Documenting Online and Social Media Discussions of Animal Welfare in 2019 – 2023

By Zachary T. Neuhofer, Valerie Kilders[a], Nicole Olynk Widmar, Lauren Nicole Bales[b]

Executive Summary

We use social media listening to examine the public's discourse and sentiment about animal welfare focusing on livestock. Analyzing more than 3.4 million posts from October 2019 to September 2023 we identify key themes and sentiment trends. Most mentions are dedicated to discussion about pets and animal shelters with only about 280,000 posts focusing on livestock. The average net sentiment, calculated as the ratio of positive to negative posts on a scale from -100 to +100, is positive in the general as well as the livestock sub-search but is lower for the latter (48 vs. 31). Within the livestock discussion, conversation more focuses on livestock operations and policy efforts rather than more general notions of compassion and care, which dominate the general discourse about animal welfare. We observe spikes in mentions and sentiment following events where individuals' care and compassion for animals are highlighted as reflections of their moral character.

Keywords: animal welfare, livestock, public perception, public sentiment, social media listening

Corresponding Author, vkilders@purdue.edu

[b]Department of Agricultural Economics, Purdue University, 403 Mitch Daniels Blvd. West Lafayette, IN 47906, United States

Published by the Center for Animal Welfare Science at Purdue University
RP.2025-01 | February 2025

Introduction

Following the implementation of California's Proposition 12 in 2022, which places regulations on animal housing, (State of California, 2022), the United States Department of Agriculture (USDA) announced their plans to re-evaluate their animal welfare standards (USDA, 2023). Similarly, more than 700 companies in the U.S. alone have vowed to transition to cage-free eggs in the next several years (Chicken Watch, 2024). Frequently, these changes are motivated by the desire to cater to demands of the public. Indeed, several experimental studies show that consumers value animal welfare attributes and are willing-to-pay a premium for food products derived from animals with a perceived higher welfare standard (Kilders & Caputo, 2021; Neuhofer et al., 2023; Ortega & Wolf, 2018; Tonsor & Olynk, 2011). However, some evidence suggests that experimentally derived market premiums do not always translate in the actual market (Fifer et al., 2014; Hensher, 2010; Penn & Hu, 2018). To better understand the public's feelings towards animal welfare, it is therefore necessary to complement these experimentally derived conclusions with data from other non-experimental sources. Given the prevalence of social media usage, capturing public conversation on social media sites like X (formerly known as Twitter), news outlets, and blogs lends itself to this purpose.

Thus, we employ a social listening framework to assess the public sentiment and discourse on the public conversation on animal welfare. Specifically, we focus on how conversations about animal welfare vary over time, both in terms of quantity and expressed sentiment. Several prior studies have looked at public sentiment and discussion related to specific animal welfare related topics including livestock and animal care professionals. However, their focus has been relatively narrow, with the analysis honing in on specific topics such as egg laying hen housing (Widmar et al., 2020b), livestock at local fairs (Mahoney et al., 2020), and the public perception of veterinarians (Widmar et al., 2020a). For our analysis, we broadly assess how animal welfare is discussed allowing us to observe whether the public's attention and attitude towards animal welfare shifts over time. Doing so provides us with a more holistic understanding of primary topics in the public discussion of animal welfare in the face of current events and policy changes.

Correspondingly, we also explore the main themes related to animal welfare that the public focuses on. Fraser et al., (1997) define three common ethical considerations surrounding animals: (1) that animals should lead "natural" lives that allow for the use and development of their natural adaptations and capabilities, (2) that animals should be generally free of fear, pain, and negative states while experiencing normal pleasures, and (3) that animals should function well in health, growth, and normal physiological and behavioral systems. These three components all hold value, but within the academic literature different consideration is given to each of them depending of whether one assesses the treatment of pets and animals in the home (Byrd et al., 2017; McKendree et al., 2014a, 2014b), the treatment of animals used for research in psychology and medicine (Baldwin, 1993; Knight et al., 2009), or the treatment of animals used in agricultural production for meat, dairy, or eggs (Croney & Millman, 2007; Heleski et al., 2006; Heleski & Zanella, 2006; Paul et al., 2019). By exploring the main themes discussed by the public, we aim to evaluate whether that is the case. In particular, we place a specific focus on the sentiment and dialogue about the welfare of livestock and poultry, given the economic relevance of animal agriculture and the extensive economic literature dedicated to the topic (Lusk, 2018; Lusk & Norwood, 2011; Ortega & Wolf, 2018; Paul et al., 2019; Tonsor & Olynk, 2011).

We contribute to the existing literature in several ways, first by identifying primary drivers of sentiment in online media and conversations surrounding animal welfare. Policymakers and regulators benefit from deeper understanding of public opinion, which functions as a key input in the policy making

process. The insights are also of use to industry stakeholders as well as animal welfare organizations as they provide a better understanding of what topics consumers might be particularly interested in, thus helping with the design of effective messaging campaigns. Given that we also report on how conversation changes over time and in response to critical events, we offer valuable understanding for anticipating and responding to shifts in public opinion. This can be leveraged by industry stakeholders and animal welfare organizations in developing the timing of their campaigns and initiatives.

Methodology

To capture public sentiment and conversation about animal welfare over time, we employed the Quid social media listening platform (formerly known as NetBase and then NetBase Quid) in line with earlier studies (Mahoney et al., 2020; Widmar et al., 2020a,b). The platform allows us to quantify the weekly volume and sentiment of online posts from Twitter, news sources, blogs, forums, and other sources pertaining to animal welfare in general, and animal welfare pertaining specifically to livestock using keywords identified by us.

We first defined keywords for a general search of animal welfare (henceforth referred to as "general search"). We included terms, such as, "Animal Welfare", "#Animal Welfare", "animal well-being", "animal well-being", and "animal care". All of the terms in the general search were denoted with "animal" to remove generic references that are not related to animals.

