

Exotic pet trade in Canada: The influence of social media on public sentiment and behaviour

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ABSTRACT

The live trade in wild animals can increase the risk of escape of exotic animals, introduce invasive species, spread zoonotic diseases, over-exploit wild populations, and harm animal welfare. Trade in exotic pets is a particularly understudied issue in Canada. While Canadians generally have pro-environmental attitudes, it is unclear whether this extends to the trade in exotic animals. With most Canadians on social media, we aimed to use Natural Language Processing of social data to examine public sentiment towards exotic pet trade in Canada. We analysed 9,274 posts on Twitter (now 'X') about exotic pets between 2012 and 2022, and 150,236 comments from 2568 TikTok videos showing exotic pets from 50 unique Canadian accounts. We found that social media users demonstrate markedly positive attitudes towards the live trade in reptiles and amphibians, mammals, birds, and arachnids and insects, even on TikTok videos showing poor animal care and questionable legality. We propose a conceptual framework for how exotic pet influencers directly and indirectly contribute to increased demand for exotic pets through opinion leadership, sharing information on where to buy exotic pets, and normalising exotic pet ownership. We suggest that it is important to raise public awareness among social media users about the challenges associated with wildlife trade, including animal welfare considerations, and the links between exotic pet trade and conservation.

1. Introduction

Though exotic pet trade remains an under-documented issue, demand for exotic pets has increased in popularity in recent decades (Bush et al., 2014; Lockwood et al., 2019; Marshall et al., 2020; McMillan et al., 2021; Romero-Vidal et al., 2023). Thousands of vertebrate species are traded without regulatory protections (Marshall et al., 2020). For example, the international trade for over roughly 90 % of known reptile species is under-regulated, and research has found that the majority of live reptiles in trade are wild-sourced (Marshall et al., 2020). Technology has been described as a “double-edged sword” with regards to unsustainable wildlife trade, in that it can enable and exacerbate the problem, while also presenting solutions (Cochrane and Glasson, 2022). This also applies to social media in particular. Public awareness and interest in conservation programs is a prerequisite to their success (Jarić et al. 2020; Jarić et al., 2023), making social media a potentially powerful tool. Seeing exotic pets on social media may be beneficial for public education, nurturing interest, and dispelling prejudice (Nekaris et al., 2013; Pasmans et al., 2017). Pet ownership can also confer

positive benefits to owners' mental health and wellbeing (Pasmans et al., 2017). Furthermore, having pets at home is associated with more positive attitudes and knowledge of wild animals among children (Prokop and Tunnicliffe, 2010).

On the other hand, illegal and/or unsustainable trade in exotic pets is increasingly occurring in the virtual environment, facilitated by social media platforms and e-commerce websites (e.g., Siriwat and Nijman, 2018; Sung et al., 2021). Issues that are associated with increased trade in exotic animals include the risks of escape of animals, the spread of zoonotic diseases, and the release of invasive species, which can damage native wildlife and habitats (Chomel et al., 2007; Lockwood et al., 2019; Warwick et al., 2018; Dobson et al., 2020). A lack of awareness and understanding of exotic pet keeping is also a common issue, particularly among novice keepers who may lack a thorough understanding of the adult size of the animals they are purchasing, or the animal's temperaments, care requirements, and the money and resources required for upkeep (Nekaris et al., 2016; Grant et al., 2017; Pasmans et al., 2017; Warwick et al., 2018). As a result, the exotic pet trade can also be associated with animal suffering and welfare concerns (e.g., Nekaris

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et al., 2016; Martin et al., 2018; Warwick et al., 2018; Green et al., 2020). Exotic animals may be kept in stressful, unsafe, uncomfortable, and unsanitary homes or enclosures (Baker et al., 2013; Quarles et al., 2023). Animals involved in the pet trade can be affected by disease, injury, anxiety, fear, pain, distress, food and water deprivation, and malnutrition (Baker et al., 2013; Grant et al., 2017; Pasmans et al., 2017; Warwick et al., 2018). They may have poor physical health, such as stunted development, as well as poor wellbeing and mental conditions (Green et al., 2020). An additional issue related to high demand for exotic pets is that prospective buyers can be victims of non-delivery merchandise scams, where people pay in advance for the cost and delivery of exotic animals that never arrive (e.g., CBC, 2022). Finally, increased demand for exotic pets may lead to unsustainable exploitation of wild-caught specimens to supply breeders, traders and consumers (e.g., see Janssen and Leupen, 2019; Watters et al., 2022). Indeed, pet trade, both legal and illegal, can cause extreme declines on wild populations (Harris et al., 2017; Morton et al., 2021; Hughes et al., 2023). In short, certain aspects of exotic animal trade can present significant challenges to conservation, public health, and animal welfare.

Understanding public sentiment towards a conservation issue is important, as human behaviour is guided by social values, attitudes, and even conversations with each other (Manfredo et al., 2021; Hurst et al., 2023). Sentiment, in the context of this research, is a broad term that can refer to a person's opinions, emotions and attitudes towards an object (Liu, 2015). Sentiment can be differentiated from opinions, in that a sentiment is a settled opinion "reflective of one's feelings" that is not open to dispute (Pang and Lee, 2008). Some scholars differentiate between attitudes and emotions (Jacobs and Vaske, 2019). Emotions can consist of feelings (e.g. happiness), expressive reactions (e.g., smiling, laughing), and behavioral tendencies (e.g., clicking the like button, or searching for pets online) (Vaske et al., 2021). Attitudes are positive or negative evaluations of an object (e.g., an exotic pet, a wildlife policy, or an event such as the escape of exotic animals) (Vaske et al., 2021). Aesthetic attitudes, or the physical attractiveness of a species, has long been thought to be positively related to support for conservation (Smith et al., 2012; de Pinho et al., 2014). Other attitudes, such as naturalistic (i.e., enjoying time in nature), or negativistic (i.e., disgust) play important roles in public perceptions of wildlife (Knight, 2008). Emotions may in some cases be more strongly related to support for wildlife than attitudes (Vaske et al., 2021), although both are important determinants of support for conservation. Attitudes, emotions, and opinions all contribute to overall sentiment towards an entity (Liu, 2015).

Sentiment analysis is a computational technique which measures the subjective feelings in text, as well as their degree of subjectivity (Liu, 2015; Cambria et al., 2017). It is a popular research approach in the field of Natural Language Processing, a subset of artificial intelligence. Recognising public sentiment towards exotic pet trade is important, as sentiment is a key element linked to behaviour and decision-making (Castillo-Huitrón et al., 2020). Social media platforms present opportunities for millions of people to express their emotions and opinions towards different topics, ideas, and issues in real time. This makes social media platforms, such as Twitter (now rebranded as X), Facebook, YouTube, and TikTok, a great source of up-to-date social data for researchers.

In this regard, Canada presents an interesting and under explored area for research. Canadians generally have high awareness of the importance of addressing climate change and related environmental issues (Yang and Arhonditsis, 2022). However, it is unclear whether this concern extends to issues relating to wildlife trade. It is also unknown how many exotic animals are kept in Canada, as the issue has not been comprehensively studied. Yet live CITES-listed species are imported in large volumes every year, including wild-caught specimens (CITES, 2022). The exotic pet trade is a major factor for increasing wild animal imports in Canada (Hamers et al., 2023). In Canada, regulations governing exotic pet ownership differ by jurisdiction at both the provincial and municipal level (Farnese and Tigerstrom, 2012), perhaps

contributing to uncertainty and confusion about the legality of owning an exotic pet.

Canada has a highly connected online population, with a social media penetration rate of 89 % (Dixon, 2022). This makes analysing sentiment using publicly-available Canadian social media data a valuable research method. This study aims to answer the following research question: What is the sentiment of social media users towards the trade in exotic pets in Canada? We sought to answer this question using natural language processing to identify public sentiment on two popular social media platforms: Twitter/X and TikTok. There are a number of possible ways to define the term "exotic pet." For the purposes of this research, we consider an exotic pet to be a privately owned native or non-native species of animal that has had a relatively short history of domestication or that was captured in the wild, and that is kept in captivity within a household (henceforth referred to as "exotic pets"). Therefore, we include wild animals kept as pets that are native to Canada in our definition of exotic pets. We focus our attention here on terrestrial species (i.e., the present study excludes fish, corals, etc.). This can include species of birds, reptiles, amphibians, invertebrates, and mammals.

This study does not attempt to identify cases of illegal wildlife trade. As legality of online wildlife trade can be difficult to determine, even for experts, we gathered perceptions of social media users on all posts relating to exotic pet ownership and trade, regardless of legality. An additional research goal was to develop a conceptual framework for how exotic pet influencers may directly and/or indirectly facilitate further exotic pet trade.

2. Materials and methods

2.1. Generating search queries

To identify which species to search for on social media, we created a list of what are likely the most traded exotic pet species in Canada. This involved consulting experts, literature (e.g., World Animal Protection, 2019), and supplementing this information with the CITES trade database (CITES, 2022). We searched the CITES trade database for the most commonly traded live terrestrial animals in Canada for breeding, personal, or commercial purposes between 2012 and 2022. This resulted in a list of 48 species of Mammals, 84 species of Birds, 100 species of Reptiles & Amphibians, and 31 species of Arachnids & Insects. Importantly, our analysis focused on the classes of each animal, rather than the individual species. As such, the lists of species derived from reports and the CITES trade database were simply used to complement each other and ensure that our search was as comprehensive as possible in finding posts about trade and ownership of both listed and non-listed species of wildlife. We searched for each of these species' scientific names, and also included between one and seven common names per species, depending on how many are commonly used. In addition, we added broader search terms to maximise our results, such as, "big cat," "exotic pet," "parrot," "bird," "snake," etc.

