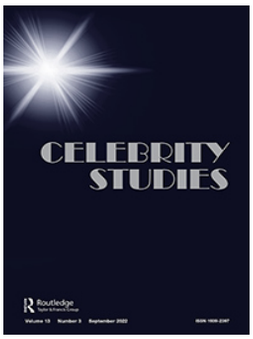

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What makes the giant panda a celebrity?

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ABSTRACT

Research indicates that animal celebrities and celebrity species emerge from the accumulation of lively capital in capitalism. This paper examines this notion through a survey of 1962 Chinese participants who visited giant pandas in Chengdu, China. The empirical investigation of 12 factors that determine panda celebrity – cuteness, aggressive behaviour, intelligence, human-animal interaction, degree of freedom, relationship to traditional Chinese culture, relationship to national identity, pet ownership, willingness to donate, willingness to learn, social context, and preference – indicates that capitalism governs the construction of animal celebrity in contemporary Chinese society. While survey participants believed they already knew and preferred the panda celebrity over other animals, they are motivated to establish stronger relationships with the giant panda through knowledge creation, donation, and pet ownership. Despite the established approach to wildlife in China, the study shows that celebrity species such as the giant panda have also been marketed through the notion of lively capital. This study advocates for additional research into the construction and accumulation of lively capital as the key to demonstrating greater appreciation for the distinctive roles that animals play in society.

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Celebrity species; animal celebrity; giant panda; capital accumulation; lively capital

1. Introduction

The iconic giant panda has garnered considerable global attention in two very different ways, as identified by George Schaller (1994) in *The last panda* (Schaller 1994). The first is noble efforts were placed into its conservation, while the second refers to its pungent disregard. As a biologist and conservationist, Schaller found that the decline of the panda population in the wild resulted from its frequent capture rather than the natural bamboo die-offs. The popularity of the giant panda, Schaller suggests, caused the interest of wildlife hunters, as well as an emerging appeal to wildlife hunters. As a result of this decline, the Chinese government placed extensive effort into successful breeding programs and the protection of wild pandas in a network of protected areas. The most recent investigation in 2020 shows that the population of wild pandas has reached 1864, and the number of captive pandas 633 (Hu and Yu 2022). In 2010, the total value of giant panda ecosystem services was between US$2.6 and US$6.9 billion (Wei *et al*. 2018). As a flagship

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species, the giant panda protects endemic vertebrates such as birds, mammals, and amphibians (Li and Pimm 2016) and plant species, including bryophytes and fern, gymnosperms, and angiosperms (Shi *et al*. 2019).

However, the giant panda's popularity is also a function of its celebrity status. Studies show that this status is not a coincidence but rather carefully and intentionally manufactured (Blewitt 2013, p. 325). For example, the American historian Songster (2018) writes the panda's popularity in China is largely a post–1949 phenomenon and a byproduct of the rise of the Chinese nation-state. Nicholls (2012) suggests that beloved panda images such as Chi-Chi in London Zoo in the 1950s resulted from the emerging power of television as well as influential figures in zoological society. Blewitt (2013, p. 327) writes that the panda's celebrity is a function of 'image, conservation status, mystery, politics, bizarre diet, and global cultural merchandising'. In a more recent study, Barua (2020) demonstrates that the panda's renowned charisma facilitates the creation of lively capital – the intersection of market and social forces that reconfigure our relationship with the natural world – resulting in a global business worth millions of dollars. Thus, the giant panda has become a symbol of the Chinese nation's past and present, serving as 'the cutest part of China's public diplomacy' (Hartig 2013, p. 49) and an internet superstar (Huang and Wang 2019). In these cases, captive pandas who have gained fame through their integration into human society are labelled as individual celebrities. For example, a wild panda living in the deep forest of Sichuan is a member of the celebrity species but not necessarily an individual celebrity by itself. In contrast, Xiang Xiang in Ueno Zoo in Japan has been made an individual celebrity while belonging to the celebrity species.

In this study, we raise the question 'what makes the giant panda a celebrity?' We further investigate the role that giant pandas play in Chinese society through the construction and accumulation of lively capital. Celebrity species based on the notion of lively capital elevate the status of the giant panda as something more than just charismatic megafauna to conduit from which to advance discussions on political negotiations and as a central feature in conservation campaigns (Hartig 2013, Buckinghamn *et al*. 2013, Okafor *et al*. 2021) and charismatic megafauna (Barney *et al*. 2005, Ducarme *et al*. 2013, Hosey *et al*. 2020). In this sense, the celebrity status of the giant panda becomes a nodal point in determining what Rojek (2001) calls the 'ideology of the common man' through celebrity and commodity cultures. Additionally, we show that despite governmental and national administrations at different levels attempting to manage and conserve wildlife in China (Huang *et al*. 2021), celebrity culture and capitalist law mediate the relationship between the public and the animal.