For our livestock sub-search (henceforth referred to as "livestock search"), we used the same terms, but complimented them with keywords such as, "meat", "chicken", "cow", "beef", "pig", "pork", and "farming". We identified the terms for both searches through a review of academic literature on animal welfare, an evaluation of government publications on the topic, especially from the USDA, as well as an assessment of the websites of popular animal welfare advocacy groups. Topic-related terms that were frequently mentioned across those sources were included. The full list of search terms in the general and livestock search can be found in Appendix Table 1[1].

Equipped with the search terms, the platform not only pulls the number of mentions[2] fitting our pre-determined criteria over time, but Quid also derives the average net sentiment of posts over time. The net sentiment is the result of the total percent of positive posts less the percent of negative posts and as such is bound between -100% and 100% (Widmar et al., 2021). To better understand the observed sentiment, we also collected sentiment drivers, which refer to the most commonly mentioned words contributing to the positive and negative sentiment (Jung et al., 2022). Sentiment drivers are grouped into likes and dislikes, positive and negative behavior, as well as things.

[1] Quid also allows researchers to define exclusionary terms that prevent unrelated posts and contributions to being incorporated in the data collection. The broad complexity of the issue led to few exclusionary terms being needed, as almost any posts or discussion relating to the treatment of animals could be considered animal welfare discussion (Browning, 2020; Fraser et al., 1997; Mellor, 2016). The three exclusionary terms we used were "Alder Farms", "Green Mount", and "Xbox". When these exclusionary terms were included they brought about popular posts that were not related to animals.

[2] Mentions refers to the number of times a word or phrase were used in internet posts in a given time period.

Results

General Search

Data for the general search as well as the livestock search was collected on October 4-6, 2023[3] and covered the time period of October 2019 to September 2023[4], which corresponds to the maximum time frame observable. The most common source for the general search was Twitter accounting for 67% of the total mentions. The remaining mentions were divided between news (21%), and blogs (10%) (Table 1) with the respective shares aligning with some previous social media listening studies such as Mahoney et al. (2020).

Table 1. Mentions, posts evaluated for net sentiment, average sentiment, and top 10 sources from the primary national search

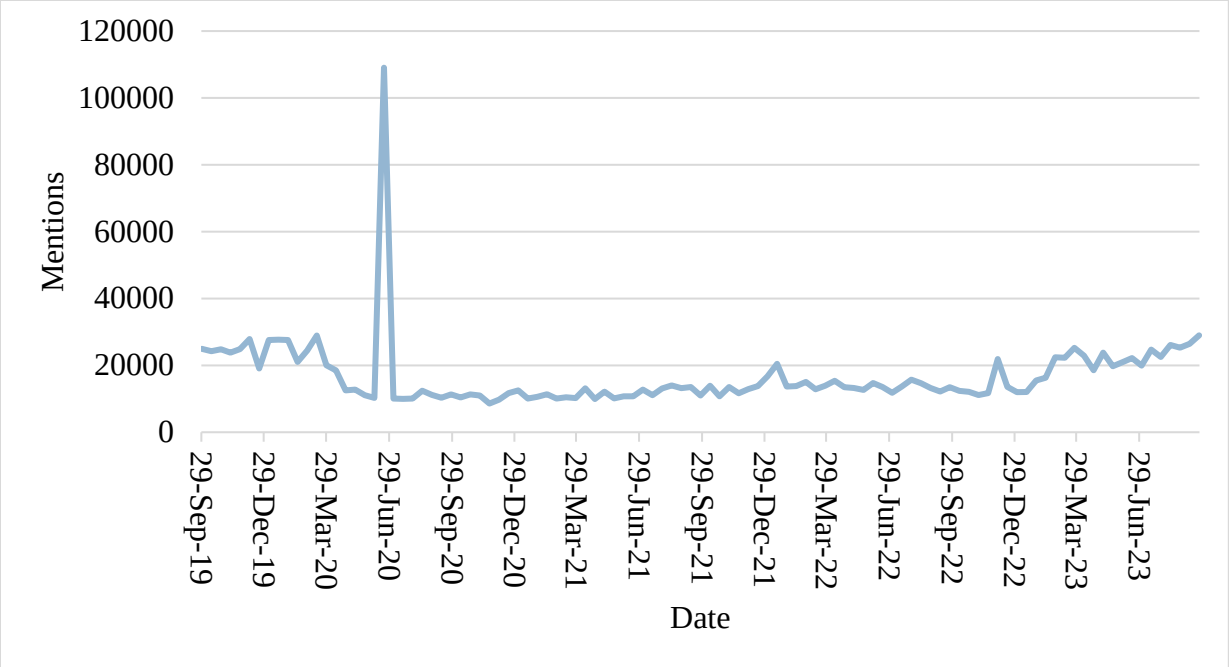
Indicator	Primary
Mentions	
Number of Mentions	3,432,912
Sources of mentions	
Twitter	67.19%
News	20.97%
Blogs	9.59%
Forums	2.22%
Other	<1%
Net Sentiment	
Number of posts for which Net Sentiment was derived	299,542
Mean (SD) of Net Sentiment	48.27 (17.71)

Within the covered time span more than 3.4 million mentions fitting our search criteria were identified. Aside from a few unique events, mentions were fairly steady across weeks averaging around 16,425 mentions per week. The minimum number of mentions occurred in the week of November 20, 2022 at 8,579 and the maximum number of 109,037 in the week of June 21, 2020. Most of the posts in June 2020 are related to the death of Elijah McClain, who was heavily involved in volunteer work for local animal shelters (Bellware, 2021; The Associated Press, 2023). See Figure 1 for a graphical representation of the timeline of mentions.

[3] Due to the nature of social media data, posts can change due to authors removing posts or social media platforms removing access to specific posts which makes it imperative to state the dates in which the data was collected.