2.2. Conducting searches

Searches on Twitter were conducted between December 13-17th 2022 using the official Twitter API Tweet Downloader with Academic access. We searched for Tweets, or X posts, that contained a species' name (scientific name OR common name), AND was geo located in Canada (place_country:CA), AND included words relating to pet ownership and trade (pet OR captive OR exotic OR pets OR buy OR sell OR sale). We limited our search to tweets from January 1st 2012 to December 13th 2022, a period of 4000 days (almost 11 years). We conducted the searches separately by the class of each species (i.e., separate searches by Mammalia, Aves, Reptilia & Amphibia (combined), and Insecta & Arachnida (combined)). We then labelled the results accordingly and concatenated the files into one dataset of Tweets that

were labelled by each of these four categories.

TikTok accounts were also scraped for comments with no start date limitations until December 30th, 2022, so the effective search window was just over four years (from Tik Tok's inception in August 2018). The accounts for scraping were first manually identified by searching TikTok using a condensed version of the key words list because the platform does not have an advanced search function like Twitter. For example, instead of searching for the exact phrase "Mexican rustleg tarantula" AND (pet OR captive OR exotic OR pets OR buy OR sell OR sale) AND place_country:CA, like we did on Twitter, we simply searched for "tarantula" AND "Canada." This involved 79 individual searches on TikTok. We included TikTok accounts from exotic pet owners, traders, stores, and handlers that were located in Canada. Comments in French were translated into English using the Google Translate function in Google Sheets and included. We excluded videos and accounts from accredited zoos and licensed wildlife rescue facilities. We also excluded wild-domestic hybrid species, such as Bengal cats or wolf dogs.

TikTok pages dedicated to exotic pets in Canada were manually identified in December 2022. We found 42 highly relevant TikTok accounts comprising 2560 videos that were used for comment scraping. We also identified 8 TikTok videos that were highly related to exotic pets in Canada, but from accounts that otherwise did not focus on exotic pets, and so the comments from these videos were scraped individually, while the rest of the accounts' videos were excluded. The total number of TikTok videos scraped was 2568 from 50 unique accounts. Scraping on TikTok was done using a tool called Export Comments.

2.3. Data cleaning

The dataset of Tweets initially contained 14,748 Tweets. We then assessed the dataset and used a cleaning function to drop all rows containing key words relating to potential unintentional inclusion (such as "teddy bear", "#art", "NFT", etc.). After cleaning, 9,274 Tweets were included. The dataset of TikTok comments contained 150,236 comments, which were all considered relevant as they were all comments made on videos that were hand-selected as relevant. We also used a dictionary to translate abbreviations to their true meanings (e.g., "u" changed to "you", and "lol" changed to "laughing out loud", etc.). We also translated the emojis of TikTok comments, as many comments on videos were entirely composed of emojis. (e.g., happy face emojis changed to "happy", the heart emojis changed to "love", and the angry emojis changed to "angry", etc.). We then cleaned up the individual comments/Tweets by removing links, @usernames, hashtags, and numbers.

2.4. Sentiment analysis

We then analysed sentiment on the cleaned Tweets and TikTok comments using TextBlob (Loria, 2018), a Python library for various Natural Language Processing tasks. TextBlob analyses input text and computes both a polarity metric and a subjectivity metric. Polarity is a float that lies within the range [-1.0, 1.0] (Loria, 2018). Negative polarity values indicate negative sentiment, while positive values indicate positive sentiment, and 0 indicates neutral sentiment. The subjectivity is a float within the range [0.0, 1.0] (Loria, 2018). A subjectivity value of 0.0 is considered to be very objective and factual, while 1.0 is very subjective and opinionated, and can denote strong emotions and personal judgements. Based on the overall sentiment score, tweets and comments were assigned an overall sentiment of positive, negative, or neutral sentiment to determine how the person feels about exotic animal ownership.

In our dataset, examples of neutral sentiment tweets/comments included: "This one looks just like mine"; "What species is this?"; "These are native to Australia"; "What kind of cage do you have?". Examples of positive sentiment tweets/comments include: "I love him! So cute"; "Aww I want one"; "Such beautiful eyes"; "You're so lucky." Examples of

negative sentiment tweets/comments include: "Humans are the worst"; "This is cruel. These animals belong in the wild"; "These animals should be banned as pets"; "These are not meant to be domestic pets."

Using Python in Jupyter Notebook, we created a data column for "count" and aggregated the data by year, class of animal, and sentiment, to determine the total numbers of positive, negative, and neutral tweets/comments for each of these aggregations. We also conducted a chi-square test (χ^2) to determine whether negative, neutral, or positive sentiment is associated with the class of animal (Arachnida & Insecta, Aves, Mammalia, or Reptilia & Amphibia). All data analysis, including creating plots, was carried out using Python.

In this paper we explore the sentiment of social media users towards the ownership of exotic animals in Canada using social media data from Twitter and TikTok. As the data used in this study were publicly available, this study was exempt from review for ethical approval. We present our results as aggregate data and general trends, and therefore do not display any information which could identify individual social media users.

3. Results

3.1. Exotic pets in Canada: General observations

We found Canadian accounts posting about ownership of a large variety of wildlife species. A number of venomous animals were kept as pets, including Canadian black widow spiders (*Latrodectus* spp.), mangrove snakes (*Boiga dendrophila*), southern copperhead snakes (*Agkistrodon contortrix contortrix*), western hognose snakes (*Heterodon nasicus*), Madagascar cat snake (*Madagascarophis colubrinus*), false water cobra (*Hydrodynastes gigas*), Gila monsters (*Heloderma suspectum*), Mexican west coast rattlesnake (*Crotalus basiliscus*), Saharan sand vipers (*Cerastes vipera*), and black throated monitors (*Varanus albigularis microstictus*). We also found posts showcasing ownership of animals that are likely to be considered "cute" by most viewers, but that might be high-maintenance to meet their minimum welfare needs and therefore be difficult to take care of, such as sugar gliders (*Petaurus breviceps*), lions (*Panthera leo*), tigers (*Panthera tigris*), servals (*Leptailurus serval*), caracals (*Caracal caracal*), and primates such as monkeys, gibbons, and lemurs, to name a few.

There were also videos showing ownership of native Canadian wildlife, such as foxes (*Vulpes vulpes*), raccoons (*Procyon lotor*), lynxes (*Lynx canadensis*), snapping turtles (*Chelydra serpentina*), and skunks (*Mephitis mephitis*). Other videos showed unboxing videos of animals that were shipped from abroad, such as a mossy leaf-tailed gecko (*Uroplatus sikorae*) from Madagascar, which is listed in CITES Appendix II (CITES, 2023). One video specifically noted that the animal was originally wild caught (a Chinese water dragon (*Physignathus cocincinus*; Vulnerable; VU)). Many other species shown by Canadian owners are endangered or near threatened in the wild with decreasing populations, such as: the black-breasted leaf turtle (*Geoemyda spengleri*; Endangered; EN), yellow-spotted newt (*Neurergus crocatus*; VU), Natal Midlands dwarf chameleon (*Bradypodion thamnobates*; EN), Sakishima grass lizard (*Takydromus dorsalis*; EN), mossy New Caledonian gecko (*Mniarogekko chahoua*; VU), Chinese crocodile lizard (*Shinisaurus crocodilurus*; EN), Java sparrow (*Padda oryzivora*; EN), Bocourt's arboreal alligator lizard (*Abronia vasconcelosii*; VU), central Fijian banded iguana (*Brachylophus bulabula*; EN), red footed tortoise (*Chelonoidis carbonarius*; VU), Burmese python (*Python bivittatus*; VU), Günther's flat-tail gecko (*Uroplatus guentheri*; EN), African spurred tortoise (*Centrochelys sulcata*; EN), Madagascan velvet gecko (*Blaesodactylus boivini*; VU), and the Crested gecko (*Correlophus ciliatus*; VU). When asked in the comments, most posters on social media claimed their animals were either 'rescued' (but are not from licensed wildlife rescue facilities) or bought from 'reputable breeders.'

