

# **FRAMING THE CULL: ASSOCIATIONS BETWEEN MESSAGE FRAMING AND PUBLIC PERCEPTIONS OF DEER CULLING IN SCOTLAND**

## **Summary Methods and Results**

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## **Background**

Deer and deer management are prominent in the Scottish media, with stakeholders increasingly acknowledging the broader implications for wildlife conservation and land management. News media can have a powerful influence on how people interpret issues, particularly through mechanisms like framing. Framing refers to the way an issue is presented by emphasising or deemphasising certain elements. As such, framing can direct interpretation, shape understanding, and influence responses to issues.

Effectively framing the proposed increase in Scotland's annual deer cull to resonate more with the Scottish public could work to enhance support and mitigate potential backlash as the new legislation is considered.

### What did we do?

We conducted an online experiment to test whether members of the Scottish public perceived increasing the deer cull in Scotland to be more or less acceptable depending on message frames in mock online news articles. To do this, we presented 1,215 members of the Scottish public with mock online news articles and varied three types of frames, including: text frames, gain/loss frames, and image frames.

#### Text frames:

Scottish online news articles often place differential emphasis on certain aspects of deer culling over others. We varied the justification given (i.e., text frame) and assessed whether this influenced the perceptions of the Scottish public about the acceptability of increasing the deer cull. The text frames we used were:

- (a) protecting biodiversity (with reference to habitats, woodlands, or peatlands)
- (b) addressing climate change (with reference to carbon or carbon emissions)
- (c) promoting deer welfare (with reference to starvation during winter)
- (d) promoting human health or safety (with reference to road safety and Lyme disease).

#### Gain/loss frames:

The gain/loss frame allowed us to assess whether the perceived acceptability of increasing the deer cull varied if the same justifications (i.e., text frames) were framed as a gain or an avoided loss.

**Table 1.** *Gain/loss frames per text frames. Bold text indicates changes between sentences.*

Text frame	Gain	Loss
Protecting biodiversity	Culling more deer would <b>increase biodiversity</b> by protecting habitats such as woodlands and peatlands in Scotland.	Culling more deer would <b>reduce biodiversity loss</b> by protecting habitats such as woodlands and peatlands in Scotland.
Addressing climate change	Culling more deer would help to address climate change by <b>increasing the amount of carbon sequestered</b> in Scotland.	Culling more deer would help to address climate change by <b>reducing the amount of carbon released</b> into the atmosphere in Scotland.
Promoting deer welfare	Culling more deer would <b>improve deer welfare</b> by making more food available, so more deer avoid starvation during winter in Scotland.	Culling more deer would <b>reduce threats to deer welfare</b> by making more food available, so more deer avoid starvation during winter in Scotland.
Promoting human health and safety	Culling more deer would <b>improve human health and safety</b> by making roads safer for motorists and reducing the prevalence of Lyme disease in Scotland.	Culling more deer would <b>reduce threats to human health and safety</b> by making roads safer for motorists and reducing the prevalence of Lyme disease in Scotland.

### Image frames:

The image frame allowed us to assess whether perceived acceptability of increasing the deer cull varied with different images. This frame had two levels: (a) healthy, and (b) unhealthy (figure 1). The “healthy” image frame showed a single healthy-looking red deer (*Cervus elaphus*) with good body and coat condition, in a forest setting with diverse vegetation. The “unhealthy” image frame showed a single less healthy-looking red deer in terms of body and coat condition in a less biodiverse (i.e., ecologically degraded) hillside setting. We chose images of red deer as they are the focus of most press coverage and policy attention.

