on their estimation of the proximity of wolves. Additionally, it is expected that there will be an error margin among all participants. Therefore, the mean value remains relevant. People who live in Zeeland are expected to fill in a greater distance in kilometre than those who live in Gelderland.

4.3.7 Pre-testing

Before the start of the survey period, the instrument will be pre-tested for function and length. Students from Wageningen University will be included in the pre-test phase, as will non-students from outside Wageningen University. The pre-test phase takes place from April 21st to April 24th. After the test phase, slight adjustments can be made to the survey to enhance its potential and reach. The first survey period lasts from May 5th till May 11th 2025 an additional week can be added to the survey period when the researcher believes the survey did not reach its maximum potential.

4.4 Data preparation

Screening, cleaning, and reducing the data are necessary before analysing it for the results. Reliability analysis of all concepts with multiple items will be done to reduce the amount of data. SPSS 30 is the analysis tool used, and Qualtrics can automatically export the data file into SPSS, ensuring the failure margin is as low as possible. Previous literature has also concluded that two items from hunting beliefs must be reverse-coded before the reliability analysis. After successful recoding, the researcher performed a reliability analysis, resulting in a Cronbach's Alpha of .809 on the domination construct and .836 on the mutualism construct.

4.4.1 Data screening

During the data screening, the researcher looked at missing values. The amount of missing values was very low compared to the total number of respondents (N). Therefore, the researcher decided to exclude all missing values rather than replace them with mean values. This way, the data remained uncorrupted. The number of variables is quite high, so the researcher wishes to reduce the data. Attitudes towards the presence of wolves in the Netherlands were the only concept measured by one item on a 5-point Likert scale. Therefore, it is not possible to reduce the data on attitudes. Other constructs were measured on several items, which is why exploratory factor analysis was done for some of these constructs.

4.4.2 Distance toward wolves

Distance toward wolves was measured by two questions: question 15 (Q15) asked respondents to indicate the province in which they live, and question 17(Q17) asked respondents to indicate the distance from their area of residence to the closest wolf habitat area. The answers from Q15 were recoded into new variables: province with wolves and province without wolves. Gelderland, Utrecht, Drenthe, and Friesland are provinces that have wolf populations according to the map of Bij12. Wolves are sometimes spotted wandering in Overijssel, but according to the map, there is no wolf population residing in Overijssel, which is why, for this study, Overijssel is considered a province without wolves.

Question 17 is measured on a continuous scale in kilometres. However, this question contained an open text box, so some respondents included km or kilometre in their answer. All letters were removed from the answer boxes to clean the data within this variable, so only numbers remained.

4.5 Hypothesis testing

Appendix III provides detailed guidelines for interpretations of effect sizes in SPSS, as Cohen (1988) outlined. The different types of effect sizes can be compared, even though they are the outcomes of different statistical tests. The code for the variable is specified in Table 1; whether the variable is considered dichotomous, categorical, or continuous. Table 2 shows which test is necessary to test which hypothesis. It indicates which variable is considered independent (IV) and which is considered dependent (DV). In case multiple independent variables are used, regression is preferred over correlation.

Table 1: Types of variables

Variable	Coded scale
Domination	Continuous
Mutualism	Continuous
Emotional dispositions	Continuous
Attitudes	Continuous
Positive perceptions	Continuous
Negative perceptions	Continuous
Acceptance of management actions	Continuous
Wolf or no wolf province	Dichotomous
Distance to wolf territory	Continuous
Gender	Dichotomous
Education	Categorical
Number of residents	Continuous
Age	Continuous

Table 2: Hypothesis test overview

Hypothesis	IV	DV	Test in SPSS
1.1	Domination and Mutualism	Attitude	Regression
1.2	Domination and Mutualism	Positive perceptions Negative perceptions	Regression
1.3	Domination and Mutualism	Emotional dispositions	Regression
2	Emotional dispositions	Attitude	Regression
3	Positive perceptions Negative perceptions	Attitude	Regression
4	Emotional dispositions	Positive perceptions Negative perceptions	Regression
5.1	Distance (province)	Attitude	Independent sample T-test
5.1.2	Distance (KM)	Attitude	Pearson Correlation
5.2	Distance (province)	Positive perceptions Negative perceptions	Independent sample T-test
5.2.1	Distance (KM)	Positive perceptions Negative perceptions	Pearson Correlation
5.3	Distance (province)	Emotional dispositions	Independent sample T-test
5.3.1	Distance (KM)	Emotional dispositions	Pearson Correlation
6.1	Distance	Acceptance of management actions	Regression
6.2	Positive perceptions Negative perceptions	Acceptance of management actions	Regression
6.3	Emotional dispositions	Acceptance of management actions	Regression
6.4	Wildlife value orientations	Acceptance of management actions	Regression

4.6 Ethical considerations

The wolf's return to the Netherlands is a sensitive topic that has resulted in societal discussions. People with different backgrounds have different opinions based on their view and their interaction with wolves. Farmers prioritize livestock safety, and conservationists prioritize the well-being of the wolf. These contradicting opinions on the wolf polarize society. This study examines acceptability towards three wolf management actions, including lethal control, which is often seen as a controversial intervention that contributes to an even bigger (political) debate about whether humans should interfere with nature to this severe extent. The researcher is aware of the potentially conflicting opinions of different stakeholders, but wishes to ensure objectivity by using reliable

measurement instruments. Therefore, the questionnaire will be designed following existing literature and proven measurements.

The researcher grew up on a farm and lives in a rural area in Gelderland, the province with the highest number of wolf packs in the Netherlands. Besides that, the researcher works for the Dutch government in The Hague, so is familiar with policy creation. These personal circumstances might influence the researcher's perspective towards wolves. Applying a positivist research approach to this topic, and using quantitative data methods with objective instruments, this researcher tries to obtain objective data that can legitimize generalizations. Several ethical considerations were made to ensure that this study is performed with as little bias as possible.

Informed consent: A questionnaire will be used as the primary data collection method. This data collection method is voluntary, but all participants will be informed how the data will be processed. Before the questionnaire begins, an introduction will outline the background of this research and ensure that the questionnaire remains anonymous. Qualtrics generates the IP address of the respondents, but this can be removed from the dataset to ensure complete anonymity. The questionnaire data will be analysed by the researcher using SPSS 30 and made publicly available. The participants can continue the questionnaire if they agree with the terms and conditions.

Voluntary participation: The questionnaire will be distributed online via social media and platforms. Participants can voluntarily participate by agreeing to the terms and conditions. Potential confronting questions like gender will have the option to choose or prefer not to answer. Whilst these types of ethical considerations belong more to the inclusivity of the research, the research needs to consider this since participation is voluntary.

Confidentiality: As previously mentioned, confidentiality was promised to participants in this questionnaire. This involved ensuring anonymity. The participants ' personal data (like names) will not be asked in the questionnaire. The questionnaire will ask for relevant personal data, e.g., demographics, because this can be relevant to the research questions. However, as said before, these data types will be treated anonymously.

Securing data storage: Qualtrics is the preferred data collection method for the survey. These results can be stored online and downloaded. To ensure safe data storage, the researcher will use both options. SPSS 30 will be used to analyse the data. SPSS 30 has the option to keep track of a logbook. This logbook can be saved in a separate document to track the researcher's actions during the analysis stage. When potential mistakes are made, the logbook can return to zero settings and start over with neutral data. Using SPSS 30, the researcher can save several data sets and have several analysis options without corrupting the data. The original data set will always be copied and stored to ensure that it remains intact. Once the results are extracted, copies will be made on the researcher's laptop device and online on a drive.

4.7 Researcher perspective and positionality

As described in the research design, it can be disputable whether quantitative research only results in generalized and objective findings. The same applies to the philosophical perspective of this research. Park et al. (2020) describe the positivism paradigm as an objective research frame with generalizable results that can be used to advance science. Positivism is linked to hypothesis testing by verifying a priori hypotheses by operationalizing variables. Therefore, one might easily say that this study fits perfectly with a positivist approach. Generalizable inferences, replication of findings, and controlled experimentation have guided positivist science. In order to statistically prove that emotions have predictive power on the acceptability of wolf management actions, this research created a hypothesis that will be tested on a large sample to test the relationship.

