

Research article

## Professional primate keepers and online primate imagery: an assessment of knowledge and attitudes

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**Abstract**

In January 2021, the International Union for the Conservation of Nature's Primate Specialist Group Section for Human Primate Interactions (IUCN PSG SHPI) published best practice guidelines on the use of non-human primate imagery online. This paper explores the contribution of professional primate keepers to the detrimental online sharing of images involving humans and primates, and their knowledge and opinions towards this subject. A total of 421 primate keepers responded to an online questionnaire shared in March 2021, providing information about their use of primate imagery on social media platforms and sharing their understanding of scientific studies on this topic. Over half (56%) of primate keepers admitted to sharing images online of themselves and primates, that could be considered irresponsible. A complementary review of posts shared on Instagram™ under the hashtag #primatekeeper revealed that 64% of 128 images surveyed depicted primates in situations which prior research has shown to have negative consequences for primate conservation, in addition to affecting the way the public perceives the conservation status of species in such imagery. Of the respondents, 53% had not heard of the IUCN PSG SHPI, and 67% of primate keepers were unaware of the new guidelines published by the group. It is recommended that the best practice guidelines are disseminated to zookeepers directly through appropriate forums to ensure primate keepers are acting in line with the recommendations in the best practice guidelines, and that further research is conducted regarding human-primate two-shot images to better guide decisions made by primatologists and others working both in and ex situ with primates.

**Introduction**

Non-human primates (hereafter primates) are facing severe population declines with approximately 60% of all primate species now facing threat of extinction (Estrada et al. 2017). These declines are mainly due to anthropogenic threats, including habitat loss or degradation, pathogen transmission, and global and domestic trade for wild meat, entertainment and pets (Nijman et al. 2011; Estrada et al. 2017; Dunay et al. 2018). Trade in wildlife as pets has grown substantially in recent years (Bush et al. 2014; Norconk et al. 2019). Primates tend to be viewed as attractive pets due to their perceived cuteness and entertaining human-like behaviour, especially when still infants (Phillips et al. 2014; Estrada et al. 2017). The trade in primates as pets is a concern both for the welfare of the

individual animals (Soulsbury et al. 2008) and the conservation of the target species (Ceballos-Mago and Chivers 2010; da Silva et al. 2016). Outside primate range countries, the primate pet trade has become commercial, whereby individuals are purposefully bred in captivity to be sold (Soulsbury et al. 2008). However, the illegal hunting of live, wild primates for international and domestic trade continues and is a concern for the survival of wild primate populations (Borgerson 2015; Shanee et al. 2017; Bergin et al. 2018, Estrada et al. 2018). Social media is identified as playing an increasing role in fuelling the ongoing legal and illegal trade of primates (Nekaris et al. 2013; Siriwat et al. 2019), and research has shown that online images of primates in the presence of humans fuels the desire for primate pet ownership (Leighty et al. 2015; Clarke et al. 2019). It has also been found that live primates displayed in

anthropomorphic settings, or as caricatures, reduces the public's perception of the need to conserve the species (Ross et al. 2008; Ross et al. 2011).

Considering these findings, academics, conservationists and wildlife practitioners have called on primatologists to be more aware of the types of imagery they share online, specifically where they are interacting with primates (Norconk et al. 2019). In January 2021, the International Union for the Conservation of Nature's Primate Specialist Group Section for Human-Primate Interactions (IUCN-PSG-SHPI: <https://human-primate-interactions.org/>) released a new set of best practice guidelines regarding the responsible imagery of primates online (Waters et al. 2021). The best practice guidelines outline the potential consequences of sharing inappropriate primate imagery for primate conservation. The document is aimed at anyone who could encounter primates, both in and ex situ, but focuses on those perceived as experts, that is, practitioners who work with and/or study primates. These best practice guidelines have been translated into 24 languages (SHPI 2021). Distribution of the best practice guidelines has been carried out online through the IUCN PSG and SHPI's websites and social media channels, and the release attracted substantial media coverage.