**A**



**B**



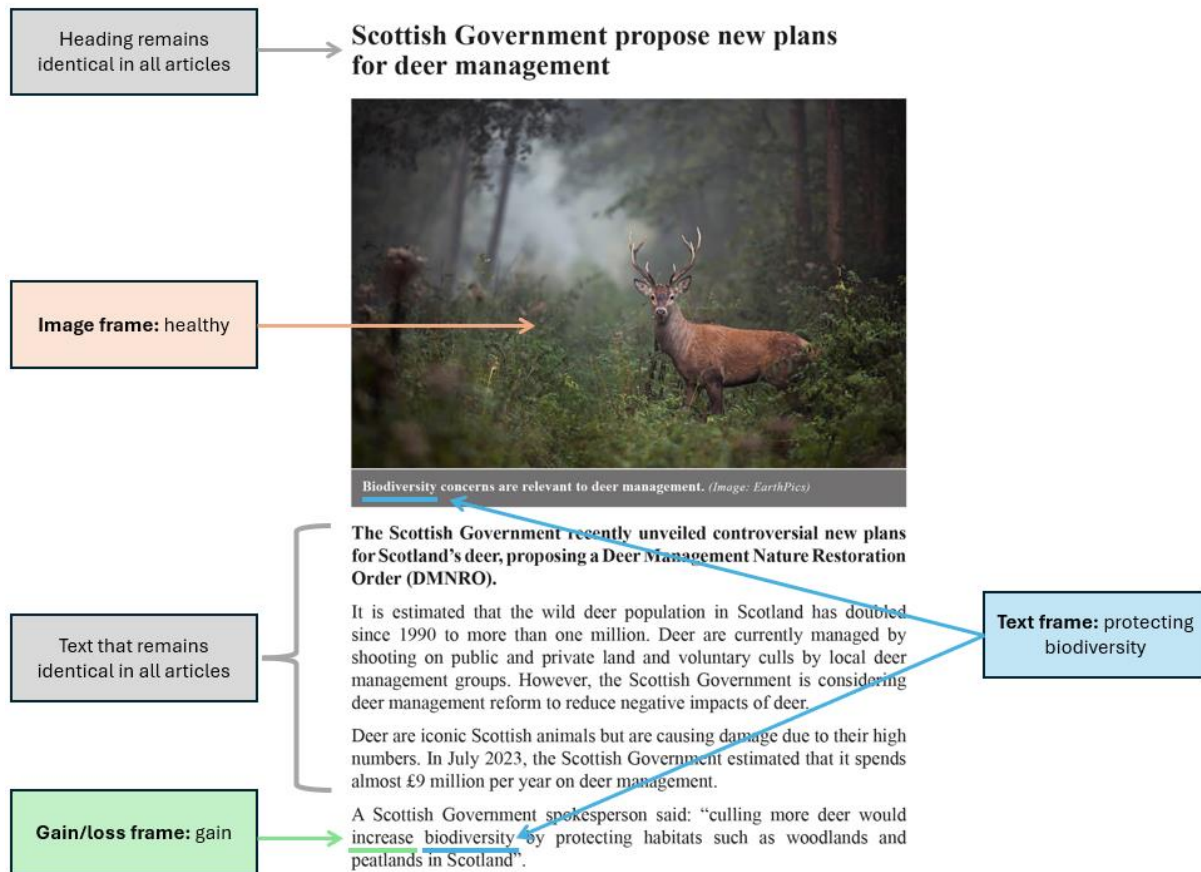
**Figure 1.** Image frames, showing (A) healthy and (B) unhealthy.

We identified the text and image frames we would test by reviewing approximately 60 recent Scottish online news articles on this topic (see Appendix 1 for list of articles), ensuring our frames were as relevant to existing news coverage as possible. We chose to test the gain/loss frames because people’s responses to an issue can be sensitive to gain or loss framings.