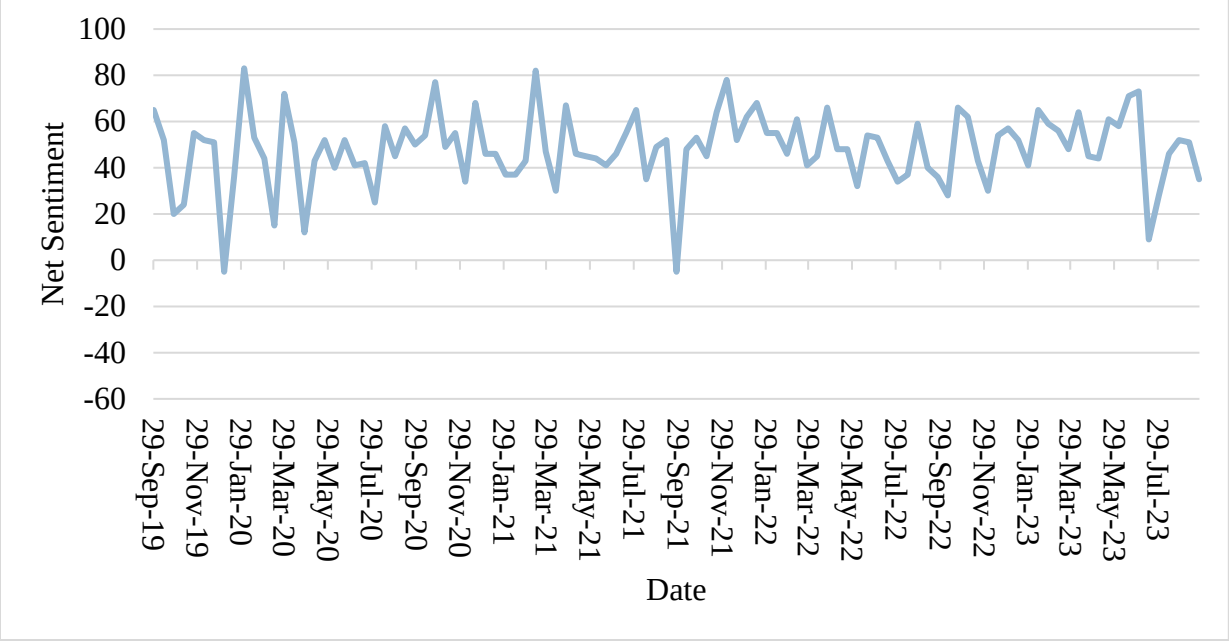
[4] In January 2023 Quid updated geolocation classification allowing location identification of posts that did not directly provide geolocation metadata. Prior to January 2023 the location was only assigned if the original post provided geolocation metadata. With the update in January 2023, Quid was able to ingest post text and estimate the location for posts that use specific terms, phrases, and location-specific terminology causing an overall increase in the number of posts collected.

Figure 1. Timeline of mentions from the primary national search



Net sentiment, i.e., the ratio of positive to negative mentions, was evaluated from 299,542 posts from which negative or positive sentiment could be captured, as posts that Quid deems neutral are not used to derive the net sentiment. Figure 2 shows a graphical representation of the timeline of net sentiment.

Figure 2. Timeline of net sentiment in the primary national search



The average sentiment was 48, meaning sentiment about animal welfare is generally positive in the captured discussion. In comparison to other animal welfare related topics, the average sentiment scores from the general search are higher than eggs produced using battery cage or enriched colony housing, while being lower than cage-free housing (Widmar et al., 2020b) and lower than the sentiment surrounding animals at agricultural fairs (Mahoney et al., 2020). However, the standard deviation of the net sentiment for the general search is about 18, suggesting at least some heterogeneity in the public's attitude towards animal welfare over time.

Looking more closely at how sentiment changes over time we find that the sentiment is overwhelmingly positive. We observe peak highs in sentiment in February 2020 (83), March 2021 (82), and July 2023 (82). The upticks in sentiment overlap with popular stories of animals being placed in animal shelters or cared for (Campa, 2023; Hattam, 2021; Jacobo & Torres, 2020). In January 2023, we observed the lowest point in sentiment in the timeline at -43. This dip in sentiment seems to be tied to a dog named "Waffle" being missed at the Richmond Animal Care and Control (RACC) due to finding a home with a family (Ortiz, 2023). Stories like this are key to understanding the limitations in Quid's tracking of sentiment. In this particular example, the "sadness" of missing Waffle at the RACC is likely leading to the reporting of negative sentiment, but the fact that Waffle found a home would most likely be considered positive to most readers. Interestingly, despite the jump in mentions relating to the protests following the death of Eljiah McClain (14,526 in the week of June 14,2020 to 109,037 in the week of June 21, 2020), the net sentiment sees only a slight decrease from 56 in the week of June 14, 2020 to 52 in the week of June 21, 2020. The small decrease in sentiment is likely due to the fact that while the cause of the discussion was due to a tragic event, the mentions of animals in the articles are of positive association since it is related to McClain caring for animals in shelters, which is recorded as a positive behavior. Indeed, caring for animals is seen as a strong moral value. This is evident in the media coverage of Elijah McClain's death but also in some other cases including the death of celebrities like Bob Barker and Betty White (Bellware, 2021; O'Kane, 2022; Passmore, 2023), who prominently spent time at animal shelters and contributed to animal welfare related causes.

Exploring this more in-depth to better understand the observed net sentiment, we are able to identify the top five likes and dislikes from 204,034 mentions. The main "likes" include saving animals (12%), animal adoption (7%), and protection (7%). The main dislikes include animals struggling (8%), being exploited (7%), and concern (6%). These terms correspond with the ethical considerations outlined by Fraser et al.'s (1997) especially that animals should be generally free of fear, pain, and negative states.

We find similar sentiments reflected in the top positive and negative behaviors, observed across 28,925 mentions for which the net sentiment and correspondingly sentiment drivers could be identified. Among the top positive behaviors are the terms "adoption" (27%), and "support" (13%), while "stopping" (19%), "not planning" (18%), and "not wanting" (5%) are among the top negative behaviors associated with our general search. The results are also a reflection of the fact that the most common human interaction with animals is through pet ownership (Brown, 2023; McKendree et al., 2014a). Another top liked behavior is "voting" (8%) suggesting that animal welfare related policies do get substantial coverage in the public discourse.