The goal of this research is to better understand the human dimensions towards wildlife, and to contribute to this understanding, a questionnaire is used to generalize the results. Unlike interviews, a questionnaire is an objective data collection method that uses numeric data to compare on a numeric scale. Another precondition for generalizing the data results is to ensure objectivity, reliability, and validity in this research. Using a positivist approach, the researcher has an objective perspective. This results in fewer researchers' biases corrupting the reliability of the research. Quantitative approaches are used to identify relationships. The hypotheses that were formed represent relationships, which is another reason why quantitative and thus positivism is the favourable approach for the researcher

As a researcher, I recognize that my background may influence how this study is conducted. I grew up on a farm in a rural area, which formed my familiarity with livestock and living close to nature. Although I have never seen a wolf in real life, I currently live in an area where wolves can wonder around and are present within 5 kilometres. In recent years, I have observed growing concerns in my neighbourhood, with videos of wolves circulating widely on social media and many comments expressing fear, frustration, or even hostility. Being close to this discourse, I have personally felt the presence of a negativity bias toward the wolf and have witnessed how this can influence discussions about wolves. Throughout the research process, I have aimed to maintain critical self-awareness and minimize bias by relying on validated instruments and transparent methods. A questionnaire guide, was created to ensure validity of the research method. The methodology chapter outlines how the data was processed and interpreted to be transparent to the reader.

5. Results

This chapter presents the findings of the research based on the methods described in the previous chapter. The results are organized according to the hypotheses, providing a clear and objective overview of the data. Interpretation of the results is described below every Table.

5.1 Sample characteristics

This section outlines the key demographic and background information of the participants involved in the study. It includes details such as age, gender, and other relevant variables that contextualize the sample population. Understanding these characteristics is essential for interpreting the results and assessing the generalizability of the findings. Table 3 shows the frequency table of the demographics of the sample of this study.

Table 3: Frequency table demographics

	Frequency	**Percentage**
Gender		
Female	305	73,3%
Male	99	23,8%
Other	12	2,9%
Total	416	100%
Age		
18-25	22	5,3%
26-40	71	17,1%
41-55	134	32,2%
56-70	177	42,5%
71-85	12	2,9%
86+	0	0%
Total	416	100%
Education		
Geen diploma	1	0,2%
Basisonderwijs	2	0,5%
VMBO, HAVO / VWO Onderbouw, MBO1	57	13,7%
HAVO, VWO, MBO2-4	125	30%
Bachelor (HBO/WO)	125	30%
Master (HBO/WO)	96	23,1%
Doctor, PhD	10	2,4%
Total	416	99,9%
Province		
Groningen	17	4,1%
Friesland	32	7,7%
Drenthe	53	12,7%
Overijssel	70	16,8%
Gelderland	147	35,3%
Flevoland	7	1,7%
Utrecht	23	5,5%
Noord-Holland	8	1,9%
Zuid-Holland	29	7,0%

Zeeland	3	0,7%
Noord-Brabant	17	4,1%
Limburg	8	1,9%
Total	414	99,5%
Pronvince		
Provincie with wolf	257	61,8%
Provincie without wolf	159	38,2%
Total	416	100%
The size of the area of residence		
1 – 50.000	275	66,1%
50.001 – 100.000	63	15,1%
100.001 – 250.000	57	13,7%
250.001 – 500.000	11	2,6%
500.000+	10	2,4%
Total	416	99,9%

416 respondents (*N=416*) completed the survey between May 5th and May 11th 2025. From this sample, 73.3% are female, 23.8% are male, and 2.9% account for others. 74.4% of this group falls within the age range of 41–70. The questionnaire has been filled in by respondents from each of the 12 provinces, but Gelderland accounts for 35,3% of the total. 257 respondents live in a province where wolf populations are situated. The median distance from the respondents to the wolf territory is 17,8 kilometres, with 0 kilometres being the lowest and 200 kilometres being the highest. 66.1% of respondents live in an area with a maximum of 50,000 residents, which can be considered a rural area. Only 5% of the sample lives in an area with more than 250.000 inhabitants. This suggests that people from larger cities in the Netherlands are underrepresented in this sample. This may be due to the sampling strategy primarily focusing on the researcher's network.

Although the survey has been disseminated to all provinces, the distribution is not uniform. Yet, 61,8% live in provinces with wolves, which comes close to 50%, ensuring that the gap between wolf provinces and non-wolf provinces is substantial but not immense. However, the fact that the sample is not representative does not mean it is unfit for this study. This study aims to test theory, which can still be achieved by using this sample. The outcomes of this study can be compared to existing theory, but the outcomes might not be generalizable to the entire Dutch population.

5.2 Reliability analysis

Most of the concepts in this study are measured using multiple items. This section contains analyses that provide insight into whether the items actually measure the same concept. With this knowledge, the researcher can make informed decisions about combining items into new indices that reflect the concepts.

Table 4: Reliability statistics

	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of items
Domination	.809	.792	10
Mutualism	.836	.840	9
Emotional dispositions	.817	.737	7
Negative perceptions	.954	.954	4
Positive Perceptions	.876	.875	4

Reliability analysis can only be performed on constructs with more than 3 items, which is why reliability analysis on attitudes toward the presence of wolves in the Netherlands does not appear in Table 4. For all other constructs, the Cronbach's Alpha is higher than 0.7 which suggests that these variables score consistently good on validity. The measurement of all concepts have acceptable reliability (all alpha exceeds .70). Indices that reflect the concepts were computed as the means of the associated items. These indices will be used for further analysis. The indices of emotional dispositions and perceptions of consequences are derived from Exploratory Factor Analysis (Appendix V & VI). Disgust is the only item that does not have a significant factor loading for component 1, resulting in the removal of disgust in the further analysis of this questionnaire. Pleasure and Interest were reverse-coded before computing all emotions into a single construct: emotional dispositions.

5.2.1 Emotional dispositions

Seven emotions were included in the questionnaire, each scored on a 5-point Likert scale. It is expected that these seven emotional dispositions can be reduced to two constructs: positive and negative emotions. Exploratory factor analysis was performed to see the item-total correlation for the eight emotions (Appendix V). KMO measures the sampling adequacy, which should be greater than 0.5 for a satisfactory factor analysis. The KMO analysis in this case is .89, suggesting that the researcher can proceed with factor analysis and Bartlett's Test of Sphericity was also acceptable(p-value <.001).

Looking at the eigenvalues, it can be concluded that two components can be extracted. The eigenvalue should be above 1 to say that a component can be extracted. However, the first component accounts for 58,6% of the variance, and adding a second component only results in an increase of 14,3% of variance. This is considered small. Therefore, this was further examined by the Scree Plot and Rotated component matrix. The eigenvalues and Scree plot did not give an exclusive indication on the number of components to be extracted. Looking at the rotated component matrix, one can see the factor loadings of individual items per component. Upon closer examination of the data, it can be concluded that not all emotions have unique factor loadings. This suggests that there is an overlap between emotions, making it challenging to compute emotions into two constructs.

5.2.2 *Perceptions of Consequences*

The researcher expects a difference between positive and negative perceptions of consequences and their predictive ability. Therefore, exploratory Factor Analysis was done (appendix VI). First of all, the KMO shows a value of .83, which is greater than 0.5, which is the cut-off point for a satisfactory factor analysis to proceed. The findings also show a significant Bartlett's Test of Sphericity (P-value <.001) adding more evidence to the researcher that a principal component analysis can be done. Looking at the Initial Eigenvalue and the Scree Plot, both outcomes suggest that two components can be extracted. Together, the two components account for 81% of the variance. The Rotated Component Matrix shows the factor loadings per component. This table suggests a significant difference between components one and two. Both components have unique factor loadings higher than .4. From a theoretical and data perspective, positive and negative perceptions of consequences are seen as two different constructs. In the further analysis of the hypothesis, these two constructs will be used instead of the eight individual variables.

