The Return of the Wolf: The Impact of Emotions and Information Framing on Acceptance of Wolves and Lethal Control

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Master Thesis - Environmental Psychology

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07/2025

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Abstract

The return of wolves to the Netherlands has reignited debates about their reintegration and adequate management strategies. This study examines whether acceptance toward wolves and the acceptability of lethal control are affected by emotions (i.e., fear, anger, and fascination) and framed information typically found in news media and educational efforts. We conducted a survey experiment with participants (N = 155) from the Friesland region, randomly exposing them to either negatively framed, positively framed, or neutral information about wolves. Results showed that higher levels of fascination were indicative of more acceptance of wolves and less acceptability for lethal control, while for fear and anger, the opposite pattern was observed. However, neither negatively nor positively framed information about wolves significantly influenced participants' emotions or attitudes as expected. Exploratory analyses revealed that most participants had already been frequently exposed to wolf-related news prior to the study, and that increased exposure to news media was associated with more negative emotions and attitudes, as well as lower levels of positive emotions towards wolves. Our findings underscore the central role of emotions, particularly fascination, in shaping attitudes towards wolves and highlight the need to consider these in efforts to foster successful coexistence between people and wolves.

*Keywords***:** acceptability of lethal control, acceptance towards wolves, emotions towards wolves, information framing, news media

Introduction

Wolves are back in the Netherlands (Bullock, 2019). After being extinct for centuries in Western Europe, the wolf population has doubled in the past 10 years, largely due to the strict EU protection status introduced in 1992 under the Bern Convention (Council of the EU, 2024; Straka et al., 2019). The wolf's return is crucial due to its positive impact on ecosystems, such as improving the biodiversity of plants and animals, largely through the regulation of ungulates (Bruskotter & Wilson, 2013; Martin et al., 2020; WWF, 2023). These ecological contributions are particularly important in the context of ongoing environmental challenges associated with climate change (WWF, 2024). However, their presence, particularly in densely populated countries like the Netherlands, poses significant challenges, including the predation of livestock, reduction of game, and threats to humans and the subsequent impact on their livelihoods (Dressel et al., 2014). Stakeholders such as livestock farmers, hunters, and local residents living in proximity to wolf habitats are particularly affected by these issues.

In light of these benefits and challenges surrounding their return, public debate regarding their reintegration and adequate management strategies has increased substantially. This debate intensified in May 2025, when the European Parliament revised the wolf's protection status from strictly protected to protected, effectively lowering legal barriers for implementing lethal control measures, despite research consistently showing that it is ineffective at addressing human-wolf conflicts (Bruns et al., 2020; European Parliament, 2025; WWF, 2024). In light of these developments, public acceptance towards wolves and the acceptability of lethal control have become central topics as wolves return to the Netherlands (Barmoen et al., 2024). As Bath (p. 9, 2009) aptly states: "A species survives when, and only when, humans decide to value it, have positive attitudes toward it, and actively engage in doing something to conserve it".

Emotions towards wolves, such as fear, anger, and fascination, play a substantial role in shaping these public attitudes (Barmoen et al., 2024; Jacobs et al., 2014; Lopes-Fernandes et al., 2016). Moreover, in the Netherlands, where wolves have only recently returned, attitudes and emotions towards wolves are largely shaped by indirect experiences. Here, information presented by news media plays a key role, but educational efforts by organisations such as Wolven in Nederland also contribute (Arbieu et al., 2019; Houston et al., 2010; Jansman et al., 2021; Wolven in Nederland, 2025). In regions such as Friesland, where wolves are not present yet, exposure to such framed information is likely limited, making this a valuable context to examine the impact of such information on attitudes and emotions (Arbieu et al., 2019; BIJ12, 2025). Thus, in this study, we aim to identify drivers of the acceptance towards wolves and the acceptability of lethal control, focusing on the role of emotions and information typically found in the news media and educational efforts.

Emotions as Drivers of Public Attitudes

Although emotions towards wolves, and large predators more broadly, are still understudied, they have been shown to play a key role in explaining people's general acceptance towards wolves as well as their acceptability of lethal control measures (Barmoen et al., 2024; Jacobs et al., 2014; Steg & de Groot, 2012). A study by Glikman and colleagues (2011) found that emotions are a better predictor of the acceptability of management options than knowledge and perceived impact beliefs of wolves. Moreover, the relevance of emotions has also been documented in reintroduction efforts in the US and Mexico, where they played a fundamental role in the acceptance of a new wolf population (Castillo-Huitrón et al., 2020).

Fear

Among the relevant emotions towards wolves, fear has been studied most extensively and is often found to be the strongest emotional predictor of attitudes towards wolves (Barmoen et al., 2024). Fear, defined as an unpleasant emotion caused by a threat of danger or

harm, is particularly present in areas where the wolf is expected to return or has recently returned and can be experienced, for example, when walking alone in the forest (American Psychological Association, 2022; Barmoen et al., 2024; Houston et al., 2010). Higher levels of fear of wolves have been linked to more negative attitudes towards them, as shown in 9 out of 10 studies reviewed in a recent systematic analysis (Barmoen et al., 2024). For instance, a study on the return of the wolf to Germany found fear negatively predicted the intention to support the return of the wolf (Herrmann & Menzel, 2013). *Therefore, we predict that participants experiencing higher levels of fear of wolves will show more acceptability of lethal control and less acceptance of wolves (H1a).*

Anger

While much of the research has focused on fear, anger is another crucial emotion experienced in regard to wolves. Anger, characterized by tension and hostility, is largely experienced as a reaction to livestock predation, which is one of the central concerns surrounding the return of wolves (American Psychological Association, 2008; Arbieu et al., 2024; Castillo-Huitrón et al., 2020). Research shows that people who experience higher levels of anger towards wolves tend to have more negative attitudes towards them and are more accepting of lethal control measures (Castillo-Huitrón et al., 2020; Jacobs et al., 2014; Slagle et al., 2012; Vaske et al, 2021). In a study, Vaske and colleagues (2013) found anger to be a substantial positive predictor of lethal control management of wolves in the Greater Yellowstone Ecosystem. *Therefore, we predict that participants experiencing higher levels of anger towards wolves will show more acceptability of lethal control and less acceptance of wolves (H1b).*

Fascination

While anger and fear towards wolves prevail in the literature, it is well known that large predators such as wolves also evoke positive emotions in people (Hathaway et al.,

2017). A study by Jacobs and colleagues (2014) found joy, defined as a tendency to feel happy towards wolves, to be more predictive (negatively) of the acceptability of lethal control than fear and anger (positively). However, it is unclear how these findings from an urban student sample extend to rural areas where wolves are already present or expected to return. In such contexts, joy may be less commonly experienced due to the negative impacts and conflicts arising from the presence of wolves. Instead, fascination, defined here as a profound interest in or a sense of wonder about wolves (American Psychological Association, 2025), may be more prevalent and therefore a more relevant emotion for explaining attitudes towards wolves of a rural population. In line with this, a study by Lopes-Fernandes et al. (2016) supports this by illustrating that the fascination towards wolves of rural populations in Portugal was one of the primary reasons for their acceptance of wolves. *Therefore, we predict that participants experiencing higher levels of fascination will show less acceptability of lethal control and more acceptance of wolves (H1c).*

Negatively Framed Information in the News Media

In the Netherlands, where the wolf has only recently returned and its population numbers are still limited, most people have little to no direct experience with them (Barmoen et al., 2024; Bullock, 2019; Houston et al., 2010). In such contexts, people's experiences with wolves are largely indirect, and the vast majority come from information conveyed through the news media (Arbieu et al., 2019). Research indicates that this information is often framed negatively and that this is particularly the case in regions with emerging wolf populations (Arbieu et al., 2019; Figari & Skogen, 2011; Houston et al., 2010; Jacobs et al., 2014). Indeed, a content analysis of the news media over 10 years in the US showed that 72% of expressions used were negative, mainly mentioning that wolves negatively impact human activities, that they should be killed or controlled, and highlighting the issue of livestock predation (Houston et al., 2010). While part of that negative framing can be attributed to the

problems an emerging wolf population poses for the local public, a study showed that press coverage of wolf damages did not correlate to the economic costs, reflecting the disproportionate emphasis on threats and negative impacts of wolves (Fernández-Gil et al., 2016; Niemiec et al., 2020).