The top "things" are identified from 621,532 mentions and are animals (49%), animal shelters (20%), and welfare (5%). These results further affirm that pet related topics dominate the discussion which is shown in the use of words and phrases that include "animals" and "animal

shelters"(Brown, 2023; McKendree et al., 2014a) It is important to note as well that the "things" identified by Quid are reported even if the word or phrase is denoted as neutral in sentiment calculations. These results provide insight into the most common terms that appear in all posts identified in the search. Noticeably absent from our top sentiment drivers is any discussion of animal research despite discussion in the scientific literature (Baldwin, 1993; Furnham et al., 2003; Knight et al., 2009). This indicates that animal welfare concerns related to animal research are a smaller subset of the greater discussion surrounding animal welfare on social media.

Livestock Search

We identified 279,703 mentions for the livestock search across all 4 years. The number of mentions, average sentiment, and top sources are listed in Table 2 for the livestock search. As for the general search, Twitter was the most prominent source (45%) of mentions. However, more than 50% of all mentions were attributable to news (33%) and blogs (17%). These results imply that news articles and blogs are a more important part of a narrower topic like livestock animal welfare, which corresponds with other studies in this area such as Widmar, et al. (2020a,b).

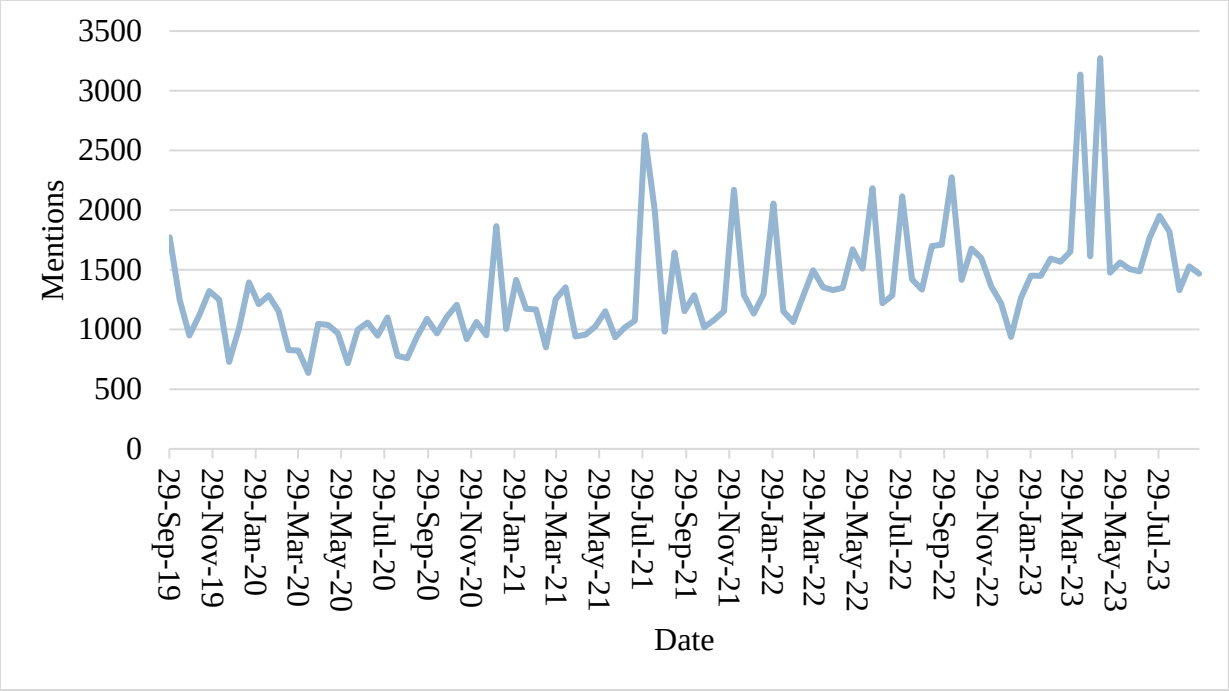
In contrast to the general search, we observe relatively higher variability in the number of mentions across weeks (Figure 3). This may be due to news accounting for a higher share of the sources of discussion with spikes mentions occurring within the news cycle. For example, a spike in mention in June 2023, corresponds with USDA's announcement that it would be reviewing its animal welfare standards for labeling (USDA, 2023). The announcement followed after a group of Democratic party senators urged the USDA to re-evaluate its animal welfare policies citing a report by the Animal Welfare Institute[5] (Animal Welfare Institute, 2023; Sutherland et al., 2023).

Table 2. Mentions, posts evaluated for net sentiment, average sentiment, and top 10 sources from the livestock sub-search search

Indicator	**Primary**
Mentions	
Number of Mentions	279,703
Sources of mentions	
Twitter	44.88%
News	32.96%
Blogs	17.28%
Forums	4.62%
Other	<1%
Net Sentiment	
Number of posts for which Net Sentiment was derived	26,868
Mean (SD) of Net Sentiment	31.48
	(31.07)

[5] The senators made the initial call in March 2023 as reported in Animal Welfare Institute, (2023) but the spike in mentions was related to the date of the USDA press release response in June 2023 (USDA, 2023)