5.3 Relationship between wildlife value orientations and wolf-specific dispositions

In this section, the following hypotheses are tested:

- *H1.1: Wildlife value orientations are associated with attitudes towards the presence of wolves in the Netherlands*
- *H1.2: Wildlife value orientations are associated with perceptions of consequences of wolves*
- *H1.3: Wildlife value orientations are associated with emotional dispositions towards wolves in general*

Table 5: Regression model with wildlife value orientations predicting wolf-specific dispositions

	Beta (p-value)	**Adjusted R Square (p-value)**
Attitude		.41 (<.001)
Positive perceptions		.40 (<.001)
Negative perceptions		-.00 (.48)
Emotional dispositions		.28 (<.001)
Domination		
Attitude	-.63 (<.001)	
Positive perceptions	-.59 (<.001)	
Negative perceptions	.04 (.54)	
Emotional dispositions	-.54 (<.001)	
Mutualism		
Attitude	.04 (.38)	
Positive perceptions	.09 (.04)	
Negative perceptions	-.04 (.52)	
Emotional dispositions	.04 (.47)	

Wildlife value orientations explained 41% of the variance in attitude towards the presence of wolves in the Netherlands (see adjusted R, Table 5). According to the guidelines proposed by Cohen (1988) this is a large effect size. Domination (beta = -.63, Table 5.) was a better predictor than mutualism (not significant). The more domination oriented people are the more negative their attitude towards the presence of wolves in the Netherlands. Mutualism is not associated with these attitudes. These figures confirm hypothesis 1.1.

Wildlife value orientations explained 40% of the variance in positive perceptions of consequences. According to the guidelines proposed by Cohen (1988) this is a large effect size. Domination (beta = -.59,) was a better predictor than mutualism (beta = .09). The more domination-oriented people are the more negative their positive perceptions of consequences. Wildlife value orientations are not associated with negative perceptions of consequences. These figures confirm hypothesis 1.2.

Wildlife value orientations explained 28% of the variance in emotional dispositions towards wolves in general. According to the guidelines proposed by Cohen (1988) this is a large effect size. Domination (beta = -.54) was a better predictor than mutualism (beta = .04). The more domination-oriented people are, the more negative their emotional dispositions toward wolves in general. Mutualism is not associated with these emotional dispositions. These figures confirm hypothesis 1.3.

5.4 Relationship between emotional dispositions towards wolves in general and attitudes towards the presence of wolves in the Netherlands

In this section, the following hypothesis is tested:

H2: Emotional dispositions towards wolves in general are associated with humans' attitudes towards the presence of wolves in the Netherlands.

Table 6: Regression model with emotional dispositions predicting attitude towards wolves

	Standardized Beta (p-value)	***Adjusted R Square (p-value)***
Emotional dispositions	*.70 (<.001)*	*.48 (<.001)*

Emotional dispositions toward wolves in general explained 48% of the variance in attitudes towards presence of wolves in the Netherlands in Table 6. In practical terms, this is a large effect size (Cohen, 1988). The more positive people's emotional dispositions towards wolves in general, the more positive their attitude towards presence of wolves in the Netherlands. This finding confirm hypothesis 2.

5.5 Relationship between perceptions of consequences and attitude towards the presence of wolves in the Netherlands.

In this section, the following hypothesis is tested:

H3: Perceptions of consequences are associated with humans' attitude towards the presence of wolves in the Netherlands.

Table 7: Regression model with positive perceptions predicting attitudes toward the presence of wolves in the Netherlands

	Standardized Beta (P-value)	***Adjusted R Square (p-value)***
Perceptions of consequences		*.57 (<.001)*
Positive perceptions	*.76 (<.001)*	
Negative perceptions	*-.03 (.43)*	

Perceptions of consequences explained 57% of the variance in attitudes toward the presence of wolves in the Netherlands in Table 7. According to the guidelines proposed by Cohen (1988) this is a large effect size. Positive perceptions of consequences (beta = .76) was a better predictor than negative perceptions of consequences (not significant). The more positive perceptions of consequences someone has, the more positive their attitude toward the presence of wolves in the Netherlands. Negative perceptions of consequences are not associated with this type of attitude. These figures confirm hypothesis 3.

5.6 Relationship between perceptions of consequences and emotional dispositions

In this section, the following hypothesis is tested:

H4:Perceptions of consequences are associated with emotional dispositions.

Table 8: Regression model with perceptions of consequences predicting emotional dispositions

Model	***Standardized Beta (P-value)***	***Adjusted R Square (p-value)***
Perceptions of consequences		*.39 (<.001)*
Positive perceptions	*.62 (<.001)*	
Negative perceptions	*-.02 (.53)*	

Perceptions of consequences explained 39% of the variance in emotional dispositions toward wolves in general in Table 8. According to the guidelines proposed by Cohen (1988) this is a large effect size. Positive perceptions of consequences (beta = .62) was a better predictor than negative perceptions of consequences (not significant). The more positive perceptions of consequences someone has, the more positive their emotional dispositions toward wolves in general. Negative perceptions of consequences are not associated with these emotional dispositions. These figures confirm hypothesis 4.

5.7 Relationship between distance towards wolves and wolf-specific dispositions

In this section, the following hypotheses are tested:

- *H5.1: Providence of residence accounts for variance in wolf-specific dispositions.*
- *H5.2: Distance toward wolves accounts for variance in attitudes towards the presence of wolves in the Netherlands.*
- *H5.3: Distance toward wolves accounts for variance in perceptions of consequences toward wolves in the Netherlands.*
- *H5.4: Distance toward wolves accounts for variance in emotional dispositions toward wolves in the Netherlands.*

Table 9: Independent sample T-test of wolf or No-wolf province towards wolf-specific dispositions

	T-value (p-value.)
Positive perceptions	*.05 (.96)*
Negative perceptions	*.03 (.98)*
Attitude	*.31 (.75)*
Emotional dispositions	*.63 (.53)*

The findings in Table 9 indicate no relationship between wolf or no-wolf provinces and wolf-specific dispositions. Thus, the province of residence is not associated with wolf-specific dispositions. Therefore, hypothesis 5.1 is rejected.

Table 10: Pearson's correlation with distance toward wolves predicting wolf-specific dispositions

	Correlation (p-value 2-tailed)
Positive perceptions	*.13 (.01)*
Negative perceptions	*.02 (.76)*
Attitude	*.06 (.20)*
Emotional dispostions	*.08 (.11)*

Table 10 shows the relationship between distance in kilometres and individual wolf-specific dispositions. There is no relationship between distance towards wolves and negative perceptions of consequences, attitudes towards the presence of wolves in the Netherland and emotional dispositions towards wolves in general. Positive perceptions of consequences form the exemption. This indicates that the further away someone lives from wolves the more positive perceptions of consequences that person has towards wolves. According to the guidelines proposed by Cohen (1988) this is a small effect size. These figures confirm hypothesis 5.3. Hypothesis 5.2 and 5.4 can be rejected.

5.8 Acceptance of management actions

In this section, the following hypotheses are tested:

- *H6.1: Attitude accounts for variance in human acceptance towards wildlife management actions*
- *H6.2: Perceptions of consequences account for variance in human acceptance towards wildlife management actions.*
- *H6.3: Emotional dispositions account for variance in human acceptance towards wildlife management actions.*
- *H6.4 Wildlife value orientation accounts for variance in human acceptance towards wildlife management actions.*

Table 11: Regression model of wolf-specific dispositions predicting wolf management actions.