The Impact on Attitudes

Various studies have shown that the exposure to information about wolves in the news media is connected to less favourable attitudes towards them (Arbieu et al., 2019; Chandelier et al., 2018; Fernández-Gil et al., 2016; Houston et al., 2010) and that this is largely due to the predominantly negatively framed information about wolves (Lecheler et al., 2013; Lünenborg & Maier, 2018; Scheufele & Tewksbury, 2007). *Therefore*, *we expect that participants exposed to negatively framed information about wolves will have more acceptability of lethal control and less acceptance towards wolves compared to the control group (H2).*

The Impact on Emotions

Beyond its impact on attitudes, negative framing also affects emotional responses. Research suggests that negatively framed information in the news media is often used to create sensational content aimed at capturing attention through eliciting emotional reactions from audiences (Hathaway et al., 2017; Lünenborg & Maier, 2018). News media are most effective at inducing negative emotions, since people are generally more physiologically activated when reading negative stories rather than positive ones, and tend to remember them longer (Niemiec et al., 2020).

In line with this, Lecheler and colleagues (2013) argue that negative framing of information can evoke anger and fear. In the context of the wolf, Fernández-Gil and colleagues (2016) found that the exposure to wolf-related news media is a driver for increased risk perception of wolves due to the emphasis and misrepresentation of incidents and problems with wolves (negative framing). Risk perception, in turn, is directly related to the

emotion of fear (Castillo-Huitrón et al., 2020; Steg & de Groot, 2012). A study found that risk perception mediates the relationship between information framing and fear (Otieno et al., 2013).

Whereas fear is often linked to perceived personal threat or uncertainty, anger tends to be associated with concrete negative experiences, such as livestock predation (Arbieu et al., 2024; Castillo-Huitrón et al., 2020). Since much of the negatively framed news coverage revolves around livestock predation, it can evoke anger in those exposed to such information (Houston et al., 2010; Niemiec et al., 2020). *Thus, we hypothesize that participants exposed to negatively framed information about wolves will experience higher levels of fear and anger than those in the control group (H3)*.

Positively Framed Information in Educational Efforts

While people are predominantly exposed to negatively framed information about wolves through news media, they also receive information largely emphasizing that wolves do not pose substantial threats to humans and their ecosystem benefits (Jansman et al., 2021; Wolven in Nederland, 2025). This positively framed information is often delivered through educational efforts by pro-wolf organizations, such as Wolven in Nederland, which aim to foster more positive emotions and attitudes towards wolves, contributing to their successful reintegration into the Netherlands.

The Impact on Attitudes

More broadly, research has shown that educating people about the wolf and large carnivores, including the benefits of their presence, has a positive impact on people's attitudes (Arbieu et al., 2019; Slagle et al., 2012). In the context of a bear population, a communication experiment showed that informing people about the benefits and actions to take to avoid conflict increased tolerance towards them (Slagle et al., 2013). *Hence, we predict that participants exposed to positively framed information about wolves will have less*

acceptability of lethal control and more acceptance towards wolves compared to the control group (H4).

The Impact on Emotions

While educational efforts focus on fostering more positive attitudes, they also aim to address emotions, particularly targeting the often irrational fear of wolves (Jansman et al., 2021; Wolven in Nederland, 2025). A systematic review of interventions to reduce fear of carnivores found that educating the public about the wolf's behavior, habitat use, ecosystem benefits, and how to behave around them tends to reduce fear towards them (Johansson et al., 2016). Moreover, multiple studies have argued that education about people's reactions when encountering wolves is at least as important as education about the behavior of the animal to reduce people's fear (Johansson & Karlsson, 2011; Slagle et al., 2013). Beyond the impact on fear, learning about the environmental benefits and value of the wolf would likely increase fascination towards them, since positive framing tends to evoke positive emotions (Lecheler et al, 2013). *Therefore, we predict that participants exposed to positively framed information about wolves will experience higher levels of fascination and lower levels of fear than those in the control group (H5).*

Mediating Role of Emotions

In addition to direct effects, various studies show that the relationship between information framing and attitudes can be explained by emotions (Lecheler et al., 2013; Marttila & Koivula, 2025). A study by Lecheler and colleagues (2013) found that discrete emotions such as anger, fear, and enthusiasm mediated the effect of positive and negative information framing on policy preferences. These findings suggest that information framing not only shifts people's evaluations of wolves through a cognitive route but also by changing how people feel about them, which in turn influences their attitudes towards wolves. *Thus, we hypothesize that negative emotions (fear and anger) and positive emotions (fascination)*

mediate the relationship between framed information and acceptability of lethal control and acceptance towards wolves (H6).

Current study

This study investigates how negatively framed information, typically found in news media, and positively framed information, typically found in education, influence the acceptance towards wolves and the acceptability of lethal control, and whether these relationships are mediated by fear, anger, and fascination. Firstly, understanding what drives the acceptability of lethal control and the acceptance towards wolves in the Netherlands is crucial, given recent legal changes that facilitate lethal control that threaten the reintegration of wolves, despite it being ineffective in addressing human-wolf conflicts. To do so, this study aims to provide a better understanding of the role of emotions, namely fear, anger, and fascination, in the context of the return of the wolf. As much of the research has focused on fear, little is known about other emotions, although some studies have pointed to their importance (Jacobs et al., 2014). Investigating the origin and impacts of negative emotions towards wolves (i.e., fear and anger) is crucial as they can inhibit the conservation efforts of large carnivores. However, focusing on positive emotions (i.e,. fascination) is arguably as important, as this sheds light on potential facilitators of the successful coexistence between humans and wolves.

Furthermore, in the Dutch context, indirect experiences – mainly through news media, but also through educational efforts – are expected to play a significant role in shaping public emotions and attitudes toward wolves. (Arbieu et al., 2019; Houston et al., 2010). Assuming that people living in Friesland have had limited exposure to information about wolves prior to the study, manipulating the type of information people receive about wolves will contribute to clarifying the effects of negatively framed content, commonly found in news media, as well as positively framed information, commonly found in educational efforts. Since negatively

framed media coverage may have contributed to recent shifts in public attitudes and policies toward wolves in Western Europe, understanding the potential of positively framed information can offer valuable insights into how such developments might be counteracted through more constructive and balanced information provision. Moreover, including emotions in the analysis allows for a deeper understanding of the psychological mechanisms through which information framing influences attitudes toward wolves.

Methods

Participants

We recruited participants through convenience sampling through street surveying in Friesland, including Drachten, Leeuwarden, Sneek, and Burgum. Recruitment focused on residents living within 25 kilometers of the Nationaal Park De Alde Feanen, a region considered a suitable habitat for wolves. This ensured that the expected return of wolves to this area, as presented in experimental conditions, was relevant for participants. Additionally, as indicated, we selected this area because wolves have not yet returned there, making it less likely that participants had prior exposure to media coverage or educational campaigns related to wolf conservation.

Regarding the number of participants, an a priori power analysis indicated that, depending on the specific analysis, adequate statistical power would require sample sizes ranging from approximately 100 participants for simpler models to at least 150 for the most sophisticated analysis, namely a SEM path model. 199 participants began the survey, of which 44 were excluded for not meeting the eligibility criteria – namely, not living within a 25 km radius of the study area, completing less than 70% of the survey, or filling out the survey in less than three minutes. The latter two criteria were chosen to ensure data quality and adequate engagement with the survey. This resulted in a final sample of 155 participants (72 men, 77 women, 2 non-binary, 4 undisclosed), ranging in age from 18 to over 66 years,

with the largest group aged 18–25 ($N = 41$). Most participants ($N = 115$) lived within 25 km of the Nationaal Park de Alde Feanen, while 40 lived within 10 km of the study area. Moreover, the majority ($N = 113$) did not identify with specific stakeholder groups such as hunters ($N = 4$), livestock farmers ($N = 9$), and dog or horse owners ($N = 32$).