3.2. Sentiment

Whether people perceive exotic animal trade as negative, neutral, or positive is weakly but significantly associated with the class of animal (Arachnida & Insecta, Aves, Mammalia, or Reptilia & Amphibia; Figs. 1, 2) ($\chi^2(6, n = 150,236) = 3265.06, \alpha = 0.05, V = 0.104, p < 0.0001$). Reptiles and amphibians were the most likely to be considered negatively, with 11 % of comments/posts expressing negative sentiment. TikTok comments for all classes of animal followed a similar pattern of being highly subjective (values close to 1.0) (Fig. 3). Following 1.0, the most common subjectivity value was 0.6, which denotes text that is fairly subjective. Many of the highly subjective and emotive discussions relating to reptiles and amphibians were regarding animal care and conditions. Sentiment analysis revealed that there is a clear culture of a “collectors’ mindset”, wherein consumers want to purchase more animals and more species, seemingly just for the purpose of having more animals. Many people had strong opinions about how these animals should be kept, and stated opinions about other social media posts when they felt animals were not being treated correctly. For example, a common concern was that animals were being kept in enclosures that were too small to meet minimum welfare standards. We found popular accounts that used “rack systems” (i.e. a series of plastic trays or drawers filled with containers), and even that claimed to use makeup containers to keep their exotic pets. This means that animals may have no day and night cycle, or no space to stretch, hide, climb, burrow, or practice other natural behaviours, and these aspects were frequently commented on by other social media users.

We found many examples of negative sentiments being expressed toward either the exotic pets themselves, or their care and conditions of ownership. For example, we found arguments between individuals on TikTok over normally ‘social’ animals being kept solitary, as well as the cohabitation of animals that should be kept separate or solitary. There were also birds with clipped flight feathers being walked on leashes. Arachnids and insects were the second most likely group of animals to be considered negatively, although rather than welfare concerns, this was mostly for reasons relating to fear and disgust. Mammals were the most likely to elicit comments/Tweets that express negative sentiment about the exotic animal trade and criticisms similar to ‘these animals belong in

the wild.’ It was much less likely to find comments about how birds, arachnids, or insects should be in the wild.

Despite these issues, the overwhelming majority of public sentiment towards exotic pet trade in Canada on both Twitter and TikTok was found to be positive, accompanied by a possible lack of critical thinking about the consequences of exotic pet trade. The number of Tweets that were positive about the exotic pet trade was higher than those that were negative across all included years (Fig. 4). We also noticed distinct examples of people anthropomorphizing animals on social media. Examples of this include people commenting: “Wow look how much she loves the spotlight;” or “aww those [reptiles/amphibians] look like they are smiling! They are so happy to see you!” (which would all be characterised as positive sentiment). Many of the people who claim to be animal rescuers in some videos made it clear in others that they are in fact breeders of exotic animals for commercial and entertainment purposes. Some of the account owners also claimed to be educators, yet conveyed limited information about animal species they owned to their viewers, with some even writing the wrong species names in video captions. Interestingly, we also found people using the #notapet hashtag on posts that appeared to depict treatment of wild animals as pets. This hashtag was created as part of a campaign by the Association of Zoos and Aquariums’ Wildlife Trafficking Alliance (WTA) and the International Fund for Animal Welfare (IFAW) to draw awareness to issues relating to the exotic pet trade and to help ensure that wild animals stay in the wild (www.notapet.net). However, the hashtag appears to be used occasionally by users to deflect attention, and possibly to avoid receiving too many questions from viewers wondering or criticizing ownership of a wild animal.

Sentiment analysis also revealed low awareness about the links between exotic animal trade and wildlife conservation. Based on their comments, not only were many people apparently unaware that exotic animal trade can harm wild populations, but many social media conversations centered on the belief that keeping animals in captivity is in fact beneficial to the survival of the species. Arguments were made such as, “literally all animals were wild once so by that logic, we shouldn’t own any pets. Most captive animals would also be dead in the wild,” ignoring the fact that humans have been domesticating and genetically altering through breeding some types of pets for over ten thousand

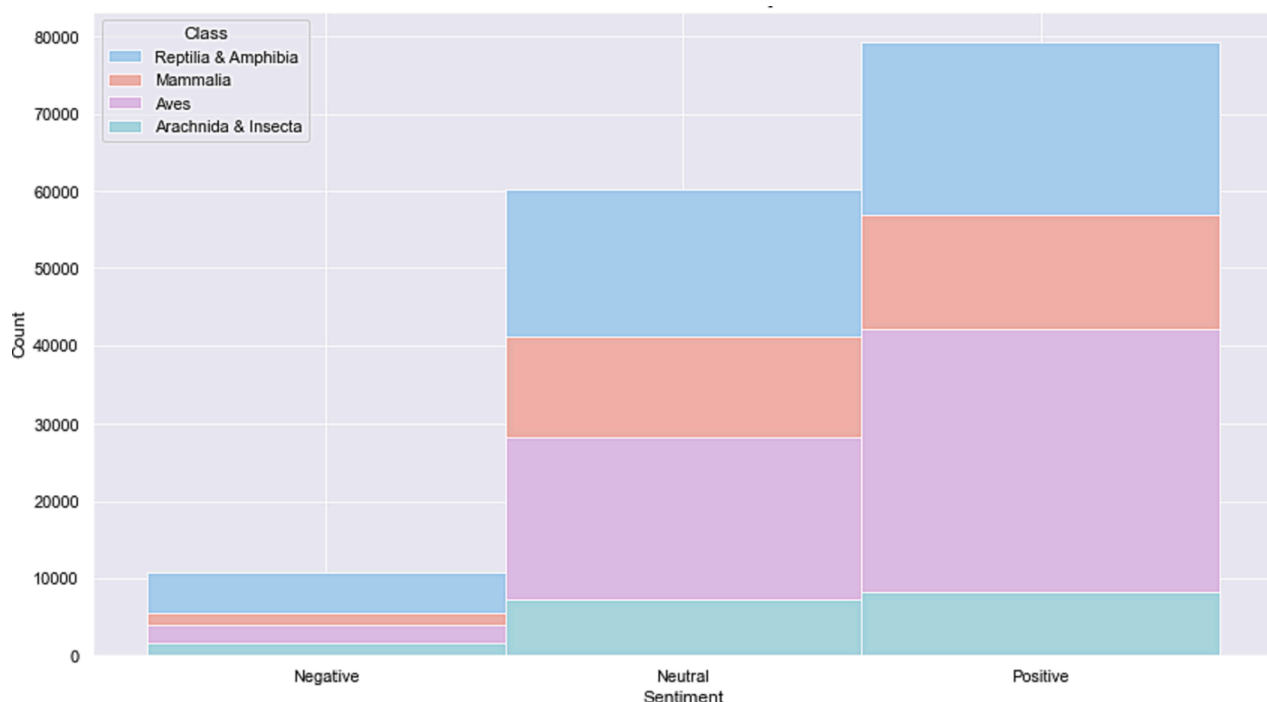


Fig. 1. Count of social media posts about exotic pets for each class of animal by sentiment (positive, neutral, and negative).

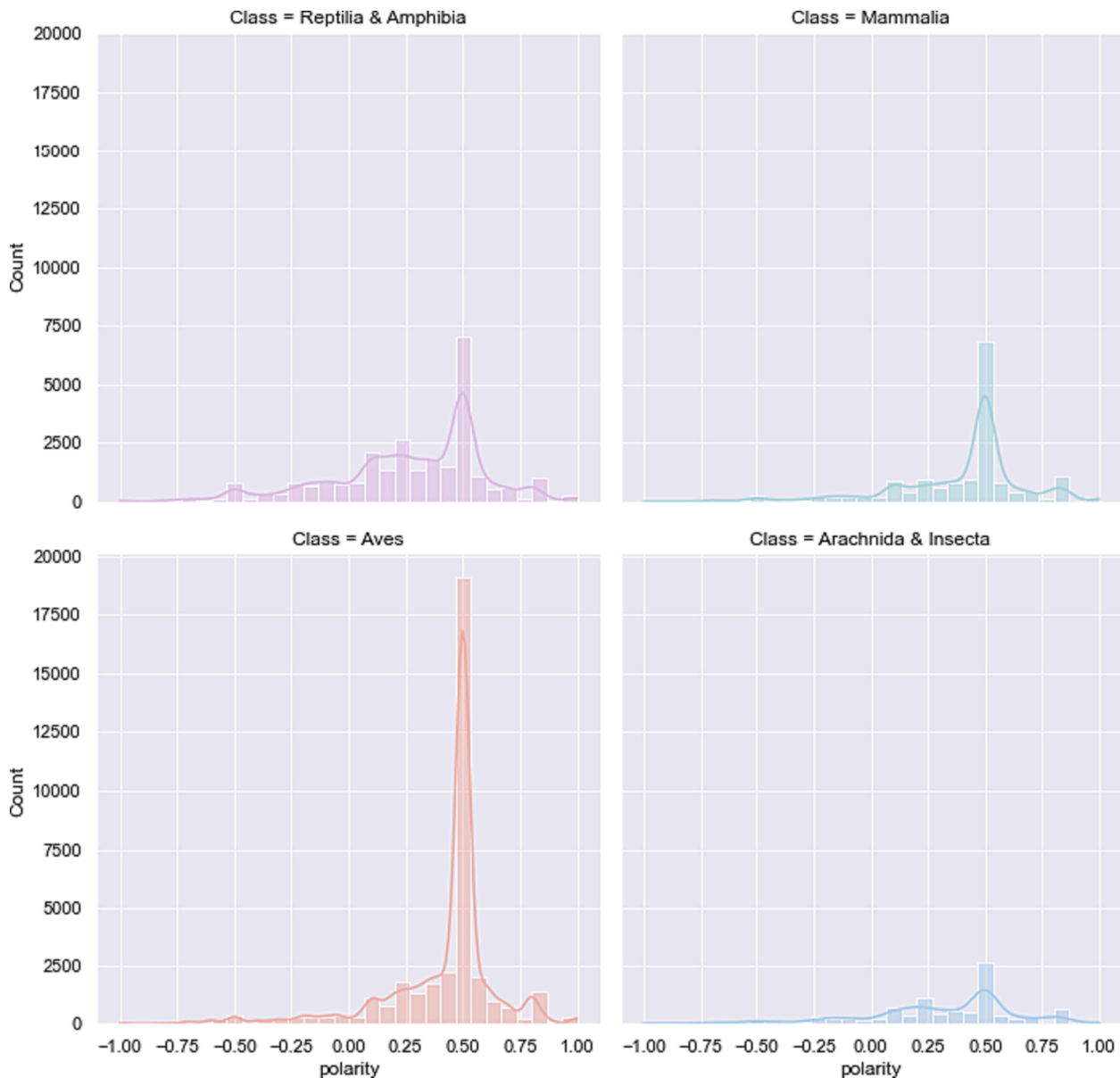


Fig. 2. Distribution of sentiment scores (polarity) for each class of animal.

years.

