RESEARCH ARTICLE

ACTA Vol. 21, No. 3, 2023, 251-257
NEUROPSYCHOLOGICA

Received: 18.04.2023
Accepted: 21.07.2023

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No cheek bias for non-primates: An Instagram replication of Thomas et al. (2006)

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SUMMARY

Background: Previous research has established that photos of great apes, including humans, show a left cheek bias. As this bias is absent in images of lower primates and other animals, phylogenetic proximity appears to influence humans' depictions of nonhuman species. However Thomas et al.'s (2006) finding of a left cheek bias for dogs challenges this argument. As their analyses were underpowered, the present study sought to replicate Thomas et al.'s study with a larger sample to help determine whether human depictions of non-human animals vary as a function of their evolutionary relatedness.

Material/ Methods: Photographs (N=2883) were sourced from Instagram's 'Most Recent' feed using hashtags that matched Thomas et al.'s Google Image search terms: #dog, #cat, #fish, #lizard, #cutebaby, #cryingbaby. The first 401 lateral images for each hashtag were coded for pose orientation (left, right).

Results: Replicating Thomas et al., results confirmed a left cheek bias for mammals but not nonmammals. The left cheek bias was driven by images of human infants; there were no cheek biases for images of nonhuman animals (dogs, cats, lizards, fish).

Conclusions: As a left cheek bias was evident in photos of primates (#cutebaby, #cryingbaby), but absent for other mammals (#dog, #cat) and nonmammals (#lizard, #fish), the data support the argument that phylogenetic proximity influences posing biases.

Key words: left; right; animals; photo; Instagram

INTRODUCTION

When posing for portraits people favour the left cheek (Lindell, 2013b). From renaissance paintings (McManus & Humphrey, 1973) and yearbook photos (LaBar, 1973), to selfies (Bruno et al., 2015) and Instagram advertisements (Messina & Lindell, 2020), left cheek portraits reign regardless of the medium and across time periods. The left cheek's greater anatomic expressivity (Nicholls et al., 2004), being contralaterally controlled by the emotion-dominant right hemisphere (Patten, 1996; Demaree et al., 2005), is argued to underlie the left cheek bias. Research confirms that people appear more emotionally expressive when captured in left than right cheek portraits (Nicholls et al., 2002), and offer the left cheek when explicitly asked to pose expressing emotion (Nicholls et al., 1999). As such, we appear to possess an intuitive understanding that the left cheek conveys greater emotion than the right.

Humans are not the only species to express emotion asymmetrically (see Lindell, 2013a, for review), with recent research investigating whether the left cheek bias extends to other primates. Humans and chimpanzees share 98.7% DNA (Prüfer et al., 2012), oro-facial musculature (Burrows et al., 2006), and contralateral cortical innervation (Morecraft et al., 2001). Given these similarities Lindell (2020) investigated whether humans choose left cheek poses when posting images of chimpanzees on Instagram. Examination of 2000 photos of chimps uploaded using the hashtag "#chimpanzee" confirmed that humans depict chimpanzees as they do themselves, favouring the left cheek (57.2%).

Lindell's (2020) findings appear consistent with research indicating that human perceptions of other animals vary as a function of genetic relatedness. For example, Harrison and Hall (2010) found that ratings of animals' communicative and empathic abilities were highly correlated with the animals' phylogenetic relatedness to humans; nonhuman primates' abilities ranked the highest of all animals tested. Theoretically then, photographic depictions of nonhuman primates should be influenced by their phylogenetic proximity to humans, with more closely-related species more likely to show a left cheek bias. Lindell and Lindell's (2021) research confirmed this supposition: examination of 6818 Instagram photographs demonstrated that humans depict closely-related nonhuman primates showing the left cheek (great apes: #chimpanzee, #bonobo, #gorilla, #orangutan), with no biases evident for the more distantly-related primates (lesser apes: #gibbon; Old World monkeys: #baboon, #macaque, #proboscismonkey; New World monkeys: #spidermonkey, #marmosetmonkey, #capuchin; and prosimians: #lemur, #slowloris, #tarsier). Lindell and Lindell thus argued that phylogenetic proximity exerts an implicit influence on depictions of nonhuman primates: "the more closely related the primate, the more likely we are to depict them as we do ourselves, showing the left cheek" (p. 94).

However, Thomas et al.'s (2006) research challenges the phylogenetic proximity argument. In the only study to date examining cheek biases in non-primates, Thomas et al. sampled 200 images of each of five animal groups (cute baby/crying baby, dog, cat, lizard, fish) from Google Images, coding the photos for pose orientation (left, right, no bias). Results revealed a left cheek bias for human infants (53.0%) and dogs (45.5%), but no bias for cats, lizards, or fish. The left cheek bias for babies, and the absence of bias for cats, lizards, and fish, all appear consistent with the phylogenetic proximity argument. However, as Lindell and Lindell (2021) found no cheek bias for either monkeys or prosimians, Thomas et al.'s finding that dogs show a left cheek bias poses a challenge, given that primates like monkeys and prosimians are more closely-related to humans than are dogs.