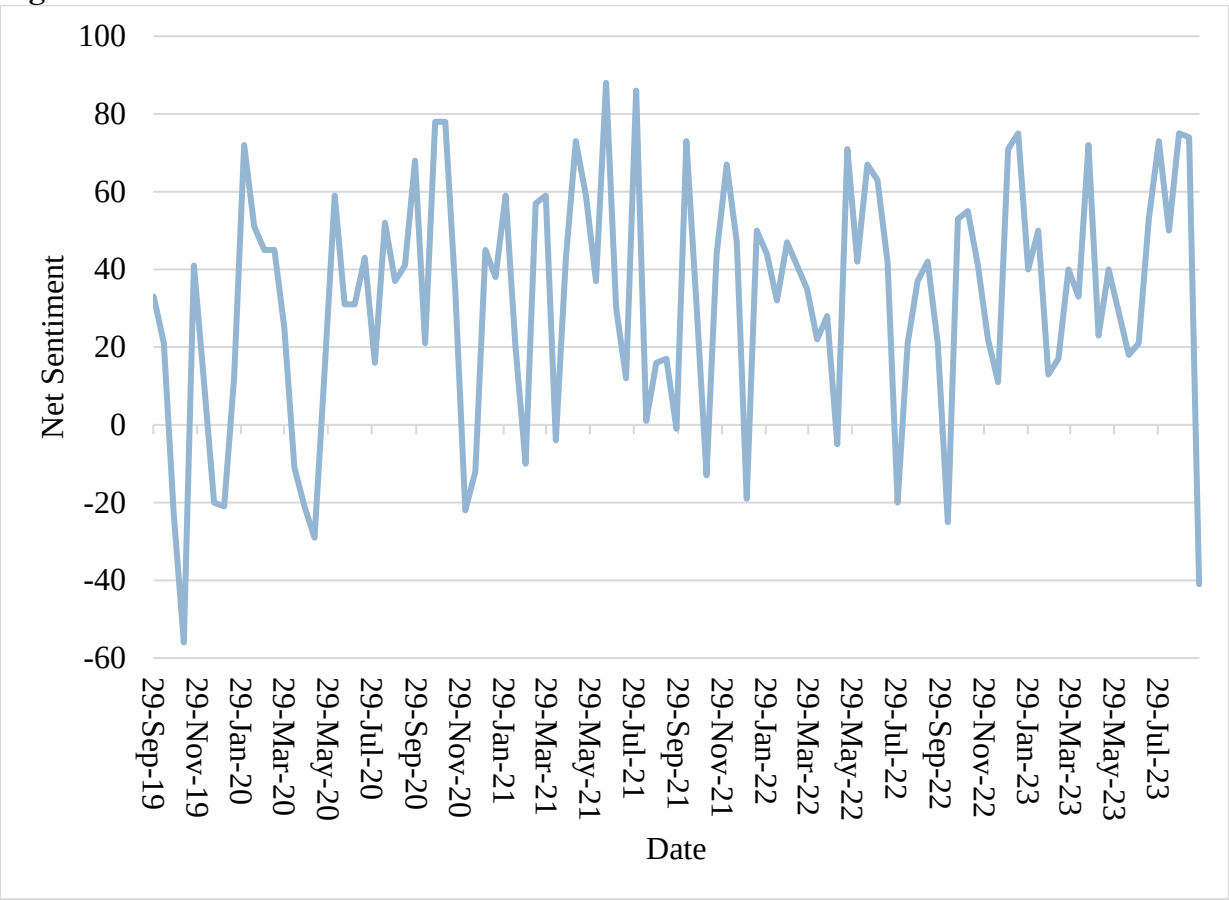
Figure 3. Timeline of mentions in the national livestock sub-search



Overall, mentions increase during the four-year period we observed. This is potentially attributable to several policy adjustments that have been national stories such as the implementation of California's proposition 12 which was enforced in January 2024, as well as an overall trend of growing concern among consumers for animal welfare (Byrd et al., 2017; Hanrahan, 2024). Further, with the update made in January 2023, Quid was able to ingest post text and estimate the location for posts that use specific terms, phrases, and location-specific terminology causing an overall increase in the number of posts collected. Net sentiment was calculated from 26,868 (10%) posts for the livestock sub-search. The average sentiment for the primary search was higher (48) than for the livestock sub-search (31). The general search which was dominated by animal shelters and pets where leading discussion were stories that reflected the sentiment that caring for animals is a positive virtue.

Even more so than the mentions, the sentiment timeline for the livestock sub-search (see Figure 4) is subject to dramatic increases followed by drastic decreases. This is likely due to the fact that net sentiment is formulated from only around 2,000 mentions in a given week meaning the overall mean is more sensitive to even small movements in the wider public discourse. Overlaying the sentiment timeline with current events, we notice that one of the weeks with the highest recorded net sentiment (86 in August 2021) coincides with discussions about the enforcement of California's proposition 12. Animal welfare proponents embraced Proposition 12 as it sought to improve the living spaces for livestock (Hanrahan, 2024).

Figure 4. Timeline of net sentiment in national livestock sub-search



Similarly, the release of a report by the Animal Welfare Institute (AWI) coincides with the largest decline in net sentiment we observed, as sentiment dropped from 40 in the week of March 26, 2023 to -46 in the week of April 2, 2023, when the report was published. The AWI report claimed that the USDA's labels are deceptive in claims such as "humanely raised" which they argue is overwhelmingly vague (Sutherland et al., 2023) explaining the publics negative response to the findings.

Looking at sentiment drivers (Table 3), we find a marked difference in the main likes/dislikes, behaviors, and things between the general search and the livestock search. For example, while pet adoption related terms were very prevalent in the general search, we find that in the livestock search, terms that are directly affiliated with animal welfare are much more prevalent. This includes "decent animal welfare" as a top term in the likes, "tougher animal welfare" as a top term in the dislikes, and "welfare" as a top negative behavior. Thus, it appears that the public conversation does indeed vary depending on what group of animals is being considered.

Table 3. Top five positive and negative sentiment drivers for different categories in the primary search and livestock sub-search

Positive		Negative	
Likes/Dislikes			
Primary (n= 204,034)			
save animal	11.60%	Struggle	7.81%
free adoption	7.33%	exploit animal	7.08%
protect animal	7.28%	Animal	5.65%
help	4.48%	Concern	5.52%
dog	3.85%	face animal	5.45%
Livestock (n= 14,108)			
help animal	12.17%	concern	23.58%
animal	10.17%	devastate no animal	7.29%
decent animal welfare	4.62%	tougher animal welfare	6.21%
improve	2.68%	exploit animal	5.06%
animal management practice	2.32%	farm animal welfare	2.99%
Behaviors			
Primary (n= 28,925)			
adopt	26.59%	stop	19.23%
support	13.00%	not plan	17.53%
vote for	8.08%	not want	5.47%
want	4.07%	abandon	4.18%
help	4.03%	cite	3.64%
Livestock (n= 2,771)			
support	22.51%	threat	16.19%
approve	9.76%	abandon	6.66%
commitment	8.01%	stop	4.99%
adopt	7.30%	not want	4.54%
focus on	5.36%	revoke	4.54%
Things			
Primary (n= 621,532)		*Livestock (n= 47,042)*	
animal	48.51%	animal	55.11%
shelter	20.42%	welfare	18.03%
welfare	5.20%	environment	2.10%
pleasant	2.68%	health	2.08%
pleasant Animal Shelter	2.64%	animal welfare law	1.71%

Nevertheless, other sentiment drivers, such as "devastate no animal" (top term among the dislikes), and "support" (top term among positive behavior), once again reflect the three ethical considerations outlined by Fraser et al. (1997).