In over 150,000 TikTok comments, only 146 comments questioned the legality of owning the animal shown in the video. The comments that did mention legality expressed uncertainty and asked questions such as, “isn’t this illegal?”; “this feels illegal”; or “is it even legal to own one of these?” There were also misconceptions stated as facts, such as: “where I live in [Canadian city], it’s only illegal to own wild ducks”; or “it’s only illegal to own orcas and pit bulls”. TikTok commenters who had knowledge about bans or strict regulations, did not seem to express an understanding or acceptance of the justification for this legislation. Examples of this were statements such as, “they are illegal here for no reason at all”; “they are banned here. Talk about weird bylaws”; or “they are technically illegal thanks to our stupid legislation.” There were also commenters who openly expressed not caring about legality, such as, “they are illegal in [province] but can be found if you know where to look”; “unfortunately they are illegal, so it’s hard to find a supplier”; or “the biggest challenge is finding a vet once you buy an illegal pet.”

Overall, social media seems to be a powerful tool which can both normalise and facilitate exotic animal ownership. The facilitation role was a commonly seen sentiment in our datasets which showed up as

variations of the statement, “where can I get one?”; “wow that’s so cool, I didn’t know u could have one of those!”; “now I want one!”. Indeed, the phrase, “I want” emerged 5,119 times in the TikTok comments and 467 times in the Twitter dataset (e.g., “I want one”; “I want to get one”; “I want it”; “I want some”; or “I want a pet [type of animal]”). Similarly, the word, “get” emerged 5,518 times (e.g., “where did you get them”; “where can I get one”; “how did you get one?”; “I am going to get a [type of animal]”). In addition, the word, “buy” emerged 1,108 times (e.g., “I’m interested in buying one”; “can I buy one?”; “I am planning to buy one”). The common response to these comments was to request that they message the poster directly, suggesting that wildlife trade is being facilitated directly on these social media platforms.

4. Discussion

Our findings suggest that the overall sentiment on Twitter and TikTok towards the exotic pet trade in Canada is strongly positive. This mirrors the findings of previous studies that have analysed the sentiment and perceptions of commenters on TikTok, Instagram, and YouTube posts that depict primates and wild cats as pets (Moloney et al., 2021;

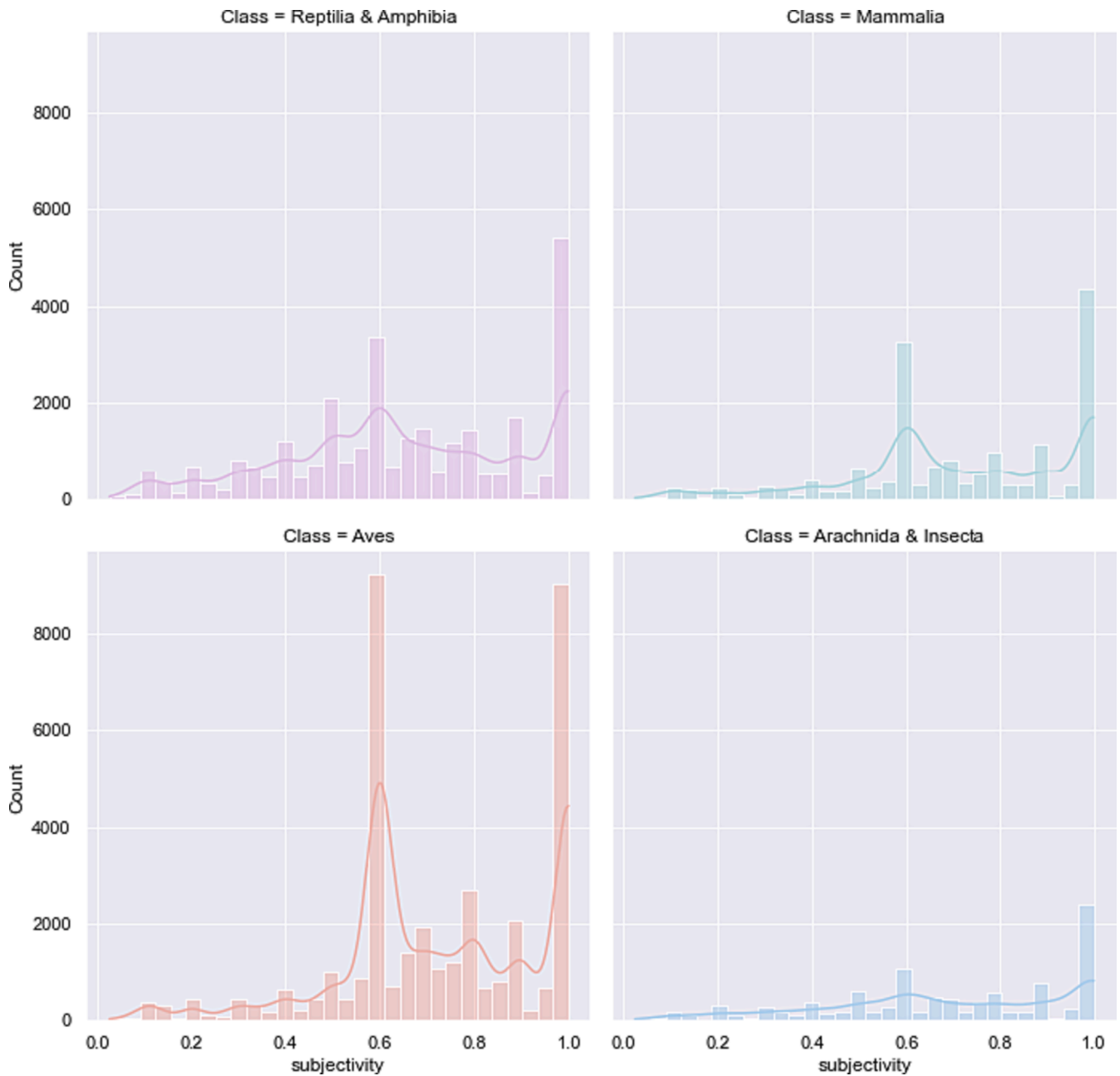


Fig. 3. Distribution of subjectivity for each class of animal.

Svensson et al., 2022). Though absolute numbers of both positive and negative sentiment tweets about exotic animals appear to have decreased throughout the COVID-19 pandemic period (Fig. 4), this is likely only a short-term effect as a result of supply chain issues, and demand for exotic pets is expected to increase again (Ribeiro et al., 2022). Social media appears to directly facilitate networking between exotic animal traders and prospective consumers. The perceived anonymity and wider reach that social media facilitates may make platforms such as TikTok increasingly popular tools to facilitate wildlife exploitation (Fiennes et al., 2023). In addition, through social media, people may become conditioned to want to own exotic pets due to the overwhelmingly positive sentiments being expressed, and the associated gains in likes, followers, and shares. This positive reinforcement may increase the behaviour intention to purchase exotic pets for the first time. Subsequent social media likes and positive comments may fan the positive reinforcement flames, leading a subset of owners to acquire more and more animals (the 'collectors', 'breeders' and 'educators') (see

Fig. 5).

The impact of the media on demand for pets is not a new phenomenon and has previously been termed the "Paris Hilton syndrome": there was a dramatic rise in popularity of the Chihuahua breed and then their mass abandonment to shelters from irresponsible pet owners after Paris Hilton's dog, Tinkerbell, rose to fame on a reality TV show (La Ganga, 2009). Other examples of media possibly influencing demand for pets include the after-effects of: '101 Dalmatians', 'Jurassic Park', 'Teenage Mutant Ninja Turtle', 'Finding Nemo', 'Harry Potter', and 'Zootopia', although empirical evidence about the strength of influence related to these films is limited (Megias et al., 2017; Siriwat et al., 2020; Veríssimo et al., 2020). The endorsement of viral exotic pet videos by prominent public personalities, or celebrities (i.e., people with many social media followers and views), can have powerful psychological effects that directly and indirectly encourage followers to desire an exotic pet (Nekaris et al., 2013).