As Lindell and Lindell (2021) noted, the numbers of images sampled by Thomas et al. (2006) were small: 200 images per animal group, including "no bias" images (e.g., dogs: 91 left, 68 right, no bias 41). Assuming a small effect size (0.14; based on Lindell, 2020), G*Power power analysis indicates that a sample of 788 is needed to achieve a power level of .80 for a $\chi 2$ analysis with two degrees of freedom; Thomas et al.'s subgroup analyses thus appear underpowered. The present study consequently sought to replicate Thomas et al.'s study using larger samples to confirm their findings. If a left cheek bias is observed for canines, as Thomas et al.'s data indicate, factors other than phylogenetic proximity must be driving posing biases for nonhuman species. However if dogs (and cats, fish, and lizards) do not show a left cheek bias, the results would instead be consistent with the argument that human depictions of non-human animals vary as a function of their evolutionary relatedness.

Images were sourced from Instagram (an online photo-sharing platform with over two billion users; Rodriguez, 2021), using hashtags that matched Thomas et al.'s (2006) Google Image search terms: #dog, #cat, #lizard, #fish, #cutebaby, #cryingbaby. Images were coded for species and cheek shown (left, right), to determine whether humans depict non-primate animals (including mammals and nonmammals) showing the left cheek.

METHOD

Image Sourcing

Images were sourced from Instagram's 'Most Recent' feed using the following six hashtags: #dog, #cat, #fish, #lizard, #cutebaby, #cryingbaby. Images were viewed on a 33cm x 55.50cm Dell monitor at a size of 13.65cm x 17.46cm. Only static images depicting a single animal were included; videos, images showing more than one face (whether another animal or inanimate), and images that did not show a real animal (e.g., illustrations, dolls) were excluded. G*Power power analysis indicated that a sample of 401 was needed to provide a power level of .8 for $\chi 2$ analysis with one degree of freedom, assuming an alpha of .05 and a small effect size. Thus, the first 401 lateral images for each hashtag that met the inclusion criteria were selected (midline images were coded but not included in the analyses), resulting in final sample of 2883 images.

Image Coding

Each photograph was coded for image type (dog, cat, lizard, fish, cute baby, crying baby) and pose orientation (left cheek, right cheek, midline). Images that showed an unambiguous lateral deviation from the midline were coded as 'left' or 'right' following the procedure previously detailed in Lindell (2019, 2020); lateral deviation ranged from a slight head turn (approximately 10° yaw) to a full profile (approximately 90° yaw), with 100% inter-rater reliability between two cross-coders.

RESULTS

Across image types Instagram posts featured left cheek poses (45.1%) more often than right cheek (38.4%) or midline poses (16.5%). Chi square analysis confirms that the frequencies of left and right cheek poses were significantly different from those expected by a null model in which the probabilities of left and right cheek images are 50:50, $\chi2$ (1, N=2406)=15.97, $p<.001$.

For the purpose of comparison with Thomas et al. (2006), data were collapsed across taxonomic classes into mammalian (#cutebaby, #cryingbaby, #dog, #cat) and nonmammalian (#lizard, #fish) groups. Chi square analysis confirms that a left cheek bias was evident only for images of mammals: $\chi2$ (1, N=1604)= 19.31, $p<.001$; frequencies of left and right cheek images of nonmammals did not differ from the frequencies anticipated by chance, $\chi2$ (1, N=802)=0.50, $p= .480$.

Finally, examination of the cheek biases exhibited in the individual taxonomic groups indicated that both the mammalian and the overall left cheek biases were driven by the biases exhibited in images of babies (Table 1). For both cute babies (#cutebaby) $\chi2$ (1, N=401)=25.44, $p<.001$, and crying babies (#cryingbaby) $\chi2$ (1, N=401)=17.18, $p<.001$, left cheek images were significantly more frequent than expected by a null model in which the chances of left and right cheek poses are 50:50. In contrast cheek biases were not evident for any of the nonhuman species: dogs (#dog) $\chi2$ (1, N=401)=0.20, $p=.653$; cats (#cat) $\chi2$ (1, N=401)= 0.00, $p=.960$; lizards (#lizard) $\chi2$ (1, N=401)=0.00, $p=.960$; fish (#fish) $\chi2$ (1, N =401)=0.90, $p=.343$.

Table 1. Numbers (percentages) of left cheek, right cheek and midline poses for the six groups: Dogs, Cats, Fish, Lizards, Cute babies and Crying babies.