	Negative perceptions	**Positive perceptions**	**Attitude**	**Emotional dispositions**	**Domination**	**Mutualism**	**Adjusted R-Square**
Scenario 1 - Wolves are present							
No action	*.009*	*.17***	*.16***	*.28**	*-.03*	*.08*	.35*
Containment	*-.060*	*-.08*	*-.06*	*.01*	*.216***	*-.05*	.10*
Lethal control	*-.028*	*-.24**	*-.16***	*.23**	*.304**	*.05*	.60*
Scenario 2 - Wolves kill sheep at nearby farm							
No action	*-.00*	*.23**	*.31**	*-.11*	*-.06*	*.08*	.42*
Containment	*-.01*	*.03*	*-.06*	*-.06*	*.22***	*-.10*	.06*
Lethal control	*.00*	*-.23**	*-.29**	*.16**	*.25**	*-.05*	.68*
Scenario 3 - Wolves attack human							
No action	*-.00*	*.21***	*.21***	*-.07*	*-.06*	*.15***	.31*
Containment	*-.079*	*-.02*	*.17*	*-.02*	*.19***	*-.11***	.03**
Lethal control	*-.00*	*-.22**	*-.21**	*.11***	*.28**	*-.03*	.52*

Scenario 4 - Wolves kill human							
No action	*-.07*	*.10*	*.08*	*-.18***	*.02*	*.11***	.12*
Containment	*-.04*	*-.03*	*.15*	*-.10*	*.14*	*-.07*	.02**
Lethal control	*-.06*	*-.21***	*-.05*	*.11*	*.21**	*-.14***	.32*

** p-value <.001*

*** p-value <.05*

Acceptance of lethal control can be best predicted by this conceptual model, up to 68% of variance is explained by the combination of concepts (scenario 2). According to Cohen (1988) this is considered a large effect size. However, the more severe a situation gets, the less explained variance in acceptance of management actions. Acceptance of no-action is the second best management action to be predicted by this conceptual model, up to 42% of variance. The amount of variance that is predicted by wolf-specific dispositions differ per scenario, but in all scenarios, acceptance of containment can be the least predicted, up to 10%.

Table 11 shows the relationship between wolf-specific dispositions, wildlife value orientations and acceptance of wolf management actions. Attitudes towards the presence of wolves in the Netherlands account in 6 out of 12 cases for variance in acceptance of wolf management actions. These figures confirm hypothesis 6.1

Positive perceptions of consequences account in 7 out of 12 cases for variance in acceptance of wolf management actions. Negative perceptions of consequences are not a predictor of acceptance of wolf management actions, meaning there is no relation between someone´s negative perceptions of consequences and support for management actions. These figures confirm hypothesis 6.2

Emotional dispositions towards wolves in general account in 5 out of 12 cases for variance in acceptance of wolf management actions. These figures confirm hypothesis 6.3. Domination account in 7 out of 12 cases for variance in acceptance of wolf management actions and mutualism in 4 out of 12 cases. Domination is a better predictor than mutualism. These figures confirm hypothesis 6.4.

Positive perceptions of consequences is the best predictor in 1 out of 12 cases. Emotional dispositions towards wolves in general in 2 out of 12 cases, attitudes towards the presence of wolves in the Netherlands in 4 out of 12 cases and domination in 5 out of 12 cases.

5.9 Acceptance of wolf management actions between scenarios.

After the analysis of the data and acceptance of the a priori hypothesis; the researcher wanted to extend the research by measuring differences in acceptance of wolf management actions between scenarios.

Table 12: Paired sample T-test

	T-value (P-value 2-tailed)
No Action	
Scenario 1 & Scenario 2	14.803*
Scenario 1 & Scenario 3	17.794*
Scenario 1 & Scenario 4	19.108*
Scenario 2 & Scenario 3	4.130*
Scenario 2 & Scenario 4	7.181*
Scenario 3 & Scenario 4	4.067*
Containment	
Scenario 1 & Scenario 2	-.49
Scenario 1 & Scenario 3	2.003**
Scenario 1 & Scenario 4	3.100**
Scenario 2 & Scenario 3	2.950**
Scenario 2 & Scenario 4	4.213*
Scenario 3 & Scenario 4	2.003**
Lethal control	
Scenario 1 & Scenario 2	*-5.713**
Scenario 1 & Scenario 3	-8.983*
Scenario 1 & Scenario 4	-12.278*
Scenario 2 & Scenario 3	-5.710*
Scenario 2 & Scenario 4	-9.334*
Scenario 3 & Scenario 4	-6.979*

** p-value <.001 ** p-value <.05*

The findings indicate that for each pair of scenarios (except containment scenario 1 and 2), there is a difference in acceptance. Specifically, the more severe a situation gets, the higher the support for lethal control. The opposite is true for no-action. Support for containment reduces when the situation gets more severe.

6. Discussion

This chapter presents a critical discussion of the key findings, placing them within a broader context of the existing literature. The chapter also addresses the theoretical and practical significance of the findings, identifies any unexpected outcomes, and reflects on possible explanations. Where appropriate, it reflects on the limitations of the study and suggests recommendations for future research.

6.1 Leaving the negativity bias behind

Discussions about wolves are frequently framed in terms of risks and threats, reflecting a broader negativity bias evident in both scientific literature and public discourse. The media can play a significant role in shaping humans, often emphasizing fears or reinforcing existing biases (Gore et al., 2009). Studies in Sweden revealed that the presence of wolves in an area leads to higher risk perceptions and significantly affects the daily lives of individuals inhabiting wolf territories (Ericsson & Heberlein, 2003; Johansson et al., 2012). These studies claim that distance from wolves is a factor that affects human behaviour. However, this study, on the contrary, has found no evidence of a relationship between wolf or no-wolf provinces toward wolf-specific dispositions in the Netherlands. The sample in the study of Johansson et al. (2012) included people who lived in areas containing a large wolf presence; they even stratified the sample in order to oversample participants in rural areas. In addition, Swedes who live in areas where wolves have been restored have more negative attitudes than the general public, and experience with wolf predation leads to even more negative attitudes toward wolves (Ericsson & Heberlijn, 2003). Therefore, the oversampling of participants in rural areas could be a potential reason for the contrasting findings from this study.

Existing literature often focuses on risk perceptions rather than on perceptions of consequences as a whole (Buijs & Jacobs, 2021). However, there is an increased focus on coexistence management, research on human–wildlife interactions still predominantly focuses on conflict situations (Inskip et al., 2016; Soulsbury & White, 2016, 2019). Although risk perceptions have proven to be related to human-wildlife context, it would seem that only one side of the story is often exposed. The amount of research on positive perceptions of consequences in relation to wolves is very limited. Therefore, the combination of both positive and negative perceptions of consequences is a unique characteristic of this study.

The findings indicate that positive perceptions of consequences are a consistent predictor of acceptance of lethal control and no-action. This concept has more predictive potential on acceptance of management actions than negative perceptions of consequences, which have no relationship with acceptance of wolf management actions. These findings indicate that more research towards positive perceptions of consequences should be done to find more robust evidence of their relation with acceptance of wolf management actions. This direction of research would not only lead to new knowledge for the academic field, but it is also relevant for practical implications for wildlife managers or policy creators. Wildlife managers who wish to create more support for management actions should focus more on positive perceptions of consequences.

By stimulating the creation of positive perceptions of consequences of wolves among humans, more support for management actions can be created. However, this idea remains under-researched.

Whilst the findings indicate that there is no relationship between negative perceptions of consequences and acceptance of wolf management actions, one could question the generalizability of these results. While the four scenarios and three management strategies presented in the survey were carefully constructed for theoretical and practical relevance, they do not encompass the full range of challenges and wolf management actions. Nevertheless, the scenarios were based on prior research and designed to align with the hypotheses. As such, while the ecological and social complexity of wolf management cannot be fully captured in a limited number of scenarios, the choices made in this study were methodologically appropriate for testing the hypothesis. Future research could expand on this by incorporating a broader range of stakeholder perspectives and by testing additional management scenarios to enhance practical relevance. Using qualitative methods to enable the conversation with stakeholders would create a deeper understanding of specific cases and the acceptability of specific management actions. The main goal of this study was to test relationships between concepts in a specific context. The concepts are already theoretically grounded, and the context does not necessarily have to be generalizable to the entire population. Therefore, for this study, this sample is considered appropriate.