Many of the discussion points related to livestock surround recent or potential policy actions, which are indicated by phrases such as "tougher animal welfare" and "animal welfare law". These key drivers are related to the USDA labeling process for animal welfare and direct legislative actions on animal welfare like Proposition 12 (State of California, 2022; Sutherland et al., 2023). Some of the top sentiment drivers indicate a desire for stricter animal welfare standards among the public as indicated by words such as "improve" in the positive likes, while dislikes included words like "exploit", "tougher" and general negative sentiment surrounding farm animal welfare. As such, the discussion about livestock animal welfare appears to be substantially more focused on policy related issues than the more general public discourse about animal welfare.

Conclusions

Online and social media analytics can provide insights into the public interest in and sentiment surrounding important social issues, like animal welfare. We documented the public conversation surrounding animal welfare with a particular focus on livestock. Most of the online and social media surrounding animal welfare studied was focused on pet ownership and care, which is likely due to the fact the leading human-animal interaction is through pet ownership (Brown, 2023; McKendree et al., 2014a).

Livestock discussion accounts for only a fraction of discussion related to animal welfare, but the phrase "animal welfare" is tied to livestock animals based on its prevalence in our top sentiment drivers among the livestock sub-search. Relatedly, our sentiment analysis shows that policy adjustments in animal welfare are well received by the public and calls for improvements are reflected negatively among the public. This shows some evidence that the public places an emphasis on policy related actions to aid in farm animal welfare, which differs from general animal welfare where the primary focus of public discourse is on local animal shelters and pet care.
Our study is not without some limitations. Prior to 2023 most of the posts Quid captured are from one primary source, which is Twitter. Other mainstream outlets like Facebook and Instagram are not substantially captured despite their large presence. Additionally, due to the subjective nature of gathering search terms, it is possible that we left out some key terms or phrases that are crucial to animal welfare.

Future work may seek to narrow other perspectives related to animal welfare, such as particular animal issues surrounding animal shelters, and policy initiatives related to animal welfare. Another aspect to consider is examining how consumer tastes and preferences in the marketplace for livestock products have coincided with changes in animal welfare policies and spikes in discussion.

Appendix

Table A1. List of search and exclusionary terms

Primary Search Terms	Livestock Sub-Search Terms	Exclusionary Terms
Animal Welfare	Meat	Alder Farms
#Animal Welfare	#meat	Green Mount
Animal well-being	Chicken	Xbox
Animal friendly	#chicken	
Animal care	Dairy	
Animal handling	#dairy	
Animal comfort	Cow	
Animal safety	#cow	
Animal pain	Beef	
Animal distress	#beef	
Animal shelter	Pig	
Humane slaughter	#pig	
Animal housing	Pork	
Animal husbandry	#pork	
Animal management	Factory farm	
	Vegan	
	Vegetarian	
	Turkey	
	#turkey	
	Farming	
	Farm	

Table A2. Results from primary and livestock searches from Census and Political Regions

	General				Livestock			
	2019-2020	**2020-2021**	**2021-2022**	**2022-2023**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**
				Census Region				
	92,610	34,030	40,111	38,060	2,130	1,940	1,600	1,770
East North Central	43.08	34.46	56.23	61.46	-1.51	35.40	54.62	72.31
	(32.56)	(40.89)	(38.53)	(28.34)	(65.23)	(29.40)	(11.75)	(23.91)
	26,800	9,870	12,900	12,750	560	400	490	440
East South Central	46.66	57.13	47.77	52.21	-58.49	95.38	-15.87	90.38
	(42.30)	(44.20)	(50.44)	(41.49)	(45.28)	(27.91)	(18.86)	(29.48)
	117,200	45,330	52,712	60,190	3,660	3,000	2,902	2,910
Middle Atlantic	25.81	36.50	58.38	52.98	-5.72	59.37	0.73	0.73
	(34.31)	(43.39)	(30.34)	(38.83)	(44.96)	(39.73)	(50.14)	(50.14)
	62,590	22,222	29,451	27,271	1,250	1,170	960	990
Mountain	42.04	50.33	41.37	59.15	-8.19	76.42	23.85	-71.73
	(38.28)	(39.68)	(36.53)	(31.72)	(34.93)	(19.45)	(64.34)	(57.57)
	45,700	19,100	24,720	19,580	1,060	950	960	780
New England	31.11	32.88	57.10	59.25	-36.85	55.77	-26.94	29.94
	(42.36)	(39.72)	(35.69)	(36.58)	(30.81)	(40.64)	(29.27)	(27.31
	177,720	73,510	82,355	80,280	4,770	4,460	4,360	3,900
Pacific	45.47	43.92	49.33	51.96	5.62	45.31	-10.98	-2.92
	(33.64)	(39.53)	(33.01)	(31.42)	(65.18)	(30.33)	(36.83)	(25.54)
	144,240	62,784	71,141	79,695	3,490	3,100	2,796	2,895
South Atlantic	42.06	51.56	58.06	51.27	9.94	22.77	25.73	53.33
	(32.96)	(29.01)	(36.42)	(35.52)	(35.88)	(47.34)	(66.25)	(46.72)
	33,540	17,610	16,054	15,370	1,080	1,240	942	902
West North Central	63.07	56.33	44.08	27.96	66.96	56.15	7.34	-42.31
	(29.27)	(27.32)	(44.71)	(52.35)	(15.40)	(42.16)	(44.64)	(49.40)
	84,180	34,060	35,722	36,249	1,410	1,171	1,195	1,193
West South Central	58.62	48.48	52.98	51.21	54.75	30.54	-7.17	9.44
	(38.26)	(34.36)	(35.25)	(43.27)	(51.33)	(66.91)	(33.16)	(34.62)
				Political Region				
	189,570	79,899	88,084	85,860	3,440	3,110	2,916	3,243
Strong Republican Majority	54.34	50.71	47.56	53.37	26.98	39.98	25.42	40.13
	(26.04)	(30.00)	(33.43)	(33.34)	(46.74)	(46.57)	(61.96)	(22.93)
	403,720	170,260	187,748	182,148	11,420	10,450	9,918	9,709
Strong Democratic Majority	39.43	38.96	47.88	50.90	20.47	31.69	14.17	25.71
	(25.76)	(26.68)	(28.51)	(27.72)	(50.79)	(46.44)	(54.69)	(46.87)
	186,080	77,029	85,960	88,830	3,930	3,470	2,870	2,770
Battle Ground State	38.96	51.69	56.10	50.37	-16.45	63.83	26.44	4.15
	(35.04)	(35.12)	(33.54)	(34.38)	(50.16)	(23.24)	(50.97)	(69.36)