Professional primate keepers (hereafter primate keepers) are in a unique position to be in close contact with the animals in their care, forming bonds with individual animals (Hosey and Melfi 2012). Such close contact creates the opportunity to take photos and videos of themselves interacting with primates. This

study aims to evaluate primate keepers' understanding of the issues around online primate imagery, their participation in this, and their future actions in response to the new best practice guidelines set out by IUCN-PSG-SHPI. It also aims to assess if employers provide guidelines for their employees' use of primate imagery on their private social media accounts, and if employees feel they are provided with the correct information from their employers regarding their role as primate keepers.

## Materials and methods

An online questionnaire was designed using Google forms™, which comprised of a mixture of multiple-choice, Likert scale, and open-ended questions. Data were collected on respondent demographics (age, gender, location and academic background), the types of online primate imagery respondents shared on social media and their reasons for doing so. The study also assessed the respondents' knowledge of scientific literature regarding primate conservation and ascertained their awareness of the IUCN-PSG-SHPI and the new best practice guidelines. The respondents were also shown the key recommendations from the new best practice guidelines and were asked to provide their feedback in response to these (Figure 1). Further, the study aimed to understand the respondents' feelings towards online primate imagery and their potential future actions in regard to the new best practice guidelines, using Likert-scale questions. The questionnaire was active 5–26 March 2021 and was shared on Facebook™, targeting

- Ensure you and/or your organisation have a code of conduct regarding the dissemination of imagery by staff, students and volunteers. Where relevant, ensure your marketing and public relations departments or any communications volunteers are fully informed of the code.
- Those who do not have control over ALL images of themselves, such as high-profile individuals whose images have been in the public domain for some time, should offer a different image and explain why the original image is problematic. They also have the opportunity to make a public statement to explain their current position.
- Promote education by explaining the issues related to images of people close to primates for primate conservation and welfare on your or your organisation's website, publications, programmes, presentations and guided tours.
- Where relevant, model appropriate behaviour by photographing people outside captive primate enclosures (unless the primates are captive but free ranging), rather than inside.
- Do not publish photographs of primates in a carer's arms. Replace these with photographs of the primate alone or with conspecifics.
- Do not publish photographs of primates being hand-fed by, playing with or interacting directly with carers, volunteers or donors unless the humans wear appropriate protective personal equipment.
- Ensure a minimum distance of 7 m/23 feet between the person and the primate in images of humans with wild primates that are posted publicly.
- In images promoting primatology as a profession, ensure that the context is obvious by including your facemask, binoculars, notepad, or similar equipment in the image and explain the context.

**Figure 1.** The eight key recommendations from the best practice guidelines for responsible images of primates (Waters et al. 2021).

forums specifically aimed at primate keepers ('Zookeepers Europe', 'ZooKreepers', 'You know you're a zookeeper when' and 'Training primates').

In addition to the questionnaire, on 3 March 2021, a review was carried out of imagery of primates and their keepers publicly available on Instagram™, using the hashtag #primatekeeper. For the survey, we only included images in which both primate keepers and primates were present (two-shot images). Instagram™ allows multiple images to be shared in a single post (a photo carousel), and each image within a post was reviewed separately. For each image, information was extracted on: species exhibited, whether the image presented the primate in full contact with the keeper (no visible physical barrier between the two subjects) or protected contact with the keeper (an obvious physical barrier such as a fence or glass window is clearly visible between the two subjects), whether the human was wearing personal protective equipment (gloves and/or mask), in what context the photo was taken (i.e., during husbandry procedure or posing with the primate), if the caption of the photo contained a comment on the suitability of primates as pets and/or a conservation message, and finally if the post was on a personal account or a facility account. Instagram™ provides a clear opportunity to choose between public and private accounts, and for ethical reasons, only Instagram™ posts shared publicly were analysed. All collected data were anonymised and retained no personal information (Lomborg and Bechmann 2014; Zook et al. 2017).