Moreover, an important consideration in interpreting the results of this study concerns the design and structure of the survey itself. The questionnaire began with a series of statements related to wildlife value orientations, specifically following a pre-designed format that presented items in a fixed order. The first statements were associated with the domination orientation. While this structure was theoretically grounded, it may have unintentionally influenced participants' perception of the survey's intent. During data collection, the researcher received feedback from multiple respondents who expressed concern that the survey seemed biased or overly negative toward wolves. Some individuals indicated they felt confronted by the tone of the opening items, which may have led them to disengage or respond defensively. This feedback highlights a potential response bias: individuals with more positive views towards wolves might have felt discouraged from completing the survey. Consequently, the sample may underrepresent voices supportive of coexistence or conservation, thereby skewing the overall results. However, the feedback of these respondents might have originated because of strong personal interests. Wolves in the Netherlands have been a topic that generates a lot of media attention, since the survey was spread on social media, some respondents might have felt inclined to influence other people's opinions. Yet, future studies might benefit from randomizing the order of wildlife value orientation items to ensure a more neutral entry point for participants.

6.2 Potential overlap in concepts

The results of this study showed that there are relationships between wolf-specific dispositions. The effects are often considered to be large according to Cohen (1988). The findings indicate that perceptions of consequences of wolves

explained 57% of the variance in attitudes toward presence of wolves in the Netherlands. These numbers raised questions on whether there is an overlap between concepts in the conceptual model used for this study. Therefore, additional testing has been done to examine if such an overlap exists and discuss the implications for future research. Lethal control in scenario 1 is presented as an example below; however, the conclusions drawn from this example are applicable to other scenarios as well.

Appendix IIX shows a regression table of the predictive variance in acceptance of lethal control in scenario 1 as an example. Wildlife value orientations account for 43.1% of the variance for lethal control in scenario 1. By adding perceptions of consequences to the model, the amount of variance explained increases to 53.2%. This increases to 59.6% when emotional dispositions towards wolves in general are added to the model. Including attitudes towards the presence of wolves in the Netherlands in the final model maximizes the predictive variance of this conceptual model to 60.3%. In the final model, when all concepts are combined, mutualism and negative perceptions are not significant predictors. Domination accounts for 30% of variance, which is the highest amount of variance explained by a single concept. These results were consistent with a report from Sijtsma et al. (2012). This report showed that domination is seen as a better predictor of acceptability than mutualism within wildlife value orientations.

A combination of concepts enforces the predictive potential of variance explained in acceptance of lethal control for scenario 1, but the amount of variance that is increased by adding a concept decreases per model. This means that there is, to an extent, an overlap in the concepts that are measured. This overlap may initially appear as a methodological limitation, but it could also reflect the complex and interwoven nature of the concepts. A possible reason for the overlap between concepts might be that humans usually do not have a range of very specific thoughts that clearly distinguish wolf-specific dispositions. Although literature provides different definitions for these wolf-specific dispositions, for humans, the boundaries might be more blurry.

Table 11 shows that negative perceptions of consequences do not have a relationship with management actions in all four scenarios. However, this does not mean that negative perceptions of consequences should be eliminated from future research. Negative perceptions of consequences in combination with this specific conceptual model do not have a relationship with management actions, but negative perceptions of consequences in combination with other concepts might provide other evidence of its predictive ability.

Appendix IX shows wolf-specific concepts and the amount of predicted variance in domination and mutualism. These findings suggest that the wolf-specific dispositions have some overlap. Attitudes towards the presence of wolves in the Netherlands alone account for 41.7% of the variance in domination. By adding the other wolf-specific concepts, the amount of variance explained increased to 46,8%. Attitude towards the presence of wolves in the Netherlands accounts for 11% of the variance in mutualism, and by adding the other wolf-specific concepts to the model, up to 14.1% of the variance can be explained. These findings

indicate that the conceptual model is a better predictor of domination than of mutualism. It also indicates that a combination of concepts enforces the predictive potential of variance explained in wildlife value orientations.

6.3 Societal relevance of the study

The findings in Table 12 support other research showing that human acceptance for no-action declines as problem severity increases, while support for lethal control becomes more acceptable under heightened conflict (Jacobs et al., 2014a; Wittmann et al., 1998). This presents a challenge for conservation, but it could also be presented as an opportunity. It reflects a broader socio-psychological dynamic in which perceived risks (e.g. wolves kill humans) shape human acceptance for more extreme management actions like lethal control, although these ´risks´ are very unlikely to actually happen.

As described before, the potential role of media in promoting positive perceptions of consequences is intriguing, yet current scientific research does not robustly support this. This study indicates that positive perceptions of consequences have more predictive potential for acceptance of management actions than negative perceptions of consequences. More research is required to explore whether and how wildlife managers can effectively encourage positive perceptions of the consequences of wolves and thus more support for wolf management actions.

Discussions about wolves are often negatively connotated. By fostering more accurate understanding among humans of the real consequences, stakeholders may become more open to evidence-based interventions that fall between the extremes of no-action and lethal control. For example, providing information that clearly states the actual consequences of the return of wolves. In addition, by contextualizing human-wildlife conflicts, misconceptions can be dispelled. A common misconception is “wolves kill humans”. Some people truly fear this, whilst Linnell et al. (2021) examined wolf attacks on humans over 18 years in Europe and only discovered 12 attacks. Most of these rare attacks were associated with high levels of habituation, and thus not considered natural behaviour of wolves.

Encouraging a more balanced and informed understanding among stakeholders may help bridge the gap between opposing views and promote collaborative decision-making. Therefore, wildlife managers should intend to shift away the focus from emotionally charged extremes and toward practical, evidence-based management actions.

7. Conclusion

This study investigated human acceptance towards wolf management actions by examining the predictive potential of wolf-specific dispositions and wildlife value orientations. Attitudes towards the presence of wolves in the Netherlands, perceptions of consequences of wolves and emotional dispositions toward wolves in general are considered to be wolf-specific concepts. Whilst wildlife value orientations were examined as a broader concept within the human-wildlife dimension. An online questionnaire was used to measure these concepts and the acceptability of three different wolf management actions: no-action, containment and lethal control within four scenarios. The four scenarios encompass a full range of possibilities, ranging from wolves are present, wolves kill sheep, wolves attack humans, to wolves kill humans, although the latter scenario is very unlikely to happen in real life. This scenario was included because people actually fear that this might happen. This `perceived fear´ might be a factor that plays a role in the polarized discussions about wolves in society. Wildlife managers or policymakers should intend to reduce this polarization by providing evidence-based information on the real consequences of the return of wolves to the Netherlands. This could create more support for wolf management actions, although the idea is under-researched.

Domination is seen as the best predictor for acceptance of wolf management actions within this conceptual model, by predicting up to 30% of the variance. A combination of concepts leads to a higher amount of acceptance that can be predicted, but the study shows that there is some overlap between the concepts. Although the concepts can be scientifically distinguished, humans might have more trouble distinguishing the boundaries of these concepts.

Acceptance of lethal control can be best predicted by this conceptual model, up to 68% of the variance is explained by the conceptual model. However, the more severe a situation gets, the less explained variance there is for lethal control. Acceptance of no-action is the second-best management action to be predicted by this conceptual model, up to 42% of variance. The amount of variance that is predicted by wolf-specific dispositions differs per scenario, but in all scenarios, acceptance of containment was the least predicted. It does not come as a surprise that acceptance of both extremes can be best predicted. Yet, these extremes are often seen as controversial by opposing stakeholders. Stimulating a more balanced and informed understanding among stakeholders may help bridge the gap between these opposing views and promote collaborative decision-making. Therefore, the intention of wildlife managers should be to steer away from emotionally charged extremes and toward more practical, evidence-based management actions.

As previous research suggested that distance towards wolves could have an impact on human dimensions, this study also included distance towards wolves as a factor. The findings indicate that there is no difference between wolf and no-wolf provinces and wolf-specific concepts. However, the findings did indicate that the further away someone lives from wolves, the more positive perceptions of conequences that person has, although this was seen as a small effect size (Cohen, 1988). In addition, the findings indicate that there are differences in

acceptance towards wolf management actions between scenarios, meaning that the more severe a situation gets, the higher the support for lethal control. The opposite is true for no-action, the more severe a situation gets, the less support for no-action. These conclusions are in line with previous research (Jacobs et al., 2014a; Wittmann et al., 1998).