Of the 155 participants, 57 had some missing data on the primary study variables. Analyses were conducted using available case analysis, meaning that only participants with complete data for the variables relevant to each specific analysis were included. Moreover, two participants were excluded from analyses involving the experimental manipulation due to self-reported inattention to the provided information (i.e., indicating that they did not read the material thoroughly).

Procedure

For the creation of the survey and data collection, Qualtrics was used. Participants filled out the survey using a tablet provided by the researcher or their own device. After reading the information about the study and agreeing to the informed consent, participants were randomly allocated to one of three experimental conditions, including the control condition. Participants were then asked to confirm whether they had read the information carefully, followed by a manipulation check assessing their recall of the content they had just viewed. After the manipulation and checks, we measured people's emotions and acceptance towards the wolf, their perceived acceptability of diverse management options regarding wolves, including the lethal control measures central to this study, as well as various demographic and exploratory variables.

Materials

In the materials section, we focus on the key variables analyzed in the study. For a comprehensive list of survey questions and measures in Dutch, refer to Appendices A-D.

Manipulation

In the manipulation, participants were randomly allocated to three conditions, namely the positive framing condition ($N = 53$), the negative framing condition ($N = 48$), and the control condition ($N = 52$). In each of these conditions, participants were presented with a short article about wolves, each taking 1-2 minutes to read (Appendix A). All conditions contained information about the expected arrival of the wolf in the Nationaal Park de Alde Feanen. Additionally, the negative framing condition included information emphasizing the threat wolves pose to livestock and the challenges they create for people, such as increasing fear of walking dogs in forested areas. This information has been found to be typically presented in the news media coverage on wolves (Houston et al., 2010). The positive framing condition displayed information about wolves' ecosystem benefits, as well as their typical behavior and how to behave in their presence. This information is often used in educational efforts regarding wolves and has been found to be effective in impacting emotions and attitudes (Arbieu et al., 2019; Jansman et al., 2021; Slagle et al., 2013; Johansson & Karlsson, 2011; Wolven in Nederland, 2025).

Measures

Emotions Towards Wolves. We measured people's fear, anger, and fascination towards the wolf. Participants were asked to indicate to what extent they feel these emotions towards wolves on a 7-point scale, ranging from 1 (not at all) to 7 (very strongly), with higher scores reflecting higher levels of emotional intensity. The scale was adapted from Jacobs and colleagues (2014).

Acceptance Towards Wolves. We measured participants' acceptance towards wolves with a self-constructed scale containing four items: "I am in favor of the return of wolves to Friesland", "I believe that humans and wolves can coexist in Friesland", "I do not think Friesland is a suitable habitat for wolves" (reverse coded), and "I would support policies that promote wolf conservation in Friesland". Participants responded to these items on a 7-point

scale, ranging from 1 (strongly disagree) to 7 (strongly agree). After reverse coding the negatively phrased item, an overall mean was computed for analysis, where a higher mean indicated more acceptability towards wolves. The scale demonstrated satisfactory internal reliability ($\alpha = .82$).

Acceptability of Lethal Control. Participants' acceptability of lethal control was measured across three different scenarios. In the first scenario, a pack of wolves is spotted in the Nationaal Park de Alde Feanen. In the second scenario, a pack of wolves, living in the Nationaal Park de Alde Feanen, is seen walking through a town. In the third scenario, a pack of wolves living in the Nationaal Park de Alde Feanen killed a sheep on a nearby farm. These scenarios reflect different types of perceived impact: the first represents a neutral presence, the second a potential threat to human safety, and the third a direct instance of damage. The scenarios were adapted from Jacobs and colleagues (2014), with one key change: the original scenario involving a fatal attack on a hiker was replaced by the town-sighting scenario. This change was made because such attacks are highly unlikely, as emphasized in the information presented in the positive framing condition, and could therefore undermine trust in the information presented or lead to psychological reactance. For each of the scenarios, participants were asked to indicate their acceptability of lethal control of these wolves on a 7-point scale, ranging from 1 (very unacceptable) to 7 (very acceptable). A higher score indicated more acceptability of lethal control of wolves. Moreover, an aggregated measure was created by averaging responses across the three scenarios, which showed satisfactory internal reliability ($\alpha = .85$). This was used in some analyses to reduce the number of statistical tests and minimize the risk for Type I error.

Analytical Strategy

To analyze the hypotheses regarding the effect of the experimental manipulation on the acceptability of lethal control, acceptance towards wolves, and emotions, we intended to

use one-way ANOVAs and MANOVAs. To examine the effect of emotions on the dependent variables, multiple linear regressions were conducted. Lastly, a SEM path model was used to test whether emotions mediated the relationship between the experimental manipulation and the dependent variables. Deviations from these planned analyses were made when key assumptions were violated.

Results

Descriptives

Table 1 provides an overview of all key variables measured with a scale. First, results indicated that negative emotions towards wolves in general were rather weak: fear (M = 2.86, SD = 1.66) and anger (M = 2.50, SD = 1.87). While still moderate, participants experienced more fascination (M = 4.10, SD = 1.97) towards wolves. Moreover, participants' acceptance towards wolves was just below the neutral point of the scale, indicating a slight tendency towards unacceptance (M = 3.81, SD = 1.61). Lastly, the acceptability of lethal control was low-to-moderate, and did not differ greatly between scenario 1 (M = 3.27, SD = 1.96), 2 (M = 3.15, SD = 1.97), and 3 (M = 3.25, SD = 2.04).

Table 1

Mean scores (M), standard deviations (SD), and sample size (N) for each variable and Correlations (Pearson's r) between the variables

	M	*SD*	*N*	1.	2.	3.	4.	5.	6.
1. Fear	2.86	1.66	131						
2. Anger	2.50	1.87	121	.47***					
3. Fascination	4.10	1.97	137	-.24**	-.44***				
4. Acceptance	3.81	1.61	155	-.39***	-.58***	.66***			
5. Lethal Control (Sc. 1)	3.27	1.96	155	.42***	.41***	-.40***	-.58***		
6. Lethal Control (Sc. 2)	3.15	1.97	154	.38***	.37***	-.35***	-.44***	.57***	
7. Lethal Control (Sc. 3)	3.25	2.04	151	.33***	.47***	-.41***	-.56***	.71***	.68***

Note: *** denotes p < .001, ** denotes p < .01, * denotes p < .05.

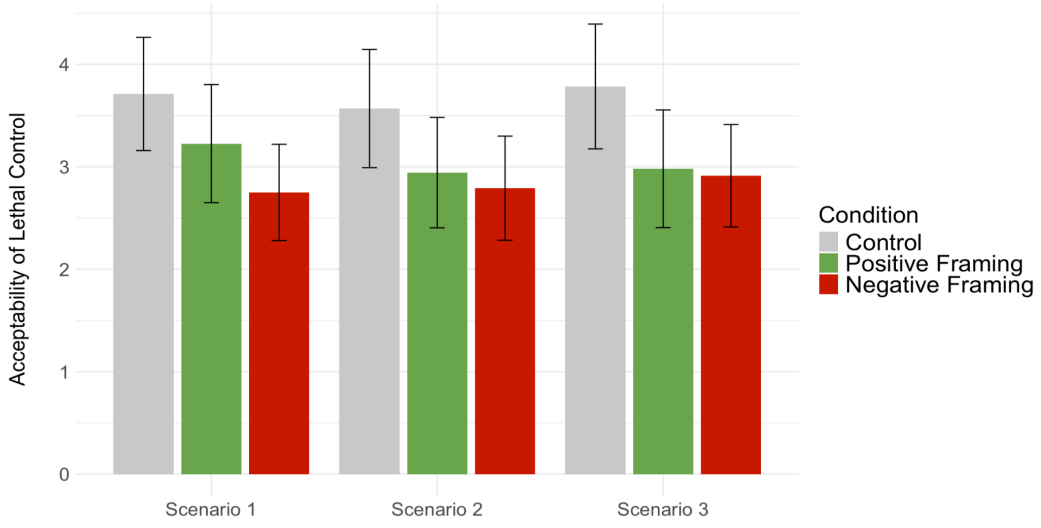
Regarding the relationships between all continuous variables, correlations are in line with the argumentation given in the introduction. Negative emotions (i.e., fear and anger) correlated negatively with the acceptance of wolves and positively with the acceptability of lethal control across all three scenarios. The opposite was the case for fascination.