## Results

### Respondent demography

A total of 421 respondents filled in the online questionnaire, with the majority of respondents identifying as female (89%). Most respondents were aged 21–30 (58%), followed by 31–40 (26%). Of the respondents, 64% were educated to the level of a bachelor's degree, with a further 15% educated to master's level. Primate keepers were mostly based either in North America (54%) or Europe (41%), with the remaining primate keepers based in Australasia (4%), Asia (1%), South America (<1%) and the Middle East (<1%). Of the respondents, 71% identified themselves as paid keepers, 16% as managers (e.g., curator, director, team leader), 11% as unpaid keepers and the remaining 2% were in miscellaneous roles that still included direct contact with primates. Primate keepers were active on all main forms of social media, with Facebook™ (n=416) and Instagram™ (n=324) being the most popular, followed by Twitter™ (n=101) and TikTok™ (n=93).

### Primate keepers and their use of primate imagery online

When asked if aware of any studies regarding images of primates shared online, only 183 (43%) of the respondents stated yes. Of these 183 respondents, 95 made specific reference to studies highlighting the effect online primate imagery can have on the primate pet trade, for example, one respondent said "It can create a public perception that primates make suitable pets" and another respondent stated "Images with humans and non-human primates can be very problematic and shouldn't be shared because they perpetuate the pet trade". Some respondents also referred to the conservation status of primates and the effect online primate imagery has on the public's perception of this. One respondent said "Posting of images of people with primates decreases people's concern for primates and they think they are less endangered than they are".

When asked whether they felt their employers contributed to their knowledge of scientific studies and conservation news regarding primates, 167 respondents (40%) disagreed or strongly disagreed that their employers did so, with 299 respondents (71%) stating that they agreed or strongly agreed that it was the responsibility of their employers to keep them informed.

More than two-thirds (68%) of respondents stated that their place of work restricts them from sharing any images online that visiting members of the public would be unable to take (for example, images taken behind the scenes), but just 15% stated that sharing images of them interacting with primates is prohibited and 12% of respondents stated that there are no guidelines in place restricting the types of images they share on social media. Only 75 respondents (18%) agreed that their place of work was not strict enough in managing the types of images they can share on social media.

When asked about the types of primate imagery they have previously shared, just 14% of respondents stated they had never shared any images online of primates in their care (Table 1). Of the 421 respondents, 82% had shared images of primates without the presence of humans, whilst 65% had shared images of primates in the presence of humans for husbandry purposes, with just over half of those through protective barriers. Over half (56%) of respondents had shared images of primates in the presence of humans in a posing context (i.e., selfie, holding or playing) without a husbandry purpose, either in full contact (no barrier) or protected contact (through barrier).

Most primate keepers shared similar views on how they will act in the future when it comes to sharing photos online of

**Table 1.** Responses by primate keepers when asked which statements applied to the types of images they have shared on their personal social media accounts involving the primates in their care. Respondents could select as many options as necessary.

| Statement  | Number of responses |
|--|---------------------|
| I have never shared an image of a primate in my care   | 61                  |
| I have shared an image online of me conducting a husbandry procedure (i.e., training, vet procedure) with a primate within their enclosure | 124                 |
| I have shared an image online of me conducting a husbandry procedure (i.e., training, vet procedure) with a primate through a barrier      | 148                 |
| I have shared an image online of me interacting with a primate (i.e., selfie, holding, playing) within their enclosure                     | 117                 |
| I have shared an image online of me interacting with a primate (i.e., selfie, playing) through a barrier                                   | 120                 |
| I have shared an image online of primates in my care without any human presence  | 345                 |

**Table 2.** Respondents' answers based on statements in regards to sharing online photos of primates. Answers are based on a scale of 1–5 (1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree. Results are presented as percentages (%). † Optional statements