The top number in each cell is the total number of mentions in the reported year for each region in the primary and livestock sub-search. Below is the average sentiment in each year, and the standard deviation is reported in ()

Data Availability Statement: The data underlying this article will be shared on reasonable request to the corresponding author.

Acknowledgement: The authors acknowledge financial support from Purdue University's Center for Animal Welfare Science. This activity was funded in part by Purdue University as part of AgSEED Crossroads funding to support Indiana's Agriculture and Rural Development. Further, the authors appreciate the support of Dr. Candace Croney, Center for Animal Welfare Science Director, in providing inspiration for this research. The authors would also like to thank Michael Smith, Sachina Kida, Anam Ali and Luke Grieser for their help during the data collection process.

References

Animal Welfare Institute. (2023). *US Senators Urge USDA to Address Misleading Food Label Claims*. https://awionline.org/press-releases/us-senators-urge-usda-address-misleading-food-label-claims

Baldwin, E. (1993). The Case for Animal Research in Psychology. *Journal of Social Issues*, *49*(1), 121–131. https://doi.org/10.1111/j.1540-4560.1993.tb00912.x

Bellware, K. (2021, February 23). Police had no legal reason to place Elijah McClain in chokehold, probe of death finds. *The Washington Post*. https://www.washingtonpost.com/nation/2021/02/23/elijah-mcclain-investigation/

Brown, A. (2023). *About half of U.S. pet owners say their pets are as much a part of their family as a human member*. Pew Research Center. https://www.pewresearch.org/short-reads/2023/07/07/about-half-us-of-pet-owners-say-their-pets-are-as-much-a-part-of-their-family-as-a-human-member/#:~:text=Most Americans (62%25) own,new Pew Research Center survey.

Byrd, E., Widmar, N. O., & Fulton, J. (2017). Of fur, feather, and fin: Human's use and concern for non-human species. *Animals*, *7*(3). https://doi.org/10.3390/ani7030022

Campa, A. (2023, July 20). Facing shutdown, shelter feared worst for 80 dogs, cats. They just got a second chance. *Los Angeles Times*. https://www.latimes.com/california/story/2023-07-20/oxnard-animal-shelter-spared-closure-ventura-county-saving-80-dogs-cats

Chicken Watch. (2024). *Progress Tracker*. https://chickenwatch.org/progress-tracker/

Croney, C. C., & Millman, S. T. (2007). Board-invited review: The ethical and behavioral bases for farm animal welfare legislation. *Journal of Animal Science*, *85*(2), 556–565. https://doi.org/10.2527/jas.2006-422

Fifer, S., Rose, J., & Greaves, S. (2014). Hypothetical bias in Stated Choice Experiments: Is it a problem? And if so, how do we deal with it? *Transportation Research Part A: Policy and Practice*, *61*, 164–177. https://doi.org/10.1016/j.tra.2013.12.010

Furnham, A., McManus, C., & Scott, D. (2003). Personality, empathy and attitudes to animal welfare. *Anthrozoos*, *16*(2), 135–146. https://doi.org/10.2752/089279303786992260

Hanrahan, R. (2024, January 3). California's Proposition 12 Takes Full Effect. *Farm Policy News*. https://farmpolicynews.illinois.edu/2024/01/californias-proposition-12-takes-full-effect/

Hattam, J. (2021, March 18). They see them as fellow citizens': How Istanbul's street dogs have found a place in society. *The Washington Post*. https://www.washingtonpost.com/travel/2021/03/18/istanbul-turkey-dogs-stray-documentary/

Heleski, C. R., Mertig, A. G., & Zanella, A. J. (2006). Stakeholder attitudes toward farm animal