Effects of the Experimental Manipulation

To test whether the experimental condition had an impact on the acceptability of lethal control across all three scenarios (H1), we ran a non-parametric MANOVA (PERMANOVA), due to violations of normality, as indicated by the Anderson-Darling test ($p < .001$). The effect of the experimental conditions on the acceptability of lethal control was approaching significance ($F(2, 145) = 2.65$, $p = .052$). A closer investigation using separate Kruskall-Wallis tests showed that differences among acceptability of lethal control were not significant across experimental conditions in any of the three scenarios (all $p > .05$). If anything, while not significant, there was a pattern that participants in the negative framing condition indicated less acceptability of lethal control than participants in the control condition, particularly in scenario 1 (see Figure 1). This pattern contradicts our expectations.

Figure 1

The Effects of Information Framing on Acceptability of Lethal Control



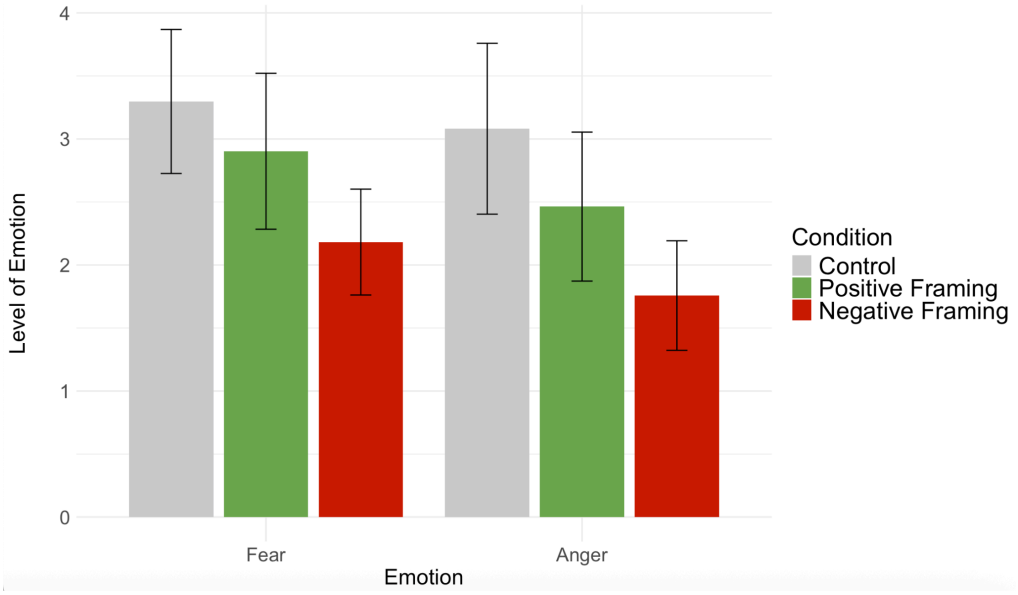
Note. The error bars represent 95% confidence intervals.

To test the impact of the experimental manipulation on acceptance towards wolves, a one-way ANOVA was conducted, for which all relevant assumptions were met. Not in line with what was expected, the analysis revealed no significant effect of the manipulation on acceptance towards wolves ($F(2, 150) = 1.44$, $p = .24$).

We conducted a multivariate analysis to examine whether negative emotions towards wolves (i.e., fear and anger) differed across experimental conditions. However, Mardia's test indicated a violation of multivariate normality for fear and anger (skewness = 40.92, $p < .001$; kurtosis = 2.74, $p = .007$), and univariate Anderson–Darling tests also showed non-normality for both variables ($p < .001$). Given these violations, a PERMANOVA was conducted, revealing a significant multivariate effect of the experimental manipulation on negative emotional responses ($F(2, 108) = 4.44$, $p = .007$). To examine the effects more closely, post hoc Dunn's tests with Holm correction indicated that negative framing led to significantly lower levels of fear (Z = 2.68, p = .022) and anger (Z = 2.92, p = .011) compared to the control group (see Figure 2). These results are contrary to what we expected.

Figure 2

The Effects of Information Framing on Fear and Anger Towards Wolves



Note. The error bars represent 95% confidence intervals.

Lastly, a Kruskal-Wallis test was run to analyse whether fascination towards wolves differed across conditions, since the assumption of normality for a one-way ANOVA was not met ($W = 0.94$, $p < .001$). Not in line with what was predicted, there was no significant effect of the experiment manipulation on participants' fascination towards wolves ($\chi^2(2) = 0.37$, $p = .836$).

Predictive and Mediating Role of Emotions

Four separate multiple regression analyses were conducted to examine the relationship between emotions (i.e., fear, fascination, and anger) and acceptability of lethal control across three different scenarios (scenario 1, scenario 2, scenario 3) as well as acceptability towards wolves. All necessary assumptions for these tests were met. All regression models were statistically significant: for scenario 1, $F(3, 99) = 15.56$, $p < .001$, adjusted $R^2 = .30$; for scenario 2, $F(3, 98) = 15.02$, $p < .001$, adjusted $R^2 = .29$; for scenario 3, $F(3, 96) = 16.47$, $p < .001$, adjusted $R^2 = .32$; and for acceptance towards wolves, $F(3, 99) = 43.73$, $p < .001$, adjusted $R^2 = .56$.

In scenario 1, fear ($\beta = 0.34$, 95% CI [0.12, 0.55], $p = .003$) and fascination ($\beta = -0.27$, 95% CI [-0.44, -0.09], $p = .004$) were significant predictors, while anger was not ($\beta = 0.18$, 95% CI [-0.03, 0.39], $p = .10$). As hypothesized, higher levels of fear were associated with more acceptability of lethal control, while higher levels of fascination were associated with less acceptability. Similarly, for scenario 2, fear ($\beta = 0.31$, 95% CI [0.09, 0.53], $p = .007$) and fascination ($\beta = -0.28$, 95% CI [-0.47, -0.10], $p = .003$) were significant predictors, while anger ($\beta = 0.19$, 95% CI [-0.02, 0.41], $p = .081$) showed no significant effect. In scenario 3, all three predictors - fear ($\beta = 0.26$, 95% CI [0.04, 0.49], $p = .022$), fascination ($\beta = –0.26$, 95% CI [–0.45, –0.07], $p = .007$), and anger ($\beta = 0.31$, 95% CI [0.09, 0.53], $p = .006$) - were significant. As expected, higher levels of fear and anger were associated with more acceptability of lethal control, while higher levels of fascination were associated with less

acceptability. Lastly, anger (β = -0.26, 95% CI [-0.40, -0.12], $p < .001$) and fascination (β = 0.39, 95% CI [0.27, 0.50], $p < .001$) significantly predicted acceptance towards wolves, while fear was marginally significant (β = -0.14, 95% CI [-0.28, 0.00], $p = .052$). As predicted, higher levels of negative emotions were associated with less acceptance towards wolves, while higher levels of fascination predicted more acceptance.