| Statement   | 1  | 2  | 3  | 4  | 5  |
|---|----|----|----|----|----|
| 1. If I choose to share photos of the primates in my care on my social media in the future, I will only do so if there are no humans present in the image. (n=421 responses)  | 8  | 12 | 20 | 30 | 30 |
| 2. I believe that selfies of animal keepers with the primates in their care shared on social media have negative consequences for their conservation. (n=421 responses)   | 3  | 13 | 25 | 29 | 30 |
| 3. As long as there is an educational message or disclaimer with the image, there is no issue with sharing images of animal keepers holding, playing or posing with primates in their care. (n=421 responses)                 | 27 | 30 | 24 | 14 | 5  |
| 4. As long as there is an educational message or disclaimer with the image, there is no issue with animal keepers sharing images of them carrying out husbandry procedures with the primates in their care. (n=421 responses) | 1  | 7  | 18 | 38 | 36 |
| † 5. I will delete any images I have shared on social media in the past where I am holding, playing, or posing with a primate in my care (n=172 responses).   | 20 | 20 | 21 | 19 | 20 |
| † 6. I will delete any images I have shared on social media in the past where I am carrying out husbandry procedures with the primates in my care (n=225 responses).  | 42 | 32 | 18 | 4  | 4  |
| 7. Primate experiences where members of the public pose with primates for photos should stop. (n=421 responses)   | 2  | 4  | 11 | 17 | 66 |
| 8. Images of animal keepers interacting with the primates in their care make people more interested in the species and more likely to contribute to their conservation. (n=421 responses)                                     | 4  | 10 | 33 | 38 | 15 |

the primates they care for, mainly in line with the best practice guidelines of IUCN-PSG-SHPI (Table 2), except for the statement regarding if they would delete inappropriate images they had previously shared on social media, where they hold, play, or pose with a primate in their care.

#### ***Primate keepers' knowledge and attitudes towards the best practice guidelines***

Over half of the respondents (n=226) had never heard of the IUCN-PSG-SHPI, 111 respondents had heard of the group but are not aware of the work they conduct, and only 84 respondents stated they were aware of the group and knew about the work they conduct. Only 76 respondents had read the best practice guidelines, whilst 61 had heard of them but had not yet read them. Of the 284 respondents who had not read the guidelines, 98% stated they were interested in reading them.

After being shown the eight key recommendations from the best practice guidelines (Figure 1; Waters et al. 2021), most respondents (n=331) agreed with all eight. Those who stated that they did not agree with all recommendations (n=46) were mainly opposed to; modelling appropriate behaviour by photographing people outside captive primate enclosures (unless the primates are captive but free ranging), to not publish photographs of primates in a carer's arms, but rather of primate alone or with conspecifics, or to not publish photographs of primates being hand fed by, playing with or interacting directly with carers, volunteers or donors unless the humans wear appropriate protective personal equipment. Common themes expressed by respondents in response to these points included the necessity of handfeeding in certain husbandry procedures, rare occasions where primates are hand-reared by caregivers in captivity, and the desire to show the bonds formed between primates and primate keepers particularly where primate keepers are required to work

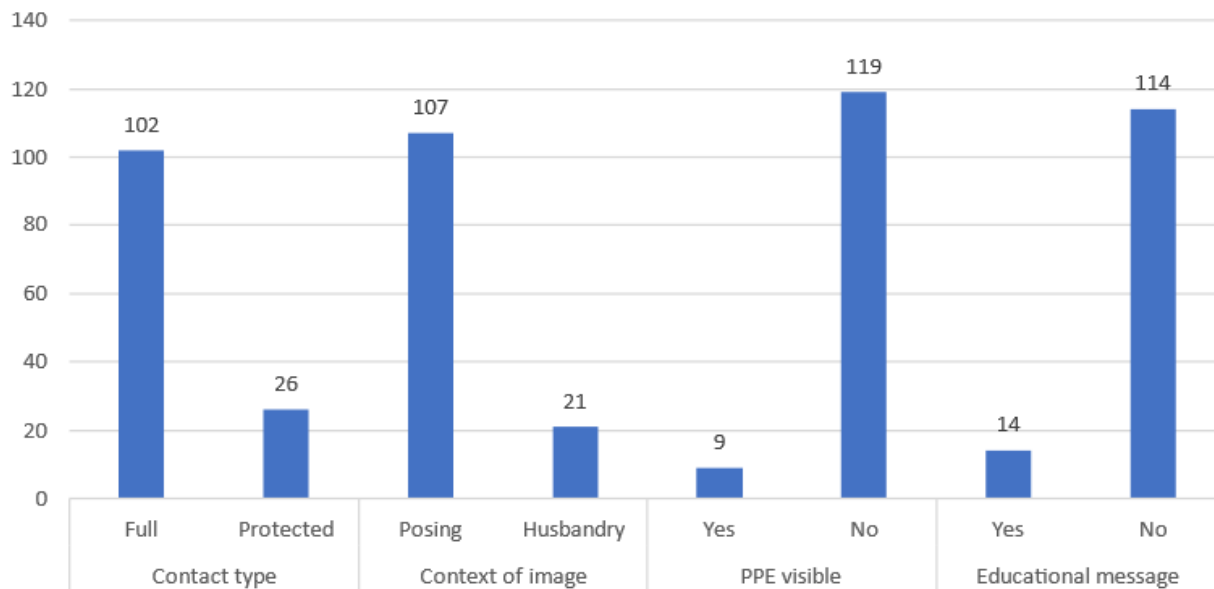
with primates in full contact. One respondent said "I don't believe it's realistic to never photograph keepers in close proximity to primates. Close proximity to keepers is a reality and necessity for captive primates and it is a disservice to the zoological community to pretend otherwise. Also, seeing interactions and the human/animal bond is a great way to build empathy in our visitors.". A total of 25 respondents gave suggestions on how to improve the best practice guidelines, such as allowing certain images to be shared providing they are appropriately captioned or contain disclaimers as they cannot be avoided in certain situations. Further, it was suggested to add guidelines regarding public-primate interactions or the use of ambassador primates for interactive experiences. It was also suggested that images where primates are interacting with human artefacts (such as baby toys and clothing) should be prohibited and that it should be included in the best practice guidelines what types of language should be used in captions; for example, one respondent said "I would like to see something about the verbiage we used to describe these photos on social media. By using labels like "sweet boy" or "happy girl" or "cutie pie" we are allowing the general public to continue to anthropomorphize and misunderstand primates".