Negative perceptions of consequences are not a predictor of acceptance of wolf management actions, meaning there is no relation between someone´s negative perceptions of consequences and support for management actions. On the contrary, positive perceptions of consequences do have a relationship with human acceptance toward management actions and are a consistent predictor in 7 out of 12 cases. Including positive perceptions of consequences is a unique characteristic of this study, and the results can be promising for future research. Discussions about wolves are often negatively connotated, and stimulating the creation of positive perceptions of consequences might be a strategy for wildlife managers that can result in more support for sustainable wildlife management actions.

To conclude, the return of wolves to the Netherlands has evoked a societal debate with opposing views. The discussion of this study has attempted to chart a path towards a constructive middle ground by suggesting that wildlife managers steer away from emotionally charged extremes and toward more practical, evidence-based management actions. Stimulating positive perceptions of consequences could be a promising strategy to create more support for management actions. A combination of psychological antecedents predicts human acceptance of management actions the best, although these concepts do overlap to some extent. While science differentiates between wolf-specific dispositions, humans may not perceive such boundaries as clear, instead tending to evaluate their views along a more general positive/negative continuum in the wolf context.

8. Literature list

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9. Appendix

Appendix I – Questionnaire guide

The six-part questionnaire includes (a) a validated scale on wildlife value orientations (Teel & Manfredo, 2010), (b) attitudes (Bruskotter et al.., 2014) , (c) Emotional dispositions (Jacobs et al., 2014b), & (d) Perceptions of consequences (Slagle et al. 2012) and (e) acceptability of management strategies (Jacobs et al. 2014a) (f) demographics (e.g., age, gender, place of residence).

Wildlife value orientations

Wildlife value orientation statements included the two ideologies of domination (including statements on hunting and utilization/use beliefs) and mutualism (including statements on social affiliation and caring beliefs, derived from Teel & Manfredo (2010). Respondents could rate on a 7-point scale how much they agreed with each statement from −3 = 'strongly disagree' to +3 = 'strongly agree' with 0 as neutral point.

Average scores of related items were computed as composite indices to represent passive constructs. The average of statements on the hunting and use dimensions were combined to form the composite index of domination, while the average of statements on the social affiliation and caring dimensions formed the composite index of mutualism. The Dutch translation of these WVO items was used, provided by Jacobs (yet to be published), see below.

Dutch translation of WVO by Jacobs (yet to be published).

- Mensen zouden vis en wilde dieren zo moeten beheren dan mensen er nut van hebben.
- Ik heb zorgen bij wilde dieren in de buurt te zijn omdat ze me pijn zouden kunnen doen.
- Dieren zouden rechten moeten hebben die overeenkomen met rechten van mensen.
- We zouden moeten streven naar een wereld met een overvloed aan vis en wilde dieren om te vissen en jagen.
- Ik zie alle levende wezens als deel van een grote familie.
- Ik heb zorgen bij wilde dieren in de buurt te zijn omdat ze een ziekte kunnen dragen.
- Jagen is niet respectvol jegens het leven van dieren.
- Ik voel een sterke emotionele band met dieren.
- De behoeften van mensen zouden prioriteit moeten hebben boven de bescherming van vis en wilde dieren.
- Ik geef net zo veel om dieren als om mensen.
- Vis en wilde dieren zijn vooral op aarde ten nutte van de mens.
- Ik ervaar troost in de relaties die ik met dieren heb.
- Het is acceptabel als mensen wilde dieren doden als ze een dreiging zijn voor bezittingen.
- We zouden moeten streven naar een wereld waarin mensen, vis en wilde dieren samen kunnen leven zonder angst.
- Het is acceptabel als mensen wilde dieren doden als ze een bedreiging voor menselijk leven vormen.
- Ik waardeer het gevoel van vriendschap dat ik ontvang van dieren.
- Mensen die willen jagen zouden die mogelijkheid moeten krijgen.
- Wilde dieren zijn als mijn familie en ik wil ze beschermen.

- Het is acceptabel als mensen vis en wilde dieren gebruiken voor onderzoek, ook als het leed veroorzaakt of leidt tot de dood van enkele dieren.
- Het zou voor mij meer belonend zijn om dieren te helpen dan om mensen te helpen.
- Jagen is wreed en inhumaan voor dieren.

Domination

Appropriate use beliefs

- **Humans should manage wildlife populations so that humans benefit**
- **The needs of humans should take priority over wildlife protection**
- **It is acceptable for people to kill wildlife if they thin it poses a threat to their life**
- **It is acceptable for people to kill wildlife if they thinik it poses a threat to their property**
- **It is acceptable to use wildlife in research even if they may harm of kill some animals**
- **Wildlife are on earth primarily for people to use**

Hunting beliefs

- **We should strive for a world where there is an abundance of wildlife for hunting**
- **Hunting is cruel and inhumane to animals**
- **Hunting does not respect the lives of animals**
- **People who want to hunt should be provided the opportunity to do so**

Mutualism

Social affiliation beliefs

- **We should strive for a world where humans and wildlife can live side by side without fear**
- **I view all living things as past of one big family**
- **Animals should have rights similar to the rights of humans**
- **Wildlife are like my family and I want to protect them**

Caring beliefs

- **I care about animals as much as I do other people**
- **It would be more rewarding to me to help animals rather than people**
- **I take great comfort I the relationships I have with animals**
- **I feel a strong emotional bond with animals**
- **I value the sense of companionship I receive from animals.**

Attitudes

To measure attitudes about wolves, respondents were asked to answer a single question (Bruskotter et al.., 2014). To what extent do you accept the presence of wolves in the Netherlands on a 5-point Likert scale

Dutch: In hoeveree accepteer jij de aanwezigheid van wolven in Nederland?

Emotional dispositions

How strong would you rate your emotion towards wolves on a 7-point liker scale?

Dutch: In hoeverre voel jij deze emotie ten aanzien van wolven in het algemeen?

Emotional dispostions: Plezier, angst, verrassing, woede, walging, verdriet, minachting en interesse. (Jacobs et al., 2014b)

Perceptions of consequences

Respondent were asked on a 7 point likert scale, to what extent they agree with the possibility of this consequence. (Slagle et al. 2012), Ripple et al. (2014), Linnell et al. (2001, 2012). In hoeverre ben je het ermee eens dat dit een mogelijk gevolg kan zijn?

Gevolg: aanvallen van wolven op vee

Gevolg: economische scahde voor boeren en/of veehouders

Gevolg: aanvallen op mensen

Gevolg: wolven die bewoonde gebieden gaan verkennen

Gevolg: meer ecotoerisme en dus meer lokale inkomsten

Gevolg: versterken van het gevoel van 'wilde natuur' bij de mens

Gevolg: Herstel van natuurlijke balans en biodiversiteit in een ecosysteem.

Gevolg: minder overlast van wilde zwijnen en herten

Acceptability of wildlife management actions

Previous research measured acceptability of three different management strategies (lethal control, containment; and doing nothing, hereafter as 'no action') in relation to four different scenarios of human-wolf conflicts increasing in severity, The four scenarios present levels of problem severity for humans; wolves are present, wolves kill sheep, wolves attack hiker and wolves kill hiker (Jacobs et al., 2014a; Sijtsma et al. 2012).

Human casualty is a scenario that represent an extreme situation, which is actually highly controversial and rare but it is included to reflect full range of potential scenarios with extremes. It is also derived from the fact that some people actually fear wolves for potentially killing people. (Jacobs et al., 2014a). For each scenario, respondents were asked how acceptable the following management actions were on a 7-point scale (−3 = 'very unacceptable' to +3 = 'very acceptable' with 0 as neutral point):

Situation 1 wolves are present

1. No action
2. Containment
3. Lethal control

Situation 2 wolves kill sheep at nearby farm

1. No action
2. Containment
3. Lethal control

Situation 3 wolves attack human

1. No action
2. Containment
3. Lethal control

Situation 4 wolves kill human

1. No action
2. Containment
3. Lethal control

Demographics

Demographics will be included in the survey to measure reliability of the data but also to measure underlying relations. Existing literature often addresses age, gender, education and income. For the scope of human-wildlife dimensions, area of residence is often included; this can vary between rural and urban areas or specified to areas where wolves are habituated (Sijtsma et al., 2012).