Lastly, a SEM path analysis was conducted to examine whether emotions (i.e., fear and anger) explained the pattern observed between the experimental condition and the acceptability of lethal control. Given the non-significant differences across the three scenarios, the aggregated measure of acceptability of lethal control was used to maintain statistical power and reduce complexity. For the same reasons, fascination was excluded from the model, while it also did not significantly differ by condition. The analysis revealed that the indirect effect of the negative framing condition via fear was not significant (β = -0.35, $p = .065$, 95% CI [-0.73, 0.03]). However, the indirect effect of the negative framing condition on the acceptability of lethal control via anger did indicate significance (β = -0.40, $p = .033$, 95% CI [-0.76, -0.03]). Moreover, the total indirect effect of the negative condition (via both fear and anger) was also significant (β = -0.75, $p = .001$, 95% CI [-1.21, -0.29]). This indicates that participants in the negative condition had less acceptability of lethal control through lower levels of negative emotions, largely anger, which is opposite to what was expected (H4). In contrast, for the positive condition, the total indirect effect via negative emotions on acceptability of lethal control was not significant (β = -0.31, $p = .205$, 95% CI [-0.79, 0.17]).

Exploratory Analysis

We explored whether the frequency of reading news about wolves predicted emotions, acceptance towards wolves, or acceptability of lethal control. Here again, we used an aggregated measure of acceptability of lethal control across the three scenarios to reduce the

number of analyses and maintain statistical power. To do this, we ran linear regressions for the emotions and attitudes separately, for which all relevant assumptions were met. The data indicated that increased exposure to news about wolves is associated with higher levels of anger towards them (ß = 0.32, *p* = .009, CI [0.08, 0.56]) and lower levels of fascination (ß = -0.36, *p* = .002, CI [-0.58, -0.13]), while no association was found with fear (ß = 0.04, p = .724, CI [-0.17, 0.24]). Additionally, participants who reported more frequent exposure to wolf-related news indicated less acceptance towards wolves (ß = -0.26, *p* = .003, CI [-0.44, -0.09]) and more acceptability of lethal control (ß = 0.26, *p* = .006, CI [0.08, 0.45]).

Building on these findings, we conducted a structural equation model (SEM) to test whether anger and fascination mediated the relationship between news exposure and both acceptance towards wolves and the acceptability of lethal control. The results showed that the indirect effect of news exposure on acceptability of lethal control through anger was significant (β = 0.13, *p* = .031, 95% CI [0.03, 0.26]), while the effect through fascination was not (β = 0.10, *p* = .085, 95% CI [0.01, 0.23]). The total indirect effect was significant (β = 0.23, *p* = .003, 95% CI [0.09, 0.39]), and the direct effect was not (β = -0.02, *p* = .864, 95% CI [-0.22, 0.19]), indicating full mediation. Similarly, for acceptance towards wolves, significant indirect effects were found via anger (β = -0.12, *p* = .006, 95% CI [-0.21, -0.04]) and fascination (β = -0.14, *p* = .014, 95% CI [-0.26, -0.03]). Here again, we found a significant total indirect effect (β = -0.26, *p* = .001, 95% CI [-0.41, -0.11]) and a non-significant direct effect (β = 0.04, *p* = .600, 95% CI [-0.11, 0.19]), indicating full mediation.

Discussion

Findings

We predicted that individuals experiencing higher levels of fear and anger towards wolves, and lower levels of fascination towards wolves, would indicate more acceptability of

lethal control and less acceptance of wolves in Friesland (H1), which was largely supported for anger and fear and fully supported for fascination. Additionally, we predicted that participants exposed to the negative framing of information about wolves would have higher levels of fear of and anger towards wolves, as well as more acceptability of lethal control and less acceptance towards wolves compared to the control group (H2/H3), which was not supported by our data. We also did not find support for the hypotheses regarding the positively framed information, namely that participants exposed to it would report higher levels of fascination and acceptance towards wolves and lower levels of fear and acceptability of lethal control, compared to the control group (H4/H5). Lastly, in an exploratory analysis, we found that increased news exposure was connected to more negative attitudes towards wolves and that this was explained by fascination and anger towards wolves.

Descriptives

The results showed that participants had higher levels of positive emotional dispositions (i.e., fascination) than negative emotional dispositions (i.e., fear and anger) towards wolves, although participants were rather unaccepting of the wolf's presence in Friesland. Moreover, although on average they did find lethal control somewhat unacceptable, people deviated strongly on that topic. In our study, we observed higher levels of acceptability across all scenarios compared to another study on the acceptability of lethal control in the Netherlands (Straka et al., 2019). Notably, even in the scenario where wolves are merely seen in a national park, the acceptability of lethal control was higher than in the study by Straka and colleagues (2019), where the scenario indicated that a wolf fatally attacked a hiker. This change is likely due to the return of the wolf in 2019 to the Netherlands, which has increased the associated problems and the public debate around their presence. This shift in attitude also reflects the lowering of the legal protection status of the wolf in the EU, which facilitates the use of lethal control of wolves. Moreover, contrary to the findings of

previous studies, we did not find any difference in the acceptability of lethal control depending on the severity of the scenario (Jacobs et al., 2014; Straka et al., 2019). This may indicate that people's opinion on whether wolves should be controlled through lethal measures does not depend on specific events connected to wolves.

Understand the Influence of Emotions

Our results showed that fear, anger, and fascination are relevant in explaining participants' attitudes towards wolves, largely aligning with previous research (Barmoen et al., 2024; Castillo-Huitrón et al., 2020; Jacobs et al., 2014; Lopes-Fernandes et al., 2016; Slagle et al., 2012). More specifically, participants with higher levels of fascination and lower levels of anger towards wolves tended to be more accepting of their return to Friesland. The impact of fear only approached significance. One possible explanation is that people may largely be aware that wolves do not pose a substantial threat to humans, which may reduce the influence of fear on broader attitudes, such as the acceptance of their presence in Friesland more generally.

Moreover, people who experienced higher levels of fear and lower levels of fascination towards wolves indicated more acceptability of lethal control in all three scenarios. Experiencing higher levels of anger towards wolves was only indicative of more acceptability of lethal control in the scenario where wolves cause direct damage (scenario 3). Although anger was significantly correlated with acceptability of lethal control in all three scenarios (positively), suggesting a general association, it only contributed unique explanatory power beyond fear and fascination in scenario 3. This is likely because anger tends to arise in response to specific, harmful events, which resonates with the fact that anger is mostly experienced in response to wolves' predation of livestock (Arbieu et al., 2024; Castillo-Huitrón et al., 2020; Frijda et al., 1989; Lerner & Tiedens, 2006). While the mere presence of wolves in scenarios one and two may be perceived as problematic by some, only

scenario three involved a clearly harmful event, likely explaining why anger only significantly predicted acceptability of lethal control beyond fear and fascination in that scenario.

The Impact of Framed Information

We did not find support for any of the hypotheses related to the impact of framed information (negative and positive) on people's emotions and attitudes. Interestingly, we did observe that people in the negative framing condition experienced lower levels of anger and fear towards wolves. While not significant, we observed a similar pattern for acceptability of lethal control and saw that this was partly explained by a decrease in anger as a consequence of reading the negatively framed information.

Psychological Reactance. One explanation for this pattern of results may be the exposure to a highly biased and emotionally charged portrayal of wolves that could have triggered psychological reactance. This may have been particularly the case among participants with relatively positive emotions and attitudes towards wolves, who may have felt that the negatively framed information harshly represented the negative impacts of wolves. The psychological reactance theory contends that a message or information can threaten the freedom of an individual, who is then motivated to restore that freedom by taking on a position that is opposite to what is advocated for or represented in the message (Rains, 2012). A study by Shen (2014) found that negative framing of information can increase psychological reactance. In our study, the content of the negatively framed article focused heavily on fear-inducing and anger-related themes, such as threats to human safety and livestock predation. Such framing likely made the attempt to manipulate their emotions and attitudes more obvious, which may have led them to resist the intended message, resulting in lower reported levels of fear and anger, the latter of which likely contributed to the observed trend toward less acceptability of lethal control.