#### ***Review of two-shot images on Instagram™***

A total of 1,723 of Instagram™ posts were found under the hashtag #primatekeeper, which were posted between 22 May 2013 and 3 March 2021. When only two-shot images were selected this resulted in a total of 128 photos, which accounts for only 7% of the total number of posts available including this specific hashtag in the caption. The 128 two-shot images were reviewed for how the primate keeper and the primate were presented together (Figure 2).

The investigation into online primate imagery on Instagram™ found that 64% (n=82) of the 128 images depicted a primate





**Figure 2.** Results of the analysis of two-shot images publicly available on Instagram™ featuring #primatekeeper in the caption of the post, and the portrayal of primate keepers and primates in these images.

keeper and a primate in full contact (therefore no physical barrier visibly present between the primate and the keeper), where the keeper was posing, wearing no PPE and the caption accompanying the image had no educational message relating to pet keeping or conservation. Of those 82 images, 48% contained South American monkeys and 35% contained prosimians. Only 14 images were accompanied by an educational message, eight of which were posted by an Instagram™ account for a zoological collection. Of the 11 posts shared by zoos containing two-shot images, three posts were not accompanied by any educational message relating to conservation and were of a primate keeper posing with a primate (only one was full contact, the other two posts were keepers standing in front a public viewing area).

## Discussion

Social media usage continues to grow, with estimates of over 3.6 billion people using some form of social media worldwide in 2020 and projected usage set to increase to an estimated 4.41 billion by 2025 (Tankovska 2021). Facebook™ reported to have 2.8 billion monthly active users as of the 31 December 2020, which is a year-on-year increase of 12% (Facebook™ 2021). It is therefore unsurprising that the role social media plays in the exotic pet trade is becoming increasingly important to monitor and study (Siriwat and Nijman 2018; Siriwat et al. 2019; Moloney et al. 2021). With 99% of respondents holding an active account on Facebook™ and 77% on Instagram™, primate keepers could share potentially detrimental imagery of primates interacting with humans on social media, which would undermine the conservation efforts of the facilities they work for. It is hoped that the findings will help inform appropriate organisations related to the zoo community, including the IUCN-PSG-SHPI, on the attitudes and knowledge of primate keepers towards the use of online primate imagery.

