

The short and long-term impacts of disruptive animal rights protest

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Executive summary

Animal Rising (AR), a prominent animal rights activist group in the UK, disrupted the UK's biggest horse race, the Grand National. We evaluated the impacts of the protest with nationally representative longitudinal and cross-sectional polls, a controlled vignette study, media analysis, and mobilisation analysis.

- Immediately after the protest, respondents' awareness of the protest was linked with more negative attitudes towards animals. Similar negative effects of three kinds of disruptive animal rights protests were found using a vignette paradigm.
- Six months after the protest, respondents' awareness of the protest was no longer linked to their attitudes towards animals.
- Simple cross-sectional before vs after analyses using two additional independent representative samples indicated that attitudes towards animals have improved in the UK over these six months.
- At the same time, there was a sharp increase in media and public attention, direct donations and sign-ups.
- Different media outlets and the varying narratives they used had a strong effect on how supportive people felt towards the animal rights activists.

This evaluation thus documents the various impacts of disruptive animal rights protests. It suggests that although highly disruptive and unpopular protest tactics may have demonstrable negative impacts on public opinion in the short term, these effects do not last and the protests also help mobilise the movement. Indeed, this initial, strongly emotional backfire effect might pave the way for a shift in how society thinks about animals.

Introduction

Factory farming produces almost all of the animal products that humans consume. Activists have long criticised the practices typically used in factory farming for two main reasons: first, animal farming is one of the largest contributors to CO₂ and methane emissions and therefore to climate change (Costa Jr et al., 2022; Reisinger et al., 2021; Scarborough et al., 2014); second, factory farming uses inhumane practices that most people would not consider humane. In addition, given decades of research documenting high levels of animal intelligence and sentience (Lifshin, 2022; Proctor, 2012), animal rights activists have also criticised the use of animals for entertainment. Animal Rising's (AR) goal is to make people question our relationship with animals, especially those we eat and use for entertainment. AR is calling for a plant-based food system that would replace the fishing and farming industries which have come under fire for animal cruelty and environmental harm (Anomaly, 2015; Blattner, 2020; Reisinger et al., 2021).

To protest animal exploitation and spark a national debate on this issue, Animal Rising (AR) carried out a series of disruptive protests in 2023. One of the biggest was at the Grand National horse race in April 2023, when AR activists went onto the course and caused a delay to the start of the race, triggering substantial media attention. The Grand National (GN) is the UK's most popular and prestigious horse race. Compared to other races, the GN is particularly dangerous. It is a long steeplechase race, and steeplechases in general cause an estimated 6 in 1000 horses to die. Two horses died at the 2023 GN race. Targeting the GN thus fits with AR's overall goal to raise awareness of the ways in which society exploits and harms animals.

There is controversy regarding the effectiveness of these kinds of disruptive protests. While some studies suggest positive impacts in the form of a positive radical flank effect (Dasch et al., 2023; Simpson et al., 2022; Ostarek et al., submitted), increased environmental concern (Kenward & Brick, 2023), or increased willingness to act (Özden & Glover, 2022), other studies find negative public opinion impacts (Feinberg et al., 2020; Menzies et al., 2023). Two recent high-powered studies on disruptive climate protests indicate that the more radical a protest, the greater the decrease in support for the activists' demands (references not yet available¹). However, a significant shortcoming of previous studies is that they measure only immediate effects. The long-term public opinion impact of disruptive protests remains unclear. Studies which only consider public opinion also miss out on important additional paths of impact, such as heightened media attention and increased

¹ These are unpublished studies of which we have reviewed pre-prints.

mobilisation. To shed light on these issues, the present study investigated short-term (a few days after) as well as long-term (6 months later) effects of the Grand National (GN) protest, it assessed how the media respond to major disruptive animal rights protests, and investigated how the protests affected direct donations and sign-ups.

Methodology

To assess the GN protest's short- and long-term public opinion impacts, we conducted nationally representative polls before, immediately following, and six months after the protest. Our analyses focused on people's responses to questions about their attitudes towards animals. Our [pre-registration](#) focused on the following questions:

- 1) *In the past week, how often did you think about issues relating to animal welfare, animal rights or the treatment of animals for food or entertainment? (5-point Likert scale²)*
- 2) *To what extent do you disagree or agree with the following statements? (7-point scale, the composite average score of both items was used for analysis)*
 - i) *Society has a broken relationship with animals.*
 - ii) *Society needs to change the way we treat animals used for food.*
- 3) *How morally acceptable or unacceptable do you find the use of animals for entertainment? For example, think of horses used for horse racing. (7-point scale)*

The main analyses below focus on these variables, and additional exploratory analyses (which are always marked as such) address further questions of interest. The longitudinal analyses below sampled attitudes towards animals over time in the same group of people. They focused on the direct link between awareness of the GN protest or of AR and attitudes towards animals. Additional cross-sectional analyses looked at the overall change in people's attitudes towards animals before and six months after the protest without linking them to the protest.

In addition to the public opinion polls, we conducted a controlled experiment in which participants were randomly assigned to different experimental conditions. They either read vignettes about different types of AR protests or a control text about fashion. This

² Likert scales are rating scales used to measure people's opinions or attitudes. In response to a question, participants usually have five or seven answer statements ranging from "Strongly disagree" to "Strongly agree" or similar. For statistical analysis, these are often translated into numbers, such that "Strongly disagree" might correspond to a 1 and "Strongly agree" to a 7.

experiment had two goals: first, to assess whether different types of protest and messaging strategies affect people's attitudes towards animals, and second, to allow us to evaluate whether effects observed in the context of the real-world GN protest can be replicated in a controlled setting.

We also conducted media analyses to assess the protest's media impact and investigate the link between how different media outlets' reporting of the protest affects people's views on AR's actions. Finally, we conducted mobilisation analyses looking at sign-up numbers and donations to assess the broader impact of the GN protest on momentum in the animal rights movement beyond public opinion.

Results

Awareness of the protest is linked with negative effects on attitudes towards animals immediately afterwards

We first used data from a nationally representative sample ($N = 1720$) collected before and immediately after the GN protest to assess the protest's immediate public opinion impacts. This was to try to establish a direct link between people's knowledge of the protest and potential changes (before vs after) in their attitudes towards animals. We used ordinal and linear Bayesian regression analyses (see the [Methods section](#) for details) to test how changes in people's attitudes towards animals were affected by a) changes in people's awareness of AR (before vs after the protest) and b) people's awareness of the GN protest³.

Our first analysis looked at how changes in awareness of AR/awareness of the GN protest related to how much respondents said they had thought about animal rights/welfare issues. Increased awareness of AR (estimate=0.16, 95% CrI [0.12, 0.20]) and awareness of the GN protest (estimate=0.13, 95% CrI [0.08, 0.17]) were associated with increased thoughts about issues relating to animal rights/welfare (relative to before the protest), suggesting that the protest succeeded in drawing attention to this topic. Next, we evaluated changes in the composite score, measuring the extent to which people agreed that society has a broken relationship with animals and needs to change how we use animals for entertainment (the composite score is simply the average of the two). Counterintuitively, increased awareness of AR was associated with lower values on the composite score (estimate=-0.08, 95% CrI [-0.13, -0.04]), as seen in Panel B of Figure 1. Similarly, higher awareness of the GN protest was associated with lower scores on this measure (estimate=-0.06, 95% CrI [-0.09, -0.01]), seen in Panel E. Analyses on the individual items making up the composite score found very similar effects.

³ The second measure is useful because some people might have been aware of the protest without having heard (or remembered) the name "Animal Rising". The first measure is useful for a more technical reason: awareness of AR could be assessed before and after the protest, hence allowing us to calculate a change score.