Age

- 18-25
- 26-40
- 41-55
- 56-70
- 71 -85
- 85+

Gender

- *Man*
- *Vrouw*
- *Anders*
- *Wil ik liever niet zeggen*

What is your highest degree

- *Geen diploma*
- *Basisonderwijs*
- *VMBO/HAVo/VWO onderbouwm MBO1*
- *Havo, VWO, MBO 2-4*
- *Bachelor HBO/WO*
- *Master HBO/WO*
- *Doctor, PhD*

In what province do you live?

- *Groningen*
- *Friesland*
- *Drenthe*
- *Overijssel*

- *Gelderland*
- *Flevoland*
- *Utrecht*
- *Noord-Holland*
- *Zuid-Holland*
- *Zeeland*
- *Noord-Brabant*
- *Limburg*

How many inhabitants does your area of residence have?

1-50.000

50.000 – 100.000

100.000 – 250.000

250.000 – 500.000

500.000+

Distance

What is the distance in KM from your area of residence to nearest wolfarea?

Dutch: Hoeveel Kilometer van jouw woonplaats vandaan lever er wolven? (maak een schatting in km)?

Open tekst box.

Appendix II – Codebook

Table A1 Codebook

NR.	Question	Code
Res.	Respondennummer	1 tot N
Q1	WVO – appropriate use belief	1 = helemaal oneens 2 = vrijwel oneens 3 = beetje oneens 4 = noch mee eens noch mee oneens 5 = beetje mee eens 6 = vrijwel mee eens 7 = helemaal mee eens
Q2	WVO – hunting belief	1 = helemaal oneens 2 = vrijwel oneens 3 = beetje oneens 4 = noch mee eens noch mee oneens 5 = beetje mee eens 6 = vrijwel mee eens 7 = helemaal mee eens
Q3	WVO – social affilitation	1 = helemaal oneens 2 = vrijwel oneens 3 = beetje oneens 4 = noch mee eens noch mee oneens 5 = beetje mee eens 6 = vrijwel mee eens 7 = helemaal mee eens
Q4	WVO – caring belief	1 = helemaal oneens 2 = vrijwel oneens 3 = beetje oneens 4 = noch mee eens noch mee oneens 5 = beetje mee eens 6 = vrijwel mee eens 7 = helemaal mee eens
Q5	Perceptions of consequences 1 aanvallen op vee 2 economische schade 3 aanvallen op mensen 4 bewoonde gebieden verkennen 5 meer ecotoerisme 6 versterkt gevoel wilde natuur 7 herstel en biodiversiteit 8 minder overlast herten en zwijnen	1 = helemaal oneens 2 = vrijwel oneens 3 = beetje oneens 4 = noch mee eens noch mee oneens 5 = beetje mee eens 6 = vrijwel mee eens 7 = helemaal mee eens
Q6	Attitude	1 = Helemaal onacceptabel 2 = Beetje onacceptabel 3 = Neutraal 4 = Beetje acceptabel 5 = Helemaal acceptabel
Q7	Emotional dispositions 1 = Plezier 2 = Angst 3 = Verrassing 4 = Woede 5 = Walging	1 = Helemaal niet 2 = Vrijwel niet 3 = nauwelijks 4 = Neutraal 5 = Nogal 6 = Tamelijk veel

	6 = Verdriet 7 = Minachting 8 = Interesse	7 = Heel erg
Q8	Scenario 1 wolves live in nature 1 = no action 2 = containment 3 = lethal control	1 = helemaal onacceptabel 2 = beetje onacceptabel 3 = noch onacceptabel noch acceptabel 4 = beetje acceptabel 5 = helemaal acceptabel
Q9	Scenario 2 wolves kill sheep 1 = no action 2 = containment 3 = lethal control	1 = helemaal onacceptabel 2 = beetje onacceptabel 3 = noch onacceptabel noch acceptabel 4 = beetje acceptabel 5 = helemaal acceptabel
Q1	Scenario 3 wolves attack human 1 = no action 2 = containment 3 = lethal control	1 = helemaal onacceptabel 2 = beetje onacceptabel 3 = noch onacceptabel noch acceptabel 4 = beetje acceptabel 5 = helemaal acceptabel
Q11	Scenario 4 wolves kill human 1 = no action 2 = containment 3 = lethal control	1 = helemaal onacceptabel 2 = beetje onacceptabel 3 = noch onacceptabel noch acceptabel 4 = beetje acceptabel 5 = helemaal acceptabel
Q12	Age	1 = 18 - 25 2 = 26 - 40 3 = 41 - 55 4 = 56 - 70 5 = 71 - 85 6 = 86 en ouder
Q13	Gender	1 = Man 2 = Vrouw 3 = Anders 4 = Wil ik niet zeggen
Q14	Degree	1 = Geen 2 = basisonderwijs 3 = VMBO, Havo / VWO Onderbouw & MBO1 4 = Havo, VWO MBO 2-4 5 = Bachelor (HBO/WO) 6 = Master (HBO/WO) 7 = Doctor (PhD)
Q15	Province	1 = Grongingen 2 = Friesland 3 = Drenthe 4 = Overijssel 5 = Gelderland 6 = Flevoland 7 = Utrecht 8 = Noord-Holland 9 = Zuid-Holland 10 = Zeeland 11 = Noord-Brabant 12 = Limburg
Q16	Residents	1= 1 – 50k 2= 50k – 100k 3= 100k – 250k 4= 250k – 500 k 5= 500k +
Q17	Distance wolves	Getal in km

Appendix III – Effect size guidelines

Table A2 - Cohen's effect size guidelines (1988)

Effect size index	Associated test strategy	Small effect size (or) Minimal relationship	Medium effect size (or) Typical relationship	Large effect size (or) Substantial relationship
ϕ (2 by 2) or Cramer's V (2 or more by 2 or more)	Chi-square	.10	.30	.50
Cohen's *d*	Independent samples t-test	.20	.50	.80
η^2	1-way ANOVA	.10	.243	.371
Pearson's *r*	Correlation	.10	.30	.50
R	Regression	.14	.36	.51

Appendix IV – Guidelines for testing in SPSS 30

Table A3 – Guidelines for testing in SPSS 30

Independent variable	**Dependent variable**	**Test strategy**	**Test statistic**	**Effect size index**
Dichotomous or categorical	Dichotomous or categorical	Chi-square	χ^2	ϕ (2 by 2) or Cramer's V (2 or more by 2 or more)
Dichotomous	Continuous	Independent samples t-test	*t*	Cohen's *d*
Dichotomous or categorical	Continuous	1-way ANOVA	*F*	η^2
Continuous	Continuous	Correlation	*F*	Pearson's *r*
Dichotomous or continuous (1+)	Continuous	Regression	*F*	R^2

Appendix V – Emotional dispositions EFA

Table A4 – KMO and Bartletts Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.885
Bartlett's Test of Sphericity	Approx. Chi-Square	2168,402
	df	28
	Sig.	<,001

Table A5 - Eigenvalues

	Initial Eigenvalues		
Component	***Total***	***% of Variance***	***Cumulative %***
1	***4,687***	***58,593***	***58,593***
2	***1,146***	***14,323***	***72,916***
3	***,666***	***8,320***	***81,235***
4	***,482***	***6,020***	***87,256***
5	***,387***	***4,838***	***92,094***
6	***,283***	***3,537***	***95,631***
7	***,232***	***2,897***	***98,528***
8	***,118***	***1,472***	***100,000***