Despite an increasing awareness about online primate imagery and its effects on primate conservation (Nijman et al. 2011; Norconk et al. 2019), it was concerning to find that only 44% of the respondents had read any scientific articles regarding this topic. Only 34% of respondents felt that their employers contributed towards their knowledge of current research and conservation news, and 71% felt that the responsibility fell on their employers to ensure they were kept up to date with such material, whilst one respondent suggested that employees need to be responsible for their own knowledge to an extent. These findings highlight the importance of good and clear communication between employers and employees, to ensure that primate keepers are kept informed of current and relevant research related to the conservation of the species in their care. It also highlights the need for organisations, such as the IUCN-PSG-SHPI, to disseminate scientific information and educational material they produce to relevant target audiences.

Another concerning finding is the lack of codes of conduct for primate keepers provided by their employers regarding the types of images they are permitted to share on their personal social media accounts, as per the best practice guidelines (Figure 1). Whilst 67% of primate keepers surveyed stated they were prohibited from sharing images from behind the scenes, this does not necessarily prohibit images of primate keepers interacting with primates being shared, particularly where primates are housed in walk-through or free ranging exhibits which visitors have access to. Harrington (2015) found that the most traded primates worldwide belonged to the genera *Saimiri*, *Callithrix* and *Cebus*; species which were commonly found to be shown interacting with primate keepers during the investigation on Instagram™. It is also concerning that these species can be legally obtained in developed countries such as the USA and the UK (Soulsbury et al. 2008). Primate species such as South American monkeys and prosimians are commonly

exhibited in walk-through or free-ranging enclosures in zoos worldwide which increases the opportunities for images of people in close proximity with primates to be taken and shared online.

Only 15% of respondents claimed that their employers specifically prohibited them from sharing images online of them interacting with the primates in their care. There is clearly a need for managers within zoological collections to review their employee guidelines in order to ensure inappropriate images of primates interacting with primate keepers are not being shared on social media. Future research is required to understand how effective such protocols are in controlling the types of material primate keepers are sharing on their personal social media. Despite some employers evidently providing guidelines on employees' use of primate imagery, 56% of primate keepers surveyed admitted to sharing images of themselves interacting with primates in their care without any husbandry purposes. However, the present survey did not identify if these images were shared by primate keepers under restrictions from their employers (past or present) making it difficult to ascertain if primate keepers had broken the protocols of their workplace at the time of posting these images. The ongoing sharing of online primate imagery on personal social media accounts was also evident in the investigation into images shared on Instagram™, in which 64% of the images reviewed contained a primate and primate keeper interacting with no barrier in place, without any personal protective equipment (PPE), and posts lacking any educational message in the caption. With 60% of respondents agreeing that in the future they would avoid sharing images online of primates in the presence of humans, a follow up study is recommended to assess possible behavioural changes by primate keepers on social media in response to the best practice guidelines.

The bonds between primates and their keepers in zoological collections has been shown to be strong (Hosey and Melfi 2012), and these bonds are often what enables primate keepers to effectively carry out husbandry procedures with the primates in their care with minimal stress (Laule and Whittaker 2007). Despite the high level of interaction between primate keepers and captive primates, very few respondents (18%) were aware of the IUCN-PSG-SHPI and of the work that they conduct. It was therefore unsurprising that 67% of respondents had not read the new best practice guidelines. It is encouraging that a large proportion of the respondents stated they wanted to read these guidelines after being made aware of them, and respondents who had read the guidelines agreed with the eight key recommendations. This suggests that the low number of primate keepers who have read the best practice guidelines was not due to a lack of interest but rather due to the limited time they had been available (two months before this study was conducted) or due to the methods of distribution.

### Recommendations

The best practice guidelines recommend that employers of primate keepers should ensure their organisation has a code of conduct regarding the dissemination of imagery by staff, students and volunteers. Where relevant, they should also ensure marketing and public relations departments are fully informed of the code. It is recommended that the IUCN-PSG-SHPI focus on sharing their resources on appropriate channels targeted towards primate keepers (such as the Facebook™ forums used in this study to share the questionnaire) as well as collaborating with zookeeper member organisations which collaborate with zookeeper member organisations (such as the Association of British and Irish Wild Animal Keepers). Many zoological organisations (such as the EAZA primate taxon advisory groups) are supporting the best practice guidelines, but support is inconsistent, perhaps due to the unwelcome realisation of many people working with primates

that these images may contribute to the public's desire to obtain a primate pet. Continuous sharing of the best practice guidelines to zoo employees and other communities (both in situ and ex situ) may help to ensure that as wide a target audience as possible has access to these guidelines.