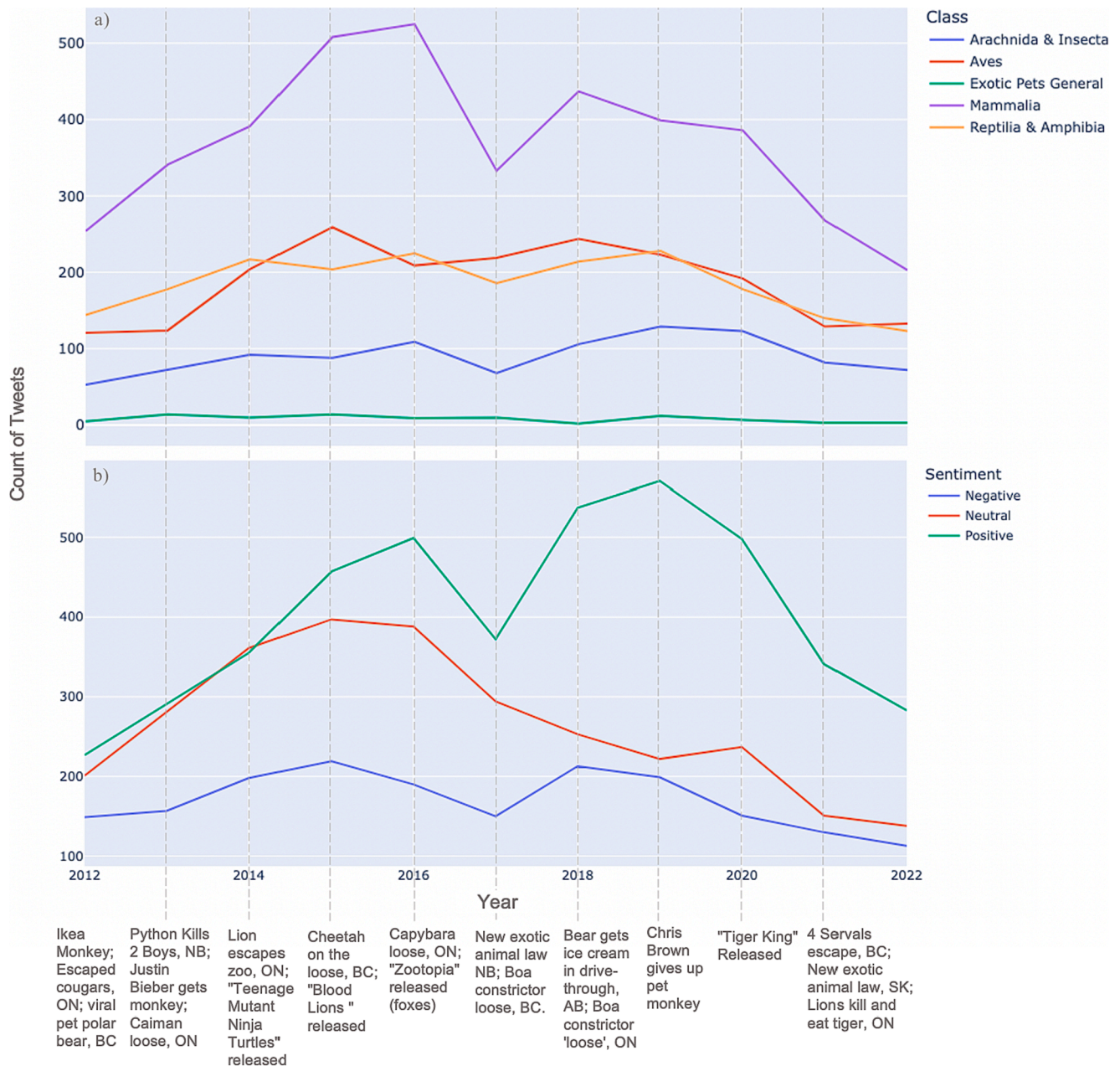


Fig. 4. Timeline showing tweets about exotic animal trade in Canada by (a) sentiment, and (b) class of animal. The timeline also shows when relatively high profile exotic pet stories emerged in Canadian media that may have impacted public sentiment.

4.1. Theoretical implications

Social media users are selectively exposed to the content that first meets their needs (Myers et al., 2022). People who follow pet influencers likely do so for entertainment purposes – such as for humor, memes, or “cute” imagery – and based on the enjoyment and affection they have for their own pets at home (Hänninen, 2021; Myers et al., 2022). Other important reasons for people to consume media produced by pet influencers are: curiosity by people who are considering purchasing a pet, and/or viewers who develop a parasocial relationship wherein they become invested in the life and story of a pet that is shown online (Hänninen, 2021). This is in contrast to other possible motivations for social media consumption, such as for the purposes of learning relevant information or gaining feelings of empowerment (Myers et al., 2022). The motivation of becoming invested in the lives of pets shown on social media, and feeling deep levels of affection for them, is an interesting one

as animals in the cute economy are commonly used as ‘props’ and ‘accessories’ to further one’s brand and self-expression (Langstone, 2022). Exotic pets are often presented using constructed anthropomorphised personalities that viewers uncritically buy into, including inventing a narration of an animal’s thoughts. However, the anthropomorphising of exotic animals can have the unintended consequence of misleading viewers into desiring them as pets (Hänninen, 2021). Viral video content may increase the number of social media users who want to own an exotic pet (Clarke et al., 2019). Furthermore, although it is unclear to what extent positive appraisal of exotic pets influences tendencies to actually buy and own them, psychology findings suggest that both integral emotions (from direct marketing contexts) and incidental emotions (from unrelated environmental factors, such as pet influencers) can shape consumers’ purchasing decisions (Achar et al., 2016).

Importantly, pet influencers are held in high esteem and demonstrate opinion leadership towards their viewers, which can result in a cascade

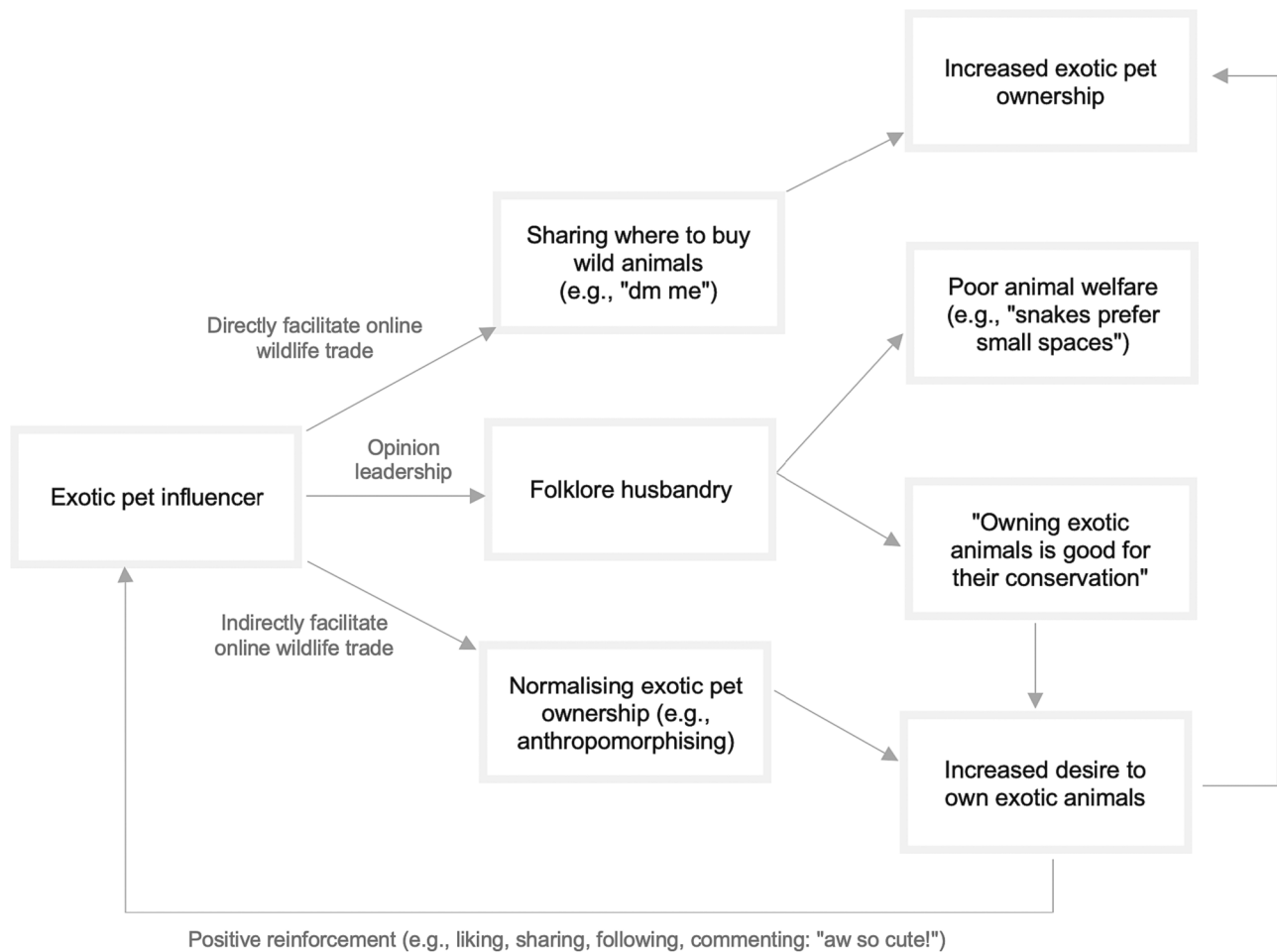


Fig. 5. Proposed conceptual framework for how exotic pet influencers can directly and indirectly facilitate further exotic pet trade.