Figure B1 - Screeplot

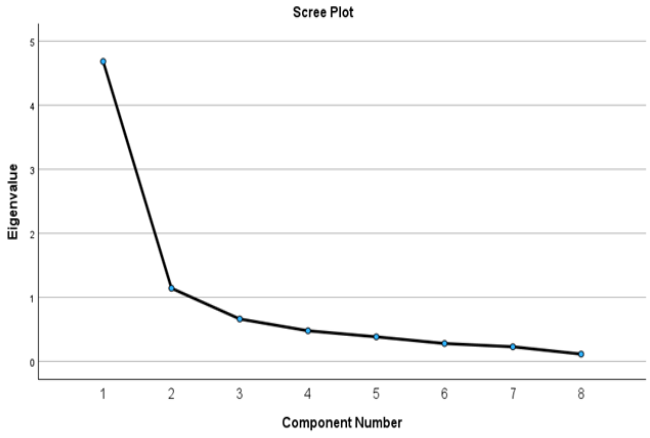

Table A6 - Rotated Component Matrix

	Plezier	Angst	Verassing	Woede	Walging	Verdriet	Minachting	Interesse
1	-.633	.807	-	,903	,879	,847	,817	-,485
2	.541		.899					.563

Principal Component Analysis (Varimax with Kaiser Normalization)

Appendix VI – Negative and positive perceptions of consequences EFA

Table A7 – Item total correlation (perceptions of consequences)

Negative perception	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Gevolg 1: Aanvallen op vee	,880	,941
Gevolg 2: Economische schade	,889	,939
Gevolg 3: Aanvallen op mensen	,877	,942
Gevolg 4: Wolven die bewoonde gebieden gaan verkennen	,902	,935
Positive perception		
Gevolg 5: Meer ecotoerisme	,596	,890
Gevolg 6: Gevoel wilde natuur	,777	,825
Gevolg 7: Biodiversiteit	,818	,806
Gevolg 8: Minder overlast zwijnen en herten	,757	,832

Table A8 KMO and Bartlett's Test (perceptions of consequences)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,832
Bartlett's Test of Sphericity	Approx. Chi-Square	2847,742
	df	28
	Sig.	<,001

Figure B2 – Screeplot (perceptions of consequences)

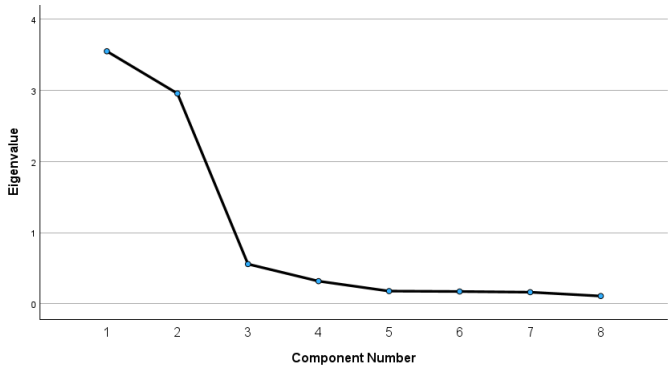

Table A9 – Eigenvalues (perceptions of consequences)

Component	Total	% of Variance	Cumulative %
1	3,550	44,377	44,377
2	2,957	36,956	81,334
3	,557	6,965	88,298
4	,317	3,964	92,263
5	,177	2,218	94,480
6	,172	2,147	96,627
7	,162	2,024	98,651
8	,108	1,349	100,000

Table A10 – Rotated component matrix (perceptions of consequences)

	Component	
	1	2
Gevolg 1: Aanvallen op vee	,932	
Gevolg 2: Economische schade	,937	
Gevolg 3: Aanvallen op mensen	,932	
Gevolg 4: Wolven die bewoonde gebieden gaan verkennen	,945	
Gevolg 5: Meer ecotoerisme		,749
Gevolg 6: Gevoel wilde natuur		,882
Gevolg 7: Biodiversiteit		,907
Gevolg 8: Minder overlast zwijnen en herten		,869

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Appendix VII – Wildlife Value Orientations

Table A11 – WVO Item-Total-Correlation Domination

Domination	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Mensen zouden wilde dieren zo moeten beheren dat mensen er nut van hebben	,526	,788
De behoeften van mensen zouden prioriteit moeten hebben boven de bescherming van wilde dieren	,683	,767
Het is acceptabel als mensen wilde dieren doden als ze een bedreiging voor menselijk leven vormen	,647	,774
Het is acceptabel als mensen wilde dieren doden als ze een dreiging zijn voor bezittingen	,725	,761
Het is acceptabel als mensen wilde dieren gebruiken voor onderzoek, ook als het leed veroorzaakt of leidt tot de dood van enkele dieren.	,395	,803
We zouden moeten streven naar een wereld met een overvloed aan wilde dieren om te jagen.	,315	,809
Jagen is wreed en inhumaan voor dieren.	,222	,814
Jagen is niet respectvol jegens het leven van dieren.	,169	,817
Mensen die willen jagen zouden die mogelijkheid moeten krijgen.	,626	,775
Wilde dieren zijn vooral op aarde ten nutte van de mens.	,439	,798

Table A12 – WVO Item-Total-Correlation Mutualism

Mutualism	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
We zouden moeten streven naar een wereld waarin mensen en wilde dieren samen kunnen leven zonder angst.	,241	,853
Ik zie alle levende wezens als deel van een grote familie	,522	,823
Dieren zouden rechten moeten hebben die overeenkomen met rechten van mensen.	,639	,809
Wilde dieren zijn als mijn familie en ik wil ze beschermen.	,573	,817
Ik geef net zo veel om dieren als om mensen.	,582	,815
Het zou voor mij meer belonend zijn om dieren te helpen dan om mensen te helpen.	,613	,812
Ik ervaar troost in de relaties die ik met dieren heb.	,592	,815
Ik voel een sterke emotionele band met dieren.	,636	,810
Ik waardeer het gevoel van vriendschap dat ik ontvang van dieren.	,561	,819

Appendix IIX – Overlap concepts management actions

Table A13 – Scenario 1 – Lethal control

Lethal control – S1		Adjusted R-square	Standardized Beta	P-Value
1	(Constant)	.431		.01
	Domination		.67	<.001
	Mutualism		.03	.49
2	(Constant)	.552		<.001
	Domination		.41	<.001
	Mutualism		.07	.07
	Negative perceptions		-.03	.44
	Positive perceptions		-.45	<.001
3	(Constant)	.596		.40
	Domination		.34	<.001
	Mutualism		.05	.19
	Negative perceptions		-.03	.38
	Positive perceptions		-.31	<.001
	Emotional dispostions		.28	<.001
4	(Constant)	.603		.05
	Domination		.30	<.001
	Mutualism		.05	.17
	Negative perceptions		-.03	.37
	Positive perceptions		-.24	<.001
	Emotional dispostions		.23	<.001
	Attitudes		-.16	.004

Appendix IX – Potential overlap concepts WVO

Table A14 – Overlap concepts Domination

Domination		Adjusted R-square	Standardized Beta	P-Value
1	(Constant)	,417		<,001
	Attitude		-,647	<,001
2	(Constant)	,430		<,001
	Attitude		-,535	<,001
	Emotional dispositions		,162	,002
3	(Constant)	,468		<,001
	Attitude		-,339	<,001
	Emotional dispositions		,101	,052
	Negativeperceptions		,039	,281
	Positiveperceptions		-,313	<,001

Table A15 – Overlap concepts Mutualism

Mutualism		Adjusted R-square	Standardized Beta	P-Value
1	(Constant)	,110		<,001
	Attitude		,34	<,001
2	(Constant)	,108		<,001
	Attitude		,34	<,001
	Emotional dispositions		,01	,86
3	(Constant)	,141		<,001
	Attitude		,16	,04
	Emotional dispositions		,07	,29
	Negative perceptions		-,05	,29
	Positive perceptions		,29	<,001

Appendix X – Use of AI

AI has assisted the researcher with the following actions:

- ChatGPT as a sparring partner to define the topic, to advise on how to create research questions. When the researcher struggled with rephrasing, ChatGPT was also used to advise on how to rephrase quotes or sentences.
- ChatGPT was used to scan articles from Google Scholar to see whether this article would be relevant for the theoretical research of this study. Specific prompts were given from the researcher, like wildlife value orientations, wolf, wolves, human-wildlife context, human-wildlife conflict, risk perceptions of wolves etc.
- Grammarly was used as a spelling and grammar checker. Grammarly also advises on the structure of sentences. The researcher determined, per advice, whether to apply this or not, automatic changes were not accepted.