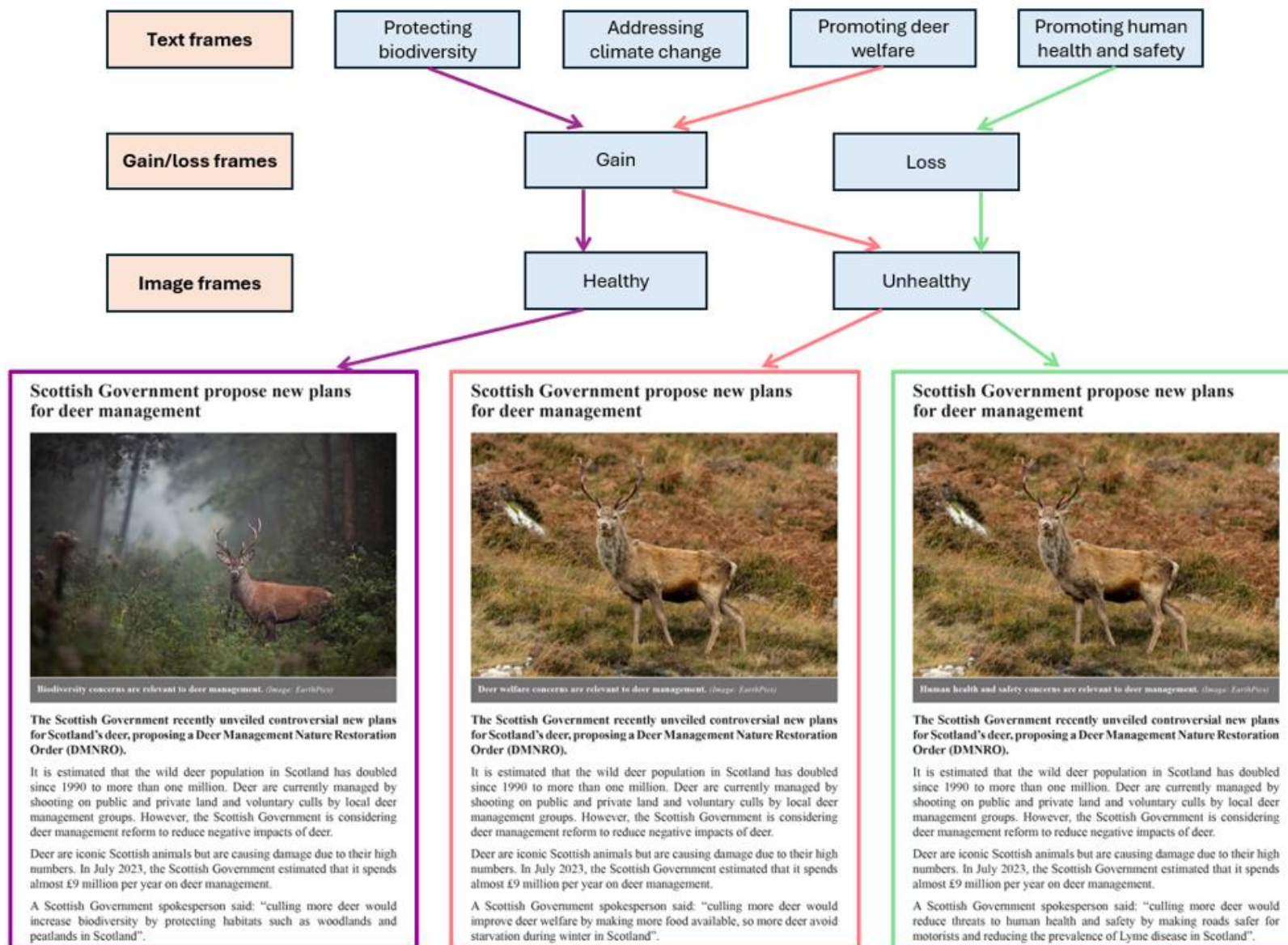
With three experimental factors (i.e., text frames, gain/loss frames, images frames) that had four, two, and two levels respectively, this resulted in 16 possible combinations of frames. Accordingly, we made 16 unique mock online news articles about deer culling, management, and legislation in Scotland (see figure 3). All mock online news articles were identical except for three framing elements we manipulated, including: one sentence of the text detailing a justification for increasing the deer cull (i.e., text frame), whether this justification was written in terms of a gain or an avoided loss (i.e., gain/loss frame), and one image (i.e., image frame) (see figure 2).

To maximise authenticity, we designed the mock online news articles to look like real online news articles; however, we were careful not to imitate the fonts, layout, or design of the 10 most popular Scottish news providers too closely, to minimise any biases that may have resulted from expectations about what certain news providers might report or existing political leanings.

We developed the mock online news articles in collaboration with a focus group of 14 staff from environmental and animal welfare organisations in Scotland and academics with expertise in deer management, conservation, social sciences, and animal welfare. The group reviewed both the frame types and the mock online news articles to confirm neutrality, accuracy, and relevance to policy considerations and communications regarding deer management in Scotland. We incorporated their feedback and suggestions into our final experimental design before we collected our data.



**Figure 2.** Example experimental condition showing the elements of the mock online news article that remained constant or varied between conditions. This example shows the protecting biodiversity text frame (blue box), the gain frame (green box), and the healthy image frame (orange box).



**Figure 3.** Full factorial design, showing 16 possible frame type combinations and three example experimental conditions.



### Sample

Between 18<sup>th</sup> July and 23<sup>rd</sup> August 2024, we hired Qualtrics to recruit a sample of 1,215 people aged 18 and over who were currently living in Scotland. To increase the external validity, we stratified our sample in terms of age, ethnicity, and gender identity, to ensure it closely reflected the diversity of the Scottish population according to the most recent Scottish Government census information. Given that 17% of the Scottish population lives in rural areas, we intentionally oversampled this group to 30% so that we could make more precise rural-urban comparisons.