of more followers and interactions with other social media users (Hänninen, 2021). Opinion leadership related to wild animals on social media is a cause for concern because of the emergence of “folklore husbandry” (Warwick, 2019; Mendyk and Warwick, 2023). Folklore husbandry refers to sharing bad (i.e., “unevidenced, pseudoscientific, convenience-led”) practice and opinions among animal keepers (Warwick, 2019). We found many exotic animal keeping ‘false facts’ that are unfounded and speculative, yet were perpetuated in our dataset, such as the notion that certain animals “thrive in small spaces.” Another notable example is the opinion that “trading and keeping exotic animals as pets is good for conservation because they are becoming endangered in the wild.” There was also the total absence of information, as online pet vendors typically do not provide information on the care requirements of the animal being sold (D’Cruze et al., 2020). Further, many people showed animals that they had purchased at pet expositions, which have little government oversight and often do not meet minimum welfare standards (D’Cruze et al., 2020). People also posted videos misrepresenting roadside zoo animals as pets, although most roadside zoos in Canada keep wild animals in inadequate conditions (WSPA, n.d). In the social media space, there is a clear need for more awareness raising on the links between exotic pet trade and conservation, as well as on dispelling common misconceptions about how to care for pets and therefore to support exotic animal welfare in Canada.

Recent research has suggested that the zoonotic disease risks of the COVID-19 pandemic may not have discouraged consumer demand for exotic pets (Ribeiro et al., 2022). However, experts have noted that this may be because the information reported on the origins of COVID-19 pathogen focused on wildlife consumed as food, rather than wildlife

kept as pets (Ribeiro et al., 2022). Moreover, one study found that information about the risk of zoonotic disease and legality information relating to owning a specific species is more likely to reduce consumer demand than information about animal welfare or its conservation in the wild (Moorhouse et al., 2017). Where unsustainable and harmful wildlife trade is facilitated by social media, more social-media based interventions may be needed.

Images and videos of pets are pervasive on social media and make up a substantial part of what has been termed the “cute economy” (Meese, 2014). Clearly, exotic pets are popular online among Canadians because people enjoy seeing how ‘pretty,’ ‘sweet,’ ‘adorable,’ ‘beautiful,’ ‘cool,’ and ‘precious’ they are (Figure S1). Although more companies, including TikTok, continue to join the Global Coalition Against Wildlife Trafficking Online, spearheaded by TRAFFIC, WWF, and IFAW, stemming online trade in wildlife remains a considerable challenge. It is important to critically examine the ubiquity of pet images and videos on social media platforms. Despite the potential harms to animals and conservation, large social media technology companies benefit from the free labour and site traffic generated by the cute economy. Within neoliberalism, cuteness is commodified, and posting images and videos of a person’s exotic pets can be considered a form of labour for social and capital gain (Maddox, 2021).

The increased visibility from posting on social media has been conceptualized as affecting the behaviour of those seeking acceptance through fear of public shaming (Langstone, 2022), and the overwhelmingly positive sentiment related to exotic pet trade may lead social media users to mimic that positivity rather than challenge it (Svensson et al., 2022). Online spaces generally lack a central authority

to monitor and delete content, and the ones that do find it difficult to keep pace with the rates that people post (Costello et al., 2017). Social media companies blocking suspicious or misleading posts is one critically important step, but users may just find increasingly creative ways to avoid detection and continue to trade. Given that the overall sentiment of viewers and followers of exotic pet owners is mostly positive, and this side of social media directly benefits the companies through increased traffic, there is little pressure for social media's representation of exotic pets to change. However, if social media users became more aware of the complexities and challenges relating to the live exotic animal trade, public sentiment can shift, and social media can become a place for collective efficacy, or informal community control and norms to emerge, and thus play a moderating role over this industry.

Collective efficacy beliefs refer to a group's shared belief that their actions can achieve their goals and have a positive impact, and that they can rely on mutual trust and expectations of pro-social behaviours (e.g., in this case, the belief that their interactions on social media can collectively discourage harmful wildlife trade) (Bandura, 1997; Sampson et al., 1997). Research on hate speech on Twitter has tentatively revealed that collective efficacy can be successful in countering antagonistic hate-related content (Ozalp et al., 2020). However, in the absence of formal high-quality communication channels for information, misinformation can satisfy the public who are motivated by uncertainty and anxiety to restore a sense of control (DiFonzo & Bordia, 2007). Social media users feel angered by misinformation when they are able to identify it, but feel happy and optimistic when they believe and then accept the misinformation (Al-Zaman, 2021). In other words, if trustworthy information is not available regarding the challenges relating to the exotic pet trade, social media users will happily accept misinformation provided by pet influencers. Therefore, addressing folklore husbandry and conservation misconceptions requires systematic and long term information interventions from trusted authorities, including subject matter experts, organisations, or popular influencers who wish to correct exotic pet trade misinformation. Community control over harmful narratives can occur in the presence of actors who are capable and willing to directly intervene on social media platforms (Costello et al., 2017; Ozalp et al., 2020). In the context of social media, this can occur when individuals witness a deviant or criminal act (e.g., posting harmful or illegal content about exotic pets), and intentionally enact social control to show that certain behaviour is not acceptable (e.g., critiquing the act in comments or replies). This can be positively reinforced: when people see other social media users intervening, and expressions of negative sentiment toward exotic pet trade become more normalised, they are more likely to do so themselves (e.g., Legros & Cislighi, 2020; Miškolci, Kováčová, & Rigová, 2018; Quarles, Feddema, Campera, & Nekaris, 2023).

4.2. Practical implications

Social media, and in particular, influencers that have many followers and views, can have an impactful role in anti-exotic pet trade messaging (Nekaris et al., 2013). In terms of possible additional interventions, research has shown that public messaging focused on invoking negative feelings of guilt and shame to change behaviour (e.g., anti-drinking campaigns) can be ineffective because people may become defensive as they process the information, which can inhibit persuasion (Duhachek et al., 2012). However, message framing can clearly impact effectiveness. So-called "gain frames" focus on the positives of successfully adapting to the situation while also moderating the behaviour (e.g., "Drink responsibly and remember a great time with friends") while "loss frames" focus on the negative consequences for not adapting (e.g., "Drink irresponsibly and risk doing something you'll regret") (Duhachek et al., 2012). Using a gain (rather than loss) message framing may be more effective because people who are already feeling guilt or shame are then motivated to process positive information to achieve success and personal growth through behaviour change. This could be tested in the

context of exotic pet trade to better understand whether gain frames (e.g., "Help protect endangered wildlife and public health by not posting, sharing and liking videos of exotic pets") or loss frames (e.g., "By supporting this activity, you are contributing to the over-exploitation of biodiversity, and encouraging the spread of zoonotic diseases") might be most effective.

Finally, other types of internet-based media, such as online newspapers and magazines, have an important role to play, especially when the barriers to posting information online have never been lower. A quick Google search of "exotic pets Canada" at the time of writing results in news articles of dubious authority highlighting the variety of "surprising" exotic pets that you can own in Canada. Many of these articles simply provide a list of animals that you can own in Canada, using positive or neutral wording, and without any warnings about the various issues relating to the exotic animal trade. As discussed above, consistent information interventions from trustworthy authorities are needed. Media coverage of issues can affect public opinions, perceptions of public opinions, and the development of social movements and collective actions (David, 2022). Digital news about wildlife trade in Canada can play an important role in informing the public about the complexities of the exotic pet trade, and in fostering awareness and engagement in policies to address the issue.

Other possible recommendations include harmonising provincial, territorial and municipal legislation across Canada regarding trade and ownership of exotic pets, especially given that much of the decision-making is left up to municipalities. A proposed Bill S-241, or The Jane Goodall Act, will amend both the Criminal Code and the Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act, and will create new legal protections regarding captive wildlife in Canada (BILL S-241, 2022). The Bill increases protection for over 800 species of wild animals, including big cats, primates, and dangerous reptiles. Bill S-241 also includes updated permitting requirements for acquiring and breeding wild animals, phasing out elephant captivity, banning new captivity of many species, and introducing new legislative protection against animal cruelty. The Bill is an important step forward, although even if it passes, the wildlife trade industry will remain under-regulated (Galvez, 2023).

4.3. Limitations and future research

This study has several methodological limitations, which should be addressed in future research. First, the results cannot be generalized to the Canadian population because the sample comprised only a subset of selected social media platforms. In addition, plants and other classes of animals, such as fish and corals, for example, were not included. Future studies should assess sentiment towards the trade in these taxonomic groups. There are also limitations associated with sentiment analysis more broadly. For instance, there are challenges with detecting sarcasm, when people write the opposite of what they mean (Liu, 2015; Birjali et al., 2021). Finally, although the Tweets were located in Canada, not all of the TikTok video commenters were Canadian: so as to not violate users' rights to privacy, we did not scrape the locations for individual commenters. Rather, an assumption of this study for the TikTok comments was that many commenters on posts from Canadian content creators were also Canadians. This also meant that we did not have demographic information, such as gender or age, that we could use to identify separate communities of opinion holders. However, beyond these limitations, this study has theoretical and practical value.