Given that there are few studies that investigate the giant panda's celebrity status, especially empirical studies, the purpose of this paper is to examine factors that influence the public's perception of this species' celebrity based on a survey of 1962 Chinese visitors at the Chengdu Research Base of Giant Panda Breeding. We build on the concept of animal species celebrity through a 12 detriments evaluation survey based on prior research (Rolston 1987, Blewitt 2013, Giles 2013, Adefalu *et al*. 2015, Borgi and Cirulli 2015, Colléony *et al*. 2017). These detriments include the public's perceptions of the panda's cuteness, aggressiveness, intelligence, human-animal interaction, degree of freedom, relationship to national culture, relationship to national identity, pet ownership, willingness to donate, willingness to learn, social context, and preference. The second objective is to investigate interactions between factors that have contributed to the

celebrity status of pandas. Previous research has demonstrated that animal celebrities (Goodman and Littler 2013) and celebrity species (Barney *et al*. 2005, Skibins *et al*. 2013, Mazzoldi *et al*. 2019, Schuetz and Johnston 2019, Hosey *et al*. 2020) are social constructions influenced by a variety of complex factors. However, interactions between these factors have yet to be examined. The study addresses this research gap through the notion of lively capital, showing that the giant panda as a celebrity species results from capitalist society's accumulation of lively capital in a different way than their human counterparts.

2. Literature review

The review of literature centres on three main aspects. First is a focus on animal celebrity, second is the concept of lively capital and its connection to capitalism, and third is how celebrity and lively capital are germane to the celebrity status of the giant panda.

2.1 Celebrity status and animals

The idea of animal celebrity is not novel. Through Hollywood films (Silverman 2001, Burt 2002), scientific experiments (Edwards 1999, Wang *et al*. 2016, Caswell 2018), acts of heroism (Genosko 1991, Kean 2009, Campbell 2019), celebrity ownership (Pycior 2005), and zoos and other institutions (Croke 2009, Nicholls 2012), animal celebrities have been, in the word of Giles (2013, p. 116), 'engineered' into existence. However, researchers (Burt 2002, Goodman and Littler 2013, Blewitt 2013, Giles 2013, Hockenhull 2015, 2017) have found that, despite the incredible stardom that animal celebrities have achieved, the vast majority of academic studies of fame have an exclusive focus on humans rather than animals. According to Hockenhull (2017), research methods and theoretical frameworks on celebrities in films, despite the significant advances over the past three decades, still need to justify the presence and inclusion of animals. Given the research gap, Giles (2013) and Blewitt (2013) have proposed research frameworks on celebrity centred on animals.

Giles (2013) defines animal celebrity by situating nonhuman beings or their anthropomorphic projections at the centre of celebrity construction. For Blewitt (2013, p. 7), animal charisma and celebrity are 'twin aspects of symbolic power', with both subject to anthropogenic manipulation. Specifically, charisma refers to qualities ascribed to animals that are experienced through animal-human encounters, whereas celebrity status packages this experience and quality into the public imagination. A species demonstrates its own unique charisma, but becoming a celebrity species is a 'modern phenomenon' (Rojek 2001, p. 16) that depends on three major historical processes – the democratisation of society, the fall in organised religion, and the commodification of everyday life. Celebrity culture forms and shapes public consciousness. In this light, a celebrity species is more than a collection of charismatic animals but a process of transforming and anchoring human-animal relations through celebrification.

Additionally, Giles (2013) argues that animal celebrities can be classified into four broad categories: Anthropomorphic animal celebrities are endowed with human or superhuman qualities. A second, promotional group, refers to captive animals that

generate new stories that capture the public's attention. The third group endorses the animal's freakery that tests 'the boundaries of acceptable, or even comprehensible, behaviour' (Yuan 1996, p. 368). Animal oddities are objectified as commodities because they defy normative assumptions about animal bodies and the categories that define and delimit them (e.g. deers with two heads, conjoined grey whales, piglet with the face of a monkey etc.). Celebrity pets, the final category, are related to animals owned by human celebrities, and thus gain fame through association with their famous owners. Examples include Oprah Winfrey's dog, George Clooney's pig, and an established history of White House pets. Giles (2013) concludes that celebrity is a media-driven process in which individuals, both human and nonhuman, are transformed into objects of desire. Although Giles' categorisation sheds light on the unique ways that animal celebrities are related to human society, his definition of animal celebrity still needs to address the nuanced difference between human and animal participants. In Giles's definition, the human celebrity and the animal celebrity can be exchangeable substitutes determined by the power of the media, with both having considerable capital and commercial value.