It is further recommended that coursework for trainee zookeepers includes information about the best practice guidelines and that such information is also included in relevant course material in university primatology modules, as well as encouraging employers to provide employees with access to relevant material, such as these best practice guidelines.

### Limitations

Despite the questionnaire being completed by over 400 people, this is only a small percentage of global zookeepers who work or have worked with primates in captivity; Birke et al. (2019) noted some 12,000 keepers are employed by UK zoos alone. This study, therefore, only represents the actions and opinions of a small percentage of the zoo community.

For the review of online primate imagery shared by primate keepers on social media the search was limited to one social media site, Instagram™. A broader study is recommended across multiple social media sites, utilising a wider range of hashtags in order to understand the full extent of online primate imagery being shared online by primate keepers. It would also be beneficial to understand the impact these images have on public perceptions and how they are interpreted by the general public. Recent research by Bayliss (2021) has identified differences in perceptions of different primate imagery between conservationists and non-conservationists, and Freund et al. (2021) recommend that primate sanctuaries limit the amount of human-primate interaction shown in imagery shared based on their review of comments posted on orangutan rescue and rehabilitation videos on YouTube™.

### Conclusions

Social media plays an important role in shaping user behaviour, so it is vital to continue investigating the role online primate imagery has on people's perceptions of primate conservation and the exotic pet trade. This will allow relevant organisations to further inform people working within the field of primatology and within the zoo keeping community about the potential consequences their online actions might have on the very species they are working to protect.

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### References

- Bayliss P. (2021) Assessing perceptions on the use of primates in social media posts. *Canopy* 21(2): 16–18.
- Bergin D., Atoussi S., Waters S. (2018) Online trade of Barbary macaques *Macaca sylvanus* in Morocco and Algeria. *Biodiversity and Conservation* 27: 531–534.
- Birke L., Hosey G., Melfi V. (2019) "You Can't Really Hug a Tiger": Zookeepers and Their Bonds with Animals. *Anthrozoös* 32(5), 597–612.
- Borgerson C. (2015) The Effects of Illegal Hunting and Habitat on Two Sympatric Endangered Primates. *International Journal of Primatology* 36(1): 74–93.
- Bush E.R., Baker S.E., Macdonald D.W. (2014) Global trade in exotic pets 2006–2012. *Conservation Biology* 28(3): 663–676.
- Ceballos-Mago N., Chivers D. (2010) Local knowledge and perceptions of pet primates and wild Margarita capuchins on Isla de Margarita and Isla de Coche in Venezuela. *Endangered Species Research* 13(1).