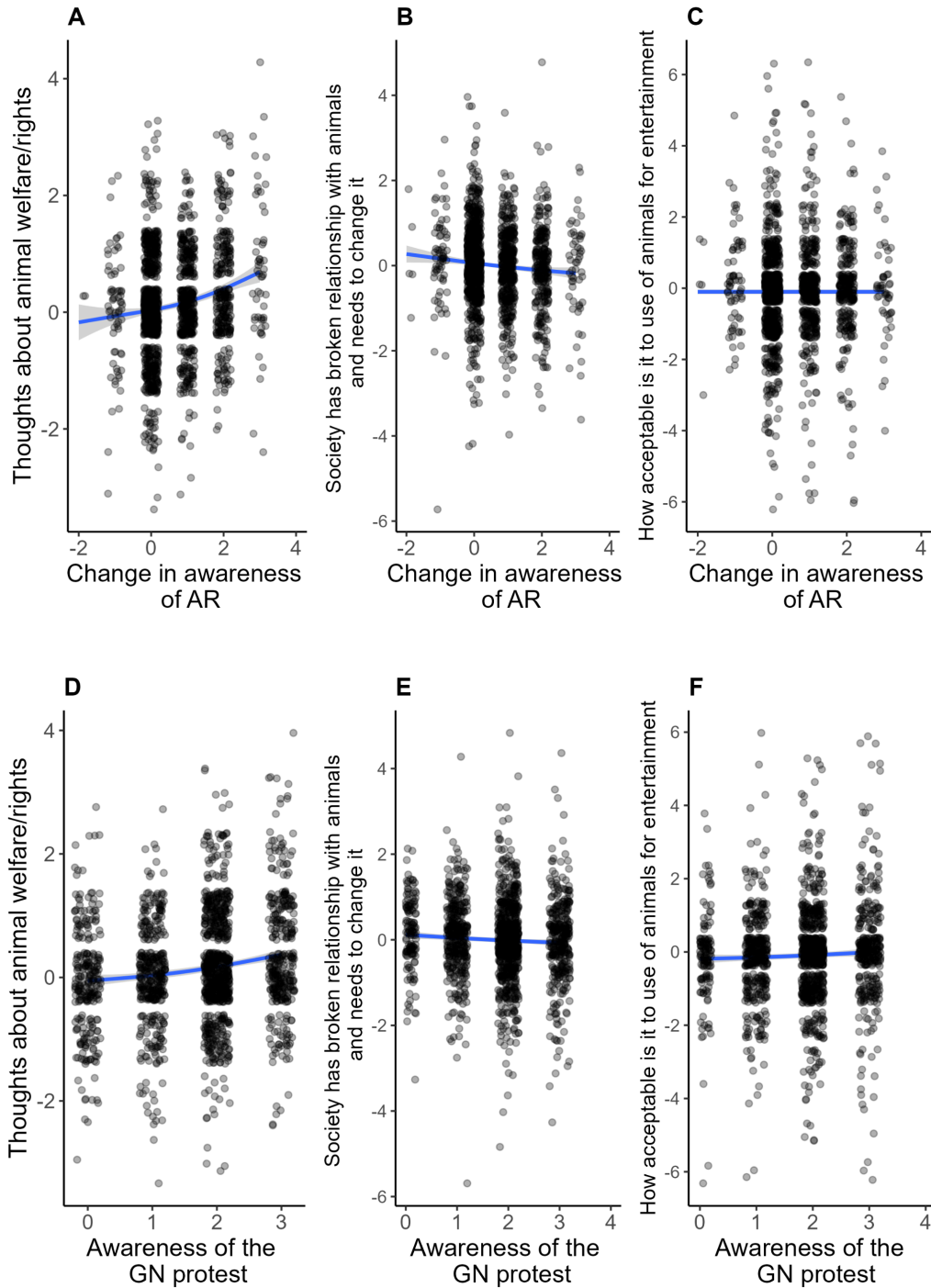


Figure 1. Immediate effects of the GN protest.

Top panel: Increased awareness of AR after the GN protest is associated with increased thoughts about animal welfare/rights issues (A), decreased agreement that society has a broken relationship with animals and needs to change how we treat animals used for entertainment (B); was not associated with how morally acceptable people considered using animals for entertainment (C).

Bottom panel: Higher awareness of the GN protest is associated with increased thoughts about animal welfare/rights issues (D), decreased agreement that society has a broken relationship with animals and needs to change how we treat animals used for entertainment (E); increased agreement that it is morally acceptable people considered using animals for entertainment (F).

There was no evidence of an association between increased awareness of AR and change in how morally acceptable people found the use of animals for entertainment (estimate=0.02, 95% CrI [-0.05, 0.08]). Higher awareness of the GN protest was, however, associated with an increase in how morally acceptable people considered the use of animals for entertainment (estimate=0.09, 95% CrI [0.02, 0.15]). Further exploratory analyses indicated that higher awareness of the GN protest was associated with lower agreement that society needs to change how we use animals for food (estimate=-0.06, 95% CrI [-0.12, -0.01]) and with more negative attitudes towards vegans/veganism (estimate=-0.04, 95%CrI [-0.07, -0.001]). No effects were seen for a number of additional measures, including support for bans on horse racing and factory farming (see the full list of questions in the [Supplementary Information](#), henceforth "SI").

Our results suggest, therefore, that immediately after the protest, exposure to the GN protest was generally associated with worsened attitudes towards animals. We also conducted an experiment using a vignette design that measured the effect of reading about disruptive animal rights protests on attitudes towards animals. This was a way to see whether the public opinion effects reported above are part of a more general pattern, as opposed to an idiosyncratic finding due to particular features of this specific protest. The results suggest that three types of disruptive protest (horse race disruptions similar to the GN, open rescues of sheep, and KFC drive-thru blockades) produce similar negative effects relative to a control condition (see the [SI](#) for details). **Thus, real-world and controlled experimental data suggest that disruptive animal rights protests tend to have negative effects on people's attitudes towards animals when measured immediately after hearing about the protest.**

Negative attitudes due to the protest do not persist

A crucial question is whether these negative immediate public opinion effects persist. We assessed the longer-term public opinion impacts by inviting the respondents who completed the poll before and immediately after the protest back six months later. This allowed us to test whether people who knew more about AR/the GN protest when it happened still showed similar negative attitudes six months later. To recap, immediately after the GN protest, awareness of the GN protest was associated with 1) lower agreement that society has a broken relationship with animals, 2) lower agreement that society needs to change how we treat animals used for entertainment, 3) lower scores on the aggregate score combining the previous two items, 4) lower agreement that society needs to change

how we treat animals used for food, 5) worse attitudes towards vegans/veganism. Similarly, immediately after the protest, increased awareness of AR was associated with 1) lower agreement that society has a broken relationship with animals, 2) lower agreement that society needs to change how we treat animals used for entertainment, and 3) lower scores on the aggregate score combining the previous two items.

The main finding of our [pre-registered](#) long-term follow-up is that six months after the protest, we no longer see a negative association for any of these measures. Fig. 2 below shows that for all variables where attitudes were found to be negatively affected immediately after the protest (the ones where the grey bells are firmly in the negative, indicating that the model estimates the probability to be high that the effect was negative) moved close to zero (the purple bells overlap considerably with zero, indicating that the model estimates the probability to be low that the effect differs from zero). The figure shows this only for effects linked with awareness of the GN because this is where more of the immediate effects were observed. Results are very similar for effects linked with changes in awareness of AR (see the corresponding plot in the [SI](#)).

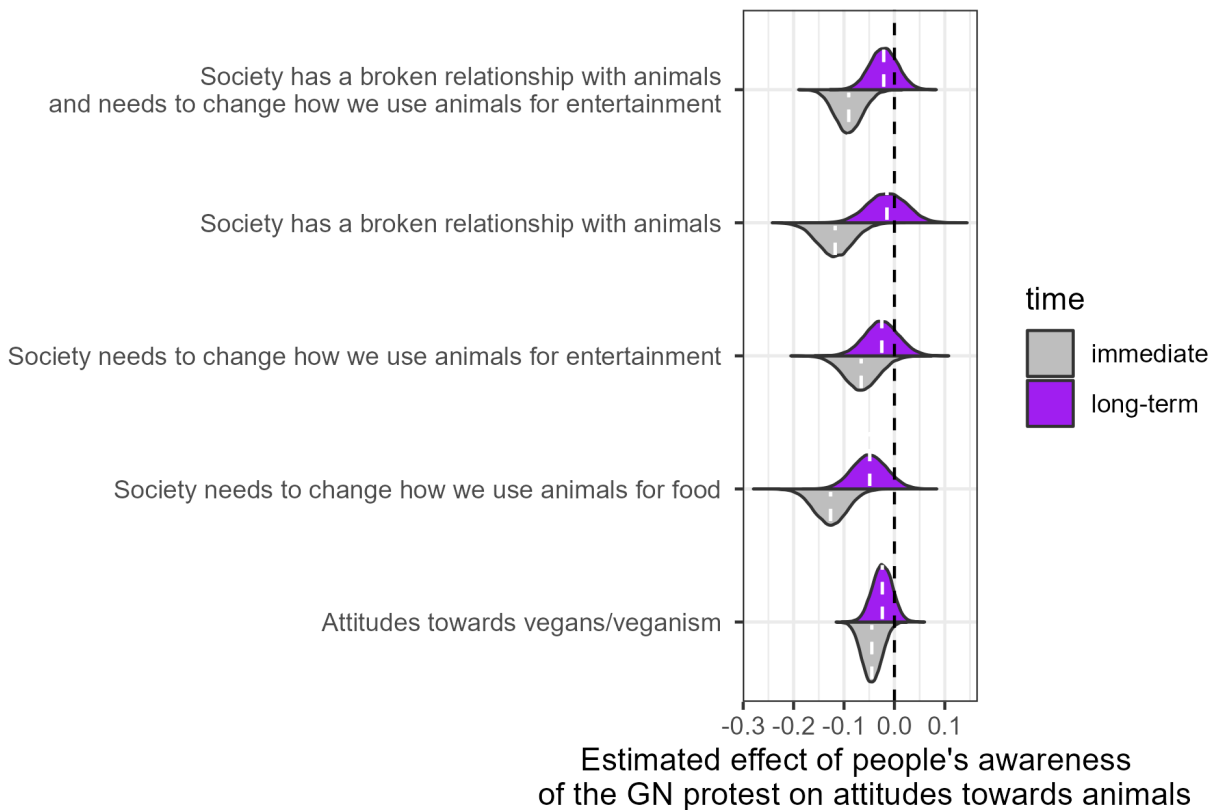


Figure 2. Short vs. long-term effects. Association between awareness of the GN protest and changes in people's attitudes towards animals immediately after (grey) and six months after the GN

(purple) relative to before the protest. The plot shows the posterior probability densities of the Bayesian regression models. The white dashed line reflects the estimated means. All variables were coded such that negative values indicate less favourable attitudes towards animals.

For all items where there was a robust negative effect or a trend towards one, the estimates have shifted towards – and do not differ statistically from – zero. This is particularly striking for the composite score combining the items asking people whether society has a broken relationship with animals and the one asking them whether society needs to change the way we use animals for entertainment, where the immediate effect was quite strong⁴ and then moved very close to zero six months later⁵. This appears to be driven to a larger extent by the item asking whether society has a broken relationship with animals⁶, and to a lesser extent by the second⁶ item asking whether society needs to change how we treat animals used for entertainment⁷. **Overall, the evidence suggests that six months after the protest the extent to which a person was aware of the protest no longer predicts their attitudes towards animals.**

The initial negative link between the GN protest and people's attitudes towards animals vanished. This pattern also holds for the extent to which participants said they had thought about issues relating to animal rights/welfare in the past week⁸. Therefore, it seems that any public opinion impacts that could be directly related to exposure to the GN protest were fleeting and are no longer visible six months later, even ones that were very strong initially.

⁴ effect of awareness of the GN: estimate=-0.09, 95% CrI [-0.14, -0.04]; effect of changes in awareness of AR: estimate=-0.12, 95% CrI [-0.17, -0.06]

⁵ effect of awareness of the GN: estimate=-0.02, 95% CrI [-0.08, 0.03]; effect of changes in awareness of AR: estimate=-0.02, 95% CrI [-0.08, 0.03]

⁶ effect of awareness of the GN: immediate effect: estimate=-0.12, 95% CrI [-0.19, -0.05], long-term effect: estimate=-0.02, 95% CrI [-0.09, 0.06]; effect of changes in awareness of AR: immediate effect: estimate=-0.14, 95% CrI [-0.21, -0.07], long-term effect: estimate=-0.08, 95% CrI [-0.15, 0.01]

⁷ effect of awareness of the GN: immediate effect: estimate=-0.06, 95% CrI [-0.14, 0.003], long-term effect: estimate=-0.02, 95% CrI [-0.09, 0.04]; effect of changes in awareness of AR: immediate effect: estimate=-0.09, 95% CrI [-0.17, -0.03], long-term effect: estimate=-0.03, 95% CrI [-0.4, 0.10]

⁸ effect of awareness of the GN: immediate effect estimate=0.13, 95% CrI [0.08, 0.18], long-term effect estimate=0.03, 95% CrI [-0.03, 0.08]; effect of changes in awareness of AR: immediate effect estimate=0.19, 95% CrI [0.14, 0.24], long-term effect estimate=0.04, 95% CrI [-0.01, 0.09]

Attitudes towards animals have improved overall

All results so far concern changes in a given person's attitudes towards animals relative to the extent to which they were aware of the GN protest/AR. This analysis allows us to capture the primary effects of exposure to the protest. However, it is also important to evaluate how attitudes have changed overall, regardless of the extent to which people were aware of the protest. To measure overall changes in attitudes towards animals, we compared the responses of two separate representative groups: one group completed the survey just before the GN protest, and the other completed it six months after. Simple cross-sectional comparisons show that people's attitudes towards animals have become more positive over this time (see Fig. 3). For several measures the Bayesian analysis indicates substantial support for a positive shift. In particular:

- People indicated thinking more about animal rights/welfare issues six months after compared to before the GN protest (estimate=0.16, 95% CrI [0.10, 0.23])
- People agreed more that society has a broken relationship with animals and needs to change how we treat animals used for entertainment (composite score; estimate=0.20, 95% CrI [0.12, 0.27])
- Similar results were seen for the two individual items making up the composite score, see Fig. 3)
- People agreed more that society needs to change how we treat animals used for food (estimate=0.13, 95% CrI [0.06, 0.19])
- People considered it more morally unacceptable to use animals for food (estimate=0.07, 95% CrI [0.002, 0.13])

Additionally, there was a trend for people also finding it morally more unacceptable to use animals for entertainment (estimate=0.05, 95% CrI [-0.02, 0.12]), whereas attitudes towards vegans have remained unchanged.

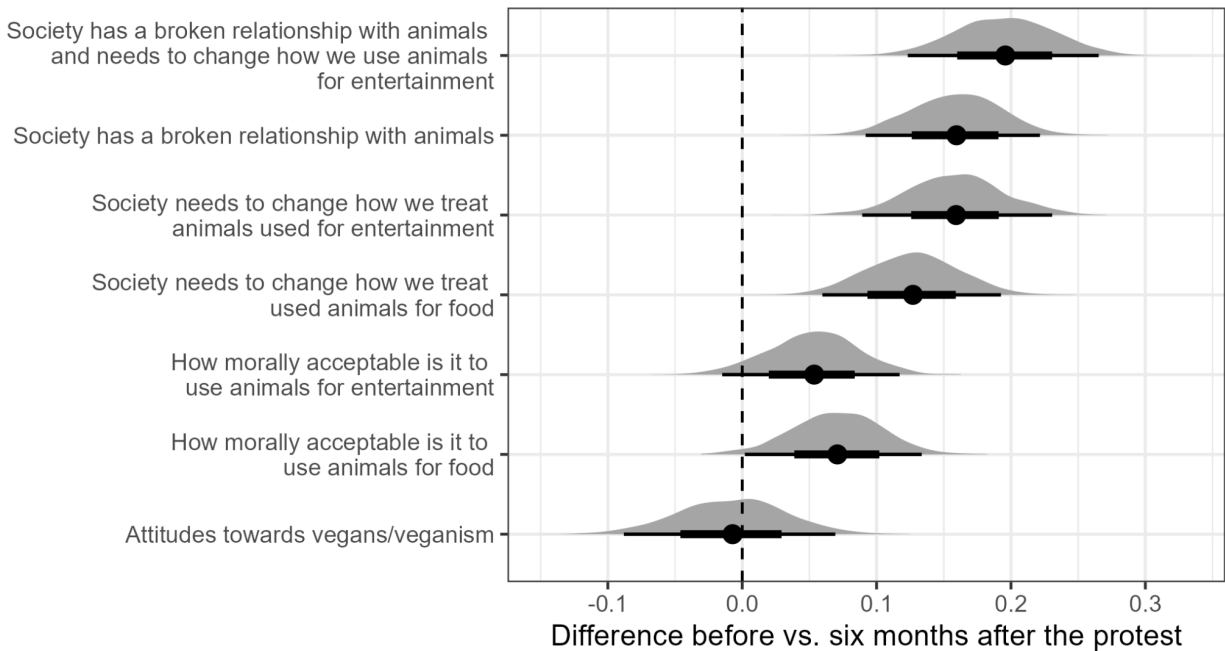


Figure 3. Dots represent the model estimates for the changes in responses before vs. six months after the GN. The thin and thick lines show the 95% and 66% CrIs, respectively, overlaid with the posterior probability densities of the estimates. The black vertical dashed line shows the zero line reflecting no difference before vs. after. Positive numbers indicate more favourable attitudes six months after compared to before the GN protest.

To give a sense of the magnitude of the changes, we used the Bayesian model fits to recover and plot estimated mean Likert scores⁹ (see Fig. 4). The largest changes were around 0.2 points on the Likert scale, which one can think of as one in five people six months after the protest choosing an answer that is one level more favourable than before the protest, for example “strongly agree” over “agree”, or “somewhat agree” over “neither disagree nor agree”. Whether one considers these changes large or small in the grand scheme of things, they are very consistent, pointing towards reliable improvements in people’s attitudes towards animals in the UK, apparently without corresponding changes in attitudes toward veganism/vegans.

⁹ See footnote 1 for explanation.

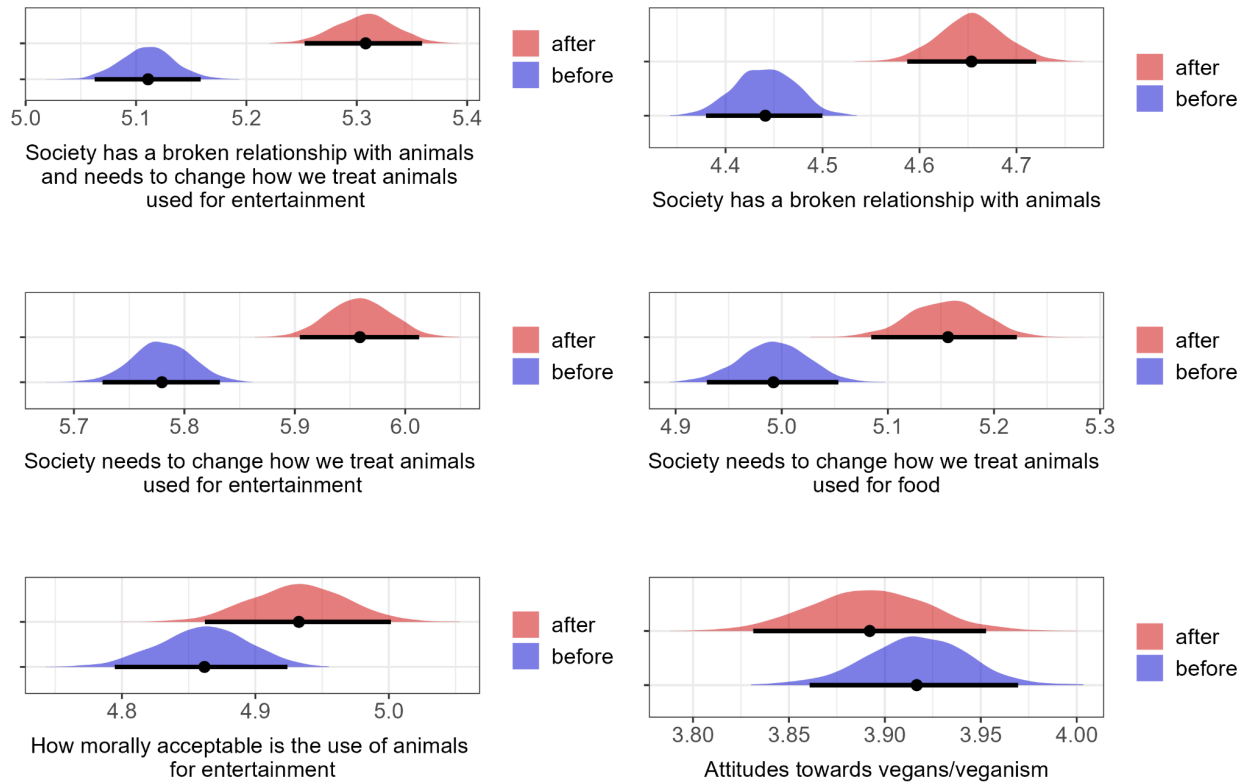


Figure 4. Predicted average Likert scores from 1-7 (represented by dots) for each variable of main interest, estimated from the sample 1 Bayesian models' posteriors, along with 95% credible intervals and posterior densities (blue: before the GN, red: six months after). Note that the results using the sample 2 data look almost identical (not shown here for brevity).

In addition to the main variables of interest, which reflect people's general attitudes towards animals, we also assessed people's support for four kinds of bans: a ban on horse racing, on animal testing, on factory farming and on all animal farming (see Fig. 5). For the first three bans we observed a trend towards increased support, which was statistically robust only for a ban on animal testing, whereas support for a ban on all animal farming barely changed. Combined with the finding above that people increasingly agree that society needs to change how we treat animals, this hints at a slightly increasing readiness for policy changes that protect animals (i.e. shifts in the [Overton Window](#)).

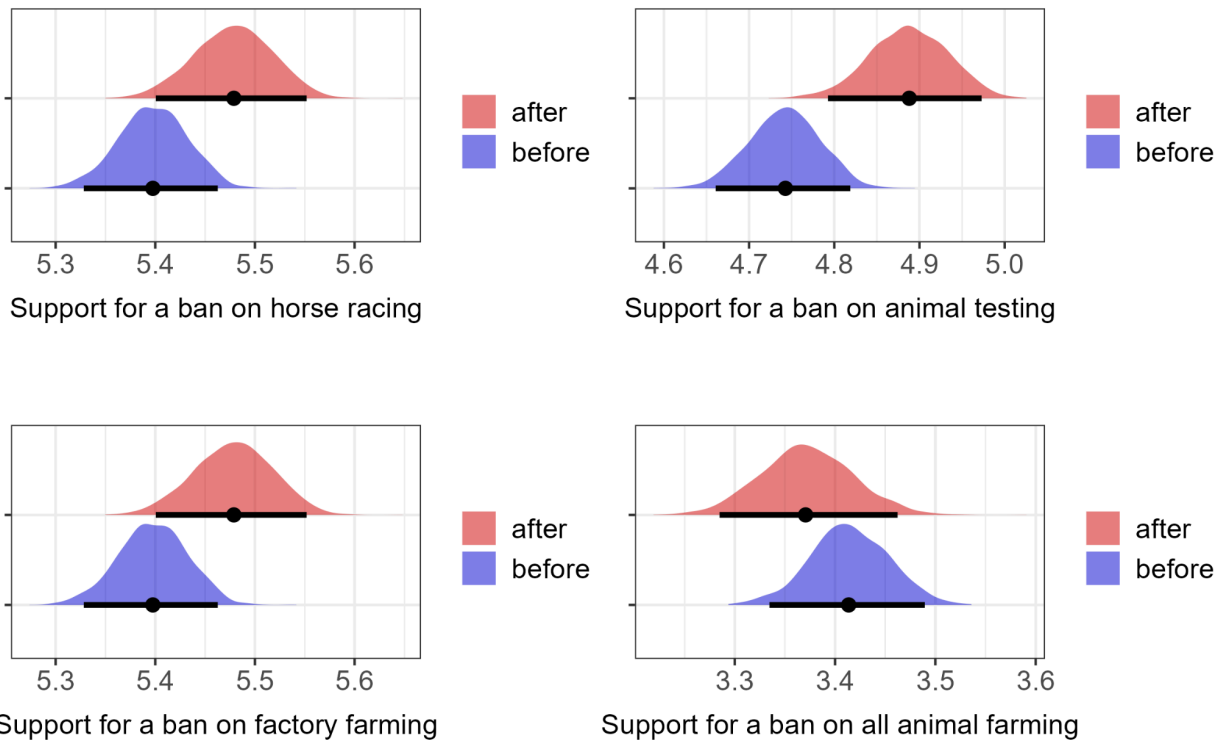


Figure 5. Predicted average Likert scores from 1-7 (represented by dots) for the items measuring support for four different bans, estimated from the Bayesian models' posteriors, along with 95% credible intervals and posterior densities (blue: before the GN, red: six months after).

All the cross-sectional analyses were confirmed with an additional nationally representative sample that was collected before the protest, which was compared to the same sample collected six months later. Results (presented in the [SI](#)) replicate all the findings above, suggesting that the overall changes we describe are very robust.

The Grand National protest enhanced media attention and mobilisation

The GN protest triggered large-scale media attention. A simple media analysis looked at the frequency with which "Animal Rising" was mentioned in news articles (see Figure 6). The group had no (or very few) mentions before the protest, but numbers rose to hundreds per day when the protest occurred. In April, AR spokespeople were invited to 61 TV interviews, seen by millions of people; by contrast, in Jan-March, they did a total of 9 interviews.

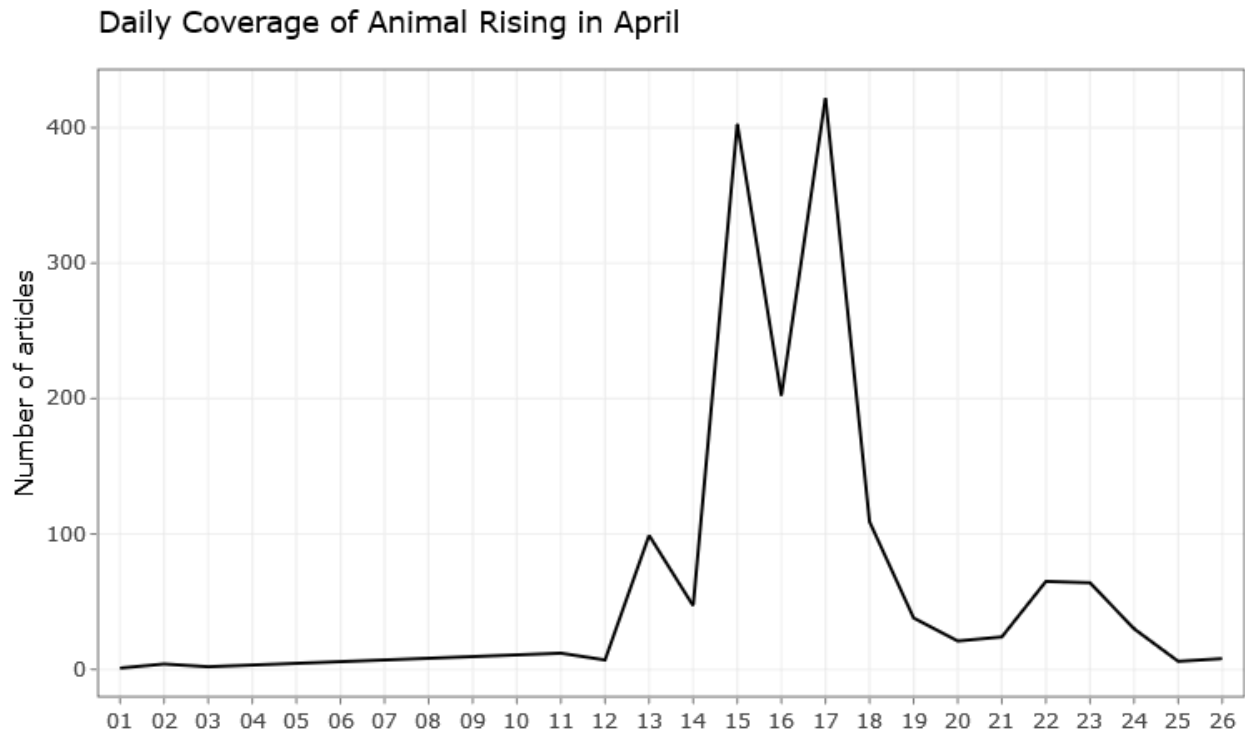


Figure 6. Media hits for “Animal Rising” in the month of April 2024.

Moreover, Animal Rising saw a sharp increase in direct donations when the GN protest happened. Fig. 7 below shows the daily donations per year. There was only a single day in 2023 with bigger donations than those associated with the GN protest. The donations for the day of the protest and the four days immediately following it were the highest of the entire year (up until 9 August, the last day for which we had donations data available).

There was also a sharp increase in sign-ups to take action with AR. The timeline of sign-ups was slightly different, with many signing up when AR's plans for the GN were [leaked](#) in a headline report by the Mail on Sunday and a second spike just before the protest. This indicates that the GN protest mobilised two different groups of people: 1) One group that is probably less involved/in touch with the animal rights movement or AR directly, who heard about the protest on the news when it happened and felt compelled to donate 2) A group of people who were probably already quite close to the animal rights movement but who had not been directly involved in AR's activities who felt motivated to be part of them as they were about to happen.

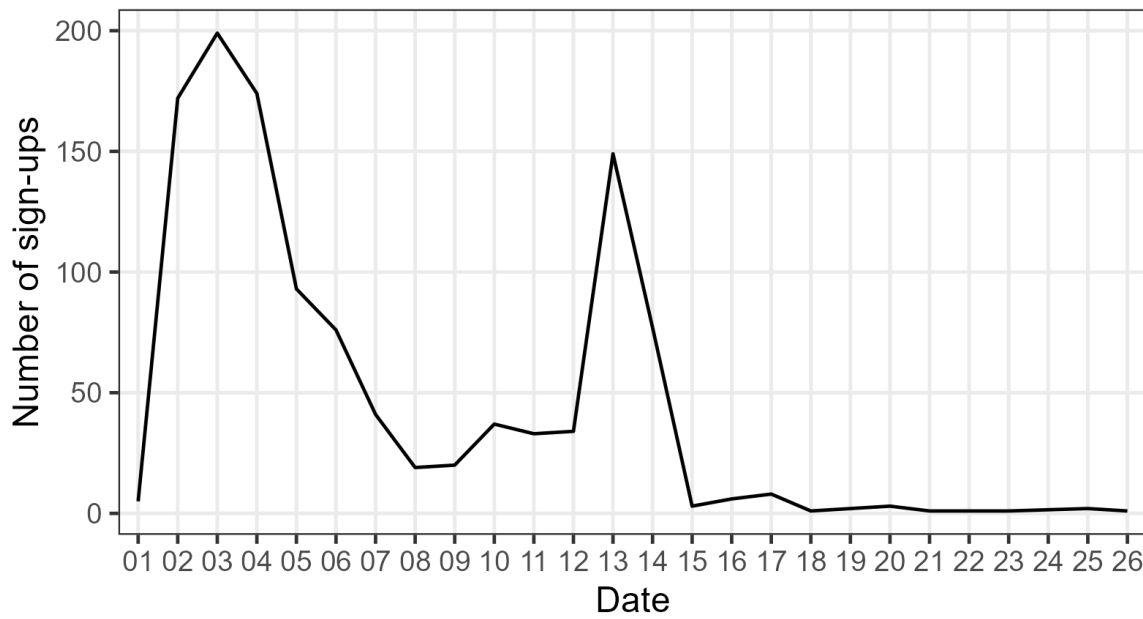
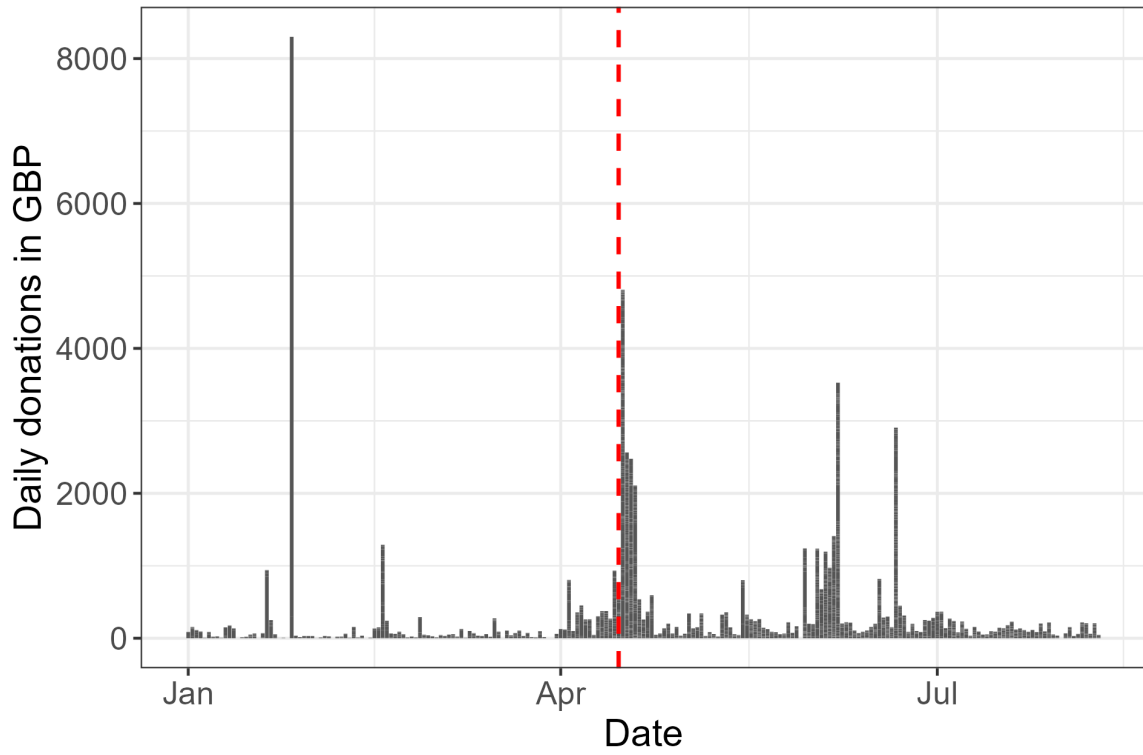


Figure 7.

Top: Donations to Animal Rising in GBP.

Bottom: Number of sign-ups for Animal Rising in the month of April 2024.

Media views affect support for Animal Rising

Previous research has highlighted how media narratives can greatly influence public opinion (McLeod & Detenber, 1999; Shanahan et al., 2011). For instance, work on attitudinal responses to Civil Rights protests indicates that news articles with a legitimising debate framing lead to greater support for and identification with the protestors (Brown & Mourão, 2021). We evaluated whether there is a similar pattern in the present data. At wave 2, respondents were asked about which news media outlet they heard about the GN protest from and how that news outlet viewed the protests (Likert scale 1-7 from “strongly condemned” to “strongly praised”). They were also asked the extent to which they support or oppose the protestors’ actions (Likert scale 1-7 from “strongly oppose” to “strongly support”).

First, we investigated whether different news outlets were associated with different levels of support for AR in a regression model with the BBC (generally considered relatively neutral) as the reference level (see Figure 6). Relative to the BBC, hearing about the protest on ITV was associated with lower levels of support¹⁰, whereas hearing about it via social media¹¹, The Guardian¹², and family or friends¹³ was associated with higher levels of support. Thus, our data are compatible with the view that the framings and narratives used by different media outlets affect public opinion; more favourable sources tend to lead to more favourable views.

¹⁰ (estimate = -0.43, 95% CrI [-0.69, -0.18])

¹¹ (estimate = 0.3, 95% CrI [0.02, 0.57])

¹² (estimate = 0.55, 95% CrI [0.16, 0.96])

¹³ (estimate = 0.84, 95% CrI [0.37, 1.31])

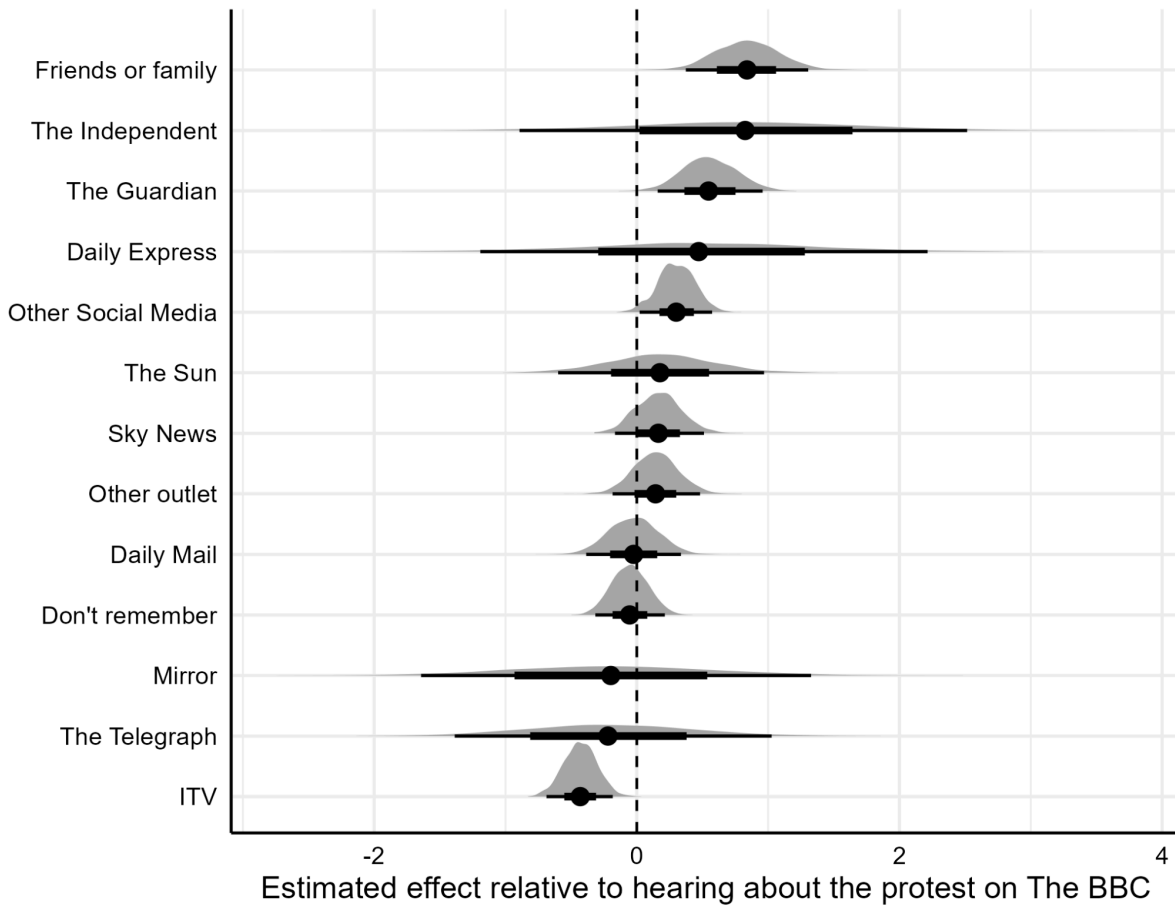


Figure 8. Forest plot showing the link between different news outlets and support for AR. Dots represent the model estimates for each contrast. The thin and thick lines show the 95% and 66% CrIs, respectively, overlaid with the posterior probability densities of the estimates, some of which are very wide due to small sample sizes for some outlets (see the embedded table). The BBC was used as the reference level for the news media outlets factor, i.e. the estimates for the remaining outlets show the differential effect on support for AR compared to hearing about the protest on the BBC. The model controls for a number of control variables (see SI) to better isolate the effect that news outlets have.

To investigate this further, we ran a regression analysis linking how favourably respondents rated the news outlet's reporting of the protest to support AR. It indicated that the more positive the outlet's view of the protest, the more supportive respondents were of AR's actions (see Fig. 9). We reasoned that people's media consumption is likely related to their political leanings and beliefs, which in turn might play a role in their pre-existing attitudes towards animals; these, in turn, are expected to influence how favourably they feel about an animal rights group. That is why, in both of the regression analyses, we included a number of demographic variables (age, gender, education, voting intention), as well as

people's responses to key questions at wave 1 that should capture pertinent pre-existing attitudes towards animals (society has a broken relationship with animals, society needs to change the way we treat animals used for entertainment/food, how morally acceptable it is to use animals for entertainment). Even though these additional factors explained much of the variance (see the regression table in the [SI](#)), the relationship between media views and support for AR remained stable, pointing towards an independent effect of media portrayal. Note that these analyses are tentative, not least because respondents were always asked about their support for AR after answering the questions about news outlets and hence there could be an order bias. Future work dedicated to media effects should replicate and extend the analyses reported here to solidify the link between disruptive animal rights protests, media narratives, and support for the protestors.

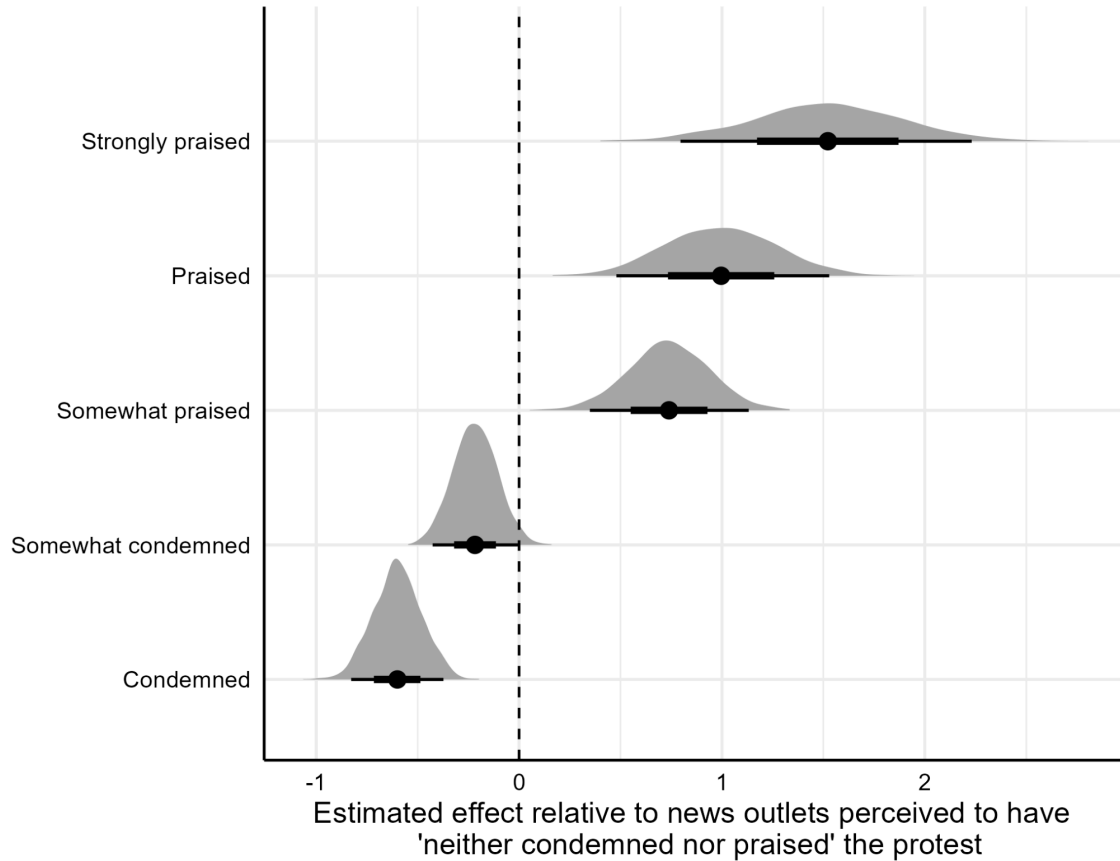


Figure 9. A forest plot of the regression estimates showing the relationship between media views and support for AR’s actions. “Neither condemned nor praised” was used as the reference level for the media views factor, i.e. the estimates for the remaining factor levels show the differential effects on support for AR relative to that reference level. Note that no participant selected “Strongly condemned”; hence this level does not appear in the plot. Dots represent the model estimates for each contrast. The thin and thick lines show the 95% and 66% CrIs, respectively, overlaid with the posterior probability densities of the estimates.

Discussion

Disruptive protests can create a ripple that spreads across society, often challenging long-standing traditions and habits. Throughout history, civil disobedience has been a powerful catalyst with the ability to enable and accelerate progressive change. Here, we sought to dissect the various impacts of Animal Rising’s Grand National horse racing protest, which has received substantial mediatic and public interest and thereby shifted attention toward animal welfare/rights issues.

Immediately after the protest, the effects of knowledge of the GN protest on public opinion were largely negative: the more somebody had heard about the GN protest, the more their attitudes towards animals tended to worsen from before to after the protest on several key measures. A controlled experiment using a vignette design confirmed that for three different protest types, attitudes towards animals are negatively affected by reading about disruptive animal rights protests (see the [SI](#) for details). Given that similar negative public opinion effects were seen in both observational and experimental settings, this suggests a robust phenomenon that does not depend on idiosyncratic features of a given protest at a particular moment in time. However, such negative effects associated with awareness of the GN protest were no longer seen six months later. Our results suggest that the negative effects weakened and essentially disappeared both when looking at the effects of awareness of the GN protest and awareness of AR (relative to before the protest). This indicates that a high-profile disruptive protest, such as the GN protest, triggers a strong emotional reaction that alters how people think about the issues it raises for a short while. After some time has passed, the direct impact of having seen or heard about the protest no longer has any particular effect.

This finding has important implications for the broader animal advocacy movement. For activists, it indicates that initially negative reactions to disruptive protests, which are often highlighted by media outlets, do not translate to lasting backfire effects which could hinder progress on the issue. At the same time, six months after the protest there is no evidence of the initially negative effects turning into positive ones. For researchers, this highlights the need to not only measure immediate effects but also to track them over time. Typical vignette designs, where the outcome variables are collected moments after participants are exposed to descriptions of protest activities, may pick up fleeting emotional effects that alter how people respond in the moment, but that might not be a good proxy for true attitudinal changes. Future work could usefully address just how long/short-lived such initial negative effects are.

Simple cross-sectional comparisons of separate nationally representative samples indicated overall positive shifts in people's attitudes towards animals over the period of six months following the GN protest. This could plausibly be due to secondary effects of the GN protest, which garnered substantial media attention and sparked a debate on animal welfare and rights. Thus, even though long-term effects were not found to be directly linked to a person's knowledge of the protests, the ripple effects they created via the large media response they triggered may have caused people to become more sympathetic towards animal rights/welfare issues. Alternatively, the positive shift could be due to other animal welfare campaigns taking place in a similar time frame (1, 2, 3) by [Open Cages](#), [The](#)

[Humane League](#), [RSPCA](#), or other factors unknown to us. The view that the positive overall shift is at least partly due to AR's protest activities is supported by media analyses showing heightened attention on animal rights issues and by the mobilisation analyses indicating that the protest enhanced momentum to act for people who were already sympathetic to the cause. Future work could investigate whether the positive trend reported here continues and attempt to relate it to AR's and other groups' activities going forward.

The present study also suggests that some aspects of people's attitudes towards animals appear more malleable than others. For example, people's agreement with the view that society has a broken relationship with animals appeared quite changeable. By contrast, support for bans (on horse racing, factory farming, animal testing, and all farming) was not linked with awareness of the protest and only changed very little before to six months after the protest. This seems to reflect a general pattern whereby people are more likely to shift towards pro-animal beliefs not connected with concrete changes or connected with small incremental improvements. In line with this view, six months after the GN protest people agreed more that society needs to change how we treat animals used for entertainment and food. However, there was only a weak trend towards people finding it less morally acceptable to use animals for entertainment and food. While people tend to think we should improve how we treat animals, they are more reluctant to say that using animals for entertainment and food is wrong. So, while it appears achievable for animal activists to shift people's views to become more favourable towards animals, it remains a significant challenge to convince people of fundamental changes needed to substantially improve the lives of animals.

Method

Participants

Longitudinal analyses

Wave 1 had a total of 1986 respondents. All respondents were invited to participate in the post-survey. Both surveys include a [commitment check](#) (Q1) as well as an attention check (Q8). Respondents were excluded if they failed an attention check or the commitment check. 1816 participants completed the survey after the GN protest (wave 2). Due to technical failure, data from 76 respondents could not be used. An additional 20 did not pass the attention (18) and/or commitment (2) checks. A total of 1720 participants could thus be used for analysis, corresponding to a retention rate of 86.6%. To test for possible biases due to differential attrition, we assessed whether those respondents who did not return for wave 2 differed from those who did on any of the main items of interest specified in the Hypothesis section. Regression analyses predicting responses to those items at wave 1 using retention (respondent later returned vs. did not return for wave 2) as the sole predictor variable suggested that the groups were highly similar (all t-values < 1) and thus that there were no issues with differential attrition.

Wave 3 (for the six-month follow-up) had a total of 1356 eligible completes (after again excluding participants who failed the commitment or attention check), corresponding to a retention rate of 78.8% relative to wave 2 and 68.3% relative to wave 1. Regression analyses again did not indicate robust differences in the key variables between respondents who returned vs. those who did not return. However, there was a weak trend towards people who did not return for wave 3 having higher scores (indicating more favourable views towards animals) on the composite score of interest ($t=1.56$) and the item asking how morally acceptable it is to use animals for entertainment ($t=1.62$). However, note that all long vs. short-term analyses only used participants who did both waves 2 and 3. The fact that the immediate effects replicate the original effects from our first study very well suggests that attrition did not meaningfully affect the results.

Cross-sectional analyses

We had 2007 respondents in total. After excluding participants who failed either the commitment or attention checks, the sample had 1986 respondents. The sample collected six months after the GN (used as the T2 sample in both cross-sectional analyses) had 1441 eligible respondents.

Data collection

All data were collected using Survey Monkey. Respondents were recruited via Prolific and were paid for their participation. They completed the survey on their laptops or phones. Two quality checks were used: 1) Participants were asked if they were committed to filling out a survey accurately and were excluded from data analysis if they indicated "no". 2) There was an attention check where a short text states that when asked about their favourite sports, participants were supposed to select "Tennis", or when asked about their favourite drink, they were supposed to select "Carrot juice". Participants were excluded if they selected any of the other options. Only complete surveys, which were not aborted or were otherwise missing data, were analysed. Sample sizes and stopping rules were decided beforehand and were pre-registered.

Analysis

We used Bayesian regression analysis to test our hypotheses. The package *brms* (Bürkner, 2017) provides an elegant implementation of ordinal regression that we consider the best analysis tool when simple Likert scale responses comprise the outcome variable. This method was used for the simple before vs. after differences, whereas linear Bayesian regressions were used for the difference score analyses described below.

Raking was used to make the results as nationally representative as possible regarding the demographic information collected (age, gender, ethnicity, region, political affiliation, social class, and level of education) (Pasek & Pasek, 2018). This method gives each respondent a weight that reflects how much their demographic profile deviates from the population average. These weights are then used in the statistical analyses and correct for biases due to over or undersampling on any of the demographics. The weighting algorithm considered all demographic factors to adequately represent the UK population except for social class (see the [SI](#) for details on the demographic questions). Thus, weights corrected for over and undersampled social class segments. For all regression models, the priors for the effect of changes in awareness of AR/ awareness of the GN protest on the variable of interest were a normal distribution with a mean of zero and a standard deviation of 0.1. This reflects our expectation that the effects will be small and are very likely to be in a range between -0.2 and 0.2.

The models that tested hypotheses regarding the effects of AR awareness on the variables of interest used awareness of AR (Q11) as the sole (continuous) predictor variable. More precisely, the difference between each respondent's awareness of AR after vs. before the Grand National protest was used to predict after vs. before changes in each variable of

interest. A complementary analysis tested the effect of awareness of the protests (rather than of AR itself) on the same variables. Awareness of the GN protest was based on wave 2 data only; this question was not asked at T1 since the protests had yet to take place. This second analysis is expected to be more sensitive because it is easier to forget the name of the protest group than to forget the protest itself. At the same time, the first analysis directly relates changes in awareness of AR to changes in the variables of interest. It thus constitutes the most logical and direct test of whether the protest triggered attitudinal changes. Hence, these two analyses are complementary and should both be taken into account regarding conclusions about the effects of the protest.

For the cross-sectional analyses looking at overall differences before vs six months after the GN protest, we used ordinal Bayesian regression analysis with time (before vs six months after) as the sole predictor variable. Again, weights were used to ensure the results can be generalised to the UK population, as described above. One nationally representative sample of respondents did the survey six months after the protest, whereas we had two samples before the protest occurred. We performed the same before vs after analysis twice, using each of the samples collected before the protest in a separate analysis. One can think of this as an internal replication, even though only the pre-sample varied between the analyses, not the post-sample.

For all analyses, we report estimates of the effect of the predictor variables alongside 95% Credible Intervals (CrI), the Bayesian equivalent of 95% Confidence Intervals (Gray et al., 2015). The 95% CrI is the range of values where the true population-level value is expected to fall with a probability of 95%. Generally speaking, effects are considered to be statistically robust if the 95% CrI does not include zero.

We used weakly informative priors for the predictor variables, assuming that any effect sizes would be small (a prior centred around zero with a standard deviation of .1 assuming a normal distribution). For the cross-sectional ordinal regression models, we used the cumulative standard normal distribution to derive expected values for the intercepts/thresholds and used a standard deviation of 1.

Animal Rising Mobilisation Data

We had access to Animal Rising's donation data from [their crowdfunding page](#), which we used for our analysis of their donations. Additionally, we had access to sign-up forms from their [Action Network](#), which they use to recruit potential volunteers to join their campaigners to understand the impact of the GN protest on activist mobilisation.

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