### Procedure

We conducted our online experiment in the Qualtrics software. We told participants that the study aimed to “increase understanding about how people think about wildlife in Scotland”. We purposefully kept this statement broad to prevent possible priming effects before the experimental condition.

Participants were then randomly assigned to read one of the 16 experimental conditions. To maintain realism, participants were told that they were reading “an excerpt from a recent Scottish online news article” rather than a mock online news article created for the study.

The mock online news articles were designed to look and read like real online news articles; however, we were careful not to imitate the fonts, layout, or design of popular Scottish news providers too closely, to avoid any biases that may have resulted from expectations about what certain news providers might report or existing political leanings.

Subsequently, we asked participants how acceptable or unacceptable it would be to increase the deer cull in Scotland (described in the mock online news article they read), measuring whether perceived acceptability varied with different message frames.

Our experiment also measured:

- Demographic information, including:
  - o Age, ethnicity, gender identity, rural-urban (current and childhood), level of formal education, land ownership.
- Self-reported social identities, including the extent to which participants identify as:
  - o Deer stalker
  - o Animal protectionist
  - o Environmental conservationist
- General experiences and perceptions of deer in Scotland, including:
  - o Whether participants enjoy knowing that wild deer live in Scotland.
  - o How often participants see deer in Scotland.
  - o Whether participants were already aware of the annual deer cull in Scotland.
  - o Whether participants perceived the number of deer to be too high, too low, or about right.
- The extent to which participants trust the Scottish Government to make the right decisions with regards to the environment.

## What did we find?

### Finding 1: General

Overall, most participants indicated that it would be very acceptable, acceptable, or somewhat acceptable to increase the deer cull in Scotland (true across 15 out of the 16 experimental conditions) (see figure 4).

### Finding 2: Frames

The acceptability of increasing the deer cull in Scotland varied across our 16 experimental conditions, though only slightly. We were surprised to find that there were no big reversals between the frame types (see figure 4).

Increasing the deer cull was **slightly more** acceptable to participants who were shown the healthy image frame compared to the unhealthy image frame.

### Finding 3: Demographics

Increasing the deer cull was **more** acceptable to participants who identified as male compared to those who identified as female.

### Finding 4: Participant self-reported social identities

Increasing the deer cull was **more** acceptable to participants who identified more strongly as deer stalkers and less acceptable to participants who identified more strongly as animal protectionists.

### Finding 5: General experiences and perceptions of deer

Increasing the deer cull was **more** acceptable to participants who reported greater existing knowledge of the deer cull; 57% of participants indicated they were aware of the cull and 32% indicated they were not aware.

Increasing the deer cull was **more** acceptable to participants who perceived the number of deer in Scotland to be high or too high compared to about right, low or too low.