Prior News Media Exposure. The general absence of significant effects on the acceptance towards wolves – and the lack of any impact of positive framing on emotions and attitudes – may be explained by participants' prior exposure to wolf-related news media. 73% of the participants indicated that during the last year, they read about the wolf in the news at least once a month, while 25% indicated reading articles at least once a week. Therefore, the assumption we made that people living in Friesland would not have been exposed to news media coverage related to wolves prior to the study did not hold true. As a consequence, participants may have already developed somewhat stable emotions and attitudes towards wolves before the study, which could explain why much of the information given in our study had no effects.

To explore this further, we tested whether the frequency of reading news about wolves in the past year could predict emotions towards wolves, acceptance towards wolves, and acceptability of lethal control. The data showed that participants with increased exposure to news articles about the wolf tended to experience lower levels of fascination and higher levels of anger towards wolves. Moreover, increased news exposure was also associated with more acceptability of lethal control and less acceptance of the wolf's presence in Friesland. These findings align with research suggesting that news coverage often overemphasizes negative aspects of wolf presence (Arbieu et al., 2019; Castillo-Huitrón et al., 2020; Chandelier et al., 2018; Houston et al., 2010; Niemiec et al., 2020). This is argued to be largely attributed to the underlying social representation of the wolf that drives the framing of information in the news media, which is fueled by a stereotype of evil and the "Big Bad Wolf" (Jürgen & Hackett, 2017).

Additionally, our mediation analysis suggests that the relationship between news media and people's attitudes is explained by fascination and anger towards wolves. While these findings do not establish causality, they highlight the important role emotions play in

linking media exposure to more negative attitudes. Notably, this mirrors our earlier findings from the experimental manipulation, where emotions were significantly influenced by negatively framed information, albeit in the opposite direction to what we anticipated, and partly explained variations in the acceptability of lethal control across experimental conditions. Together, both analyses point to emotions as a key psychological mechanism through which predominantly negative information, whether intentionally framed or encountered in the news media, shapes the acceptance of wolves and lethal control measures. This aligns with previous research pointing to the centrality of emotions in negatively connotated news media (Hathaway et al., 2017; Lünenborg & Maier, 2018).

Lastly, we did not find a relationship between fear and news media exposure. Moreover, the effect of negatively framed information on fear was likely due to psychological reactance. While these findings do not directly refute the notion that fear is learned rather than innate, they suggest that fear may be relatively stable and less susceptible to informational input than other emotions like anger or fascination. This relatively stable fear may stem from the persistent portrayal of wolves as evil and dangerous figures in Western culture, a portrayal that extends beyond news media into folklore, fairy tales, and fables (Fritts et al., 2003). From an early age, children are exposed to stories such as “Little Red Riding Hood” and “The Three Little Pigs”, which may contribute to the early development of fear towards wolves that persists into adulthood (Fritts et al., 2003).

Implications

Our findings expand the growing body of research that supports the impact of emotions on people's attitudes towards wolves and thus point to the importance of the role of emotions in facilitating successful coexistence between humans and wolves in the Netherlands (Arbieu et al., 2024; Barmoen et al., 2014; Castillo-Huitrón et al., 2020; Jacobs et al., 2014; Lopes-Fernandes et al., 2016; Slagle et al., 2012). Here, we want to highlight the

importance of fascination towards wolves, as it emerged as a strong and consistent predictor of both acceptance of wolves (positive) and acceptability of lethal control (negative), albeit having received substantially less attention than fear or anger in previous work. With this, our findings extend previous research highlighting the role of positive emotions in human-wolf contexts from Jacobs and colleagues (2014) to a rural context, including relevant stakeholder groups. Thus, we argue that taking positive emotions into account in research, as in practice, will be crucial to enable the successful reintegration of wolves into the Netherlands. At the same time, fear and anger still play meaningful roles and should not be overlooked in research as well as efforts to manage public attitudes towards wolves.

Furthermore, although our framing manipulation did not produce the intended effects, we found that frequent exposure to wolf-related news was associated with more negative emotions and attitudes. This may imply that the influence of media does not occur through immediate, one-time exposure, but rather through a slower, more subtle process. This idea is supported by the cultivation theory (Gerbner, 1998), which proposes that consistent and repeated media exposure slowly shapes people's perception of reality. Additionally, priming, a core concept from agenda-setting theory, explains how media can influence the way people interpret new information by repeatedly highlighting certain themes, often without their conscious awareness (Scheufele & Tewksbury, 2007). Thus, exposure to framed information typically found in wolf-related news media may not prompt immediate, explicit changes to people's emotions and attitudes, but rather may do so gradually and implicitly.

Lastly, our exploratory analysis suggests a link between more frequent news exposure and higher levels of anger towards wolves, lower levels of fascination towards wolves, and more negative attitudes towards wolves. Given that research has shown that the information people receive about the wolf largely comes from the news (Arbieu et al., 2019), these findings point to the importance of ensuring more balanced and accurate media reporting.

Highlighting not only the risks but also the benefits of wolf presence and providing constructive information on how to coexist with wolves may help foster more nuanced public attitudes (Johansson & Karlsson, 2011; Slagle et al., 2013). The importance of this is further highlighted when considering the absence of the effect of positively framed information on emotions and attitudes in our study, which does not align with previous research highlighting how such information about wolves can influence people's attitudes positively and decrease fear (Arbieu et al., 2019; Johansson & Karlsson, 2011; Slagle et al., 2012; Slagle et al., 2013). Our findings may imply that once people have been exposed to substantial information (predominantly negative) about the wolf through the news media, counteracting the impact of such information through educational efforts may not be effective. This is in line with research showing that negatively framed information has a greater impact on people's attitudes than positively framed information (Arbieu et al., 2019; Soroka, 2006). It is important to note that methodological shortcomings likely also contributed to the absence of effects regarding the framed information, which are discussed further in the following section.

Limitations and Future Research

Beyond the contributions and implications of this study, a few limitations should be addressed. To represent the information that is typically portrayed in the news media, we relied on research articles mapping out the most frequently discussed topics regarding the wolf (Chandelier et al., 2018; Fernández-Gil et al., 2016; Houston et al., 2010). However, these studies were conducted in France, Spain, and the United States, so it remains unclear whether these findings accurately represent the tone and content of Dutch media coverage. This may limit the external validity of the framing stimuli and could have reduced the effectiveness of the framing manipulation, due to the lack of context specificity. Additionally, to ensure that participants would read and sufficiently engage with the articles provided, they were kept rather short, which may have limited the depth and impact of the framed

information. Furthermore, given the limited amount of literature on people's fascination towards wolves, there was little theoretical basis on which to target fascination directly with the positively framed information. These methodological shortcomings may offer an additional explanation for the ineffectiveness of our manipulation.

In light of these limitations, future research would benefit from conducting a content analysis of Dutch news media coverage of wolves. Such an analysis could clarify whether the negativity bias often found in international media also applies to the Dutch context, which would build on our findings suggesting that news media exposure is connected to emotions and attitudes towards wolves. This would provide important insights into the type of information people in the Netherlands are most likely exposed to, particularly in terms of framing strategies. This, in turn, would help explain why certain public attitudes and emotions towards wolves may be forming.

Additionally, future research should also examine how such framed information influences people's attitudes and emotions over time. Another limitation of the current study is that it assessed the effects of framed information only in the short term. As discussed earlier, the influence of media may unfold subtly and gradually through repeated exposure, rather than as an immediate reaction. Moreover, our findings on news media exposure were correlational, and we did not assess whether participants were predominantly exposed to negatively or positively framed information. Thus, to better isolate causal effects, future studies should employ longitudinal experimental designs, ideally in countries where wolves have not yet returned, such as Ireland or England. In such settings, participants are less likely to have prior exposure to wolf-related information, allowing researchers to assess how both negatively framed news content and positively framed educational efforts shape attitudes and emotions in the absence of more stable pre-existing attitudes or emotions.