Following from Giles's observation that animal celebrity is largely a social construction, Blewitt (2013) demonstrates that the animal celebrity has resulted from the interaction of the natural world and human society. According to Blewitt (2013, p. 336), animal celebrities bridge the 'ostensibly great divides between human and non-human others, between nature and culture, and material and the semiotic and the organic and the technological'. Due to the animal's connection to the natural world, animal celebrities differ significantly from human celebrities, and this celebrity status is shaped by several forces, including cultural proclivities, political struggles, and the mundane. Importantly, animal celebrities can mirror their human counterparts through a philosophical dialectic between species and 'the wider environment that is designated nature' (Blewitt 2013, p. 336). In this light, the capitalisation of animals, whether celebrities, pets, or wildlife, points to an unavoidable historical context in defining the celebrification of animals. The following section aims to demonstrate how the animal's authentic liveliness, or simply its 'being', fuels capitalist production and consumption.

2.2 Lively capital and celebrity species

In her book, *When Species Meet*, Donna Haraway (2013) critiques Karl Marx's theory of capitalism and demonstrates that the participation of nonhuman beings in the accumulation of lively capital has been largely undermined. Through her investigation of the intertwined lives of dogs and human beings, Haraway (2013) concludes that interspecies encounters are moments that generate lively capital, which adds a new dimension to Marx's classical dictum of exchange value and use value. While encounter value, like exchange and use values, refers to relationships between people and the commodified world, it differs significantly from the creation of human subjects in capitalist circulation centred on human labour and productivity. Instead, Haraway (2013) emphasises the reciprocity and mutual self-transformation that humans and animals experience through encounter values during the establishment of the 'human-animal companionate family' (p. 47).

While Haraway (2013) contextualises her study on pet-owner companionship and does not explicitly address the concept of animal celebrity or celebrity species, Barua (2016, 2020) illustrates that lively capital supports the production and reproduction of the panda as a celebrity species. Incorporating the term 'atmospheric politics' into his research,

Barua (2020) shows how capitalism mobilises both the animal's 'umwelt', or 'lifeworld', and the immaterial affective exchanges between species to generate a global market for celebrity species status. Barua (2020, p. 12) argues that the 'affective ecology', or affective atmospheres across human-nonhuman divides and between nonhumans, can be the key to constructing lively capital. Barua (2020, p. 1) argues that the relationship between life and productivity intensifies as lifeworlds are transformed into regimes of value.

Correspondingly, Blewitt (2013) notes that animal celebrities are often bridges connecting the 'great divides' between human and nonhuman beings, and that animal celebrities provide a better understanding of the nonhuman world. Being a part of lively capital construction in naturecultures (Haraway 2013) suggests that the mutually created history between species has involved 'always asymmetrical living and dying, and nurturing and killing' (p. 42). In this light, celebrity species and animal celebrities are more than bridges bringing human beings to a different world. Instead, by looking at the construction of celebrity species and animal celebrities more closely, we are obliged to see how lively capital has come to shape inequalities between the species precisely because of the generation of the lively capital grounds in the asymmetrical relationship and encounters of animals and human beings (Fennell 2022). According to Rojek (2001, p. 14), it is impossible to comprehend the phenomenon of celebrity without acknowledging that 'celebrity culture is irrevocably bound up with commodity culture'. As such, celebrity species and animal celebrities are also products based on the accumulation and circulation of lively capital within the institution of capitalism.

2.3 Contextualizing panda celebrity

Following the arguments of Haraway (2013) on lively capital and naturecultures, Barua (2020), on atmospheric politics, and Rojek (2001) on the connection between celebrity and commodity, we contextualise the giant panda as a celebrity. Since the French missionary Armand David named the discovered black-and-white bear the 'giant panda' and sent the first specimen from Baoxing county Sichuan China to the French Natural History Museum in Paris in 1869, the giant panda has become integral to the generation and accumulation of lively capital at a global level. As one of the most recognisable flagships for conservation and biodiversity protection, this charismatic megafauna species has long captured the attention of educators and advocates for their particular appeal and attraction. While there is a lack of consensus on the definition of charismatic megafauna (Ducarme *et al*. 2013), researchers tend to agree that charismatic megafauna are large-sized vertebrates (Berti *et al*. 2020, Hosey *et al*. 2020) with symbolic importance or popular appeal (Barney *et al*. 2005).