### Finding 6: Trust in the Scottish Government

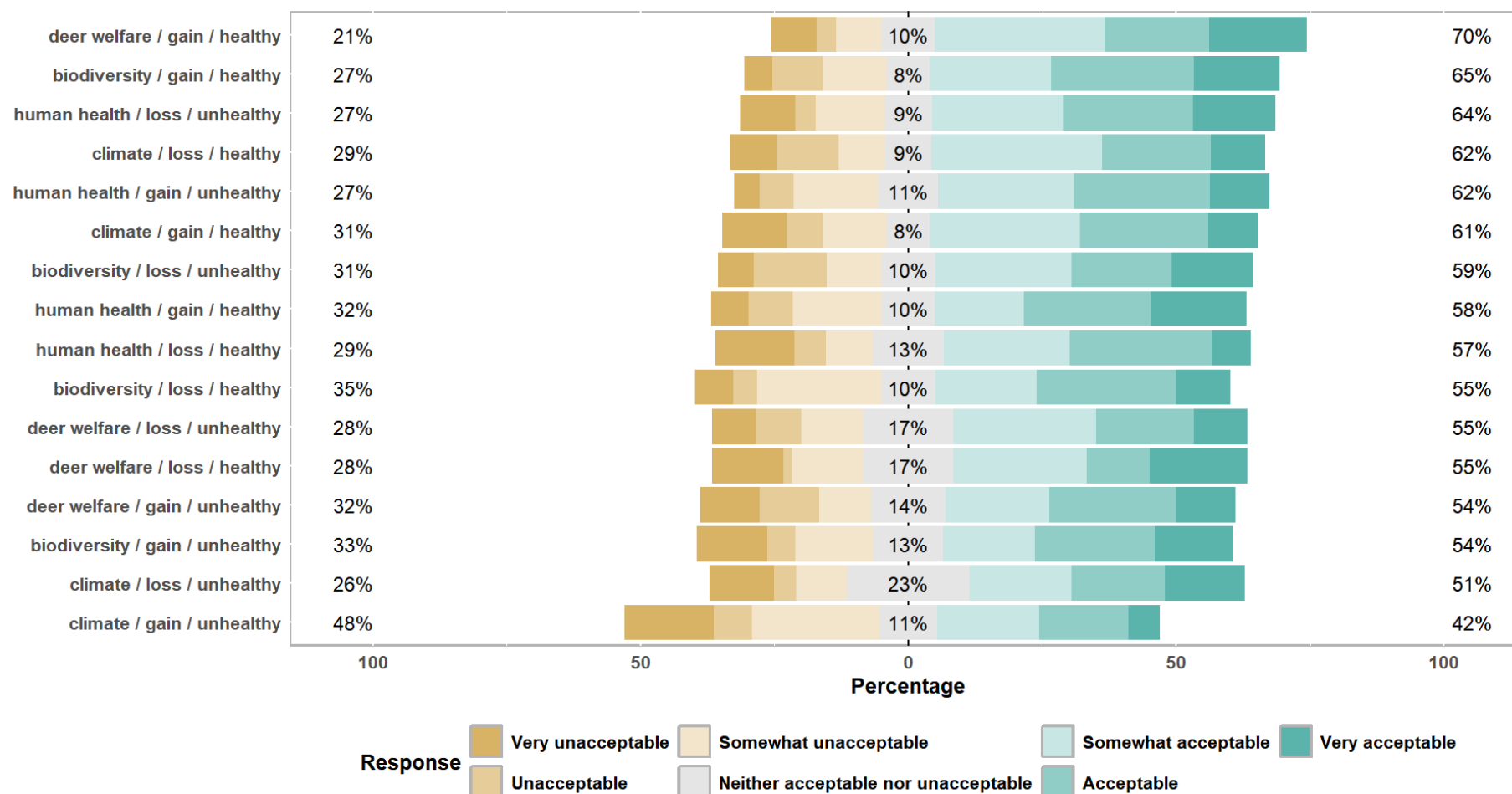
Increasing the deer cull was **more** acceptable to participants who reported a greater level of trust in the Scottish Government to make the right decisions regarding the environment.

### Finding 7: Unrelated factors

Factors that **did not** help to explain the variability in acceptability of increasing the deer cull:

- Text frame
- Gain/loss frame
- Social identity: environmental protectionist
- Whether participants enjoy knowing that wild deer live in Scotland
- Age
- Level of formal education
- Rural-urban comparisons
- Land ownership





**Figure 4.** The distribution of acceptability of increasing the deer cull across the 16 experimental conditions. The left labels indicate the frames of the respective experimental condition, formatted “[text frame] / [gain/loss frame] / [image frame]”, listed with the most acceptable condition at the top, down to the least acceptable condition. After excluding “I do not know” responses, remaining percentages show combined proportions of participants in each condition who indicated very unacceptable, unacceptable, or somewhat unacceptable (left), neither acceptable nor unacceptable (middle), or somewhat acceptable, acceptable, or very unacceptable (right). Colours show responses on the 7-point Likert scale.

## Conclusions

This study sheds new light on public perceptions surrounding a potential increase in the deer cull in Scotland. We conducted an online experiment to generate robust, up-to-date data on whether certain messages resonate differently with members of the Scottish public.

While message framing had a smaller influence than expected on the acceptability of increasing the cull, the stronger influence of image frames is particularly relevant given the rising prevalence of social and image-based media as news sources.

Participant characteristics such as gender identity, social identities, prior experiences and perceptions of deer, and trust in the Scottish Government to make the right decisions regarding the environment, were more strongly associated factors.

Effective communication strategies may consider focussing less on framing specific messages, and more on engaging with the public's pre-existing beliefs, social identities, knowledge of deer management, and trust in institutions to foster informed and supportive attitudes towards sustainable deer management.