Furthermore, the conceptualization of fear in our study may present another limitation. Participants were asked about their general fear of wolves, but prior research suggests that fear may not always be self-directed. Individuals may instead experience vicarious fear – concern for others such as children, pets, or livestock (Barmoen et al., 2024). As such, it remains unclear whether the reported fear in our study reflects personal fear or vicarious fear. This could have influenced our findings in several ways. First, it is plausible that personal fear has a stronger effect on acceptance of wolves and acceptability of lethal control, as it is likely to be experienced more intensely and perceived as more immediate or threatening. Moreover, assuming that participants may have indicated their personal fear, it may be possible that increased news media exposure might be related more so to vicarious fear, given the focus on incidents with animals (Houston et al., 2010).

Without distinguishing between these types of fear, it is also more difficult to develop targeted communication or intervention strategies, for instance, in educational efforts. Messaging aimed at reducing personal fear may not resonate with those whose concerns focus on others, such as their children or animals. Therefore, future research should investigate the extent to which individuals experience personal versus vicarious fear of wolves, how these fears are influenced by different types of information, and how they affect public attitudes.

Lastly, we want to highlight the importance of further research focusing on the fascination towards wolves. Despite limited prior research, fascination emerged as the strongest predictor of attitudes in our study. This underscores the importance of investigating whether these findings can be replicated across different contexts. This aligns with Jacobs and colleagues' (2014) call for more attention to positive emotions in human–wildlife relations. In light of this, future research could examine how fascination towards wolves develops as they return to a region. Drawing on our findings and previous research (Lopes-Fernandes et al., 2016), it may be possible that fascination increases in anticipation of, or in response to,

wolves' return, potentially explaining why positive attitudes towards them persist even as their presence poses significant challenges, particularly to rural populations. More generally, there is a clear need to better understand the origins and predictors of fascination, also to offer valuable insights into communication strategies. If fascination indeed plays a central role in shaping attitudes, then targeted educational strategies could leverage this emotion more effectively to support a successful coexistence with wolves.

Conclusion

Recent legal developments in the EU to facilitate lethal wolf control lack scientific grounding and pose a threat to conservation efforts and ecosystem benefits. Reflecting this, participants in our study were mildly unaccepting of the return of the wolf to Friesland and only slightly opposed to lethal control measures. Our findings showed that emotions can explain substantial parts of these patterns: greater fascination was linked to lower acceptability of lethal control and higher general acceptance of wolves, while anger and fear showed the opposite pattern. Importantly, fascination more strongly and consistently predicted attitudes than anger and fear. While we did not find directional evidence for the impact of news on emotions on attitudes as predicted, our study suggests that a link between increased exposure to news about wolves and less favourable emotions and attitudes towards wolves does exist. Overall, leveraging positive emotions such as fascination, reducing negative emotions, and further understanding the influence of news media, while also considering the impact of educational efforts, in shaping emotions and attitudes will be key to reintegrating the wolf and facilitating efforts towards a successful coexistence between people and wolves.

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Appendix A

Experimental Manipulation

WOLVEN VERWACHT IN NATIONAAL PARK DE ALDE FEANEN

In 2018 vestigde de eerste wolf zich in Nederland op de Veluwe. Inmiddels hebben wolven zich ook gevestigd in het noorden van het land, waaronder in het Nationaal Park Drents-Friese Wold en het Nationaal Park de Drentsche Aa.

In 2021 werd er een wolf gesignaleerd in het Nationaal Park De Alde Feanen. Hoewel deze wolf niet in de regio bleef, verwachten experts dat het nationaal park een aantrekkelijke omgeving is voor wolven. Experts achten het zeer waarschijnlijk dat wolven naar het nationaal park migreren vanuit andere nationale parken in Groningen en Drenthe.

WOLF - IMAGE: CHRISTOPH BOSCH

EEN PROBLEEM VOOR DE MENSEN

Wolven worden steeds vaker gezien in de buurt van woningen, wat bewoners zorgen baart. Veel mensen voelen zich onveilig wanneer ze met hun hond of paard het bos in gaan, en laten hun kinderen alleen onder strikt toezicht buiten spelen. In Utrecht hebben autoriteiten geadviseerd om kinderen uit het bos te houden na meerdere verontrustende incidenten met wolven, waaronder een geval waarin een kind werd gebeten.

WOLVEN DODEN VEE

Nu wolven naar Nationaal Park De Alde Feanen terugkeren, zullen aanvallen op vee en huisdieren waarschijnlijk toenemen. Sinds de komst van wolven naar Nederlands zijn er in totaal minstens 4.500 aanvallen gemeld, voornamelijk op schapen, geiten en ander vee. Dit aantal zal naar verwachting stijgen naarmate het aantal wolven toeneemt.

Note. This image shows the negative framing condition in the way it was presented to participants.

WOLVEN VERWACHT IN NATIONAAL PARK DE ALDE FEANEN

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In 2021 werd er een wolf gesignaleerd in het Nationaal Park De Alde Feanen. Hoewel deze wolf niet in de regio bleef, verwachten experts dat het nationaal park een aantrekkelijke omgeving is voor wolven. Experts achten het zeer waarschijnlijk dat wolven naar het nationaal park migreren vanuit andere nationale parken in Groningen en Drenthe.

WOLF - IMAGE: CHRISTOPH BOSCH

HET VOORDEEL VAN WOLVEN

Wolven vergroten de biodiversiteit, waarmee ze een belangrijke rol spelen bij het in stand houden van een evenwichtig en gezond ecosysteem. In gebieden zoals het Nationaal Park De Alde Feanen, met moerassen, bossen en weiden, helpen wolven de populaties herten en wilde zwijnen te reguleren. Dit voorkomt overbegrazing, vergroot de diversiteit van plant- en diersoorten, en houdt daarmee het rijke ecosysteem van het park in stand.

WOLVEN EN MENSEN

Wolven vermijden doorgaans contact met mensen, omdat ze ons niet als prooi of als deel van hun roedel beschouwen. Mocht u een wolf tegenkomen, blijf dan kalm en houd afstand. Aangezien hondsdolheid in West-Europa is uitgeroeid, zijn aanvallen van wolven op mensen uiterst zeldzaam. In de afgelopen 40 jaar zijn er in Europa geen dodelijke aanvallen van wolven op mensen geregistreerd.

Note. This image shows the positive framing condition in the way it was presented to participants.

WOLVEN VERWACHT IN NATIONAAL PARK DE ALDE FEANEN

In 2018 vestigde de eerste wolf zich in Nederland op de Veluwe. Inmiddels hebben wolven zich ook gevestigd in het noorden van het land, waaronder in het Nationaal Park Drents-Friese Wold en het Nationaal Park de Drentsche Aa.

In 2021 werd er een wolf gesignaleerd in het Nationaal Park De Alde Feanen. Hoewel deze wolf niet in de regio bleef, verwachten experts dat het nationaal park een aantrekkelijke omgeving is voor wolven. Experts achten het zeer waarschijnlijk dat wolven naar het nationaal park migreren vanuit andere nationale parken in Groningen en Drenthe.

WOLF - IMAGE: CHRISTOPH BOSCH

Note. This image shows the control condition in the way it was presented to participants.

Appendix B

Manipulation Check

For participants exposed to the positive framing condition:

Wat zei het artikel dat je zojuist hebt gelezen over wolven? (Selecteer alle antwoorden die van toepassing zijn)

- Er zijn de afgelopen 40 jaar in Europa geen dodelijke aanvallen door wolven op mensen geregistreerd.
- De verwachting is dat wolven terugkeren naar Nationaal Park de Alde Feanen.
- Wolven vergroten de biodiversiteit, waarmee ze een belangrijke rol spelen bij het in stand houden van een evenwichtig en gezond ecosysteem.

For participants exposed to the negative framing condition:

Wat zei het artikel dat je zojuist hebt gelezen over wolven? (Selecteer alle antwoorden die van toepassing zijn)

- Sinds de komst van wolven naar Nederland zijn er in totaal minstens 4.500 aanvallen op vee gemeld.
- De verwachting is dat wolven terugkeren naar Nationaal Park de Alde Feanen.
- Wolven worden steeds vaker gezien in de buurt van woningen, wat bewoners zorgen baart.

For participants exposed to the control condition:

Wat zei het artikel dat je zojuist hebt gelezen over wolven? (Selecteer alle antwoorden die van toepassing zijn)

- De verwachting is dat wolven terugkeren naar Nationaal Park de Alde Feanen.
- In 2021 werd er een wolf gesignaleerd in het Nationaal Park De Alde Feanen.

Appendix C

Key Variables

Emotions Towards Wolves

We measured emotions towards wolves with the following items:

Geef aan in welke mate u de volgende emoties voelt ten opzichte van wolven

- Angst
- Woede
- Vreugde
- Fascinatie

We used a scale from 1 to 7, ranging from helemaal niet (1), through enigszins (4), to zeer sterk (7)

Acceptance Towards Wolves

Geef aan in hoeverre u het eens of oneens bent met de volgende stellingen.

- Ik ben vóór het houden van wolven in Friesland.
- Ik geloof dat mensen en wolven in Friesland naast elkaar kunnen bestaan.
- Ik zou beleid steunen dat de bescherming van de wolf in Friesland bevordert.
- Ik denk niet dat Friesland een geschikt leefgebied is voor wolven.

We measured these with the following scale

- Helemaal niet mee eens
- Niet mee eens
- Iets oneens
- Noch eens, noch oneens
- Een beetje mee eens
- Mee eens zijn
- Helemaal mee eens

Acceptability of Lethal Control

In het volgende worden u drie verschillende scenario's voorgelegd. Voor elk van deze scenario's wordt u gevraagd aan te geven hoe acceptabel u de beheeropties met betrekking tot deze wolven vindt.

Scenario 1 : Wolven werden door mensen gezien in het Nationaal Park de Alde Feanen. Hoe onacceptabel of acceptabel is het als wildlife-organisaties:

- Dood de wolven
- Wolven vangen en verplaatsen
- Het publiek voorlichten (bijvoorbeeld hoe zich te gedragen in de aanwezigheid van een wolf)
- Houd de situatie in de gaten (bijvoorbeeld de bewegingen en het gedrag van wolven)
- Niets doen

Scenario 2 : Wolven werden gezien door mensen in het Nationaal Park de Alde Feanen. Hoe onacceptabel of acceptabel is het als wildlife-organisaties:

- Dood de wolven
- Wolven vangen en verplaatsen
- Het publiek voorlichten (bijvoorbeeld hoe zich te gedragen in de aanwezigheid van een wolf)
- Houd de situatie in de gaten (bijvoorbeeld de bewegingen en het gedrag van wolven)
- Niets doen

Scenario 3 : Wolven die in het Nationaal Park de Alde Feanen leven, hebben een schaap of ander vee gedood op een nabijgelegen boerderij. Hoe onacceptabel of acceptabel is het als wildlife-organisaties:

- Dood de wolven
- Wolven vangen en verplaatsen
- Het publiek voorlichten (bijvoorbeeld hoe zich te gedragen in de aanwezigheid van een wolf)

- Houd de situatie in de gaten (bijvoorbeeld de bewegingen en het gedrag van wolven)
- Niets doen

We measured participants acceptability of lethal control across the scenarios listed above with this scale:

- Zeer onaanvaardbaar
- Onacceptabel
- Iets onaanvaardbaar
- Neutrale
- Iets acceptabel
- Aanvaardbaar
- Zeer acceptabel

Appendix D

Additional Variables

Residence

Gelieve hieronder aan te geven waar uw woonplaats zich bevindt.

Note. We asked participants to indicate whether they live inside the red or blue circle, or outside of both. The blue circle indicated a 10km radius around the Nationaal Park de Alde Feanen, the red circle a 25km radius.

Gender

Wat is uw geslacht?

- Mannelijk
- Vrouwelijk

- Non-binair / derde geslacht
- Liever niet zeggen

Age

Hoe oud ben je?

- 18-25 jaar oud
- 26-35 jaar oud
- 36-45 jaar oud
- 46-55 jaar oud
- 56-65 jaar oud
- 66 jaar en ouder

News Media Exposure

Hoe vaak heeft u het afgelopen jaar over de wolf gelezen in Nederlandse kranten:

- Minstens één keer per week
- Een paar keer per maand (2-3 keer per maand)
- Een keer per maand
- Elke paar maanden (2-5 keer per jaar)
- Slechts één of twee keer in het afgelopen jaar
- Nooit

Stakeholder Group

Behoort u tot een van de volgende groepen op basis van uw beroep of activiteiten? (Selecteer alle toepasselijke antwoorden)

- Jager
- Veehouder
- Hondenbezitter
- Paardeneigenaar

- Milieubeschermer
- Geen van bovenstaande

Experience with Wolves

Geef aan welke van de volgende uitspraken op u van toepassing is. (Selecteer alle antwoorden die van toepassing zijn)

- Ik heb vroeger in de buurt van wolvenhabitat gewoond.
- Ik heb een wolf in gevangenschap gezien
- Ik heb een wilde wolf buiten Nederland gezien
- Ik heb een wilde wolf gezien in Nederland
- Ik ben een dier verloren door een aanval van de wolf
- Ik ken iemand die een dier is verloren door een aanval van de wolf
- Geen van bovenstaande

Appendix E

Debriefing

Bedankt voor uw deelname aan dit onderzoek!

Uw deelname heeft ons waardevolle inzichten gegeven in hoe mensen in Friesland wolven waarnemen en hoe zij de omgang met wolven in verschillende scenario's het liefst zouden zien. Daarnaast richtte dit onderzoek zich op de rol van emoties en nieuwsmedia/informatie bij het vormen van deze percepties.

Zoals vermeld in de informatie over het onderzoek, was u onderdeel van een van drie experimentele condities, waarin verschillende informatie over wolven werd gepresenteerd:

- **Neutrale informatie**: Deze conditie informeerde deelnemers simpelweg over de verwachte terugkeer van wolven in Nationaal Park De Alde Feanen, zonder emotionele lading. Deze conditie diende als de controleconditie van het experiment.
- **Negatieve informatie**: Deze conditie benadrukte mogelijke problemen rondom wolven, zoals aanvallen op vee en zorgen over de veiligheid van mensen.
    - Dit soort zorgen worden vaak uitgelicht in de nieuwsmedia, terwijl positieve informatie over wolven minder vaak voorkomt.
- **Positieve informatie**: Deze conditie legde de nadruk op de voordelen van wolven, zoals hun positieve impact op het ecosysteem en het feit dat wolven over het algemeen geen directe bedreiging vormen voor mensen.
    - Onnatuurlijk gedrag van wolven, zoals het benaderen van mensen, is meestal het gevolg van menselijke interactie, bijvoorbeeld door ze te voeren of op te zoeken. Wanneer wolven mensen met voedsel associëren, kunnen ze hun

natuurlijke schuwheid verliezen, wat kan leiden tot nabije ontmoetingen en ongewenst gedrag.

Wij verwachten dat deelnemers die werden blootgesteld aan negatief geformuleerde informatie over wolven, negatieve emoties en houdingen ten opzichte van wolven zullen rapporteren. Daarentegen zou blootstelling aan positief geformuleerde informatie juist moeten leiden tot positieve emoties en houdingen ten opzichte van wolven.

Als u geïnteresseerd bent in de resultaten van dit onderzoek, kunt u contact opnemen met een van de aanwezige onderzoekers of een e-mail sturen naar (j.thiedemann@student.rug.nl) of bellen naar (+49 1575 0952782).