welfare. *Anthrozoos*, *19*(4), 290–307. https://doi.org/10.2752/089279306785415439
Heleski, C. R., & Zanella, A. J. (2006). Animal science student attitudes to farm animal welfare. *Anthrozoos*, *19*(1), 3–16. https://doi.org/10.2752/089279306785593883
Hensher, D. A. (2010). Hypothetical bias, choice experiments and willingness to pay. *Transportation Research Part B: Methodological*, *44*(6), 735–752. https://doi.org/10.1016/j.trb.2009.12.012
Jacobo, J., & Torres, E. (2020, January 31). "World's Worst Cat" has been adopted at North Carolina animal shelter. *ABC News*. https://abcnews.go.com/US/worlds-worst-cat-adoption-north-carolina-animal-shelter/story?id=68459793
Jung, J., Tao, J., & Widmar, N. O. (2022). Quantifying "local food" online and social media in the United States for 2018–2021. *Agriculture and Food Security*, *11*(1), 1–13. https://doi.org/10.1186/s40066-022-00397-y
Kilders, V., & Ali, A. (2024). Understanding the influence of end-users on the acceptance of gene edited foods and sensitivity to information. *Food Quality and Preference*, *120*(November 2023), 105238. https://doi.org/10.1016/j.foodqual.2024.105238
Kilders, V., & Caputo, V. (2021). Is Animal Welfare Promoting Hornless Cattle? Assessing Consumer's Valuation for Milk from Gene-edited Cows under Different Information Regimes. *Journal of Agricultural Economics*, *72*(3), 735–759. https://doi.org/10.1111/1477-9552.12421
Knight, S., Vrij, A., Bard, K., & Brandon, D. (2009). Science versus human welfare? Understanding attitudes toward animal use. *Journal of Social Issues*, *65*(3), 463–483. https://doi.org/10.1111/j.1540-4560.2009.01609.x
Lusk, J. L. (2017). Consumer research with big data: Applications from the food demand survey (foods). *American Journal of Agricultural Economics*, *99*(2), 303–320. https://doi.org/10.1093/ajae/aaw110
Lusk, J. L., & Norwood, F. B. (2011). Animal welfare economics. *Applied Economic Perspectives and Policy*, *33*(4), 463–483. https://doi.org/10.1093/aepp/ppr036
Mahoney, J. A., Widmar, N. J. O., & Bir, C. L. (2020). #GoingtotheFair: A social media listening analysis of agricultural fairs. *Translational Animal Science*, *4*(3), 1–13. https://doi.org/10.1093/tas/txaa139
McKendree, M. G. S., Croney, C. C., & Widmar, N. O. (2014a). Bioethics symposium II: Current factors influencing perceptions of animals and their welfare. *Journal of Animal Science*, *92*(5), 1821–1831. https://doi.org/10.2527/jas.2014-7586
McKendree, M. G. S., Croney, C. C., & Widmar, N. O. (2014b). Effects of demographic factors and information sources on United States consumer perceptions of animal welfare. *Journal of Animal Science*, *92*(7), 3161–3173. https://doi.org/10.2527/jas.2014-6874
Neuhofer, Z. T., Lusk, J. L., & Villas-Boas, S. (2023). Can a sustainability facts label reduce the halo surrounding organic labels? *Applied Economic Perspectives and Policy*, *November 2022*, 1–31. https://doi.org/10.1002/aepp.13350
O'Kane, C. (2022, January 5). Betty White famously loved animals. Fans are taking up the #BettyWhiteChallenge to donate to animal shelters in her honor. *CBS News*. https://www.cbsnews.com/news/bettywhitechallenge-animal-shelter-donations/
Ortega, D. L., & Wolf, C. A. (2018). Demand for farm animal welfare and producer implications: Results from a field experiment in Michigan. *Food Policy*, *74*(November 2017), 74–81. https://doi.org/10.1016/j.foodpol.2017.11.006
Ortiz, A. (2023). *Shelter's Longest Resident Refuses To Leave Her Plush Toy Collection Behind*. The Dodo. https://www.thedodo.com/daily-dodo/shelters-longest-resident-refuses-to-leave-her-plush-toy-collection-behind
Passmore, S. (2023). *TV legend Bob Barker remembered fondly for animal activism in NorCal*. CBS News

Sacramento. https://www.cbsnews.com/sacramento/news/tv-legend-bob-barker-remembered-fondly-for-animal-activism-in-norcal/
Paul, A. S., Lusk, J. L., Norwood, F. B., & Tonsor, G. T. (2019). An experiment on the vote-buy gap with application to cage-free eggs. *Journal of Behavioral and Experimental Economics* , *79*(February), 102–109. https://doi.org/10.1016/j.socec.2019.02.005
Penn, J. M., & Hu, W. (2018). Understanding hypothetical bias: An enhanced meta-analysis. *American Journal of Agricultural Economics*, *100*(4), 1186–1206. https://doi.org/10.1093/ajae/aay021
Scarpa, R., Campbell, D., & Hutchinson, W. G. (2007). Benefit estimates for landscape improvements: Sequential Bayesian design and respondents' rationality in a choice experiment. *Land Economics*, *83*(4), 617–634. https://doi.org/10.3368/le.83.4.617
State of California. (2022). *Proposition 12 - Farm Animal Confinement*. https://www.cde.ca.gov/ls/nu/fd/mb-fdp-03-2022-a.asp
Sutherland, E., Jones, D., Granger, A., & Craig, A. (2023). *Deceptive Consumer Labels*. https://awionline.org/sites/default/files/uploads/documents/Deceptive-Consumer-Labels-2023.pdf
Tonsor, G. T., & Olynk, N. J. (2011). Impacts of Animal Well-Being and Welfare Media on Meat Demand. In *Journal of Agricultural Economics* (Vol. 62, Issue 1, pp. 59–72). https://doi.org/10.1111/j.1477-9552.2010.00266.x
USDA. (2023). *USDA Launches Effort to Strengthen Substantiation of Animal-Raising Claims*. https://www.usda.gov/media/press-releases/2023/06/14/usda-launches-effort-strengthen-substantiation-animal-raising
Van Loo, E. J., Caputo, V., Nayga, R. M., Seo, H. S., Zhang, B., & Verbeke, W. (2015). Sustainability labels on coffee: Consumer preferences, willingness-to-pay and visual attention to attributes. *Ecological Economics*, *118*, 215–225. https://doi.org/10.1016/j.ecolecon.2015.07.011
Van Loo, E. J., Caputo, V., Nayga, R. M., & Verbeke, W. (2014). Consumers' valuation of sustainability labels on meat. *Food Policy*, *49*(P1), 137–150. https://doi.org/10.1016/j.foodpol.2014.07.002
Vera, A. (2020, June 27). Colorado protesters shut down highway calling for justice in the death of Elijah McClain. *CNN*. https://www.cnn.com/2020/06/27/us/colorado-protest-elijah-mcclain/index.html
Widmar, N. O., Bir, C., Lai, J., & Wolf, C. (2020a). Public perceptions of veterinarians from social and online media listening. *Veterinary Sciences*, *7*(2), 1–12. https://doi.org/10.3390/VETSCI7020075
Widmar, N. J. O., Bir, C., Long, E., & Ruple, A. (2021). Public perceptions of threats from mosquitoes in the US using online media analytics. *Pathogens and Global Health*, *115*(1), 40-52.
Widmar, N. O., Bir, C., Wolf, C., Lai, J., & Liu, Y. (2020b). #Eggs: social and online media-derived perceptions of egg-laying hen housing. *Poultry Science*, *99*(11), 5697–5706. https://doi.org/10.1016/j.psj.2020.07.011