- Clarke T., Reuter K., LaFleur M., Schaefer M. (2019) A viral video and pet lemurs on Twitter. *PLoS ONE* 14(1): e0208577.
- da Silva F., Canale G., Kierulff M., Duarte G., Paglia A., Bernardo C. (2016) Hunting, pet trade, and forest size effects on population viability of a critically endangered Neotropical primate, *Sapajus xanthosternos* (Wied-Neuwied, 1826). *American Journal of Primatology* 78(9): 950–960.
- Dunay E., Apakupakul K., Leard S., Palmer J., Deem S. (2018) Pathogen transmission from humans to Great Apes is a growing threat to primate conservation. *Ecohealth* 15(1): 148–162.
- Estrada A., Garber P., Mittermeier R., Wich S., Gouveia S., Dobrovolski R. et al. (2018) Primates in peril: the significance of Brazil, Madagascar, Indonesia and the Democratic Republic of the Congo for global primate conservation. *PeerJ* 6: e4869.
- Estrada A., Garber P., Rylands A., Roos C., Fernandez-Duque E., Di Fiore A. (2017) Impending extinction crisis of the world's primates: Why primates matter. *Science Advances* 3(1): e1600946.
- Facebook (2021) Facebook Reports Fourth Quarter and Full Year 2020 Results. Available at: <https://investor.fb.com/investor-news/press-release-details/2021/Facebook-Reports-Fourth-Quarter-and-Full-Year-2020-Results/default.aspx> [Accessed 27 May 2021].
- Freund C.A., Heaning E.G., Mulrain I.R., McCann J.B., DiGiorgio A.L. (2021) Building better conservation media for primates and people: A case study of orangutan rescue and rehabilitation YouTube videos. *People and Nature* Early View.
- Harrington L. (2015) International commercial trade in live carnivores and primates 2006–2012: response to Bush et al. 2014. *Conservation Biology*, 29(1), 293–296. doi: 10.1111/cobi.12448.
- Hosey G., Melfi V. (2012) Human-animal bonds between zoo professionals and the animals in their care. *Zoo Biology* 31(1): 13–26.
- Laule G., Whittaker M. (2007) Enhancing nonhuman primate care and welfare through the use of positive reinforcement training. *Journal of Applied Animal Welfare Science* 10(1): 31–38.
- Leighty K., Valuska A., Grand A., Bettinger T., Mellen J., Ross S. (2015) Impact of visual context on public perceptions of non-human primate performers. *PLoS ONE* 10(2): e0118487.
- Lomborg S., Bechmann A. (2014) Using APIs for data collection on social media. *Information Society* 30: 256–265.
- Moloney G., Tuke J., Dal Grande E., Nielsen T., Chaber A. (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.
- Nekaris K., Campbell N., Coggins T., Rode E., 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(8): e69215.
- Nijman V., Nekaris K.A.I., Donati G., Bruford M., Fa J. (2011) Primate conservation: measuring and mitigating trade in primates. *Endangered Species Research* 13: 159–161.
- Norconk M., Atsalis S., Tully G., Santillán A., Waters S., Knott C. et al. (2019) Reducing the primate pet trade: Actions for primatologists. *American Journal of Primatology* 82(1): e23079.
- Phillips K.A., Bales K.L., Capitanio J.P., Conley A., Czoty P.W., 't Hart B.A. (2014) Why primate models matter. *American Journal of Primatology* 76(9): 801–827.
- Ross S.R., Lukas K.E., Lonsdorf E.V., Stoinski T.S., Hare B., Shumaker R., Goodall J. (2008) Inappropriate use and portrayal of chimpanzees. *Science* 319: 1487.
- Ross S., Vreeman V., Lonsdorf E. (2011) Specific image characteristics influence attitudes about chimpanzee conservation and use as pets. *PLoS ONE* 6(7): e22050.
- Shanee N., Mendoza A., Shanee S. (2015) Diagnostic overview of the illegal trade in primates and law enforcement in Peru. *American Journal of Primatology* 79(11): e22516.
- [SHPI] Primate Specialist Group, Section for Human-Primate Interactions (2021). Resources. Available at: <https://humanprimateinteractions.wpcomstaging.com/resources/> [Accessed 27 May 2021].
- Siriwat P., Nijman V. (2018) Illegal pet trade on social media as an emerging impediment to the conservation of Asian otter species. *Journal of Asia-Pacific Biodiversity* 11(4): 469–475.
- Siriwat P., Nekaris K., Nijman V. (2019) The role of the anthropogenic Allee effect in the exotic pet trade on Facebook in Thailand. *Journal for Nature Conservation* 51: 125726.
- Soulsbury C., Iossa G., Kennell S., Harris S. (2008) The welfare and suitability of primates kept as pets. *Journal of Applied Animal Welfare Science* 12(1): 1–20.
- Tankovska H. (2021) Number of social media users 2025 | Statista. Available at: <https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/> [Accessed 27 May 2021].
- Waters S., Setchell J., Maréchal L., Oram F., Wallis J., Cheyne, S. (2021) Best Practice Guidelines for Responsible Images of Non-Human Primates. Available at: <https://humanprimateinteractions.wpcomstaging.com/wp-content/uploads/2021/01/HPI-Imagery-Guidelines.pdf> [Accessed 27 May 2021].
- Zook M., Barocas S., Boyd D., Crawford K., Keller E., Gangadharan S.P., Goodman A., Hollander R., Koenig B.A., Metcalf J., Narayanan A., Nelson A., Pasquale F. (2017) Ten simple rules for responsible big data research. *PLoS Computational Biology* 13: e1005399.