This study provides a valuable snapshot of public perceptions and serves as an initial step in understanding how message framing influences public perceptions of deer culling in Scotland. We hope this research inspires future studies that will deepen our understanding of how to effectively communicate the complexities of sustainable deer management in Scotland.

This study was a collaboration between Scottish Environment LINK, the University of Oxford, and the University of the Highlands and Islands. It was funded by Scottish Environment LINK and the University of Oxford School of Geography and the Environment. It was reviewed by and received ethics clearance through the University of Oxford Central University Research Ethics Committee [reference: SOGE C1A 24 41].

Results in this document have not yet undergone independent peer review.

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## Appendix 1

**Table 1.** Table of all 122 relevant Scottish online news articles returned from the Nexis database search, of which we continued to review until we had reached saturation with the frames we were finding. Search criteria included national-level Scottish news coverage that dated from February 2020 onwards, which marked the release of the Scottish Government's Independent DWG Report.

Title	Publication	Date
Lorna Slater successor 'must scrap' out-of-season Scotland deer cull for animal and human welfare	The Scotsman	04/05/2024
She's happy to have blood on the hillsides, but not on her hands Gamekeepers and landowners are furious at the Scottish Government's deer culling plans.	Scottish Daily Mail	06/04/2024
Middle East negotiators called in to help defuse ... Scottish deer row!	Scottish Daily Mail	01/04/2024
Conflict experts called in to ease tensions in the countryside between gamekeepers and environmentalists	The Scotsman	31/03/2024
Oh deer, we better bring in the conflict resolution experts!	The Daily Mail	31/03/2024
Culling pregnant deer may damage our mental health, say gamekeepers	The Times	25/03/2024
Gamekeepers signal "fundamental opposition" to DMNRO proposals	The Herald	24/03/2024
Landowners could be told to cull more deer for nature protection	The Times	06/01/2024
Scottish landowners could be forced to cull deer	The Telegraph	05/01/2024
Goodwill hunting locals trained to cull deer Nature experts say shooting classes will help preserve Highland forests	Daily Record and Sunday Mail	18/11/2023
Scots being trained to shoot deer at Highland mountain reserve for woodland protection project	Daily Record	18/11/2023
Deer stalking skills taught in Scotland project on Highlands public nature reserve in first-of-its kind initiative	The Scotsman	17/11/2023
Locals enlisted to learn deer stalking skills get to keep the venison	The Herald	17/11/2023
Scotland's deer cull. Is it really about "class envy"?	The Herald	14/11/2023
Vicky Allan: Is the deer cull really about stopping the rich having their fun?	The Herald	14/11/2023
Cull deer to save forests: Experts' call in bid to restore native woods	Daily Record and Sunday Mail	03/10/2023
Hillwalkers urged to plan routes to avoid disturbing 'essential' deer culling	The Herald	20/09/2023
Cochrane's Scotland: "Declaration of war" on Scotland's red deer halted by rare rebellion	The Telegraph	15/09/2023
Plans to scrap out of season deer cull to be debated in Scottish Parliament following successful motion	The Scotsman	13/09/2023
Scotland deer management: Scottish Government policy will fail country's venison asset, says head stalker	The Scotsman	07/08/2023
John Muir Trust chief David Balharry faces misconduct inquiry	The Times	20/07/2023
Deer at RSPB's Gartocharn nature reserve to be culled to reduce impact on area	Daily Record	30/06/2023
Land managers given more power to control deer population	PA Newswire	23/06/2023
Night sight' scopes to be allowed amid deer cull changes	The Herald	23/06/2023