5. Conclusions

The poor regulation of the exotic pet trade and of wildlife content sharing on social media, and the lack of knowledge of exotic pet owners and prospective owners as expressed through their sentiment is cause for concern (Nekaris et al., 2013; Warwick et al., 2018; Clarke et al., 2019; Quarles et al., 2023). Natural Language Processing is a valuable way to

understand public perceptions of ideas and topics, and to keep track of trends. It could also be a useful tool to test the effectiveness of much-needed public awareness campaigns, and social media bias counter measures. Social media users have largely positive sentiment towards the exotic pet trade in Canada, even on videos showing poor animal care and questionable legality. Though sharing videos of exotic pets on social media platforms may increase interest in owning exotic pets, these platforms also provide valuable opportunities for increasing public education and awareness about wildlife trade concerns (Harrington et al., 2019). There is a clear need to improve awareness of exotic animal ownership and care, and the links between exotic animal trade and conservation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

This study used data collected from TikTok and Twitter. As social media users did not give consent for their data to be shared in a personally identifiable manner, it is not publicly available.

Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jnc.2023.126522>.

References

- Achar, C., So, J., Agrawal, N., & Duhachek, A. (2016). What we feel and why we buy: The influence of emotions on consumer decision-making. *Current Opinion in Psychology*, 10, 166–170.
- Al-Zaman, M. S. (2021). Social media and COVID-19 misinformation: How ignorant Facebook users are? *Heliyon*, 7(5), e07144.
- Baker, S. E., Cain, R., Van Kesteren, F., Zommers, Z. A., D'Cruze, N., & Macdonald, D. W. (2013). Rough trade: Animal welfare in the global wildlife trade. *BioScience*, 63(12), 928–938.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- BILL S-241. 2022. BILL S-241: First Session, Forty-fourth Parliament, 70-71 Elizabeth II, 2021-2022. Senate of Canada, Ottawa.
- Birjali, M., Kasri, M., & Beni-Hssane, A. (2021). A comprehensive survey on sentiment analysis: Approaches, challenges and trends. *Knowledge-Based Systems*, 226, Article 107134.
- Bush, E. R., Baker, S. E., & Macdonald, D. W. (2014). Global trade in exotic pets 2006–2012. *Conservation Biology*, 28(3), 663–676.
- Cambria, E., Das, D., Bandyopadhyay, S., & Feraco, A. (Eds.). (2017). *A practical guide to sentiment analysis*. Cham: Springer.
- Castillo-Huitrón, N. M., Naranjo, E. J., Santos-Fita, D., & Estrada-Lugo, E. (2020). The importance of human emotions for wildlife conservation. *Frontiers in Psychology*, 11, 1277.
- CBC. (2022). Ontario family says it lost thousands of dollars in 'absolutely sickening' exotic animals scam. Available at: <https://www.cbc.ca/news/canada/toronto/ontario-family-says-it-lost-thousands-of-dollars-in-absolutely-sickening-exotic-animals-scam-1.6420580>.
- Chomel, B. B., Belotto, A., & Meslin, F. X. (2007). Wildlife, exotic pets, and emerging zoonoses. *Emerging infectious diseases*, 13(1), 6.
- Cochrane, J., Glasson, A. 2022. A double-edged sword: The role of technology in combating wildlife crime. Available at: <https://enact-africa.s3.amazonaws.com/site/uploads/2022-06-13-tech-and-wildlife-policy-brief.pdf>.
- Costello, M., Hawdon, J., & Ratliff, T. N. (2017). Confronting online extremism: The effect of self-help, collective efficacy, and guardianship on being a target for hate speech. *Social Science Computer Review*, 35(5), 587–605.
- CITES. 2022. CITES Trade Database. Available at <https://trade.cites.org/>.
- CITES. 2023. Appendices I, II and III: Valid from 25 November 2023. Available at: <http://cites.org/eng/app/appendices.php>.
- Clarke, T. A., Reuter, K. E., LaFleur, M., & Schaefer, M. S. (2019). A viral video and pet lemurs on Twitter. *PloS one*, 14(1), e0208577.
- David, Y. (2022). Public opinion, media and activism: The differentiating role of media use and perceptions of public opinion on political behaviour. *Social Movement Studies*, 21(3), 334–354.
- D'Cruze, N., Paterson, S., Green, J., Megson, D., Warwick, C., Coulthard, E., ... Carder, G. (2020). Dropping the ball? The welfare of ball pythons traded in the EU and North America. *Animals*, 10(3), 413.
- de Pinho, J. R., Grilo, C., Boone, R. B., Galvin, K. A., & Snodgrass, J. G. (2014). Influence of aesthetic appreciation of wildlife species on attitudes towards their conservation in Kenyan agropastoralist communities. *PloS one*, 9(2), e88842.
- Dixon, S. 2022. Social media usage in Canada - Statistics & Facts. Available at: <https://www.statista.com/topics/2729/social-networking-in-canada/>.
- DiFonzo, N., & Bordia, P. (2007). *Rumor psychology: Social and organizational approaches*. Washington: American Psychological Association.
- Dobson, A. P., Pimm, S. L., Hannah, L., Kaufman, L., Ahumada, J. A., Ando, A. W., ... Kinnaird, M. F. (2020). Ecology and economics for pandemic prevention. *Science*, 369(6502), 379–381.
- Duhachek, A., Agrawal, N., & Han, D. (2012). Guilt versus shame: Coping, fluency, and framing in the effectiveness of responsible drinking messages. *Journal of Marketing Research*, 49(6), 928–941.
- Farnese, P., and Tigerstrom B.V. 2012. A Survey of Provincial, Territorial and Municipal Legislation for Exotic Animals. Public Health Agency of Canada.
- Fiennes, S., Anasari, S. D., & Hardianto, N. (2023). TikTok facilitating songbird trade in Indonesia. *Oryx*, 57(4), 420–421.
- Galvez, R. (2023). *Jane Goodall Bill: Bill to Amend—Second Reading—Debate Continued. Debates of the Senate (Hansard)*. Ottawa: Senate of Canada.
- Green, J., Coulthard, E., Megson, D., Norrey, J., Norrey, L., Rowntree, J. K., ... D'Cruze, N. (2020). Blind trading: A literature review of research addressing the welfare of ball pythons in the exotic pet trade. *Animals*, 10(2), 193.
- Grant, R. A., Montrose, V. T., & Wills, A. P. (2017). ExNOTic: Should we be keeping exotic pets? *Animals*, 7(6), 47.
- Hamers, M., Elwin, A., Collard, R. C., Shepherd, C. R., Coulthard, E., Norrey, J., ... D'Cruze, N. (2023). An analysis of Canada's declared live wildlife imports and implications for zoonotic disease risk. *FACETS*.
- Hänninen, C. 2021. Why does my neighbor's labradoodle have eight million followers on Instagram? Exploring pets as social media influencers. Thesis, Department of Marketing, Hanken School of Economics, Helsinki.
- Harrington, L., Macdonald, D., & D'Cruze, N. (2019). Popularity of pet otters on YouTube: Evidence of an emerging trade threat. *Nature Conservation*, 36.
- Harris, J.B.C., Tingley, M.W., Hua, F., Yong, D.L., Adeney, J.M., Lee, T.M., Marthy, W., Prawiradilaga, D.M., Sekercioglu, C.H., Suyadi and Winarni, N., 2017. Measuring the impact of the pet trade on Indonesian birds. *Conservation Biology*, 31(2), pp.394–405.
- Hughes, A., Auliya, M., Altherr, S., Scheffers, B., Janssen, J., Nijman, V., ... Edwards, D. P. (2023). Determining the sustainability of legal wildlife trade. *Journal of Environmental Management*, 341, Article 117987.
- Hurst, K. F., Sintov, N. D., & Donnelly, G. E. (2023). Increasing sustainable behavior through conversation. *Journal of Environmental Psychology*, 86, Article 101948.
- Jacobs, M., & Vaske, J. J. (2019). Understanding emotions as opportunities for and barriers to coexistence with wildlife. *Human-wildlife interactions: Turning conflict into coexistence*, 65–84.
- Janssen, J., & Leupen, B. T. (2019). Traded under the radar: Poor documentation of trade in nationally-protected non-CITES species can cause fraudulent trade to go undetected. *Biodiversity and conservation*, 28(11), 2797–2804.
- Jarić, I., Correia, R. A., Bonaiuto, M., Brook, B. W., Courchamp, F., Firth, J. A., ... Roll, U. (2023). Transience of public attention in conservation science. *Frontiers in Ecology and the Environment*. <https://doi.org/10.1002/fee.2598> (in press).
- Knight, A. J. (2008). "Bats, snakes and spiders, Oh my!" How aesthetic and negativistic attitudes, and other concepts predict support for species protection. *Journal of Environmental Psychology*, 28(1), 94–103.
- La Ganga, M.L. 2009. Animal shelters seeing glut of Chihuahuas. Los Angeles Times. Available at: <https://www.latimes.com/archives/la-xpm-2009-dec-10-la-me-chihuahuas10-2009dec10-story.html>.
- Langstone, D. (2022). 'Well, that's it! I might as well just die now': Animals and the reinforcement of stereotyped gender representation on social media. In *Feminist Animal Studies* (pp. 149–164). Routledge.
- Legros, S., & Cislighi, B. (2020). Mapping the social-norms literature: An overview of reviews. *Perspectives on Psychological Science*, 15(1), 62–80.
- Liu, B. (2015). *Sentiment Analysis: Mining opinions, sentiments, and emotions*. Cambridge: Cambridge University Press.
- Lockwood, J. L., Welbourne, D. J., Romagosa, C. M., Cassey, P., Mandrak, N. E., Strecker, A., ... Tlusty, M. F. (2019). When pets become pests: The role of the exotic pet trade in producing invasive vertebrate animals. *Frontiers in Ecology and the Environment*, 17(6), 323–330.
- Loria, S., 2018. Textblob Documentation. Release 0.16.0. Available online: <https://buildmedia.readthedocs.org/media/pdf/textblob/dev/textblob.pdf>.
- Maddox, J. (2021). The secret life of pet Instagram accounts: Joy, resistance, and commodification in the Internet's cute economy. *New media & society*, 23(11), 3332–3348.
- Manfredo, M. J., Berl, R. E., Teel, T. L., & Bruskotter, J. T. (2021). Bringing social values to wildlife conservation decisions. *Frontiers in Ecology and the Environment*, 19(6), 355–362.
- Marshall, B. M., Strine, C., & Hughes, A. C. (2020). Thousands of reptile species threatened by under-regulated global trade. *Nature communications*, 11(1), 4738.
- Martin, R. O., Senni, C., & D'Cruze, N. C. (2018). Trade in wild-sourced African grey parrots: Insights via social media. *Global Ecology and Conservation*, 15, e00429.
- McMillan, S. E., Dingle, C., Allcock, J. A., & Bonebrake, T. C. (2021). Exotic animal cafes are increasingly home to threatened biodiversity. *Conservation Letters*, 14(1), e12760.
- Meese, J. (2014). "It Belongs to the Internet": Animal Images, Attribution Norms and the Politics of Amateur Media Production. *M/C Journal*, 17(2). <https://doi.org/10.5204/mcj.782>