In his detailed investigation of the history of the panda celebrity, Barua (2020, p. 9) explains that atmospheric politics, as noted above, have contributed to the capitalisation of the giant panda by interfering with the animal's social, ecological, chemical, and architectural milieu. The panda celebrity is therefore a result of the consistent accumulation of lively capital, in which the liveliness and lifeworlds of the animal have been thoroughly transformed into objects in media-driven affective economies. Placing the generation of lively capital within the capitalist logic of accumulation, it is possible to observe that the public, an active participant in the panda fandom, is mobilised between the experience of having the giant panda materialised and

wanting more from the animal (Rojek 2001). In the case of the panda celebrity, atmospheric politics provides the means to increase the endangered species' productivity via scientific enrichment and renovation programs (Nicholls 2012, Barua 2020). However, once materialised in zoos and enclosures, this ability to enhance the biological reproduction of the animal is transferred to the public's need and desire for more – a deeper, more intimate relationship, or, in the words of Haraway (2013), a human-animal companionate family kin pattern.

The movement between having and wanting is fuelled by media and mass communication (Rojek 2001, Giles 2013). Driessens (2013) suggests that celebrity capital accumulates as media visibility increases. The media creates visibility, or recognisability, based on the simple and effective principle of recurrent media representations. The panda's celebrity thus accrues lively capital due to the animal's persistent and recurrent media representation, establishing an accumulative advantage and the 'richer-get-richer' preferential attachment (Ravid and Currid-Halkett 2013). For example, the giant panda Chi-Chi, who lived in the London Zoo from 1958 until she died 1972, became a superstar because of the accumulative process of lively capital which follows a circular motion under the influence of the mass media. The lively capital generated thus served as the foundation for further capital accumulation. In other words, an animal celebrity such as the giant panda with *established* lively capital has a greater chance of generating *additional* lively capital because of its iconic status and presence in the global mainstream media maelstrom (See Nicholls 2012).

3. Materials and methods

In this study, we consider the public's preferential attachment as a factor contributing to the construction of animal celebrity. Defined as an accumulated process of lively capital, animal celebrity is seen as an animal or species that receives more public attention, influence, and interest than other animals or species. In the past decades, numerous attempts have been made to evaluate the factors influencing the public's affection for animals. Kellert (1989), for example, identified 12 factors that contribute to people's preference for animals, including body size, aesthetics, intelligence, danger to humans, likelihood of inflicting property damage, predatory tendencies, phylogenetic similarities to humans, cultural and historical embodiment, relationship to human, texture, locomotion modes, and economic values. Woods (2000) evaluated Kellert's study by investigating Australians' preference for animals, incorporating Kellert's factors with additional modifications. Ryan (1988) proposes a matrix for studying affection towards animals based on two intersecting dimensions. For instance, dolphins are considered safe and human-oriented, whereas saltwater crocodiles are considered dangerous and un-human.

This study investigates panda celebrity on 12 modified affective dimensions based on the works of Woods (2000) and Ryan (1988) (See Table 1). In parallel, we examined three other species that are not typically considered animal celebrities, including red pandas, peafowls, and swans (Table 2). The opportunity to encounter all four species simultaneously during a single visit to the Chengdu Research Base of Giant Panda Breeding makes the comparison possible and provides the foundation for the empirical fieldwork. We recognise the participants' attraction to the pandas as a preference identifying an inherent bias with the paper.

Table 1. Factors influencing the public's perception of animal celebrity.

1. Aesthetics: Animals considered 'cute' are considered more attractive and therefore more preferred.
2. Aggressive behaviour: Animals that pose a perceived threat or danger to people are less liked.
3. Intelligence: Animals considered to have the capacity for reason, feeling, and emotion are preferred.
4. Human-animal interaction: Animals that interact more with people are preferred.
5. Degree of freedom: Animals enjoying greater freedom are preferred.
6. Traditional Culture: Animals that play an important role in the history or culture of a geographic area are likely to be preferred.
7. National Identity: Animals that the public can relate to and identify with are likely to be preferred.
8. Pet ownership: Animals that are pets or useful to humans are likely to be preferred.
9. Willingness to donate: Animal celebrity is more likely to attract public donations.
10. Willingness to know: The public wants to learn more about the animal celebrity.
11. Social context: The public holds a deeper understanding and knowledge of the animal celebrity.
12. Animal preference: The public favours the animal celebrity over other animals/species.