Off-season deer culling sparks revolt	Scottish Express	11/05/2023
Glen Coe community and wildlife trust lock horns over deer cull	The Scotsman	10/05/2023
Filth and the fury: Is Scotland's environment heading towards natural disaster?	The Herald	30/04/2023
So would the lynx REALLY be a boon for tourism... or just a snarling, spitting threat to farms and vulnerable wildlife?	Scottish Daily Mail	29/04/2023
Islanders on South Uist vote against mass red deer cull	The Herald	21/03/2023
Islanders vote down plan to cull 1,200 deer over tick fears	Scottish Express	21/03/2023
"Let's kill Bambi": Why Scotland desperately needs a deer cull	The National	19/03/2023
Deer cull on estate of 'absentee landlord' ends with 160 animals shot	The Herald	15/03/2023
160 deer culled by government body as Highland landowner fails to manage herd	The Scotsman	15/03/2023
The massacre of the monarchs of the glen Locals want to cull EVERY deer on isle because of Lyme disease	Scottish Daily Mail	08/03/2023
Highland lairds warned official hired guns will cull deer if they refuse	The Sunday Post	26/02/2023
Trossachs deer cull is necessary to protect habitats, says government agency	Daily Record	09/02/2023
The way to save Scotland's pinewoods is to apply basic ecological sense	The Herald	06/02/2023
Are Scotland's beloved red deer about to become the latest victims of the eco zealots?	Scottish Daily Mail	04/02/2023
Police called in as gamekeepers and conservation body clash over botched deer killing	The Herald	01/02/2023
Deer cull Scotland: New laws needed force landlords to cut herds	The Herald	21/01/2023
Expert calls for new law to force landlords to cull deer herds	The Herald	21/01/2023
Nature group learns of community buyout plan from pres amid dispute	PA Newswire	18/01/2023
Operation Deerhunter after estate "fails to cull"	Scottish Daily Mail	17/01/2023
Red deer set to be culled on Scottish estate due to 'absentee' owner	The Scotsman	16/01/2023
Red deer cull ordered on estate of 'absentee' landlord	The Herald	16/01/2023
Nature group and Highland community clash over deer cull	PA Newswire	11/01/2023
Gunfire at 3am and carcasses in the streets... the shocking deer cull that's torn apart Highland village sa	Scottish Daily Mail	17/09/2022
Granny's happy place the Queen in Scotland	Daily Record and Sunday Mail	11/09/2022
Perth-based national gamekeeping group warns mass cull could leave young deer to starve	Daily Record	06/09/2022
Baby deer 'face lingering death' after mums culled	Scottish Daily Mail	01/09/2022
Young deer 'could starve' if mothers shot in controversial cull	The Scotsman	31/08/2022
Young deer could starve if mothers shot in controversial cull, gamekeepers warn	The Herald	31/08/2022
Young deer could starve if mothers shot in controversial cull, gamekeepers warn	PA Newswire	31/08/2022
Managing Scotland's deer is vital to tackle climate and biodiversity crises	The Herald	26/08/2022
Scotland's approach to deer management must change - Finlay Clark	The Scotsman	23/08/2022
Forestry group trials drones to help with deer culling	PA Newswire	26/07/2022

Drones deployed to help with deer culling	The Herald	26/07/2022
Deer contracts success for Forestry and Land Scotland	The Scotsman	26/07/2022
How drones are being used to remotely spot deer herds and protect new woodlands in Scottish Highlands	The Scotsman	26/07/2022
Multi-million-pound deer culling contracts will protect forests and support jobs	The Scotsman	20/07/2022
Going wild: action call as deer numbers surge, pleas for urgent and enforced culling to protect wilderness	The Sunday Post	19/06/2022
Head of Perth-based national gamekeeping body raises jobs fears over tree planting and deer culling plans for Cairngorms	Daily Record	26/04/2022
Gamekeepers revolt over national park's plan to fight climate change with deer cull	The Scotsman	20/04/2022
Young, female and vegetarian - the face of Scottish gamekeeping is changing	The Herald	11/04/2022
Vicky Allan: Wolves could save Scotland's environment	The Herald	15/03/2022
Cull of the wild: Use wolves to control deer	Scottish Daily Mail	14/03/2022
Highlands and Grampian mountains are best places to bring back wolves to Scotland, study finds	The Scotsman	13/03/2022
It's time to develop a taste for venison - Dick Playfair	The Scotsman	27/02/2022
Vicky Allan: Has Brewdog 'lost the plot' with deer cull plan to protect trees?	The Herald	08/02/2022
Wallaby numbers to be 'controlled' on Loch Lomond island owned by broadcaster Kirsty Young	The Scotsman	24/01/2022
Chair of Perth-based gamekeeping body fears new five-year park plan could lead to job and investment losses	Daily Record	07/01/2022
Deer cull to cost £31m	Scottish Daily Mail	06/01/2022
Venison imported 11,000 miles from New Zealand	Scottish Daily Mail	29/12/2021
Cull to target 185,000 deer	Scottish Daily Mail	13/12/2021
200,000 deer to be killed off in quango cull	Scottish Mail on Sunday	12/12/2021
Robert McNeil: Sometimes we have to shoot things. It's for their own good, you know	The Herald	20/11/2021
Are red deer a pest or the pride of Scotland?	The Herald	13/11/2021
Wildlife photographer slams deer policies which reduce the animal "to a pest"	The Herald	12/11/2021
NatureScot: Root and branch approach to restoring our rainforest	The Herald	26/10/2021
Let hunters shoot deer on public land'	Scottish Daily Mail	25/09/2021
Deer cull call - plea to let amateurs hunt on state-owned property	Daily Record and Sunday Mail	25/09/2021
Call for recreational hunters to shoot deer on Scotland's public land as part of annual cull	The Scotsman	24/09/2021
Letters: Scottish Government inactivity will be terminal for the NHS as we know it	The Herald	02/09/2021
Keeper anger at hind cull	Scottish Star	02/09/2021
Anger over off-season deer cull to save trees	Scottish Express	02/09/2021
Gamekeepers 'sickened' by Scottish Government agency's 'unjustified' deer cull	The Herald	01/09/2021
40,000 deer to be shot in cull	Scottish Daily Mail	28/08/2021
Deer will be culled to save the forests	Daily Record and Sunday Mail	28/08/2021

Let gamekeepers be Zero heroes	Scottish Express	11/08/2021
Are these the latest victims of the trendy "rewilding" craze?	The Daily Mail	01/06/2021
Heartbreaking photos show unborn deer lying next to dead mother in Scots forest after shooting	Daily Record	14/05/2021
Plans to make culling Scotland's deer as easy as shooting rats in a barrel are grotesque and unethical – Ross Ewing	The Scotsman	07/04/2021
500,000 That's number of deer 'that need culled across Scotland'	Scottish Daily Mail	25/03/2021
Culling of pregnant deer ruled out by Scottish Government	The Herald	24/03/2021
Culling of pregnant deer ruled out by Scottish Government	The Herald	24/03/2021
Low-fat, tasty and in abundance... Scots urged to eat more venison	The Herald	22/03/2021
A clear outlook on how to maintain balance of nature	The Herald	16/03/2021
Rural workers protest Scottish Government over policies for the countryside	The Scotsman	16/03/2021
A clear outlook on how to maintain balance of nature	The Herald	16/03/2021
Scots venison donated to London food banks amid drop in restaurant demand	The Herald	03/03/2021
Questions raised over government agency's cull of 1300 deer	Daily Record	02/03/2021
Why we must use our full capacity and allow the asymptomatic to be tested	The Herald	29/01/2021
National pledge to plant five trees for every Scot in 2021	The Scotsman	28/01/2021
They shoot deer, don't they? Scotland's culling controversy.	The Herald	27/01/2021
Primary school children should repeat year - Readers' Letters	The Scotsman	21/01/2021
Lynx effect: Reintroducing extinct predator to Scotland may have benefits but are we ready for big cats roaming free? – Scotsman comment	The Scotsman	20/01/2021
Cull calls ignore deer importance	The Times	03/01/2021
Scottish environmental groups make new call for red deer cull, as numbers rise	The Times	27/12/2020
Deer cause 40 accidents a day on our roads	Scottish Daily Mail	23/12/2020
Road accidents involving deer increase by 35 percent: Nearly 1800 accidents	The Scotsman	22/12/2020
Scottish panoramas the iconic red deer of Glenshee	The Herald	06/12/2020
Fears over impact of Covid on deer herds and venison industry	The Scotsman	15/11/2020
A rewilding dream...or just HOWLING AT THE MOON Their fearsome cries last echoed in Scotland's glens more than 200 years ago. Now, despite furious opposition, there's growing support for plans to reintroduce the wolf...	Scottish Daily Mail	24/10/2020
BambiGate row sees Scots rangers refuse to shoot deer amid animal cruelty fears	Daily Record	11/10/2020
SNP quango makes £500k from hunting 'Hypocrisy' after Sturgeon condemned the sport	Scottish Mail on Sunday	24/05/2020
Scotland needs to follow a much more rigorous policy of culling red deer	The Herald	13/03/2020
Big bucks for firm in £13m deer deal	Daily Record and Sunday Mail	08/03/2020
We need to shoot more monarchs of the glen, Ma'am... Balmoral estate urged to cull deer to help climate	Scottish Daily Mail	29/02/2020



Queen urged to cull more deer at Balmoral to help environment	The Herald	28/02/2020
Deer and present danger monarch told to kill more balmoral stags	Daily Record and Sunday Mail	23/02/2020
Queen in firing line for deer cull failure at Balmoral as number rocket	Daily Record	23/02/2020