- Megias, D. A., Anderson, S. C., Smith, R. J., & Veríssimo, D. (2017). Investigating the impact of media on demand for wildlife: A case study of Harry Potter and the UK trade in owls. *PloS one*, 12(10), e0182368.
- Mendyk, R. W., & Warwick, C. (2023). Arbitrary Husbandry Practices and Misconceptions. In *Health and welfare of captive reptiles* (pp. 561–582). Cham: Springer International Publishing.
- Miškolci, J., Kováčová, L., & Rigová, E. (2018). Countering hate speech on Facebook: The case of the Roma minority in Slovakia. *Social Science Computer Review*, 38(2), 128–146.
- Moloney, G. K., Tuke, J., Dal Grande, E., Nielsen, T., & Chaber, A. L. (2021). Is YouTube promoting the exotic pet trade? Analysis of the global public perception of popular YouTube videos featuring threatened exotic animals. *Plos one*, 16(4), e0235451.
- Moorhouse, T. P., Balaskas, M., D'Cruze, N. C., & Macdonald, D. W. (2017). Information could reduce consumer demand for exotic pets. *Conservation Letters*, 10(3), 337–345.
- Morton, O., Scheffers, B. R., Haugaasen, T., & Edwards, D. P. (2021). Impacts of wildlife trade on terrestrial biodiversity. *Nature Ecology & Evolution*, 5(4), 540–548.
- Myers, S., Sen, S., Syrdal, H., & Woodroof, P. (2022). The impact of Persuasion knowledge cues on social media engagement: A look at pet influencer marketing. *Journal of Marketing Theory and Practice*, 1–18.
- Nekaris, K. A. I., Campbell, N., Coggins, T. G., Rode, E. J., & Nijman, V. (2013). Ticked to death: Analysing public perceptions of 'cute' videos of threatened species (slow lorises–*Nycticebus* spp.) on Web 2.0 Sites. *PloS one*, 8(7).
- Nekaris, K. A. I., Musing, L., Vazquez, A. G., & Donati, G. (2016). Is tickling torture? Assessing welfare towards slow lorises (*Nycticebus* spp.) within Web 2.0 videos. *Folia Primatologica*, 86(6), 534–551.
- Ozalp, S., Williams, M. L., Burnap, P., Liu, H. and Mostafa, M., 2020. Antisemitism on Twitter: Collective efficacy and the role of community organisations in challenging online hate speech. *Social Media+ Society*, 6(2), p.2056305120916850.
- Pang, B., & Lee, L. (2008). Opinion mining and sentiment analysis. *Foundations and Trends® in information retrieval*, 2(1–2), 1–135.
- Pasmans, F., Bogaerts, S., Braeckman, J., Cunningham, A. A., Hellebuyck, T., Griffiths, R. A., Sparreboom, M., Schmidt, B. R. and Martel, A., 2017. Future of keeping pet reptiles and amphibians: towards integrating animal welfare, human health and environmental sustainability. *Veterinary Record*, 181(17), pp.450–450.
- Prokop, P., & Tunnicliffe, S. D. (2010). Effects of having pets at home on children's attitudes toward popular and unpopular animals. *Anthrozoös*, 23(1), 21–35.
- Quarles, L. F., Feddema, K., Campera, M., & Nekaris, K. A. I. (2023). Normal redefined: Exploring decontextualization of lorises (*Nycticebus* & *Xanthonycticebus* spp.) on social media platforms. *Frontiers in Conservation. Science*, 4, 23.
- Ribeiro, J., Araújo, M. B., Santana, J., Strubbe, D., Vaz, A. S., & Reino, L. (2022). Impacts of the SARS-CoV-2 pandemic on the global demand for exotic pets: An expert elicitation approach. *Global Ecology and Conservation*, 35, e02067.
- Romero-Vidal, P., Toledo-González, B., Bunn, L., Blanco, G., Hiraldo, F., Bermúdez-Cavero, A. O., ... Tella, J. L. (2023). Poaching sources and trade routes in Peru and Ecuador warn of the unsustainable rural demand for preferred parrot species. *Conservation Science and Practice*, e12936.
- Sampson, R. J., Raudenbush, S. W., & Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *science*, 277(5328), 918–924.
- Siriwat, P., Nekaris, K. A. I., & Nijman, V. (2020). Digital media and the modern-day pet trade: A test of the 'Harry Potter effect' and the owl trade in Thailand. *Endangered Species Research*, 41, 7–16.
- Siriwat, P., & Nijman, V. (2018). Illegal pet trade on social media as an emerging impediment to the conservation of Asian otters species. *Journal of Asia-Pacific Biodiversity*, 11, 469–475.
- Smith, R. J., Veríssimo, D., Isaac, N. J., & Jones, K. E. (2012). Identifying Cinderella species: Uncovering mammals with conservation flagship appeal. *Conservation Letters*, 5(3), 205–212.
- Sung, Y. H., Lee, W. H., Leung, F. K. W., & Fong, J. J. (2021). Prevalence of illegal turtle trade on social media and implications for wildlife trade monitoring. *Biological Conservation*, 261, Article 109245.
- Svensson, M. S., Morcatty, T. Q., Nijman, V., & Shepherd, C. R. (2022). The next exotic pet to go viral Is social media causing an increase in the demand of owning bushbabies as pets? *Hystrix*, 33(1).
- Vaske, J. J., Miller, C. A., Pallazza, S., & Williams, B. (2021). Attitudes and emotions as predictors of support for wolf management. *Journal of Environmental Psychology*, 78, Article 101695.
- Veríssimo, D., Anderson, S., & Thlusty, M. (2020). Did the movie Finding Dory increase demand for blue tang fish? *Ambio*, 49, 903–911.
- Warwick, C. (2019). *Many animals across all classes are increasingly becoming victims of folklore husbandry*. Available: Improve Veterinary Practice. at: <https://www.veterinary-practice.com/article/many-animals-across-all-classes-are-increasingly-becoming-victims-of-folklore-husbandry>.
- Warwick, C., Steedman, C., Jessop, M., Arena, P., Pilny, A., & Nicholas, E. (2018). Exotic pet suitability: Understanding some problems and using a labeling system to aid animal welfare, environment, and consumer protection. *Journal of Veterinary Behavior*, 26, 17–26.
- Watters, F., Stringham, O., Shepherd, C. R., & Cassey, P. (2022). The US market for imported wildlife not listed in the CITES multilateral treaty. *Conservation Biology*, e13978.
- World Animal Protection. (2019). *Risky business: The unregulated exotic pet trade in Canada*. World Animal Protection.
- World Society for the Protection of Animals (WSPA). n.d. Barren Cages, Empty Lives: Roadside Zoos in Canada. WSPA, Toronto.
- Yang, C., & Arhonditsis, G. B. (2022). What are the primary covariates of environmental attitudes and behaviours in Canada? A national-scale analysis of socioeconomic, political, and demographic factors. *Ecological Informatics*, 69, Article 101661.