In May 2022, 2086 Chinese tourists visiting the Chengdu Research Base of Giant Panda Breeding were invited to complete an anonymous online survey. The questionnaire was created using Wenjuanxing, a professional website for conducting surveys. Once the questionnaire was published, Wenjuanxing issued a QR code that participants could scan to access. Participants could only submit the questionnaire if every question was answered. The median amount of time spent on a survey was 89 seconds. To ensure the quality of the data collected, we eliminated questionnaires that were completed in less than 50 seconds, leaving 1962 valid samples for further analysis. As a result, the percentage of valid questionnaire responses is 94.06%. Before answering the questionnaire, respondents gave their informed consent.

While the widespread use of mobile phones among Chinese citizens aided in the collection of the questionnaire, we observe a disparity between the older and younger generations in internet literacy. 71.9% of the respondents ($N = 1962$, 59.3% female) were under 35 years of age. As a token of appreciation, the research team presented the participants with small gifts such as keychains or magazines. All collected data were documented on Wenjuanxing. Finally, the research team exported the data to SPSS for additional analysis and coding.

The questionnaire contained 19 questions. Six questions addressed the demographic characteristics of the tourists, including gender, age, origin, educational background, first/repeated visits, and visiting purposes (Table 3). Twelve rank order scale questions followed the demographic survey, with respondents encouraged to rank the giant panda, the red panda, the peacock, and the swan, based on a specific factor listed in Table 1. According to the evaluative factor, the animal with the most significant influence was placed first in the order. For instance, question seven assessed the cuteness factor and asked participants to rank the level of cuteness exhibited by the four animals. In the survey, respondents tapped on the images of the animals to indicate their preferred order. The animal tapped first was the cutest, and the animal tapped second was less cute but still cuter than the other two animals. The least cute animal was chosen last. The weighing system was consistent across all 12 evaluation factors. Given that four animals had been listed, there were 24 arrangements for each question. First, we assigned each animal the following values:

Giant panda = a; Red panda = b; Peafowl = c; Swan = d.

Second, numbers were assigned to arrangements. Figure 1 shows that the numbers 1–6 were used to designate the arrangement sequences abcd, abdc, acbd, acdb, adbc, and adcb. Accordingly, the remaining numbers, 7–24 were assigned to arrangements.

Table 2. Profiling four species at the panda base.

	Giant panda	Red panda	Peafowl	Swan
Trophic level	Herbivorous	Herbivorous	Omnivores	Herbivorous
Mass	70–100 kg (Female, Adult)	3–6 kg (Female, Adult)	2.7–4 kg (Female, Adult)	8.5–9 kg (Female, Adult)
Scientific classification: Order	Carnivora	Carnivora	Galliformes	Anseriformes
Conservation status	Vulnerable	Endangered, China's List of Key Wildlife, Grade II	Green peafowl is endangered in the wild.	Endangered in the wild.
Population in China	About 1,800 pandas in the wild	6,000–7,000 red pandas in the wild	About 500 green peafowls in the wild in China	Lack of accurate data from China
Presentation in traditional Chinese culture	Lack of traditional symbolism	A limited impact on the culture	A symbol of auspiciousness, good luck, and nobility	Swans have had a prominent place in Chinese ritual from very early times, especially in marriage rites.
Ecological value	US$2.6-US6.9 billion in 2010	High ecological value	High ecological value	Lack of data
Celebrities	Su-Lin; Chi-Chi; Ling-Ling and Hsing-Hsing; Mei Lan etc.	Babu, Brummie of the year; Rusty	Unknown	Unknown
Internet culture	The new 'cat' of the internet	The red panda has gained a considerable and increasing cultural role in the western world, particularly in the virtual world of the Internet.	Unknown	Prompted less than mammals
Anthropomorphic	Heavily anthropomorphized	Anthropomorphized	Anthropomorphized	Anthropomorphized
Freakiness	Bamboo diet, pseudo thumb	Red panda-raccoon confusion	Colourful appearances	Not identified
Politics	Panda diplomacy	Unknown	High officials decorated their hats with peafowl feathers in Qing Dynasty.	Royal swan ownership in England
Images in media	Kongfu panda Po Bing Dwen Dwen	Master Shifu; Mei Lee	Lord Shen in Kongfu Panda	The ugly duckling The swan princess
Life in Panda Base	Enclosures	Enclosures and free-roaming	Free-roaming	Free-roaming

SPSS for Mac 26.0 was utilised for data analysis. In addition to descriptive statistics (e.g. mean, standard deviations), