

YOUNG ACADEMICS

Environmental
Studies
1

Stephanie N. Hartwig

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Content Analysis of Attitudinal
Expressions, 2010–2020

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With a Foreword by Dr. Karen Potter

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Foreword

Wolves have a stronghold in the human imagination, they trigger strong emotions yet divide opinion. We can all recollect childhood stories that provoke fear – who's afraid of the big, bad wolf? The Brothers Grimm's Little Red Riding Hood and her sly, stalking wolf, or the three little pigs and their wolf antagonist seeking to demolish their homes and gobble them up. Yet wolves are also mythologised and worshipped by humans, revered for their wild spirit and intelligence, seen as the ultimate symbol of an untamed natural world. In reality, from an ecological perspective, wolves are vitally important as a keystone species. By regulating prey populations, they maintain, or revitalise and restore the health of ecosystems, improve habitat and even the landscape. Similarly in reality, the wolf is a damage causing carnivore, killing domestic animals and attacking humans.

Our author, Stephanie Hartwig, lives in Germany, where wolf populations have been growing. From near extermination in the 19th century, Germany is now home to an estimated 161 packs of wolves (Federal Wolf Documentation and Advisory Office). This is a remarkable conservation success story, but again wolves are stirring up a fierce debate, questions are being asked if humans and wolves can co-exist in the country. Stephanie carefully and clearly situates her novel research to monitor attitudes towards wolves in order to gain a better understanding of this societal debate. Attitudinal surveys have been undertaken by previous researchers, but often limited in scope, both spatially and as a snapshot in time. Here Stephanie builds on previous research with longitudinal surveys, undertaken in other countries, such as the United States, Canada and France. She makes a contribution for Germany, understanding how attitudes change

over time, across regions with varying experience with wolf contact. This is set against the context of a change in wolf distributions, a rise in wolf attacks and as controversial laws were passed to allow wolves to be killed. To add to this, the research thoroughly examines the role of the media in disseminating information to the public and how, as an agenda setter, this shapes public attitudes.

This contribution is clearly necessary. For those involved in wolf conservation efforts, the findings highlight pivotal moments and regions to target for clear communication to influence public opinion. With this deeper understanding of the influential role of the media, it should promote a constructive dialogue with the media to desensationalise and help support co-existence with wolves. Masters students inherently struggle with coming up with a clear rationale or justification for their research. For those embarking on their own research journey, I would recommend reading this book as an exemplar of how to set the stage through an understanding of the literature in your field, determining the originality of your research with the potential to make a real-world impact. I would finally recommend Stephanie Hartwig's book to those who are just fascinated by wolves.

As an academic and research supervisor, then there can be nothing more rewarding than seeing the talent and hard work of your student being recognised through acceptance for publication. Stephanie has spent a huge amount of time on her research, working late into the evening, sacrificing annual leave and weekends. Whilst I talk about the topic, the quality of the research and the contribution to the literature, what I most admire is Stephanie's focus and singlemindedness to achieve her aim and now a greater goal of the research, to get it published. The research is presented with great care and scientific objectivity, but her own passion for wolves has lain at the heart of this endeavour, driving for a deeper understanding of living with these majestic creatures, and to make a difference to conservation efforts.

Congratulations again Stephanie, your own mate, pups and wider pack should be very proud.

Dr. Karen Potter
Associate Lecturer & Research Fellow (Environment),
The Open University, Milton Keynes, UK

Preface

This master thesis is entitled “Wolves in the German Print News Media. Content Analysis of Attitudinal Expressions, 2010–2020,” and has been written to fulfil the graduation requirements of the Environmental Management programme at Ulster University, Northern Ireland. I was engaged in researching and writing this thesis from February to July 2021 (distinction level).

My own initial encounter with the topic of wolves occurred in the winter of 2020. At that time, both local media outlets and numerous neighbours in the vicinity drew substantial attention to a wolf sighting within our district of Erlangen-Höchstadt in Middle Franconia. The lone wolf in question merely passed through the area, without any notable interactions. A local farmer had initially spotted the animal. The images of this sighting were subsequently shared on social media and eventually reached my phone. My primary interest in this occurrence was not in catching a glimpse of the wolf itself, but rather in observing the diverse reactions of local residents to his crossing. I began to consider the potential implications of wolf presence on the various stakeholders, as well as their collective impact on wolf perception. I conducted further research into the legal status of wolves, and as I gathered more information, it became increasingly evident to me that our coexistence with wolves is a matter of attitude. In countries where wolves have always been present, wolf sightings may be perceived as a relatively normal occurrence. However, in Germany, the concept of coexisting with large carnivores is still a novel idea, and all thoughts, emotions and experiences are immature and require time and experience to develop. It is evident that con-

licts between wolves and humans can impede the potential for coexistence. However, there are numerous roles that wolves can play in our lives, beyond attacks, spanning from traffic accidents or illegal killings to public presentations, political debates, wolf parks, eco-tourism and most of all, a balanced ecosystem. The engagement with wolves evokes a variety of thoughts and emotions, influencing our attitudes towards them. This diversity of attitudes was the subject of my master thesis.

From a technical standpoint, in order to maximise the learning outcome, I sought to approach the thesis by selecting a subject that I had no previous knowledge of and that would necessitate the acquisition of skills which I had not yet developed. In the process, I was able to utilise unfamiliar computer programs, such as Nexis Uni® as a part of LexisNexis® and NVivo Pro12, and I also gained more experience in the collection and analysis of large amounts of data. I advanced my experience with software and programs that I was already familiar with, such as Excel and Python 3. I have learned that struggling is an inherent part of the process. In the words of John C. Maxwell (2009), “The process of achievement comes through repeated failures and the constant struggle to climb to a higher level.” Consequently, this thesis has imparted me with invaluable insights, both in a professional and personal capacity.

Objectivity is key to research, no matter what your professional background. However, I must admit that from a personal perspective, I was delighted to discover that wolves are living in Germany. This is undoubtedly good for nature. I am certain that the addition of large predators will bring balance back to our ecosystem – and send a tingle down my back when I go for a walk in the woods, but of the good kind! One context in which we humans see our natural environment is as a recreational space, and we use it as such. I love to walk, hike, cycle and enjoy the outdoors. I am a real nature enthusiast. However, it undeniably affects the environment, especially when we seek that extra thrill off the beaten track, and that’s where the wolf comes in: It is important to recognise that we are not the only intelligent species in the world, and that we may be outmatched in certain situations by other creatures that have evolved in different ways. This does not have to be a source of fear or insecurity, but rather a reminder to be humbly aware of the natural world and to respect all living beings

on this planet. The wolf is a beautiful and intelligent creature that lives in families, just like us. They take care of their young for as long as they can until the pups grow up and leave the pack to start their own families. Sometimes they live by themselves, sometimes they go back to look after the elders. Sometimes they live with their aunts, uncles and cousins, and sometimes they start patchwork families. Are you still wondering if I'm talking about wolves? I am. But doesn't it sound familiar?

The wolf population in Germany has remained relatively stable over the recent years since submitting the thesis: There has been an increase in the number of wolf packs since the monitoring year of 2020/2021, from 159 to 184 in 2022/2023, representing a 16 % growth (DBBW 2024a). The number of wolf pairs has also increased by 26 %, from 38 to 48. Additionally, the number of wolf pups has risen by 11 % since that time, reaching 640. The distribution of wolf populations in Germany remains concentrated in the north-east of the country, with only few packs and pairs spreaded towards the south. In general, it can be stated that there has been little change in public attitudes towards wolves over the past three years. Those who are opposed to the presence of wolves continue to maintain their stance, while those who are in favour of continued wolf existence defend their position with great passion: Sheep farmers in Germany experience a pervasive sense of insecurity and uncertainty about the future in relation to the presence of wolves (Gieser T., 2023). This is significant in the wider debate given that 88.6 % of animals killed or injured by wolves in 2022, were sheep or goats (DBBW 2024b). Hunters are concerned by the loss of attractive hunting grounds with wolves being present and there is an overall consensus among hunters, that wolf populations must be managed and limited (Richardson J. 2022; Grima N. et al. 2019; Gieser T. 2023). Those who feel generally enthusiastic towards wolf presence in Germany, perceive a sense of familiarity with wolves and understand it to be a profound and intimate connection to the natural world. (Gieser T. 2023). This highlights the strong differences to the lives of shepherds and hunters, who have a more utilitarian approach to nature, which they understand as a 'cultivated landscape' (Gieser T. 2023). In Germany, wolf reintroduction into the ecosystem has led to a heightened awareness of socioeconomic disparities between rural and urban populations (Niedzialkowski K. 2023; Gie-

ser T. 2023). There is a pervasive sense of political alienation among rural residents, who perceive themselves to be dominated by the worldviews of the urban population (Zscheischer J. and Friedrich J. 2022). Additionally, wolf experts dismiss their fear of wolf attacks on humans as baseless, leaving the rural population with a sense that their concerns are not taken into account by those in decision-making positions. (Zscheischer J. and Friedrich J. 2022.) In particular, during elections the wolf becomes a matter of political contention (SZ 2024) and it appears that wolf opposers' influence is increasing in the political sphere (Geiser T. 2023). In the context of the upcoming 2024 European elections, a number of parties are attempting to exploit the emotional debate about wolf presence among voters (SZ 2024), especially with respect to the aforementioned concerns expressed by farmers and hunters. Particularly in the wolf context, this perceived marginalisation by the political establishment has so far facilitated electoral success for the far-right party, Alternative für Deutschland (AFD) (Leser J. and Pate R. 2022). People who have experienced livestock predation by wolves in their neighbourhood tend to vote for far-right political parties that are critical of nature conservation (C. v. Hohenberg B. and Hager A. 2022). The media also bears some responsibility for the prevailing atmosphere, which portrays wolves as attackers of hunting dogs (DJZ 2024a) and approaching human settlements (DJZ 2024b). However, it is common practice for conservation organisations to counterbalance such reports by creating informative webpages about wolves (NABU 2024) highlighting the wolf's protected status (WWF 2024). Despite the intensification of these tensions, there has been a continued commitment to EU-wide conservation policies to date, which has served to maintain a balance between the interests of conservationists and those of land users (Niedzialkowski K. 2023). However, in light of the emotionally charged nature of the debate surrounding the presence of wolves in Germany, it is possible that this may soon change: Following the attack on the family pony of the current EU Commission President by a wolf in Lower Saxony in 2022, the president made statements expressing her desire to limit the population of wolves in Europe (SZ 2024; FAZ, 2022), and using the term 'massacred' (SZ 2024), a word which has been widely interpreted by the public and the press to convey the severity of her feelings about the incident. For many wolf opposition groups, this

represents a pivotal turning point in their efforts to regulate wolf populations in Germany (SZ 2024). Given the constant calls for a factual discourse on wolves, it seems paradoxical that there is so much emotion surrounding the issue. It also raises the question of the extent to which such an important part of this discourse is being omitted when wolves are discussed in a purely factual manner. Overall, it can be said that in countries where wolves are undergoing a period of recolonization after decades of absence, such as Germany, the coexistence of humans and wolves is contingent on the population's willingness to adopt appropriate behaviours (Zanni M. et al. 2023). The first step towards such behaviours is a reflexive reorientation to a more positive attitude towards wolves as an integral component of the German ecosystem.

As previously stated, it is my opinion that the long-term survival of wolves in Germany hinges on the ability to shift attitudes towards a more positive outlook. This is a challenging task, particularly when considering the numerous obstacles that farmers must overcome on a daily basis in order to ensure the safety of their cattle. It is clear that a great deal will have to happen before farmers in Germany are convinced that it is in their best interest to have wolves in the countryside, and it is very likely that day may never come. In addition to these robust convictions, this study also gauges ambivalence in attitudinal expressions. This category encompasses the proportion of the public with less robust opinions and the potential to be swayed in a positive direction towards wolf recovery. Further research into this category is necessary to identify the topics that elicit these ambivalent sentiments. Should I conduct a comparable study again, I would devise a questionnaire to ascertain the current attitudes towards wolves amongst the general public, in addition to analysing the existing attitudes in the newspaper media. This would serve as a control group for the study that observes the current sentiment towards wolves. Moreover, interviews with individuals representing different stakeholder groups would provide a valuable comparison to the results of the study and elucidate the reasons for these attitudes.

I would like to acknowledge the contributions of those who have facilitated the success of this thesis. I am grateful to all those who engaged in discussions about wolves during my research and assisted me in comprehend-

ing the intricate relationship between humans and wolves. Among those I would like to specifically mention are Dr. Sara Benetti, Head of School at the University of Ulster, Department of Geography and Environmental Sciences, for her support and guidance throughout the study programme. Sara's passion and perceptive insights constituted an invaluable source of motivation and guidance. Particularly during the challenging circumstances of the pandemic, she demonstrated remarkable leadership abilities, providing clarity, stability and direction during a period of considerable uncertainty. Her encouragement and support have proven to be invaluable during periods of significant challenge, a fact for which I am sincerely grateful.

Furthermore, I would like to express my gratitude to my supervisor, Dr. Karen Potter, now at the Open University. She was the ideal person to guide me through my studies, as she consistently presented me with challenges that forced me to think more deeply and engage with complex concepts. This approach has undoubtedly maximised the learning opportunities available to me. When I was satisfied with the solutions I had devised, with a single question, she would challenge me to identify further opportunities for improvement. However, when I encountered difficulties, she would encourage me to persevere. Her experience as a supervisor, tutor and academic proved invaluable. She responded to every question, regardless of its perceived absurdity, with patience and her trusting and understanding nature facilitated open discussion of methods. These admirable qualities set me on a positive trajectory. I am profoundly grateful for her support.

I would also like to express my gratitude to Loraine Hanna, Ulster University's Open Research Officer, and Edward Carlsson Browne, Copyright Officer for Digital Learning and Enhancement at Ulster University, for their guidance in the selection of Open Access licenses. Furthermore, I would like to thank Joan Atkinson and the library team for their unwavering support throughout the study programme.

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List of References

- Clemm von Hohenberg, B. and Hager, A. (2022). 'Wolf attacks predict far-right voting' (online). Available at: <https://doi.org/10.1073/pnas.2202224119> [Accessed 29 May 2024]
- DBBWa (2024) 'Karte der Territorien' (online). Available at: <https://www.dbb-wolf.de/Wolfsvorkommen/territorien/karte-der-territorien> [Accessed 20 May 2021]
- DBBWb (2024) 'Schadensstatistik' (online). Available at: <https://www.dbb-wolf.de/wolfsmanagement/herdenschutz/schadensstatistik> [Accessed May 2024]
- Deutscher Jagdverband (DJV) (2022) 'Deutscher Jagdverband positioniert sich zum Wolf' (online). Available at: <https://www.jagdverband.de/deutscher-jagdverband-positioniert-sich-zum-wolf> [Accessed 21 May 2024]
- Deutsche Jagdzeitung a (DJZ) (2024) 'Angreifer von Jagdhund bestätigt' (online). Available at: <https://djz.de/wolf-als-May-angreifer-von-jagdhund-bestaetigt/> [Accessed 22 May 2024]
- Deutsche Jagdzeitung b (DJZ) (2024) 'Problemwolf in Österreich nicht fristgerecht erlegt' (online). Available at: <https://djz.de/problemwolf-in-oessterreich-nicht-fristgemaess-erlegt/> [Accessed 23 May 2024]
- Gieser, T. (2023) 'Leben mit Wölfen – Affekte, Gefühle und Stimmungen in Mensch-Wolf Beziehungen' (online). Available at: <https://doi.org/10.14361/9783839465226> [Accessed 20 May 2024]
- Grima, N., Brainard, J. and Fisher, B. (2021) 'Are wolves welcome? Hunters' attitudes towards wolves in Vermont, USA', *Oryx*, 55(2), pp. 262–267. doi:10.1017/S0030605319000061. [Accessed 24 May 2024]
- Leser, J., Pates, R. (2022) 'The Framing of Right-Wing Populism: Intricacies of 'Populist' Narratives, Emotions, and Resonance' (online). Available at: https://doi.org/10.1007/978-3-030-80803-7_27 [Accessed 30 May 2024]

- Maxwell, J. C. (2009) 'Self-improvement 101: What every leader needs to know'. USA: Thomas Nelson.
- Naturschutzbund Deutschland e. V. (NABU) (2024), 'Hintergrundwissen zum Wolf – Speiseplan, Sozialverhalten, Lebensraum & Co' (online). Available at: <https://www.nabu.de/tiere-und-pflanzen/saeugetiere/wolf/wissen/index.html> [Accessed 30 May 2024]
- Niedzialkowski, K. (2023), 'Between Europeanisation and politicization: wolf policy and politics in Germany' (online). Available at: <https://doi.org/10.1080/09644016.2022.2127646> [Accessed 24 May 2024]
- Richardson, J.E. (2022), 'They Need to Be Managed: Hunters' and Ranchers' Narratives of Increased Tolerance of Wolves after a Decade of Wolf Hunting, Society & Natural Resources' (online). Available at: <https://doi.org/10.1080/08941920.2022.2048152> [Accessed 24 May 2024]
- Statistisches Bundesamt DESTATIS (2024) 'Ausgewählte Merkmale im Zeitvergleich' (online). Available at: <https://www.destatis.de/DE/Themen/Branchen-Unternehmen/Landwirtschaft-Forstwirtschaft-Fischerei/Landwirtschaftliche-Betriebe/Tabellen/ausgewaehlte-merkmale-zv.html> [Accessed 20 May 2024]
- Süddeutsche Zeitung (2024) 'Von Wölfen und Wählern' (online). Available at <https://www.sueddeutsche.de/projekte/artikel/politik/woelfe-europa-europawahl-frankreich-deutschland-rumaenien-e608113/> [Accessed 24 May 2024]
- WWF Deutschland (2024), 'Die Wölfe sind in Gefahr' (online). Available at: <https://www.wwf.de/themen-projekte/bedrohte-tier-und-pflanzenarten/woelfe> [Accessed 30 May 2024]
- Zanni, M. et al. (2023) 'The wolf and the city: insights on wolves' conservation in the anthropocene' (online). Available at: <https://doi.org/10.1111/acv.12858> [Accessed 29 May 2024]
- Zscheischler, J. and Friedrich, J. (2022) 'The wolf (canis lupus) as a symbol of an urban-rural divide? Results from a media discourse analysis on the human-wolf conflict in Germany'(online). Available at: <https://doi.org/10.1007/s00267-022-01719-3> [Accessed 30 May 2024]
- Content Analysis of Attitudinal Expressions towards Wolves in the German Print News Media, 2010 to 2020

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Abstract

After more than 150 years, wild wolves have returned to Germany and caused intense, ongoing debate (Carter and Linell 2016). A successful coexistence in Germany strongly depends on whether people will accept their return (Kaczensky 2006). Thus, it is important to monitor people's attitudes, beliefs, and judgments towards wolves, to gain a better understanding of the public debate (Lehnen et al. 2021). While attitudes towards wolves in Germany have been explored from different angles, e. g. over media presence and emotions (Kaczensky 2006), information sources (Arbieu et al. 2019), and experiences (Arbieu et al. 2020), so far, little is known about attitudes in the media over time, as wolf presence is relatively new in Germany. Therefore, this content analysis set out to explore whether attitudes towards wolf recovery in Germany was changing over time, and if there was a difference in attitudes towards wolves in regions with no wolves and no wolf experience, some wolves and short wolf experience or many wolves and long wolf experience over time. Several different samples were taken from a pool of all news publications available from 2010 to 2020. One sample represented total publications across the decade, another all nationwide publications. The regional samples originated from news coverage published in Berlin, North Rhine-Westphalia, and Saxony-Anhalt, which were the three federal states representing the regions with no wolves and no wolf experience, some wolves and short wolf experience or many wolves and long wolf experience. To analyse the overall time trend, a regression analysis was performed on the samples of total and nationwide publications. The results indicate increasing negative attitudes towards wolves in total publications over the measured period

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and decreasing positive attitudes in nationwide publications. The regional analysis was performed via a two-way ANOVA with the factors being 'time' and 'the three regions'. There was a significant difference over time and between the regions. The region with no wolf experience had the highest number of attitudinal expressions, followed by the region with long wolf experience and finally followed by the region with short wolf experience.

Keywords: Attitudes, wolf recovery, canis lupus, human-wolf coexistence, Germany, conservation

1. Introduction

Two decades have passed since the return of wild wolves to Germany. Yet, wolf recovery is still subject to intense public debate (Carter and Linnell 2016). To farmers and hunters, the grey wolf (*Canis lupus*) is a competitor (Kaczensky 2006) for livestock and game, and there is also the socio-cultural construct of the ‘big black wolf’, passed on through ancient mythology and fairy tales (Fritts et al. 2003). It is even known that the fear or perceived threat posed by an apex predator is engrained in our very own genetics signalling biophobic responses of the past (Ulrich 1993). By contrast, to some, wolves are a symbol of returning wilderness (Fritts et al. 2003) and environmentalists emphasize the wolves’ ecological value (Beschta and Ripple 2016). In densely populated countries like Germany, there are few retreat areas for wolves, so humans and wolves must share landscapes (Arbieu 2019). Yet, despite the dense population, recent wolf habitat models suggest that there is still a sufficient amount of space for many more wolves to come (Kramer-Schadt et al. 2020). However, it is known that a higher exposure to wolves may result in a more negative attitude towards wolves (Kaczensky 2006). Successful coexistence in Germany therefore strongly depends on whether people will accept their return (Kaczensky 2006). Thus, it is important to monitor people’s attitudes, beliefs, and judgments towards wolves, to gain a better understanding of the public debate (Lehnen et al. 2021). This can help to address human-wolf conflicts (Koenig et al. 2020), to improve educational programs for children (Randler et al. 2020) and to aid wolf management decisions more effectively (DeCesare et al. 2018).

1.1 Attitudes and the Media

When people are concerned with a subject, they want to increase their knowledge about it and stay well-informed by tracking the most recent information. It is the foundation for open discussion and debate about issues. A shared interest in solving problems at hand is important to ensure a well-functioning community (Skogen and Krange 2003). Knowledge, however, is a strong modifier of attitudes (Glikman et al. 2011), and we draw upon various sources of information to obtain it. For Germans, the preferred information source for the topic of wolves is the news media (Arbieu et al. 2019). While the media does not dictate public opinion about wolves, as an agenda setter, it affects its audience's values, attitudes, and beliefs (Shrum 2008). By telling its readers/viewers/listeners what to think about, and focusing public attention towards particular subjects, the media has the ability to shape public discourse (McComb 2017). However, the media is also affected by public opinion (Brosius and Kepplinger 1990). It was found that if a certain awareness of an issue precedes media coverage, the media echoes public perception rather than to dictate it (Hopkins et al. 2017). It is therefore reasonable to believe that in its role as an information source to the public, it also becomes a reflection of the public debate (Bengston 2005) that expresses public attitudes towards wolf return.

1.2 Attitudes, Beliefs, Judgments

Eagly and Chaiken (1993) define an attitude as “a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor” (p. 1). Thus, in the context of this study, an attitude towards wolves can be understood as an evaluation of wolves being either ‘good’ or ‘bad’. Attitudes are closely intertwined with what a person believes (p. 106) and his/her judgment (p. 367) over an issue. Beliefs are “associations or linkages that people establish between the attitude object and various attributes” (Eagly and Chaiken 1993), which in short can be interpreted as what a person holds to be true. A judgment expresses a consequence of an attitude and the associated beliefs, so, how something, or someone

should be dealt with or treated. In an attitudinal context, beliefs, when they contain evaluative remarks or express emotions, can be interpreted to express an attitude (Eagly and Chaiken 1993). Following the authors Karlsgren et al. (2004), these will further be termed 'attitudinal expressions.'

1.3 Attitudes and Wolves

From a psychological perspective, negative information tends to have a greater influence on attitudes than positive information (Soroka 2006). The media, with its need to sensationalise, often through presentation of conflict (Happer and Philo 2013) has become increasingly aware of the emotionality surrounding the topic of wolves (Fritts et al. 2003) returning to Germany after over 150 years (Reinhardt et al. 2020). There is a variety of research about wolf recovery, ranging from topics such as monitoring and management (Fechter and Storch 2014; Reinhardt et al. 2020; Kramer-Schadt et al., 2020), of wolf ecology and behaviour (Wagner et al. 2012; Reinhardt and Kluth 2016) and of coexistence between wolves and humans (Ronnenberg et al. 2017; Arbieu 2020). Research also exists on attitudes towards wolves among the German public (Naturschutzbund Deutschland e. V. (NABU) 2018; Arbieu et al. 2019; Arbieu et al. 2020; Randler et al. 2020; Kaczensky, P. (2006); Lehnen L. et al. (2021)), with varied conclusions. The research company 'Forsa' conducted a survey on behalf of the NABU investigating attitudes towards wolves in Germany and found that a majority of Germans welcome wolf recovery, whereas Randler et al. (2020) studied a group of second grade students, in which girls showed a higher level of fear of wolves than boys, and boys showed a higher level of knowledge about wolves. In research regarding attitudes and exposure to information sources, Arbieu et al. (2019) concluded that indirect experiences with wolves – such as exposure to media – can have a strong influence on people's attitudes and opinions and that attitudes from people who received their information about wolves from the TV or news press, were generally more negative compared to information retrieved from other media sources (such as books and documentaries). Lehnen et al. (2021) performed a meta-analysis of all attitudinal studies so

far. In 2006, Kaczensky performed a combined media analysis and acceptance study that statistically measured media presentation and public attitudes towards wolves in the German print media from 2001–2005. Data was collected at different levels – via phone surveys, questionnaires, and print news articles. However, wolves had only begun spreading out from Saxony in 2006, to one other federal state (DBBW 2021) and the concept of wolf recovery was, so to say, ‘brand new’ with little public experience throughout the country. Now, after 20 years of wolf recovery, wolves have spread to 11 out of 16 federal states with an emerging time trend – those areas where wolves had initially settled have now become wolf areas with long experience, whereas those regions where wolves have appeared only recently are just beginning to learn what it means to live alongside wolves. This highly interesting concept of analysing a time trend of attitudes towards wolves among the public, coupled with a comparison across different regions, has been explored in other countries, such as the U.S. and Canada (Houston et al. 2010), and France (Chandelier et al. 2020), but so far has not been endeavoured in Germany over an extended period. Following the concept of time trend analysis performed in these studies, this research will fill this gap and address the following questions: Are attitudes towards wolves changing over time? Also, is there a difference in attitudes towards wolves between regions with no wolves and no wolf experience, some wolves and short wolf experience or many wolves and long wolf experience?

2. Materials and Methods

2.1 Hypotheses

In accordance with the research questions posed, the following hypotheses have been formulated:

Research Question 1: Are attitudes towards wolf recovery in Germany changing over time?

H0a: There will be no significant change in the number of positive and negative attitudinal expressions towards wolf recovery in Germany in total publications over the examined period.

H1a: There will be significant change in the number of attitudinal expressions in total publications towards wolf recovery in Germany. Negative attitudinal expressions will increase over time.

H0b: There will be no significant change in the number of positive and negative attitudinal expressions of wolf return to Germany in national publications over the examined period.

H1b: There will be significant change in the number of attitudinal expressions in national publications towards wolf recovery in Germany.

Rationale: The rationale of differentiating between total publications and nationwide publications is that H1a allows for an analysis across all newspapers collected from all over the country. This can include regional and local newspapers as well, and it represents the complete range of articles,

whereas for H1b, the samples were extracted from nationwide newspapers only. Nationwide newspapers have a broader readership and therefore tend to cover a wider spectrum of topics and area range and may therefore represent the more general public.

Research Question 2: Is there a difference in attitudes towards wolves in regions with no wolves and no wolf experience, some wolves and short wolf experience or many wolves and long wolf experience over time?

- H0a: There will be no difference in the time trend of positive and negative attitudinal expressions between the three regional groups.
- H2a: There will be a difference in the time trend of positive and negative attitudinal expressions between the three regions.
- H0b: There will be no difference in positive and negative attitudinal expressions between the three regional groups.
- H2b: There will be a difference in positive and negative attitudinal expressions between the three regions.
- H0c: There will be no interaction between the two factors 'region' and 'time'.
- H2c: There will be an interaction between the two factors 'region' and 'time'.

Rationale: The local newspapers are publications that focus on very specific regions and therefore represent attitudes of the public that specifically lives in that area rather than nationwide attitudes.

2.2 Sampling of newspaper articles

The news articles used for this analysis have been downloaded from the online database Nexis Uni® and can be viewed in Appendix A. Nexis Uni® is a part of LexisNexis®, which has the largest database of electronically available news articles and is widely and commonly used for media analyses (Bengston et al. 2005). The search included news stories on the topic of wild wolves in Germany, which were available online and published

between January 1, 2010, and December 31, 2020. An analysis of the past decade of wolf recovery in Germany was established, as wolves had some time to expand their range and people had time to grow aware of the new inhabitants. It also allowed for a larger number of articles to accumulate. All publications originated from newspapers that have been publishing continuously over that time span. This will ensure that the results reflect shifting public opinions rather than resulting from changes in group composition. Over the set time period of 2010 to 2020, there were $n=76$ sources of newspapers and newswires combined originating from Germany as per Nexis Uni. Having checked for discontinued publication, all 76 publications were useable for this study. This study combines all types of published articles, from news articles to opinion pieces and readers' letters. The search command aimed at targeting as many news articles as possible related to wolf recovery in Germany. Initially, there were over twelve thousand articles found by the search code. After further narrowing down by search criteria (see Appendix B), the result yielded $n=7053$ news articles, of which $n=6234$ (88.39 %) originated from newspapers and $n=819$ (11.61 %) from newswires and press releases. A review of $n=1000$ articles yielded into an accuracy rate of 86.14 % $((V_A - V_O)/V_A * 100$, where $V_A =$ *accepted value*, $V_O =$ *observed value*). The total number of articles was uploaded into the NVivo Pro 12 software without further filtering. The articles were uploaded as files (not cases). When opening the files later during the coding procedure, misidentified stories, as well as irrelevant attachments of articles that were uploaded with some files, were omitted, thereby further increasing the accuracy of relevant news stories. The final database of German print media contained $n= 5356$ articles.

For all samples taken, the appropriate sample size was calculated $([z^2 * p(1-p)]/e^2/[1 + (z^2 * p(1-p))/e^2N])$ where $N =$ population size, $z =$ z-score, $e =$ margin of error, $p =$ standard deviation; confidence level = 95 %.) Then samples were added with the goal to either reach an even number of samples over the period, i.e., through random sampling, or to spread the samples evenly over each year, i.e., stratified random sampling. The appropriate minimum sample size for hypothesis 1a was $n=358$ and was extended to $n=550$, in order to spread the samples evenly over the period. So, the total number of the sample size for hypothesis 1a was $n= 550$ and

reached across all available newspapers. Here, a stratified random sample was possible, leading to a sample size of $n=50$ articles/year. Hypothesis 1b required a sample of $n=99$. Thus, a stratified random sample of $n=110$ was taken from all national newspapers to match $n=10$ /year. Hypotheses 2a–c required samples from Berlin, Saxony-Anhalt and North Rhine-Westphalia. Berlin had a calculated sample size of $n=146$. The sample was rounded up to 150. It was not possible to take a stratified random sample here, due to the low number of articles especially at the beginning of the period. Therefore, a simple random sample was extracted from all Berlin samples. It was partially possible to take a stratified random sample for Saxony-Anhalt and North Rhine-Westphalia, except for Saxony-Anhalt in 2010, as there was $n=0$ publications available for that year. Comparing samples from North Rhine-Westphalia (NRW) to samples from Saxony-Anhalt (ST) allows for an examination of regional differences, whereby NRW is a region where wolf return is relatively new, and ST is a region that has a long wolf history. It also includes an aspect of urbanity versus rural landscapes, as North-Rhine-Westphalia has a high population density (526 residents/km²), and the population density of Saxony-Anhalt is the third lowest of Germany with 107 residents/km² (Statista 2021). All samples were chosen by use of Python 3.9.

2.3 Analysis

Prior to hypotheses testing, the data was quantified to provide an in-depth visualisation of the single samples. A linear regression analysis was performed to test the time trends for attitudinal expressions towards wolf recovery in Germany. In order to compare the differences between regions with different levels of wolf presence in Germany over time, a two-way analysis of variance (ANOVA) was performed and graphically visualised for comparisons. All data were analysed using Excel from Microsoft 365.

2.4 The Classification System and Codebook

An investigation into how attitudinal expressions towards wolves trend over time in Germany requires a classification system to sort the articles into superordinate categories. The chosen categories were 'year', 'title', 'news-paper' and 'region'. A codebook of attitudinal expressions was developed based on the generic terms 'attitudes', 'beliefs' and 'judgments' following Eagly and Chaiken (1993). An iterative deductive-inductive approach was taken to create the categories of attitudinal expressions used for the coding system. After researching possible categories from past literature (Gosling et al. 2019; Houston et al. 2010), a list of categories was created that were relevant to the analysis. For the refinement of the categories, a random sample of n=10 articles from each year were examined and the evaluative expressions that appeared repeatedly in these news stories were analysed and led to a redefinition of the categories. Where possible, each category received a positive and a negative counterpart, distinct to its definition. 'Attitudes' was separated into the subcategories 'wolves are good and welcome' and 'wolves are bad and unwelcome'. 'Beliefs' included the largest number of evaluative categories. These were 'wolves are harmful to humans and disrupt human activity' and its opposite, then 'cattle need better protection', 'cattle is well-protected' and 'wolves kill livestock'. The last belief-category was 'wolves cause ambivalence/polarization/uncertainty'. This last-named category, as well as 'wolves kill livestock', derived inductively, as there was a noticeable focus on this topic within the publications. Another category pair included 'wolves negatively impact ecosystems' and its counterpart. Judgment categories included 'wolves should be killed or controlled' and 'wolves should be managed/protected/introduced.' All coding rules were equally applied to all regions coded for and can be viewed in Appendix B.

2.5 Reliability and Validity

According to Mackey and Gass (2005), reliability can be achieved by the same researcher by using the test-retest method. After having coded all the data, the first four years of the n=550 sample across all newspapers, as

well as the first four years of the n=110 sample across all nationwide newspapers was recoded eight weeks after original coding and a correlation analysis was performed. There was a strong correlation with the recoded data (Appendix C), hence the analysis was continued. As for validity testing, it has been recognized that external audits provide a proper solution for this matter (Creswell, J.W. 2012), which includes the 'peer review' by submission to a reputable scholarly journal.

3. Results

3.1 Attitudes Towards Wolf Recovery over Time

3.1.1 Results of Total Publications

The final database of German print media used in this analysis contained $n= 5356$ relevant articles. The number of publications across the period increased constantly throughout the years, with the least news publications about wild wolves occurring in 2010 ($n = 65$) and 2011 ($n=96$), and the most in 2019 ($n=1327$). News coverage dropped steeply in 2020, with only $n=296$ relevant stories (Figure 1).

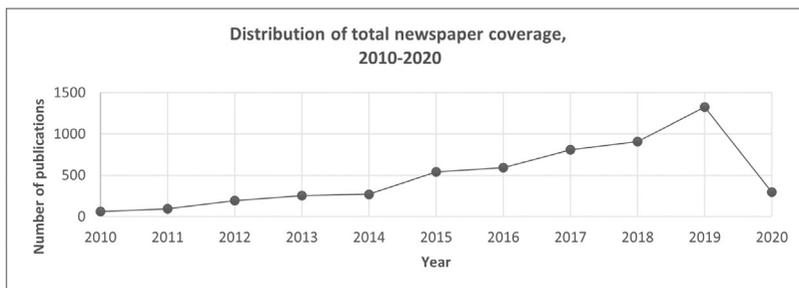


Figure 1: Volume of total stories about wolf reintroduction in Germany across the period 2010 to 2020

Data compilation of German newspaper coverage into positive and negative attitudinal expressions is helpful in terms of providing an overall picture of the discourse about wild wolves returning to Germany. The stratified random sample of $n=550$ articles contained $n=4519$ relevant attitudinal

expressions of all newspaper publications across the nation, of which 48.33 % (n=2184) were positive and 42.31 % (n=1912) were negative (Figure 2). The attitudinal expressions measuring ‘ambivalence, polarisation and uncertainty’ amounted to 9.36 % (n = 423). The results indicate a slight majority of positive attitudinal expressions towards wolves in Germany.

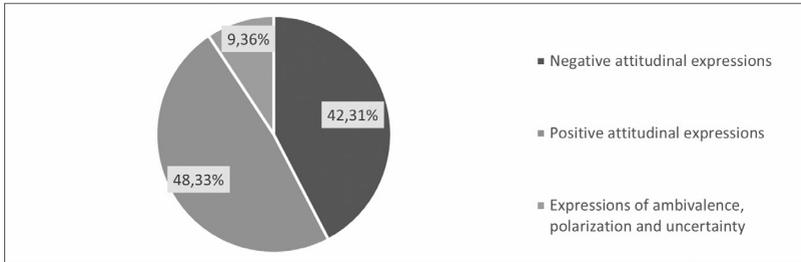


Figure 2: Percentage of all positive and negative attitudinal expressions about the presence of wild wolves in Germany and related expressions of ambivalence, polarisation and uncertainty across the period 2010 to 2020

Separating positive and negative attitude expressions into two groups of categories reveals which attitudes were repeatedly stated in the news and also carves out the differences between the categories. Proportionally, the number of attitudinal expressions between the categories remained relatively even over the examined period (Figure 3). Overall, public discourse focused on the conflict between livestock farming and wolf protection, and whether wolves should be killed/controlled or reintroduced. From 2016 to 2017 there was a strong increase in negative attitudinal expressions. An examination of the single categories shows a strong positive correlation between the negative categories ‘wolves are bad and unwelcome’, ‘wolves are harmful to humans’ ‘wolves kill livestock’, ‘cattle need better protection’, ‘wolves should be killed or controlled’, ‘cattle is well-protected’ and ‘ambivalence/polarisation/uncertainty’. For a detailed view of the time trends of the single categories, the correlation analysis and a graphical overview, see ‘Appendix D’.

Attitudes Towards Wolf Recovery over Time

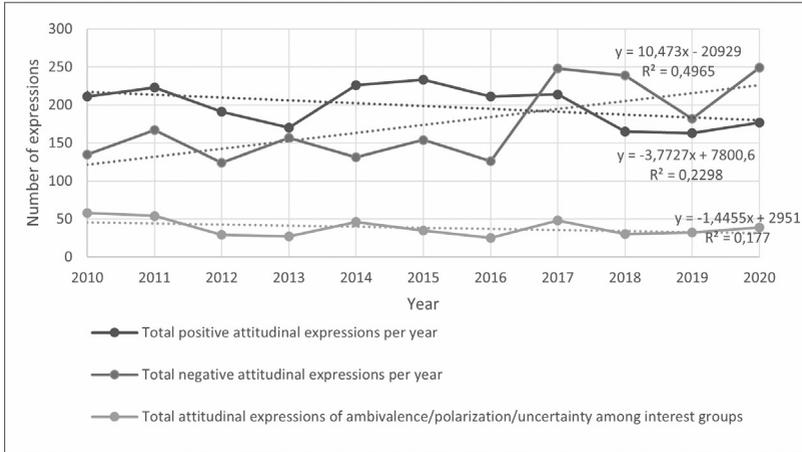


Figure 3: Overview of positive and negative attitudinal expressions of total publications about wolf presence in the German news media from 2010 to 2020 and the expressions of the category ‘ambivalence/polarisation/uncertainty’

The most frequently used positive attitudinal expressions throughout the examined decade were from the judgment-category ‘wolves should be managed / protected / introduced’ (38.14 %), and the attitude-category ‘wolves are good and welcome’, amounting to 30.04 %, respectively. These values were followed by beliefs that ‘wolves are not harmful to humans or human activity’ (18.36 %) and ‘cattle is well-protected’, accounting for 9.48 %. The least expressed positive category was the belief that ‘wolves positively impact ecosystems’ (3.98 %). For a graphical overview of the aggregated positive and negative results of the total publications sample, see ‘Appendix E’.

Of all negative attitudinal expressions, those most mentioned originated in the belief-categories ‘cattle need better protection’ (23.33 %) and ‘wolves kill livestock’ (21.60 %). This was followed relatively closely by the attitude ‘wolves are bad and unwelcome’ with 20.55 % and the judgement-category ‘wolves should be killed or controlled’ amounting to 18.15 %. The two belief-categories least mentioned were ‘wolves are harmful to humans or disrupt human activity’ (13.70 %) and ‘wolves negatively impact ecosystems’ (2.67 %). ‘Ambivalence/polarisation/uncertainty’ made up 9.36 % of the total attitudinal expressions counted.

Results

A linear regression analysis was performed, to test the statistical significance ($p < .05$) of these trends in attitudinal expressions, with the number of attitudinal expressions from total publications as the dependent variable (y) and the examined period (2010 to 2020) as the independent variable (x).

Table 1: Results of regression analysis of attitudinal expressions in total publications, 2010 to 2020, showing a strong significance in negative attitudinal expressions ($p < .05$; $F > F$ crit).

	R	R ²	F	F crit	df	B	t	p
Negative attitudinal expressions	.70	.50	8.87	.02	1	10.47	2.98	.02
Positive attitudinal expressions	.48	.23	2.69	0.14	1	-3.78	-1.64	.14

The results indicate that, on average, negative attitude expressions about the return of wild wolves to Germany increased by 10.47 expressions per year (Table 1, Figures 4 and 5).

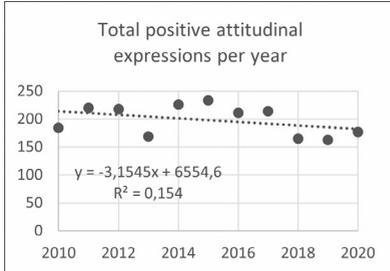


Figure 4: Scatter plot of total positive attitudinal expressions, 2010–2020

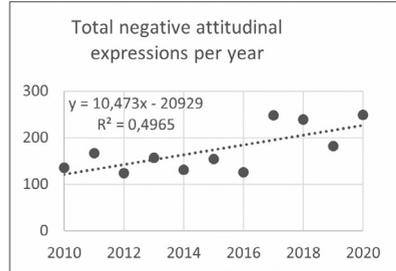


Figure 5: Scatter plot of total negative attitudinal expressions, 2010–2020

The null hypothesis stated that there would be no significant change in the number of attitudinal expressions towards wild wolves returning to Germany in total publications over the examined period. The alternative hypothesis was that negative attitudinal expressions about wolf return to Germany would increase over the measured decade. The results indicate that negative attitudinal expressions have changed over time. More pre-

cisely, the results show increasing negative attitudinal expressions over the period. Thus, the null hypothesis is rejected, and the alternative hypothesis is accepted.

3.1.2 Results of National Publications

The final number of publications in national German newspaper publications was $n=1163$ articles. The number of publications steadily increased throughout the examined period, starting with $n=22$ articles in 2010 (Figure 6). This number increased to $n=340$ news stories in 2019 and dropped in 2020 to $n=128$.

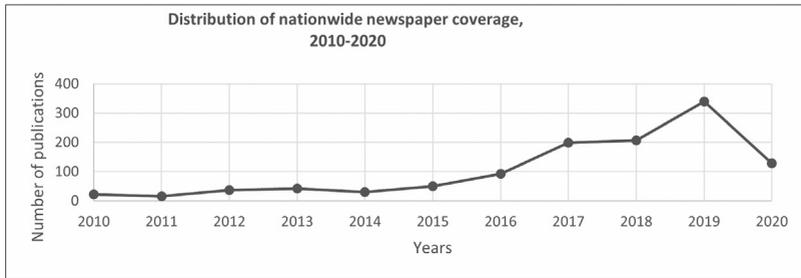


Figure 6: Distribution of nationwide publications, 2010–2020

The sample used to analyse the overall trend in attitudinal expressions towards wolves from national newspapers comprised $n=110$ publications and produced $n=955$ relevant attitudinal expressions. Overall, the results indicate a majority of positive attitudinal expressions towards wolves in Germany for national newspaper publications (Figure 7). Where 39.16 % ($n=374$) were negative, 46.07 % ($n=440$) were positive. The attitudinal expressions measuring ‘ambivalence/polarisation/uncertainty’ amounted to 14.76 % ($n=141$).

Results

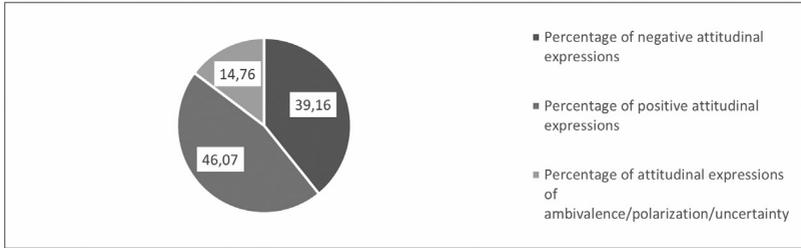


Figure 7: Percentage of positive and negative attitudinal expressions about wolf presence in Germany and related expressions of ambivalence, polarisation and uncertainty from nationwide publications across the period 2010 to 2020

Positive attitudinal expressions about wolf presence in Germany peaked in 2016 (14.09 %) and levelled out at 5.68 % in 2020, while negative attitudinal expressions increased to 13.90 % in 2016 and declined to 8.56 % at the end of the decade (Figure 8).

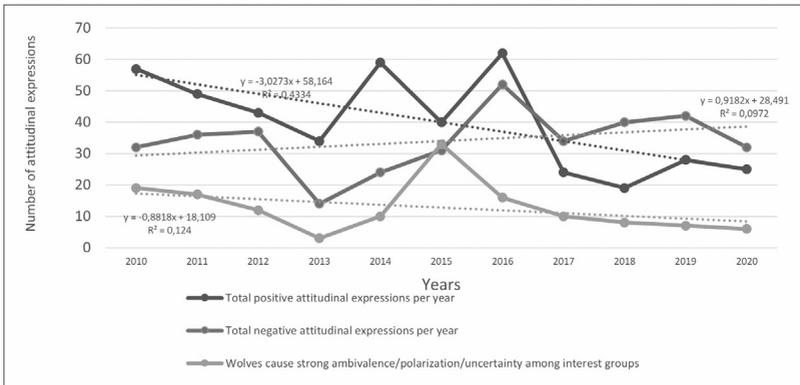


Figure 8: Overview of attitudinal expressions of all positive and negative attitudinal expressions about wolf recovery in Germany across national newspapers including the expressions of ambivalence, polarisation, and uncertainty, 2010 to 2020

The category ‘ambivalence/polarisation/uncertainty’ was at its highest in 2015 (23.40 %) and declined over the remaining time to 4.26 % in 2020. Separation into positive and negative categories shows that the proportions among the categories was not always even throughout the exam-

ined period (Figures 9 and 10). Positive attitudinal expressions dominated in the first half of the decade, however, the effect switched in the second half with negative attitudinal expressions controlling the narrative. Aggregated results of positive and negative attitudinal results can be viewed in 'Appendix F'.

The most frequently used positive attitudinal expressions throughout the examined decade originated from the judgment category 'Wolves should be managed/protected/introduced' with 48.64 % and the attitude category 'Wolves are good and welcome' with 27.50 %, followed by the beliefs that 'wolves are not harmful to humans or positively impact humans' (11.82 %) and 'Cattle is well-protected' (8.64 %). The least frequent attitudinal expression was "wolves positively impact ecosystems" with 3.41 %.

With 24.6 %, the category 'wolves should be killed or controlled' accounted for the most frequently named negative attitudinal expressions, followed by 'wolves kill livestock' (22.19 %). The category 'cattle need better protection' amounted to 19.79 % and 'wolves are bad and unwelcome' counted 19.52 %. The least frequent negative attitudinal expressions originated from the categories 'wolves are harmful to humans and human activity or disrupt human activity' with 12.57 % and 'wolves negatively impact ecosystems' (1.34 %).

In order to test the statistical significance ($p < .05$) of time trends in attitudinal expressions in national newspapers, a linear regression analysis was conducted with the number of attitudinal expressions from national publications as the dependent variable (y) and 'time' as the independent variable (x). The results indicate that, on average, with every passing year, positive attitudinal expressions about wolves returning to Germany decreased by 3.03 expressions (Table 2, Figures 24 and 25). The null hypothesis stated that there will be no significant change in the number of attitudinal expressions of wolf return to Germany in national publications over the examined period. The alternative hypothesis was that the number of attitudinal expressions of wolf return to Germany in national publications will change over the examined period. As the results indicate decreasing positive attitudinal expressions over the period, the null hypothesis is rejected, and the alternative hypothesis is accepted.

Results

Table 2: Results of regression analysis of national attitudinal expressions about wolf return to Germany, 2010 to 2020

Variable	R	R ²	t	df	B	p
Total negative attitudinal expressions	.31	.10	.98	1	.92	.35
Total positive attitudinal expressions	.66	.43	-2.62	1	-3.03	.03

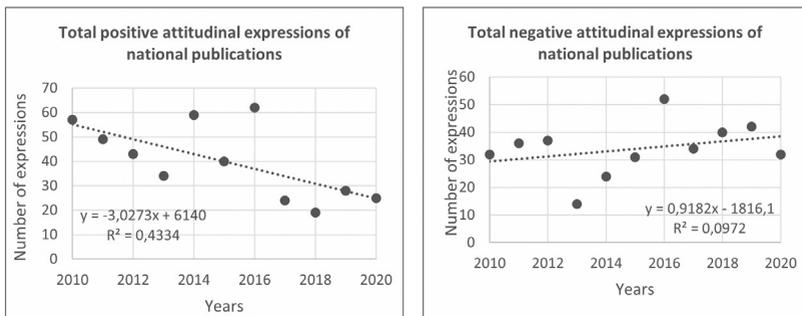


Figure 9: (left): Scatter plot of positive attitudinal expressions of nationwide publications over the ten-year period, 2010-2020; (right): Scatter plot of negative attitudinal expressions of nationwide publications over the ten-year period

This research question has set out to investigate whether attitudes towards wolves in Germany are changing over time. This was performed by examining a sample including all newspapers across the nation and through a sample of all national newspaper publications. The results indicate an increasing trend in negative and a decreasing trend in positive attitudes towards wolves in Germany within the measured timeframe (2010 to 2020).

3.2 Analysis of regional trends

3.2.1 Results of attitudes towards wolves across regions

The final number of publications from NRW and ST were $n=756$ and $n=382$, respectively. The number of publications increased throughout the examined period with only $n=12$ articles covering wolf return in the NRW sample and $n=0$ articles published in Saxony-Anhalt (Figure 10). NRW publications peaked in 2019 with $n=205$ stories before news coverage of wild wolves fell to $n=68$ in 2020, whereas for Saxony-Anhalt, publications were highest in 2017 and then subsided to $n=10$ articles in 2020. As for Berlin, there were a total of $n=234$ publications. 2010 counted only 9 articles, whereas the number increased constantly throughout the decade. Publications peaked in 2018 and decreased again to $n=10$ in 2020.

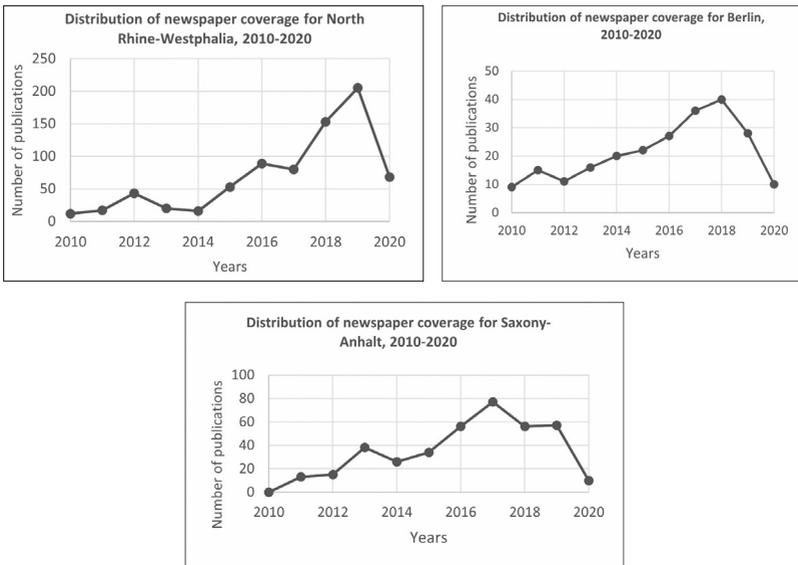


Figure 10: Distribution of newspaper coverage about wolf return for North Rhine-Westphalia, Saxony-Anhalt and for Berlin, 2010-2020

Results

The results for all three federal states indicate a majority of positive attitudinal expressions towards wolf return over the measured period (Figure 11). The NRW sample contained $n=814$ relevant attitudinal expressions, of which 57.25% ($n=466$) were positive and 30.96% ($n=252$) were negative. The total attitudinal expressions measuring ‘ambivalence, polarisation and uncertainty’ amounted to 11.79% ($n = 96$). The Saxony-Anhalt sample resulted in $n=931$ relevant attitudinal expressions.

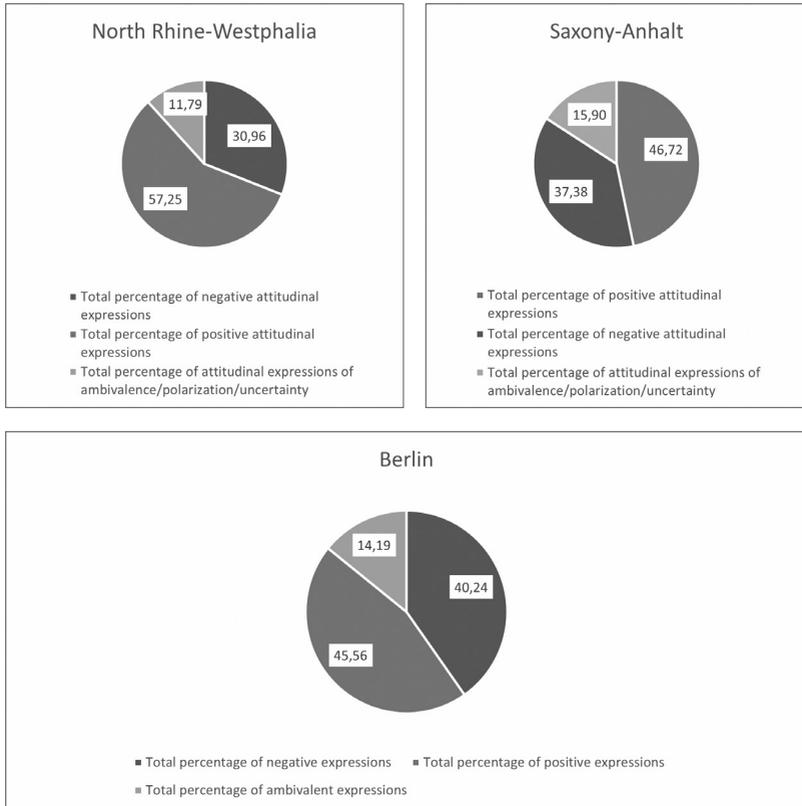


Figure 11: News coverage about wolf presence in Germany from North Rhine-Westphalia (top left), Saxony-Anhalt (top right), and Berlin (bottom) 2010–2020

The number of positive attitudinal expressions was 46.72 % (n=435), whereas 37.38 % (n=348) were negative. ‘Ambivalence/polarisation/uncertainty’ amounted to 15.9 % (n=148). The Berlin sample counted n=1240 attitudinal expressions, of which 45.56 % (n=565) were positive and 40.24 % (n=499) were negative. The category ‘ambivalence/polarisation/uncertainty’ amounted to 14.19 % (n=176).

Positive attitudinal expressions about wolf presence in Germany peaked in NRW in 2018 with 11.16 % and was at its lowest in 2010 and 2016 with 7.51 % (Figure 12). Negative attitudinal expressions of the region were at its highest in 2019 (18.25 %) and lowest in 2011 (1.98 %). The most attitudinal expressions of ‘ambivalence/polarisation/uncertainty’ in NRW were measured in 2015 with 17.71 % and the least was counted in 2010 (4.17 %). 2011 had no attitudinal expressions in that category for NRW.

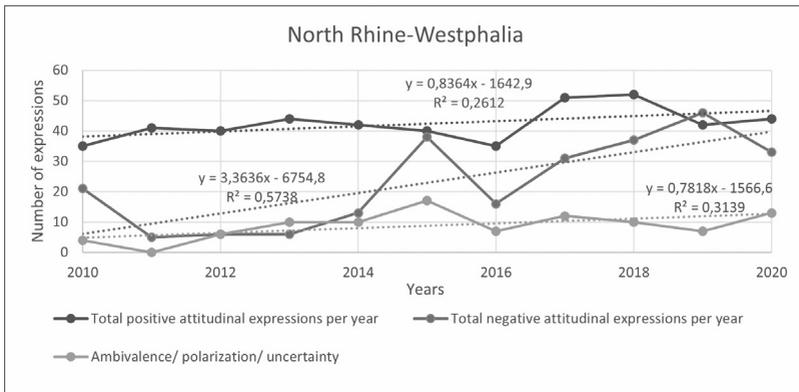


Figure 12: Overview of attitudinal expressions of all positive and negative attitudinal expressions about wolf recovery in North Rhine-Westphalia including the expressions of ambivalence, polarisation, and uncertainty, 2010 to 2020

The most positive attitudinal expressions in ST were counted in 2014 (14.02 %) and were lowest in 2020 (5.06 %) (Figure 13).

Results

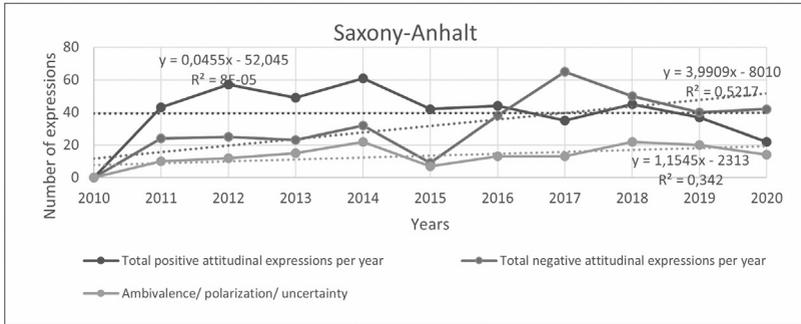


Figure 13: Overview of attitudinal expressions of all positive and negative attitudinal expressions about wolf recovery in Saxony-Anhalt including the expressions of ambivalence, polarisation, and uncertainty, 2010 to 2020

The most negative attitudes in ST were counted in 2017 (18.68 %) and 2015 had the least negative expressions about wolves (2.59 %). In 2014 and 2018, expressions of ‘ambivalence/ polarisation/ uncertainty’ peaked at 14.86 % and were at their lowest in 2011 with 6.76 %. There were no articles available about wolf recovery in Germany for ST for the year 2010 (n=0).

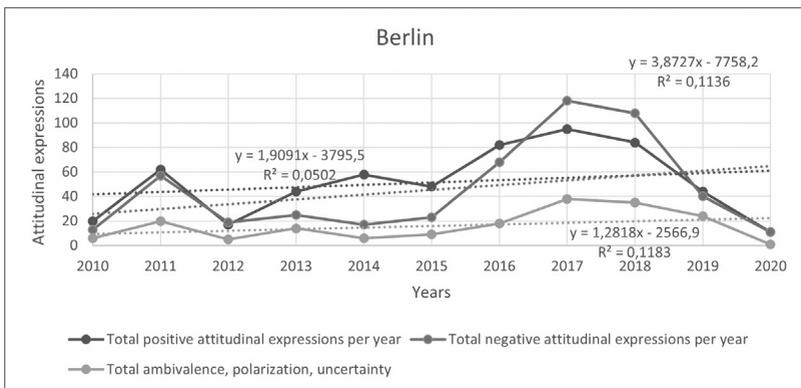


Figure 14: Overview of attitudinal expressions of all positive and negative attitudinal expressions about wolf recovery in Berlin including the expressions of ambivalence, polarisation and uncertainty, 2010–2020

The Berlin sample accounted for 23.65 % of negative attitudinal expressions in 2017 and 2.2 % in 2020 (Figure 14). The most positive attitudinal expressions were counted in 2017 with 16.81 % and the least in 2020 with 1.95 %. ‘Ambivalence/polarization/uncertainty’ accounted for 21.59 % in 2017 and there was only one expression in that category in 2020.

Separation into single groups of positive and negative categories shows that proportionally, positive attitudinal expressions in all three federal states were relatively even over the examined decade (Figure 14), whereas negative attitudinal expressions varied being proportionally lower in all three federal states in the first half of the decade and increased strongly in the second half. An overview of aggregated results of positive and negative attitudinal expressions of all three federal states can be viewed in ‘Appendix G’.

In NRW, the most frequently used positive attitudinal expressions throughout the examined decade were from the judgment category ‘wolves should be managed/protected/introduced’ (40.13 %) and the attitude category ‘wolves are good and welcome’ (34.12 %). It was followed by the beliefs that ‘wolves are not harmful to humans (17.38 %). The least expressed categories were the belief categories ‘cattle is well-protected’ (4.51 %) and ‘wolves positively impact ecosystems’ (3.86 %).

Of all negative attitudinal expressions, the ones most mentioned originated in the belief-categories ‘cattle need better protection’ (25.40 %) and ‘wolves kill livestock’ (23.41 %), followed by the attitude that ‘wolves are bad and unwelcome’ (19.84 %) and the judgment that ‘wolves should be killed or controlled’ (16.67 %) and the belief that ‘wolves are harmful to humans and disrupt human activity’ (13.89 %). The least mentioned negative expression was ‘wolves negatively impact ecosystems’ (0.79 %).

In ST, the most frequent positive attitudinal expressions originated from the judgment category ‘wolves should be managed/protected/introduced’ with 37.93 % and the attitude ‘wolves are good and welcome’ (31.72 %). The belief that ‘wolves are not harmful to humans’ (17.47 %) was followed by ‘cattle is well-protected’ (10.80 %). The least mentioned category was ‘wolves positively impact ecosystems’ (2.07 %).

With 24.14 %, the category ‘wolves kill livestock’ was the most mentioned negative attitudinal expression, followed by ‘cattle need better protection’ with 23.85 %. ‘Wolves should be killed or controlled’ amounted to

20.11% of negative expressions, followed by ‘wolves are bad and unwelcome’ with 18.10%. The least mentioned negative categories in the ST sample were ‘wolves are harmful to humans’ with 10.34% and ‘wolves negatively impact ecosystems’ (3.45%).

As for the Berlin sample, the judgment ‘wolves should be managed/protected/introduced’ amounted for nearly half of all positive attitudinal expressions (49.20%), followed by ‘wolves are good and welcome’ 22.83% and ‘wolves are not harmful to humans’ 16.99%. ‘Cattle is well-protected’ counted 7.96% and the least expressed category was ‘wolves positively impact ecosystems’ with 3.01%.

From the negative categories among the Berlin sample, ‘wolves should be killed or controlled’ and ‘wolves kill livestock’ were the main attitudes expressed with 28.46% and 23.45%, respectively. ‘Cattle needs better protection’ followed with 21.64% and ‘wolves are bad and unwelcome’ with 13.83%. The least expressed categories in Berlin were ‘wolves are harmful to humans’ (11.02%) and ‘wolves negatively impact ecosystems’ (1.60%).

It was hypothesized there would be no difference in attitudinal expressions depending on the region where the expression was measured, i.e. in regions with no wolves and no wolf experience and many wolves and a lot of wolf experience. Also, it was hypothesized that these attitudinal expressions would not differ over time and there would be no interaction between the two factors ‘time’ and ‘region’.

The results show that there are significant differences in attitudinal expressions over the measured period as well as between the three regions (Table 5; $p < 0.05$). The results for interaction between the two factors ‘time’ and ‘regions’ are also significant. Therefore, the null hypotheses are rejected in all three cases and the alternative hypotheses are accepted.

Table 5: Results of two-way ANOVA of the three specified regions (no/some/a lot of wolves) over time (2010 to 2020)

	df	F	P-value	Crit. F-value
Factor time	10	5.88255506	4.80733E-05	2.132503754
Factor region	2	6.552412323	0.004014808	3.284917651
Interaction btw time & region	20	2.604973196	0.0071735	1.897668509

In order to examine these results more closely, the attitudinal expressions of all three regions were aggregated into positive and negative categories and the mean value of each region was presented graphically (Figures 15–17).

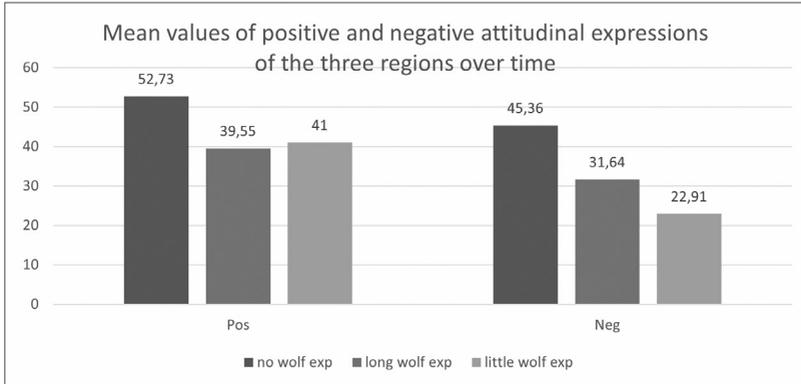


Figure 15: Difference in mean values of attitudinal expressions of the three regions with different levels of wolf experience in Germany over time, 2010 to 2020

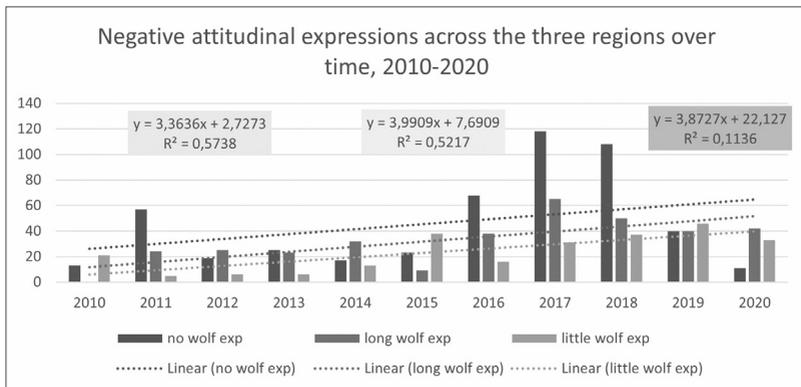


Figure 16: Negative attitudinal expressions across the three regions over time, 2010 to 2020

Results

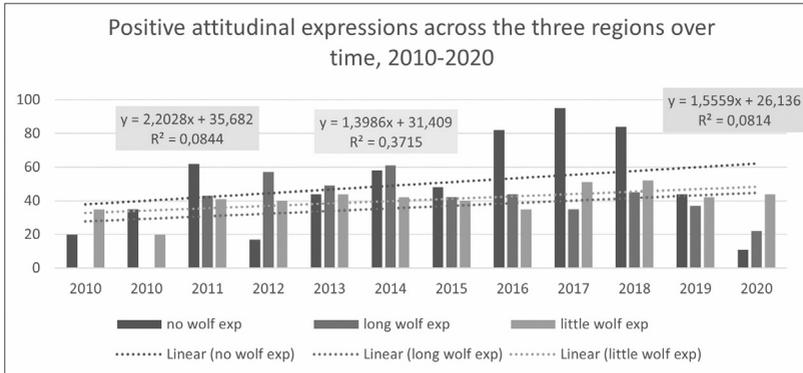


Figure 17: Positive attitudinal expressions across the three regions over time, 2010 to 2020

The results show a difference in positive attitudinal expressions between the region with no wolf experience and the two regions with wolf experience. There appears to be no difference between the positive attitudes of the two regions with wolf experience. There is a difference in negative attitudinal expressions between all three regions. Berlin has the highest number of negative attitudinal expressions, followed by ST and finally NRW. All three regions increase in positive and negative attitudinal expressions over time.

4. Discussion

4.1 General Observations

In the sample of total publications, aggregated results of positive and negative attitudes towards wolves show a strong spike in negative attitudinal expressions from the year 2016 to 2017. There are several factors that may have led to this climb. For one, this spike in total negative attitudes is driven by increases in five negative categories during that period. Parallel to this finding, data provided by the Federal Documentation and Consultation Centre on Wolves (DBBW) – the body that advises ‘federal and state authorities regarding all questions concerning wolves in the wild’ (DBBW, 2021a) – shows that wolf territories expanded by 71 % in that year, from 87 to 122 territories (DBBW, 2021). It is worth noting that one positive category, ‘cattle is well-protected’, was among the categories that increased. This can be explained by the definition of the category to include expressions of improved governmental support for cattle protection, meaning that governments sensed the need for more sufficient financial support for livestock-keepers. The time trend for the category is also accompanied by increasing ambivalence, polarization and uncertainty, expressing the worries, complaints and discussions about wolf return in Germany. Another event that may have led to the spike in negative attitudes in 2016–17 surrounds an alleged wolf attack on a tourist in Greece that circulated in the media outlets at the time (Sueddeutsche Zeitung, 2017). Although this claim was widely disputed by experts (Radinger 2018), the incident may have tarnished the image of wolves, causing greater ambivalence and uncertainty among the public.

Reflecting the findings of the NABU survey, the results of this study show a majority of positive attitudinal expressions across all samples over the measured period. However, where the NABU survey reflects a snapshot of 2018, this study follows a time trend over the past decade, and there is a clear change in attitudes over time: In newspapers from all across the country, negative attitudes significantly increased over the examined decade. Likewise, national news publications show a significant decrease in positive attitudinal expressions. Parallel to these findings, the number of wolf packs expanded strongly throughout the measured period at an average rate of 78 % per year (DBBW 2021). So, it can be said that over time, with increasing wolf populations, attitudes towards wolves in the news media are becoming more negative. This is consistent with the findings that experiences with wolves among livestock-keepers and hunters were more negative (Arbieu et al. 2020) and that people who access information about wolves from the news media generally show a more negative attitude towards wolves (Arbieu et al. 2019).

The most frequent news media coverage of wolf return to Germany took place in 2019 (n=1327). In that year, the German Parliament passed a controversial law in wolf management that allows for easier killing of wolves (controversial, as it contradicts EU law). By then, there were 128 territories spread from the north-east to the north-west of Germany and wolves were beginning to make their way southwards (DBBW 2021). Wolf attacks on livestock were constantly on the rise throughout the period peaking in 2019 with approximately 900 attacks (DBBW 2021b). It is possible that the response of policymakers to growing protests of farmers may have contributed to the sharp drop in the number of news publications in 2020, signalling successful appeasement. However, another contributing factor to this drop in coverage most certainly was the emergence of Sars-Cov-2 in Germany, resulting in a stronger focus of the media on covering the pandemic and due to social distancing measures in place. Likewise, it was the year of the U.S. presidential election, and after a controversial presidency, this event may have also garnered more media attention. The potential impact of wolf recovery on ecosystems was the least mentioned category throughout all samples (< 5 %). It appears that people were more concerned with how wolves affect daily livelihoods, as these were the cat-

egories most expressed. This is interesting, because the German Federal Agency for Nature Conservation (BfN) biannually publishes a study measuring nature consciousness among Germans and found that Germans are becoming increasingly nature conserving (BfN 2021). Compared to the 2017 survey, the 2019 Nature Awareness Study shows that, on average, there have been significant increases in the population's expressed willingness to adopt a more nature-conserving behaviour (2019: 63 percent; 2017: 56 percent) and attitude (2019: 60 percent; 2017: 54 percent), signalling a potential receptiveness for conservational matters. These findings have implications and could help shape communication strategies for state services and/or conservation NGOs (Chandelier et al. 2018); for example, to further emphasize to the public the wolves' 'usefulness' to nature, so to say, the ways in which wolves positively impact ecosystems by hunting diseased animals and increasing overall biodiversity (Ripple and Beschta 2012; Beschta and Ripple 2016; Beschta et al. 2018).

Regarding the regional differences, the results of this study indicate that the number of positive attitudinal expressions is proportionately high for all three regions. In the context of Berlin and North Rhine-Westphalia, this may be related to the observation that urban regions and regions in Germany with no wolves are generally more enthusiastic about the return of wolves than rural areas (Kaczensky 2006; Arbieu et al. 2019). The proportion of positive attitudinal expressions towards wolves exhibited by the region with a long history of wolf presence may be attributed to the fact that regions with a long history of wolf presence possess a greater level of knowledge about wolves (Kaczensky 2006; Arbieu et al. 2019). This may have a positive effect on attitudes in Saxony-Anhalt, where individuals are more accustomed to wolves and therefore exhibit less fear. This also reduces the likelihood of risky behaviour and personal concern (Kaczensky 2006), thus further enhancing positive attitudes towards wolves.

The region with long wolf experience (ST) exhibits a higher prevalence of negative attitudes than the region with some wolf experience (NRW). This may be attributed to the observation that in areas where large predators are a regular feature of local life, negative attitudes tend to prevail (Arbieu et al. 2020). Similarly, experience with attacks on livestock (Ericsson and Heberlein 2003) and higher exposure to news media (Arbieu, 2020) have

been found to lead to increasing negative attitudes. In Saxony-Anhalt, the number of wolf kills reached its highest point in 2017 (DBBW 2021c), a year which also witnessed the most newspaper publications and the year with the most negative attitudinal expressions about wolves.

While reading the articles, it became increasingly clear that alongside the attitudinal expressions that fall under the three generic categories, there was a sentiment spanning the articles that conveyed an indecisiveness about wolf recovery. Also, there was a clear polarization of opinions evident and a sentiment of uncertainty that would not clearly fall under positive or negative expressions. These terms were included into the analysis and coded as 'wolves cause ambivalence/ polarization/ uncertainty'. According to Eagly and Chaiken (1993), a person is ambivalent, when he/she is 'holding inconsistent beliefs or harboring inconsistent emotions' (p. 124) – in short, mixed feelings. The importance of these sentiments cannot be underestimated, as it may be the case that by including ambivalence in this analysis, positive and negative attitudinal expressions are less distinct from one another. Kaplan (1972) believed that in order to measure ambivalence, it is necessary to measure positive and negative attributes of an attitude object (= what is under evaluation, in this case wolf recovery) separately, which will increase ambivalence. This increase in ambivalence will result in more polarized attributes of wolf recovery, which in turn will balance the evaluative meaning in the number of positive and negative expressions (Eagly and Chaiken 1993). Similarly, Conner and Sparks (2002) argue coherently that high levels of ambivalence represent weak attitudes and are less stable over time compared to lower levels of ambivalence (p.51). In this context, it is worth noting that the category of 'ambivalence, polarisation and uncertainty' remained relatively stable throughout all samples, between 10–15%, reflecting a constant notion of public fear, polarisation, and indecision towards wolves. While the temporal effect may not be as moderating towards positive and negative attitudes, it is yet an important aspect: Since ambivalent attitudes are based on opposing evaluations and conflicting information, they should be more tenuous and thus more flexible than positive or negative attitudes (Conner and Sparks, 2002), and while the gap between positive and negative attitudes is widening, the number in this category reflects the pro-

General Observations

portion of the public with less strong opinions and with the potential to be swayed in a positive direction towards wolf recovery.

5. Conclusions

This study has shown that overall, positive attitudes towards wolves outnumbered negative attitudes in Germany in the measured period. However, while negative attitudinal expressions increased significantly in the sample of total publications, the number of positive attitudinal expressions decreased significantly in nationwide publications over the period.

The impact of wolves on ecosystems was least mentioned across all samples. Public attitudes appeared more concerned with the effects of wolf presence on their daily lives. Given that Germans are developing a stronger sense for nature conservation, this aspect should be emphasized stronger when promoting wolf conservation. Attitudes are more positive in cities, and consistent with that, attitudes towards wolves in Berlin were more positive compared to the regions with long and short wolf presence. Positive attitudes were relatively equal in both regions with wolf presence, which shows that knowledge alone cannot guarantee a more positive attitude towards wolves (Kaczensky, 2006). Negative attitudinal expressions were highest in wolf-free regions as well. Attacks on livestock and increased media exposure may have a negative effect on attitudes towards wolves, which would explain the higher number of negative expressions in the region with long wolf experience compared to the region with short wolf experience. The moderating effect of ambivalence on positive and negative attitudinal expressions cannot be ignored, however, the category of 'ambivalence, polarisation, uncertainty' remained relatively stable and at a low level throughout all measured samples. Considering the negative influence of the news media on attitudes towards wolves, the topic of

ambivalence may be worth further exploration in the wolf context, given how strongly the topic of wolf recovery is debated among the public.

A content analysis of attitudes towards wolves in the German newspaper media has not yet been carried out in the research literature. This study addresses this gap by providing insight into the content and amount of reporting on this topic. Overall, it shows that media analyses achieve a considerable range in the description of human-wolf coexistence. However, the media has a tendency towards sensationalising newsworthy subjects, a phenomenon that cannot be ignored. Nevertheless, in order to gain a more comprehensive understanding of the current situation, it would be beneficial to include a broader selection of media sources and different communication methods, such as social media, magazines and stakeholder e-papers. Furthermore, quantitative analyses cannot provide the same level of in-depth insight as can be achieved by qualitative research. Qualitative methods of analysis have the potential to capture important characteristics, perspectives and processes that shape attitudes towards wolves, thereby enabling a deeper understanding of the conditions for successful coexistence.

List of References

- Arbieu, U., Mehring, M., Bunnefeld, N., Kaczensky, P., Reinhardt, I., Ansorge, H., Böhning-Gaese, K., Glikman, J., Kluth, G., Nowak, C., Mueller, T. (2019) Attitudes towards returning wolves (*Canis lupus*) in Germany: Exposure, information sources and trust matter. *Biological Conservation* 234. 202–210 Available from: DOI: <https://doi.org/10.1016/j.biocon.2019.03.027> [Accessed 19 February 2020]
- Arbieu, U., Albrecht, J., Mehring, M., Bunnefeld, I., Reinhard, I., Müller, M. (2020). ‘The positive experience of encountering wolves in the wild’. *Conservation Science and Practice*. 2(5). DOI: 10.1111/csp2.184 [Accessed 1 April 2020]
- Bengston, D. N., Potts, R. S., Fan, D. P., Goetz, E. G. (2005) ‘An analysis of the public discourse about urban sprawl in the United States: Monitoring concern about a major threat to forests’. *Forest Policy and Economics*. 7. 745–756 [Accessed 1 March 2020]
- Beschta, R.I. and Ripple, W.J., 2016. Riparian vegetation recovery in Yellowstone: the first two decades after wolf reintroduction. *Biological Conservation*. 198. 93–103. DOI: <https://doi.org/10.1016/j.biocon.2016.03.031> [Accessed 28 March 2020]
- Bundesamt für Naturschutz (BfN) (2019) ‘Naturbewusstseinsstudie 2019’ (online). Bundesamt für Naturschutz. Pub no. 10053. Pp. 108. Available at: <https://www.bmu.de/en/publication/naturbewusstsein-2019/>
- Brosius, H. and Kepplinger, H. (1990) ‘The Agenda-Setting Function of Television News: Static and Dynamic Views.’ *Sage Journals*. 17(2).183–211. DOI: <https://doi.org/10.1177/009365090017002003> [Accessed 15.04.2020]

- Carter, N. and Linnell J. (2016) Co-Adaptation Is Key to Coexisting with Large Carnivores. *Trends in Ecology & Evolution*. 31(8), 575–578, DOI: 10.1016/j.tree.2016.05.006 [Accessed 16 November 2020]
- Chandelier, M., Steuckardt, A., Mathevet, R., Diwersy, S., Gimenez, O. (2018) ‘Content analysis of newspaper coverage of wolf recolonization in France using structural topic modeling’. *Biological Conservation*. 220. 254–261 Available from: <https://doi.org/10.1016/j.biocon.2018.01.029> [Accessed 1 March 2020]
- Conner, M. and Sparks, P. (2002) ‘Ambivalence and Attitudes’. *European Review of Social Psychology*. 12(1). 37–70. DOI: 10.1080/14792772143000012 [Accessed 28 April 2021]
- Creswell, J. W. (2012). ‘Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research’. Deutschland: Pearson.
- DBBW (2021) ‘Wolfsterritorien in Deutschland’ (online). Available at: <https://www.dbb-wolf.de/Wolfsvorkommen/territorien/karte-der-territorien> [Accessed 1 March 2020]
- DBBW (2021a) ‘DBBW, the Federal Documentation and Consultation Centre on Wolves’ (online). Available at: <https://www.dbb-wolf.de/home> [Accessed 30 April 2021].
- DBBW (2021b) ‘Bundesweite Schadenstatistik’ (online). Available at: <https://www.dbb-wolf.de/wolfsmanagement/herdenschutz/schadensstatistik> [Accessed 30 April 2021]
- DBBW (2021c) ‘Berichte zur Prävention von Nutztierschäden’ (online). Available at: <https://www.dbb-wolf.de/mehr/literatur-download/berichte-zu-praevention-und-nutztierschaeden> [Accessed 2 May 2021]
- DeCesare, S. J., Wilson, S. M., Bradley E. H., Gude, J.A., Inman, R. M., Lance, N. J., Laudon, K., Nelson, A. A., Ross, S. M. and Smucker, T. D. (2018) ‘Wolf-Livestock Conflict and the Effects of Wolf Management’. *The Journal of Wildlife Management*. 82(4). 711–722. DOI: 10.1002/jwmg.21419 [Accessed November 2020]
- Eagly, A. and Chaiken, S., (1993) ‘The psychology of attitudes’. Fort Worth, USA: Hartcourt Brace & Company.
- Ericsson, G. and Heberlein, T. (2003) ‘Attitudes of hunters, locals, and the general public in Sweden now that the wolves are back’. *Biological Conservation*. 111. 149–159. DOI:10.1016/S0006-3207(02)00258-6

- Fechter, D., Storch, I. (2014) How Many Wolves (*Canis lupus*) Fit into Germany? The Role of Assumptions in Predictive Rule-Based Habitat Models for Habitat Generalists. *PLoS ONE*. 9(7): e101798. doi:10.1371/journal.pone.0101798 [24 March 2021]
- Fritts, S. H., Stephenson, R. O., Hayes, R. D. and Boitani, L. (2003), 'Wolves and Humans'. USGS Northern Prairie Wildlife Research Center. 317. <https://digitalcommons.unl.edu/usgsnpwrc/317> [Accessed 20 February 2020]
- Glikman, J. A., Vaske, J. J., Bath, A. J., Ciucci, P., Boitani, L., (2011) 'Residents' support for wolf and bear conservation: the moderating influence of knowledge'. *European Journal of Wildlife Research*. 58(1). 295–302. DOI: 10.1007/s10344-011-0579-x [Accessed 3 May 2020]
- Gosling E., Bojarska K., Gula, R. and Kuehn, R. (2019) 'Recent arrivals or established tenants? History of wolf presence influences attitudes toward the carnivore'. *Wildlife Society Bulletin*. 1–12. DOI: 10.1002/wsb.1027 [Accessed 1 March 2020]
- Happer, C. and Philo, G. (2013) 'The role of the media in the construction of public belief and social change'. *Journal of Social and Political Psychology*. 1(1), 321–336, Doi:10.5964/jspp.v1i1.96 [Accessed 23 March 2020]
- Houston, M. J., Bruskotter, J. T. and Fan, D. (2010) 'Attitudes Toward Wolves in the United States and Canada: A Content Analysis of the Print News Media, 1999–2008', *Human Dimensions of Wildlife*. 15(5). 389–403. Available at: DOI: <http://dx.doi.org/10.1080/10871209.2010.507563> [Accessed 1 March, 2020]
- Kaczynsky, P. (2006), 'Medienpräsenz- und Akzeptanzstudie "Wölfe in Deutschland"'. Forstzoologisches Institut Fakultät für Forst- und Umweltwissenschaften'. Available at https://www.researchgate.net/publication/259620497_Medienprasenz-_und_Akzeptanzstudie_%27Wolfe_in_Deutschland [Accessed 20 March 2020]
- Karlgren, J., Eriksson, G., Mizzaro, S., Clough, P., Sanderson, M., Franzén, K. and Hansen, P. (2004) 'Reading Between the Lines: Attitudinal expressions in text'. American Association for Artificial Intelligence. Available at: <https://api.semanticscholar.org/CorpusID:17305838> [Accessed 15.05.2020]
- Koenig, J. H., Kiffner, C., Kramer-Schadt, S., Fürst, C., Keuling, O. and Ford, A. T. (2020) 'Humanwildlife coexistence in a changing world'. *Conservation Biology*. 00(0). 1–9. DOI: 10.1111/cobi.13513 [Accessed 24 Januar, 2021]

- Kramer-Schadt, S., Wenzler, M., Gras, P. and Knauer, F. (2020). 'Habitatmodellierung und Abschätzung der potenziellen Anzahl von Wolfsterritorien in Deutschland'. Bundesamt für Naturschutz. DOI:10.19217/skr556 [Accessed 18 January 2021]
- Lehnen, L., Mueller, T., Reinhardt, I., Kaczensky, P. and Arbieu, U. (2021) 'Social attitudes towards the wolf's return to Germany'. *Natur und Landschaft*. 96(1). 27–33. DOI: 10.17433/1.2021.50153871.27-33 [Accessed 26 April 2021]
- Mackey, A. and Gass, S. (2005) 'Second Language Research – Methodology and Design'. Publishers: Lawrence Erlbaum Associates, Inc. 9(3). XV+405 Available at: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiL0M6x0K-jwAhXG_rsIHZhqC-4QFjABegQIAxAD&url=https%3A%2F%2Fwww.manaraa.com%2Fupload%2F8be2a1cf-6275-4941-971c-ae6446630635.pdf&usg=AOvVaw0YEHKDJFAs3ljCIj8HuoMY [Accessed 6 April 2021]
- McCombs, M. E. and Shaw, D. L. (2017) 'The Agenda-Setting function of mass media'. *The Agenda Setting Journal* 1(2), 105–117. DOI: 10.1075/asj.1.2.02mcc [12 May 2020]
- NABU (2018) 'Wölfe in Deutschland 2018'. Available at https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiMpt3cx6fwAhWkgf0HHTn6BLwQFjAAegQIAxAD&url=https%3A%2F%2Fwww.nabu.de%2Fimperier%2Fmd%2Fcontent%2Ffnabude%2Fforsa-umfrage_vom_nabu_-_w__lfe_in_deutschland_2018.pdf&usg=AOvVaw0iPMYpcKMT78wRSNws-fna [Accessed 3 January 2021]
- Randler, C., Wagner, A., Rögele, A., Hummel, E. and Iztok, T. (2020) 'Attitudes toward and Knowledge about Wolves in SW German Secondary School Pupils from within and outside an Area Occupied by Wolves (*Canis lupus*) Animals, 10, 607. DOI:10.3390/ani10040607. [Accessed 20 April 2021]
- Radinger, E. (2018) 'Ergebnis: Tödlicher Angriff auf die Touristin Celia Hollingworth in Griechenland' (online). Available at: <https://www.elli-radinger.de/ergebnis-toedlicher-angriff-auf-die-britin-celia-hollingworth-in-griechenland/> [Accessed 1 February 2021]
- Reinhardt, I. and Kluth, G. (2016) 'Territorial and dispersal behaviour of wolves (*Canis lupus*) in Germany', *Natur und Landschaft*. 91(6). 262–271. DOI: 10.17433/6.2016.50153396.262-271 [Accessed 12 January 2020]

- Reinhardt, I., Kluth, G., Collet, S., Szentiks, C. A. (2020) 'Wölfe in Deutschland – Statusbericht 2019/20' (online). Available at: <https://www.dbb-wolf.de/mehr/literatur-download/statusberichte> [Accessed 24 March, 2021]
- Ronnenberg, K., Habbe, B., Gräber, R., Strauß, E., Siebert, U. (2017) 'Coexistence of wolves and humans in a densely populated region (Lower Saxony, Germany)'. *Basic and Applied Ecology*. 25. 1–4. DOI: <http://dx.doi.org/10.1016/j.baae.2017.08.006> [Accessed 10 March 2020]
- Shrum, L. J. (2008) 'Attitudes, Values, and Beliefs, Media Effects on' *The International Encyclopedia of Communication*, First Edition. Edited by Wolfgang Donsbach. John Wiley & Sons, Ltd. DOI:10.1002/9781405186407.wbieca064 [Accessed 01 May 2020]
- Skogen, K. and Krange, O. (2003) 'A wolf at the gate: The anti-carnivore alliance and the symbolic construction of community'. *Sociologia Ruralis*. 43(3). 309–324. DOI: 10.1111/1467-9523.00247 [Accessed 10 March 2020]
- Soroka, S. N. (2006), 'Good News and Bad News: Asymmetric Responses to Economic Information'. *The Journal of Politics*, 68(2). 372–385. DOI: <https://doi.org/10.1111/j.1468-2508.2006.00413.x> [Accessed 1 May 2020]
- Statista (2021) 'Bevölkerungsdichte (Einwohner je km²) in Deutschland nach Bundesländern zum 31. Dezember 2019' (online). Available at: <https://de.statista.com/statistik/daten/studie/1242/umfrage/bevoelkerungsdichte-in-deutschland-nach-bundeslaendern/> [Accessed 12 January 2021]
- Sueddeutsche Zeitung (2017) 'Touristin in Griechenland von Wölfen getötet' (online). Available at: <https://www.sueddeutsche.de/panorama/maronia-touristin-in-griechenland-von-woelfen-getoetet-1.3687037> [Accessed 12 January 2021]
- Ulrich R.S. (1993), 'Biophilia, biophobia, and natural landscapes'. Ch. 3. Available at https://www.researchgate.net/publication/284655696_Biophilia_biophobia_and_natural_landscapes [Accessed 23 July 2020]
- Wagner, C., Holzapfel, M., Kluth, G., Reinhardt, I. and Ansorge, H. (2012) 'Wolf (*Canis lupus*) feeding habits during the first eight years of its occurrence in Germany'. *Mammalian Biology*. 77(3). 196–203. DOI: 10.1016/j.mam-bio.2011.12.004 [Accessed 12 April 2020].
- Zimmermann, B., Wabakken, P., Dötterer, M. (2001) 'Human-carnivore interactions in Norway: How does the re-appearance of large carnivores affect

List of References

people's attitudes and levels of fear?'. *Forest Snow and Landscape Research*. 76(1). Available at: <https://www.researchgate.net/publication/23733647>

APPENDIX A

(wolf or wölfe or wolfes or wölfen) and subject(tiere or wildtiere or “bedrohte tier- und pflanzenarten” or artenschutz or lebensräume) or (Headline(Wolf or Wölfe) and Atleast4(wolf or Wölfe)) or ((„Canis lupus“) pre/10 (wolf or Wölfe) and w/255 Rückkehr or Deutschland or Schutz** Or schützen or geschützt* or Tierschutz* or Rudel or Wild* or Romantik or romantisie* Or Wolfsromantik Or Tierriss or gerissen or Problem* Or Angst* Or Weide* Or Landwirt* or Schäfer or Hobbyschäfer or Tierhüter or Lamm or Lämmer or Kalb or Kälber or gesichtet or Sichtung or Jagd or Abschuss or Gefahr* Or gefährlich or Ansiedelung Or angesiedelt or Zuwanderung or zugewandert or Lebensraum or Habitat Or Wiedereinführung or Umwelt* Or Management Or Umweltmanagement or Beobacht* Or Truppenübungsplatz* or Truppenübungsplätze* or Natur* or Biodiversität or Artenvielfalt or Arten* or aussterben or ausgestorben or NABU or Naturschutzbund or Politik* Or Beschluss) and not („Maren Wolf“ or „Tobias Wolf“ or „Wolf Ritz“ or „Peter und der Wolf „or „Peter Wolf“ or „Wolf Spitzer“ or „Wolf-Eike Kuntsche“ or „Wolf Hirtreiter“ or „Kurt-Wolf von Borries“ or „Wolf von Hayer“ or Wolfgang or „Wolfgang Petri“ or Wolfgangsee or Wolfsburg or Wolfratshaus! or Wolff or Wulf or Wulff or „Brigitte Wolf“ or „Wolfgang Kerstan“ or „Wolf-Dieter Bucher“ or „Vincente Wolf“ or „Dick Wolf“ or „Kate Wolf“ or „Alice Wolf“ or „Jack Nicholson“ or Beowulf or Wolverine or „Hugh Jackson“ or Wolves or Videospiel* or Konsole* or „Der mit dem Wolf tanzt“ or Film* Or event* or „Wolf im Schafspelz“ Or „Armin Wolf“ Or Nintendo or „Lost Ember“ or „Alfred Wolf“ or „Obstof Wolf“ or „Hannes Wolf“ or (Gaby W/2 Wolf) or „Jack Wolfskin“ or „Verein der grauen Wölfe“ or „Har-

ald Wolf“ or „Wolf Karg“ or „Willi Wolf“ or „Martin Wolf Wagner“ or „Johannes Wolf“ or „Caspar Wolf“ or „Ingo Wolf“ or Türkisch* Or Viren or Eishockey or Naturfotograf! Or Hunnen or „Thomas Wolfe“ or „Julia Bleske“n or Islam* Or Fußball or Flüchtling* Or Spieler or Tanztheaterbühne or Terrorismus or Trump or „Axel Halley“ Or Neonazi* or Fans or Tierschützerskeptisch or Genmanipulierte or „Katrin Bettina Müller“ or Rechtsextremismus or Endzeit or Hitler* or Handball or 3500 or Alaska or „Tom Wolfe“ or Opolka or Tierpark or Künstler*)

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APPENDIX B

Analysis of attitudes towards wolf recovery in Germany

Codebook

Name	Description	Examples
Attitudes	= a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour (Eagly and Chaiken 1993)	
Wolves are bad and unwelcome	Any negative, evaluative text of wolf presence	<ul style="list-style-type: none">• Wölfe sind bei uns nicht willkommen; Wölfe sollen wegbleiben;• ... eignet sich nicht als Wolfsland; wir sind eine Kulturlandschaft und können den Wolf nicht gebrauchen.• „Problem-Wolf“

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Name	Description	Examples
Wolves are good and welcome	Any positive, evaluative text of wolf presence	<ul style="list-style-type: none"> • ... ist Wolfserwartungsland; Wölfe sind in ... willkommen; Wir freuen uns, dass Wölfe unser Land wieder besiedeln. • einer von 40 Ehrenamtlichen, die in Niedersachsen um Akzeptanz für das wilde Tier werben. • Es muss in jedem Bundesland mit Wölfen gerechnet werden
Beliefs	“associations or linkages that people establish between the attitude object and various attributes” (Eagly and Chaiken 1993)	
Wolves are harmful to humans and disrupt human activity	<p>Evaluative text focusing on statements that are made about wolves...</p> <p>... being a physical threat or danger to humans</p> <p>... changing human behaviour or where humans feel they cannot go about things as they normally would because of wolf presence.</p>	<ul style="list-style-type: none"> • ... dass Wölfe dort kaum einen Unterschied machen zwischen Kindern und Wildtieren.“ • ... und immer wieder kommt er nahe an Siedlungen heran. • Die Leute dort fürchten, dass die gefährlichen Tiere auch für Menschen eine Bedrohung sind.“ • Die wiederum könnten mit ihrer Angriffslust Wanderer gefährden.

APPENDIX B

Name	Description	Examples
		<ul style="list-style-type: none"> • Die Litanei übereifriger Wolfsschützer, dass Kinder nicht ins Beuteschema der Wölfe passten, hilft da überhaupt nicht, zumal es ja auch nicht so ist, dass Wölfe sich „nie“ an Kindern vergreifen. • für die anderen ist in der Region einfach viel zu viel los, als dass es ein konfliktfreies Miteinander geben könnte. „Jedes Wochenende kommen Tausende Ausflügler, Bergsteiger und Freizeitsportler zu uns, sommers wie winters“, sagt einer, „da kann mir keiner erzählen, dass hier auch noch rudelweise Wölfe leben können ohne Probleme.“ • „Aber sobald ich merke, dass der Wolf meinen oder die Arbeitsplätze meiner Mitarbeiter gefährdet, bin ich sofort ein Gegner.“ • „Morgens und abends muss ich jede Herde abgehen und kontrollieren, ob nicht wieder etwas passiert ist“, schildert Horn. Mehr als eine Stunde Zeit kostet ihn das. Zeit, in der andere Arbeiten liegenbleiben.

APPENDIX B

Name	Description	Examples
		<ul style="list-style-type: none"> • „Eine Anwohnerin hat einen erwachsenen Wolf gesehen, der am helllichten Tag durch den Ort spaziert ist.“ In der Nähe hätten Kinder an einer Bushaltestelle gestanden. Dagegen müsste doch etwas unternommen werden. • Bürgermeister Dirk Oelmann (50) steht am Zaun vorm evangelischen Kindergarten, wo nun ein Wolf vorbeikam: „Schauen Sie sich die Zaunhöhe an. Mehr als 1,30 sind das nicht. Ein Wolf springt da locker drüber.“ • Der Schwarzwaldverein sieht Wanderer durch Wölfe beeinträchtigt. Dabei gehe es weniger um die potenzielle Gefahr, die von einzelnen Tieren ausgehe, erklärte der Verein am Montag in Stuttgart. Wenn Weidegebiete aber wolfsicher eingezäunt werden müssten und nicht mehr durchquert werden könnten, würden Wanderwege massiv eingeschränkt. • „Sollten sich weitere Vorfälle häufen, geben die ihre Herden auf.“

APPENDIX B

Name	Description	Examples
<p>Wolves cause strong ambivalence, polarisation, uncertainty</p>	<p>= Evaluative expressions that convey mixed thoughts and feelings towards wolf presence (i. e. ambivalence)</p> <p>= Evaluative expressions that describe strong fears or worries about wolf presence (i. e. uncertainty)</p> <p>= Evaluative expressions that convey a strong polarization between people towards wolf presence</p>	<ul style="list-style-type: none"> • „Das mag ja alles sein, aber ein mulmiges Gefühl bleibt“, sagt Anke Hennig. • „Ich weiß nicht recht, wie ich dazu stehen soll“, gibt Kees de Vries, Bauer aus Deetz im Fläming und Chef des Umweltausschusses unumwunden zu • Ich stand dem Thema zwiespältig gegenüber. • Aber viele haben eine gewisse Angst und ein unwohles Gefühl, wenn sie wissen, dass Wölfe in ihrer Gegend unterwegs sind. • Die Menschen fragen sich, ob sie noch joggen gehen können oder was mit ihren Kindern passiert, wenn sie draußen sind • Die Debatte um den Wolf in Bayern nimmt erneut an Fahrt auf.

APPENDIX B

Name	Description	Examples
		<ul style="list-style-type: none"> • Die zunehmende Verbreitung von Wölfen auch in Niedersachsen verschärft den Gegensatz zwischen den Interessen von Naturschützern und Nutztierhaltern: Einerseits soll sich das Raubtier möglichst frei entfalten können, auf der anderen Seite beklagen Landwirte und Schäfer vermehrt Angriffe auf ihre Herden. • Viele freuen sich darüber, doch ist zum Teil auch die Angst vor dem „bösen Wolf“ noch verbreitet.
Wolves kill livestock	= Evaluative expressions of wolves attacking, harming, or killing livestock	<ul style="list-style-type: none"> • Findet er kein Wild, reißt er auch Nutztiere. • Tierhalter beklagen Verluste • Bei einem Übergriff in der Nähe von Cottbus, wohin Seelig gerufen wurde, lagen zehn, 15 Embryos auf der Weide. Der Stress hatte zur Folge, dass die trächtigen Schafe ihren Nachwuchs verloren. • Nicht, weil mal ein Schaf gerissen wird, sondern weil etliche Tiere gerissen werden

APPENDIX B

Name	Description	Examples
<p>Wolves are not harmful to humans or human activity or positively impact humans and human activity</p>	<p>= Evaluative expressions focusing on statements that are made about wolves not being a physical threat to humans and humans can go about their daily lives without fear.</p> <p>= Evaluative expressions of the ability of human-wolf coexistence</p>	<ul style="list-style-type: none"> • „Wir Menschen gehören nicht ins Beutespektrum der Wölfe. • Angriffe auf Menschen seien extrem unwahrscheinlich. „Menschen sind kein Beutetier für Wölfe“, sagt Herdtfelder. • „Die Menschen gehen wie eh und je Pilze sammeln in den Wäldern, Kinder spielen an Wäldern“, meint Stier. • Und wenn das für sie der kürzeste Weg ist, laufen sie durchaus mal an einer Siedlung oder einem Gehöft vorbei. Das ist ganz normal und bedeutet nicht, dass es sich um einen verhaltensauffälligen Problemwolf handelt. • Die meisten Menschen werden von den Tieren gar nichts mitbekommen und keine Probleme mit ihnen haben. • ‚Anders als es Märchen schildern, sind Wölfe eher scheu und keine Gefahr für den Menschen‘, betont Naturschutzminister Bonde nach dem Wolfsfund.

APPENDIX B

Name	Description	Examples
Cattle is well-protected	= Evaluative expressions that describe how live-stock is sufficiently protected from wolves, not in danger of an attack by wolves or that governmental recompensating measure are in place.	<ul style="list-style-type: none"> • Gerade hat die EU beschlossen, dass Bauern, denen durch Wölfe ein Schaden entsteht, von Brüssel entschädigt werden. • Freude versicherte, dass Tierhalter in jedem Fall entschädigt werden. • Die Entschädigungen werden prompt bezahlt • In Sachsen und im europäischen Ausland dagegen sind Entschädigungszahlungen vom Staat für vom Wolf gerissene Tiere längst gang und gäbe. • Auf dem Menü der rund 60 Wölfe in Deutschland stünden Reh, Hirsch und Hase. Schafe gäbe es nur in Ausnahmefällen
Cattle need better protection	= Evaluative expressions of the necessity to protect cattle from wolves, especially from farmers and the government.	<ul style="list-style-type: none"> • Problematisch wird es jedoch, wenn Nutztiere irgendwo dastehen und nicht durch einen Zaun geschützt sind. • Die Halter der Nutztiere haben doch Möglichkeiten, ihre Tiere zu schützen, warum wird es nicht gemacht?

APPENDIX B

Name	Description	Examples
		<ul style="list-style-type: none"> • Wenn Wölfe darüber springen, die scheinbar gesicherte Schafsherde angreifen und anschließend das Areal auf demselben Weg ebenso mühelos wieder verlassen, ist das doch der beste Beweis dafür, dass der Zaun eben nicht „wolfssicher“ ist. • Das Hessische Umweltministerium empfiehlt den Haltern, ihre Tiere mit Stromzäunen zu schützen. • Den Konflikt zwischen Wolf und Weidetierhaltung löse nur ein besserer Herdenschutz mit unbürokratischeren Hilfen für Weidetierhaltern.
<p>Wolves negatively impact ecosystems</p>	<p>= Evaluative expressions of how wolves harm ecosystems, especially by decimating game or by implementation of extensive fencing to prevent wolf attacks</p>	<ul style="list-style-type: none"> • Die Sorge von Jägern, der Wildbestand werde durch die Rückkehr der Wölfe erheblich dezimiert, • Sie fürchten, dass die Wölfe zu viel Wild jagen, so dass am Ende kein Reh mehr übrigbleibt.

APPENDIX B

Name	Description	Examples
		<ul style="list-style-type: none"> • Können wir dort oben das Gebiet nicht mehr beweiden, erhöht sich wegen des langen Grases die Lawinen- und Erosionsgefahr, außerdem buscht und waldet alles zu. Seltene Blumen und Tiere sterben aus • Aber nicht nur das. Wenn immer mehr Almen geschlossen werden, leide die Artenvielfalt in den Bergen massiv.
<p>Wolves positively impact ecosystems</p>	<p>= Evaluative expressions of how wolves improve ecosystems by managing game populations, changing habits of wildlife species, hunting sick deer, etc.</p>	<ul style="list-style-type: none"> • „Der Wolf ist als Rückkehrer in sein ehemaliges Verbreitungsgebiet ein natürlicher Bestandteil unserer Ökosysteme“, heißt es dort. • Wie man den Bestand wieder in den Griff bekommt, darüber gehen die Meinungen auseinander. Der Nabu plädiert dafür, den Wolf wieder anzusiedeln
		<ul style="list-style-type: none"> • Dass der Wolf als Jäger von kranken und schwachen Tieren indes eine wichtige Rolle im Ökosystem spielt, ist auch an den Vorbereitungen zu dem Schweriner Managementplan ablesbar...

APPENDIX B

Name	Description	Examples
Judgements	= A consequence of an attitude and the associated beliefs.	
Wolves should be killed or controlled	= Evaluative expressions about how wolves should be eradicated, limited in number, or kept out of certain regions	<ul style="list-style-type: none"> • Als sich die Wölfe dann ausbreiteten und die ersten Schafe rissen, wurde natürlich sofort die Forderung laut, die Wölfe müssen weg. • Solange sich die Anzahl in Grenzen hält, sehe ich keine Schwierigkeiten. • Wenn es Anzeichen dafür gibt, dass ein Wolf jede Scheu verloren hat, dann darf der Abschuss kein Tabu sein. • Er wurde daher vom Umweltminister zum Abschuss freigegeben. Das ist sehr schade, aber vielleicht auch notwendig.
		<ul style="list-style-type: none"> • Im Mahnfeuer-Aufruf fordert Wendlin Schmücker vom „Förderverein der deutschen Schafhaltung“ das „Regulieren der Bestände“ und ein Raumplanungskonzept, „das Wolfsrudel in urbanen Gebieten oder in Gebieten mit Weidetierhaltung grundsätzlich nicht mehr duldet“.

APPENDIX B

Name	Description	Examples
<p>Wolves should be managed/protected/ introduced</p>	<p>= Evaluative expressions of how wolves are a species worthy of protection and humans should implement environmental management strategies to ensure species recovery. Also, expressions indicating that German landscapes are suitable for reintroduction.</p>	<ul style="list-style-type: none"> • Deshalb streben wir unter den aktuellen Rahmenbedingungen eine Koexistenz mit dem Wolf an • Die Aussage, Hessen biete wegen der Zahl der überfahrenen Wölfe keinen geeigneten Lebensraum, sei „schlichtweg Quatsch.“ • Im Juli hatte das Kontaktbüro Wolfsregion Lausitz in Rietschen den Standort zum Schutz der Jungtiere noch geheim gehalten. • Aber nach wie vor hat der Wolf einen riesigen Teil seines Verbreitungsgebietes verloren. Auch bei uns ist er nicht überm Berg, nur weil es in Sachsen sechs Rudel gibt. • Um die Tiere zu schützen wurden Wolfsrichtlinien geschaffen, Wolfsmanagementpläne entworfen. • Der erreichte Konsens war, der Bevölkerung und dem Wolf dessen Heimkehr in die mecklenburgischen Wälder zu erleichtern. • Die bayerischen Berge sind ein hervorragender Lebensraum für Raubtiere.

APPENDIX B

Name	Description	Examples
Newspaper	= All newspapers filtered from Nexis Uni® and relevant to the respective region and year	<ul style="list-style-type: none"> • Süddeutsche Zeitung • Aachener Zeitung • Schwarzwälder Bote
Region	= All 16 federal states of Germany or, respectively, the federal states relevant to the specific hypotheses	<ul style="list-style-type: none"> • Baden-Württemberg • Bayern • Berlin • Brandenburg • überregional

APPENDIX C

	Wolves are bad and unwelcome	
	Wolves are harmful to humans or disrupt human activity	
	Wolves negatively impact ecosystems	
	Wolves kill livestock	
	Cattle needs better protection	
	Wolves killed or controlled	
	Wolves are good and welcome	
	Wolves are not harmful to humans and human activity or positively impact humans	
	Wolves positively impact ecosystems	
	Cattle is well-protected	
	Wolves should be managed/protected/introduced	
	Ambivalence/polarisation/uncertainty among interest groups	
R	.83	.77
	.90	.84
	.97	.93
	.85	.79
	.88	.99
	.82	.97

Table of correlation coefficient scores of test-retest from n=550 sample across all newspapers 2010–2013

	Wolves are bad and unwelcome	
	Wolves are harmful to humans or disrupt human activity	
	Wolves negatively impact ecosystems	
	Wolves kill livestock	
	Cattle needs better protection	
	Wolves killed or controlled	
	Wolves are good and welcome	
	Wolves are not harmful to humans and human activity or positively impact humans	
	Wolves positively impact ecosystems	
	Cattle is well-protected	
	Wolves should be managed/protected/introduced	
	Ambivalence/polarisation/uncertainty among interest groups	
R	.92	.83
	1	.99
	.82	.97
	.94	.86
	1.0	.98
	.96	.91

Table of correlation coefficient scores of test-retest from n=110 sample across nationwide newspapers

APPENDIX D

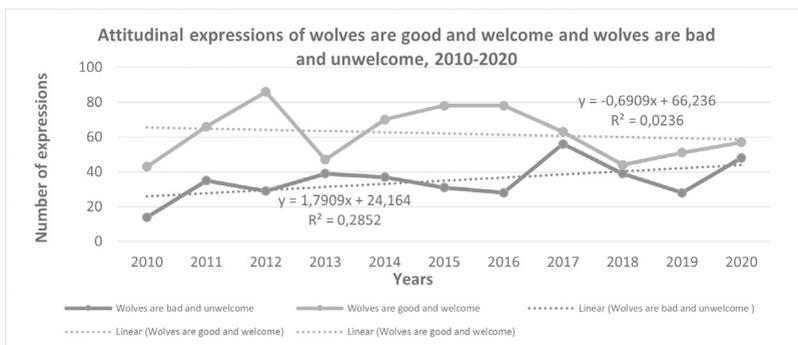


Figure: Time trend of attitudinal expressions of the categories ‘wolves are good and welcome’ and ‘wolves are bad and unwelcome’ in total publications sample (2010 to 2020)

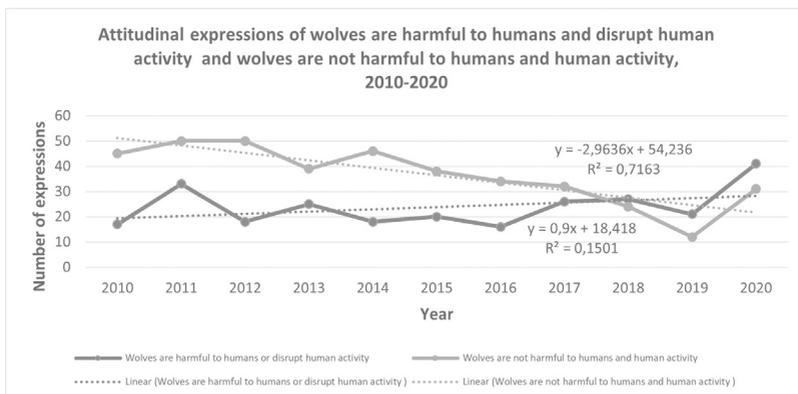


Figure: Time trend of attitudinal expressions of the categories ‘wolves are harmful to humans and disrupt human activity’ and ‘wolves are not harmful to humans and human activity’ in total publications sample (2010 to 2020)

APPENDIX D

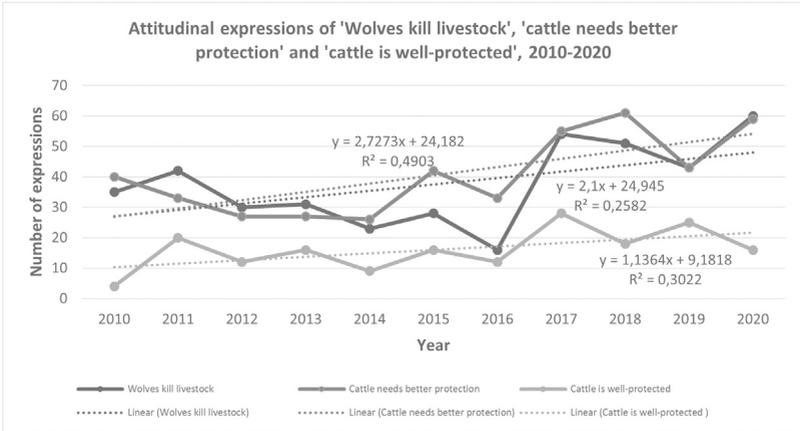


Figure: Time trend of attitudinal expressions of the categories 'wolves kill livestock', 'cattle needs better protection' and 'cattle is well-protected' in total publications sample (2010 to 2020)

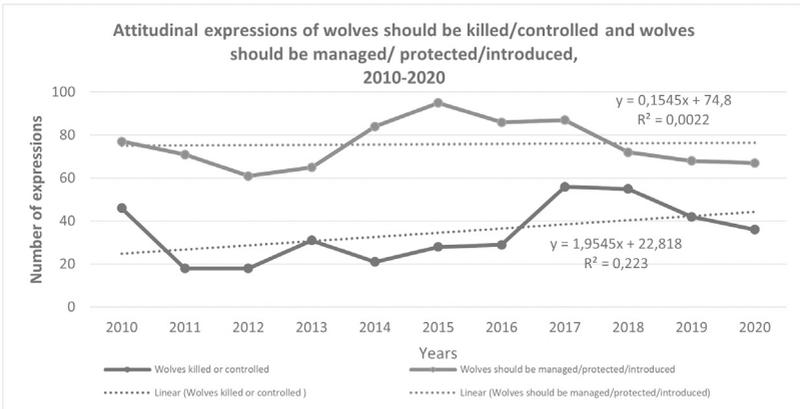


Figure: Time trend of attitudinal expressions of the categories 'wolves should be killed/controlled and wolves should be managed/protected/introduced' in total publications sample (2010 to 2020)

APPENDIX D

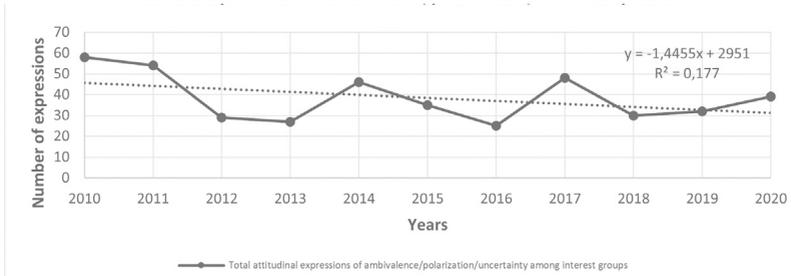


Figure: Time trend of attitudinal expressions of the category ambivalence/polarization/uncertainty in total publications sample (2010 to 2020)

APPENDIX D

Table: Correlation analysis of the seven categories related to increase of negative attitudinal expressions from the year 2016 to 2017 in total publications sample

	Year	<i>Wolves are bad and unwelcome</i>	<i>Wolves are harmful to humans or disrupt human activity</i>	<i>Wolves kill livestock</i>	<i>Cattle need better protection</i>	<i>Wolves killed or controlled</i>	<i>Cattle is well-protected</i>	<i>Wolves cause ambivalence/polarization/uncertainty</i>
Year	1							
Wolves are bad and unwelcome	1	1						
Wolves are harmful to humans or disrupt human activity	1	1	1					
Wolves kill livestock	1	1	1	1				
Cattle need better protection	1	1	1	1	1			
Wolves killed or controlled	1	1	1	1	1	1		
Cattle is well-protected	1	1	1	1	1	1	1	
Wolves cause ambivalence/polarization/uncertainty	1	1	1	1	1	1	1	1

APPENDIX D

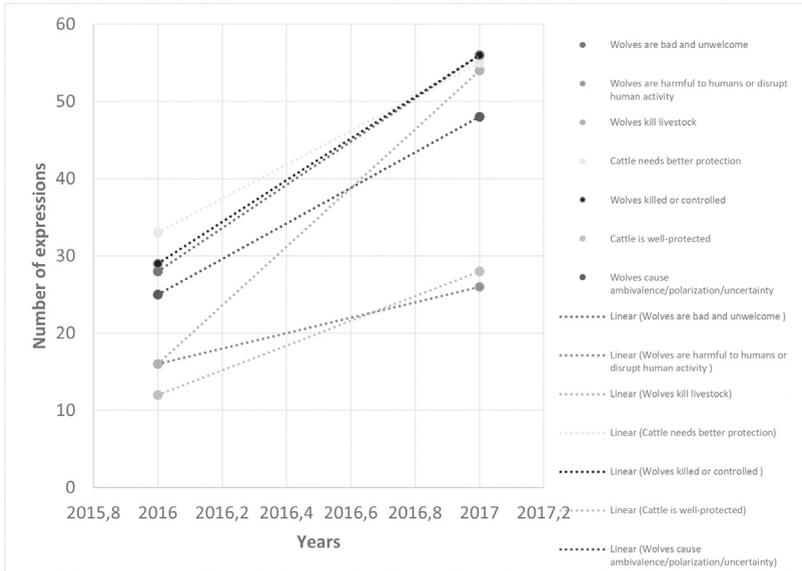


Figure of the seven categories related to the increase in negative attitudinal expressions from the year 2016 to 2017 in total publications sample

APPENDIX E

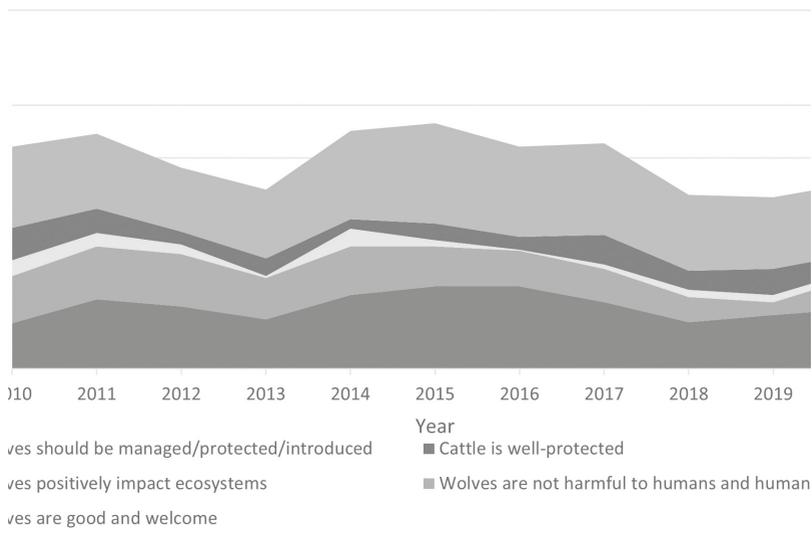


Figure: Aggregated results of positive attitudinal expressions of total publications across Germany, 2010–2020

APPENDIX E

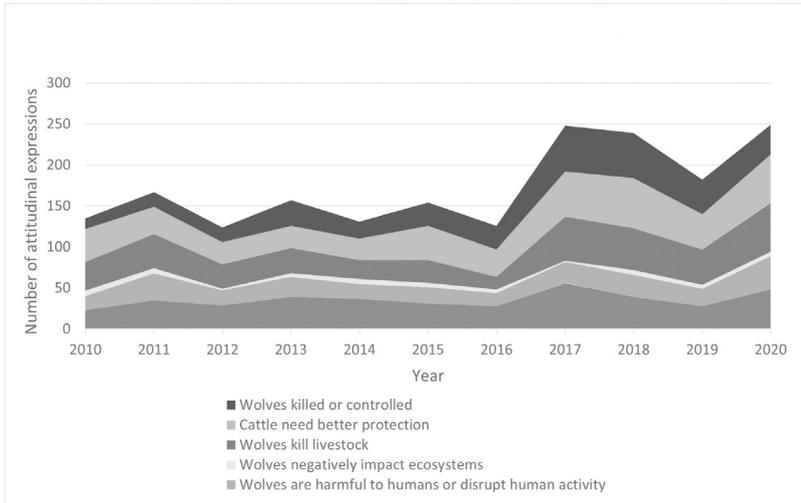


Figure: Aggregated results of negative attitudinal expressions from total publications, 2010–2020

APPENDIX F

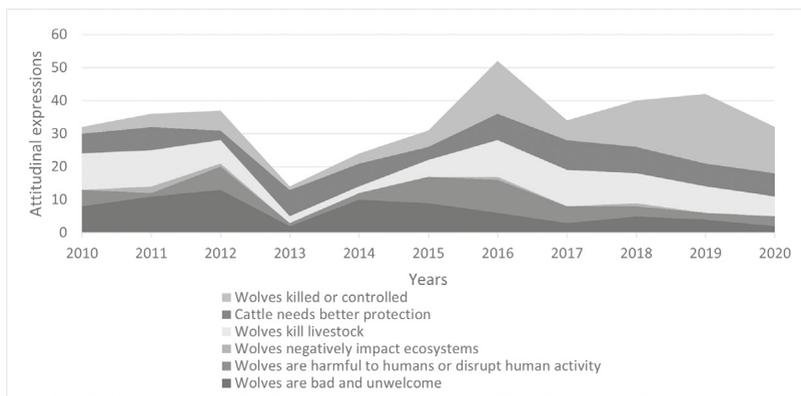


Figure: Total negative attitudinal expressions of national newspapers, 2010 to 2020

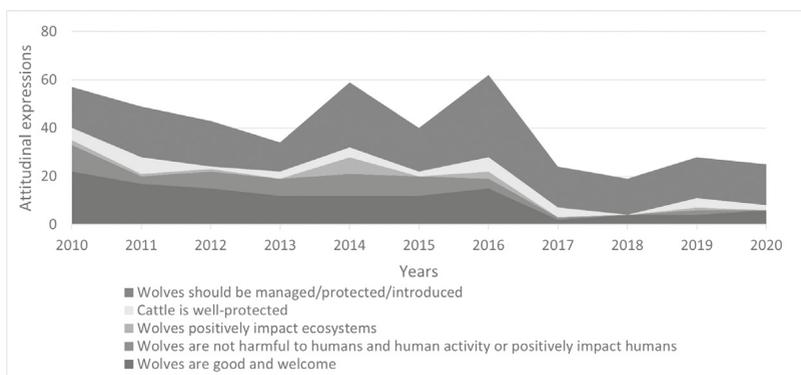


Figure: Total positive attitudinal expressions of national newspapers, 2010 to 2020

APPENDIX G

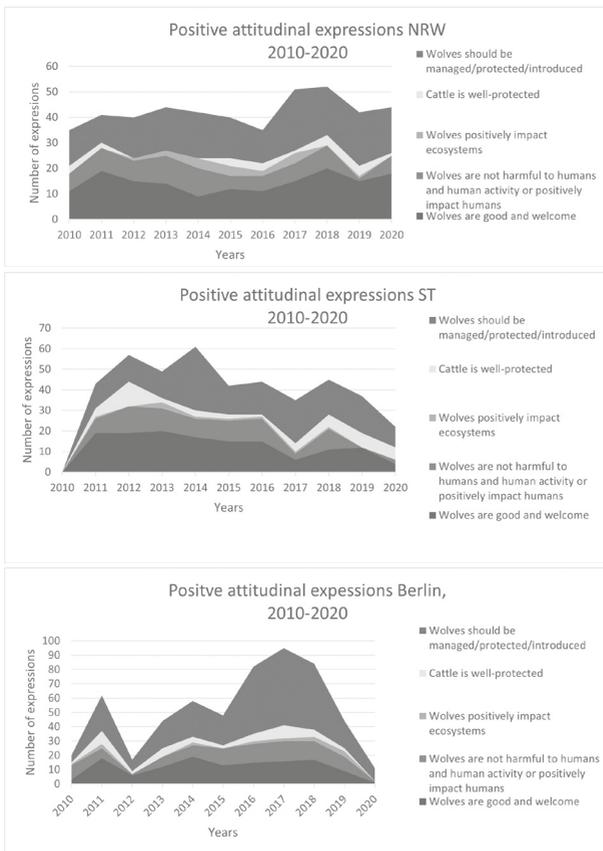


Figure: Aggregated results of positive attitudinal expressions representing the federal states of North Rhine-Westphalia (top), Saxony-Anhalt (middle) and Berlin (bottom), 2010 to 2020

Appendix G

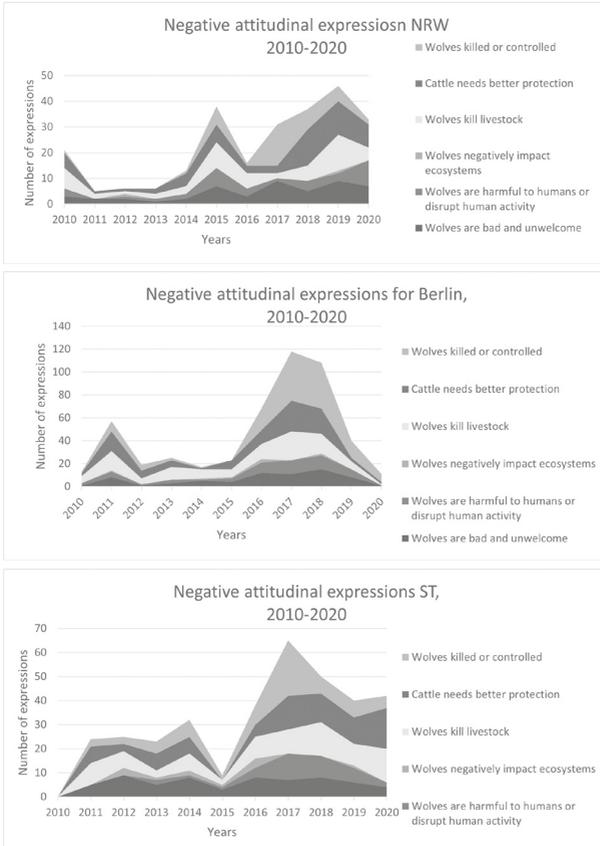


Figure: Aggregated results of negative attitudinal expressions representing the federal states of North Rhine-Westphalia (top), Saxony-Anhalt (middle) and Berlin (bottom), 2010 to 2020