	Dogs	Cats	Fish	Lizards	Cute babies	Crying babies
	(#dog)	*(#cat)*	*(#fish)*	*(#lizard)*	*(#cutebaby)*	*(#cryingbaby)*
Left	196 (37.6%)	201 (40.0%)	210 (51.5%)	201 (47.5%)	251 (48.1%)	242 (47.7%)
Right	205 (39.4%)	200 (39.9%)	191 (46.8%)	200 (47.3%)	150 (28.7%)	159 (31.4%)
Midline	120 (23.0%)	101 (20.1%)	7 (1.7%)	22 (5.2%)	121 (23.2%)	106 (20.9%)

DISCUSSION

Consistent with Thomas et al. (2006) and previous research (Lindell, 2013b), results confirmed an overall left cheek bias in images uploaded to Instagram. This bias was driven by left cheek images of human infants; no cheek biases were observed for images of nonhuman animals (dogs, cats, lizards, fish). As a left cheek bias was evident in photos of primates (#cutebaby, #cryingbaby) but absent for other mammals (#dog, #cat) and for nonmammals (#lizard, #fish), these data appear congruent with the argument that phylogenetic proximity influences posing biases (Lindell & Lindell, 2021).

The present study's larger sample replicated Thomas et al.'s (2006) research, finding a left cheek bias for mammals but no cheek bias for nonmammals. Patterns of bias for the individual species were similarly consistent with Thomas et al. (2006), with one key exception: the absence of a cheek bias for dogs. Whereas Thomas et al. reported a left cheek bias for dogs (N=200; 45.5% left, 34.0% right, 20.5% no bias), the present sample showed no overall bias (N=521; 37.6% left, 39.4% right, 23.0% no bias). As noted previously, Thomas et al.'s analysis was underpowered, rendering the data unable to answer the question of interest (Case & Ambrosius, 2007). Moreover, the analyses Thomas et al. reported compared frequencies of all 3 poses (left, right, no bias), assuming they would be equally frequent. However, whilst left and right cheek poses are statistically equally likely (50:50), it is unclear why frequencies of midline poses were similarly expected to be equal to the frequencies of left and right poses (33.3: 33.3:33.3). The present study's analyses instead compared only left and right cheek poses against a null model that assumes that left and right cheek poses would occur at chance (50:50), in line with previous research (e.g., Bruno et al., 2015; Lindell, 2020). Similar analysis of Thomas et al.'s (2006) data, though remaining underpowered, indicates that the frequencies of left and right cheek poses for dogs do not differ from those anticipated by chance ($\chi 2$ (1, N=159)= 3.33, *p*=.068), akin to their results for cats ($\chi 2$ (1, N=122)=0.19, *p*=.665), fish ($\chi 2$ (1, N=195)=0.13, *p*=.720) and lizards ($\chi 2$ (1, N=190)=1.35, *p*=.246).

Differences in the sources of the images are also worthy of consideration. Thomas et al. (2006) drew images from a Google Image search whereas the present study's images were drawn from Instagram's Most Recent feed. Google Images are sorted based on their relevance according to Google's algorithms (presumably determined by advertiser revenue and popularity, but we cannot know as Google's search algorithms are secret; Naughton, 2016), whereas Instagram's Most Recent posts are sorted temporally in the time/date order of upload by users. As Instagram users "tag" (i.e., identify) the images they upload using hashtags, other users can search for images on a particular topic that have been explicitly identified (e.g., at the time of writing there are >104,000 posts tagged #cryingbaby, and >352,000,000 posts tagged #dog). As such, Instagram's Most Recent feed provides a rich source of images that have been explicitly identified as representing a concept by the users, uninfluenced by search algorithms and/or marketing clout, thus offering high ecological validity.

As noted in previous investigations of nonhuman primates (e.g., Lindell, 2020) and other nonhuman animals (e.g., Thomas et al., 2006), the cheek biases reported in the present study reflect how humans represent animals rather than how animals elect to pose. These data thus offer an insight into how humans perceive the subjects of the images. Not surprisingly then, photos of babies showed a robust left cheek bias, in line with previous research examining adults (Lindell, 2013b); in marked contrast, no such bias was evident for photos of dogs, cats, fish, or lizards. As such, the results appear consistent with previous findings indicating that our depictions of nonhuman primates vary as a function of their phylogenetic proximity (left cheek bias for other great apes but not for more distantly-related primates; Lindell & Lindell, 2021): we depict subjects that we perceive as 'more like us' showing their left cheeks.

CONCLUSIONS

As a left cheek bias was evident in photos of primates (#cute baby, #crying baby), but absent for other mammals (#dog, #cat) and non mammals (#lizard, #fish), the data support the argument that phylogenetic proximity influences posing biases.

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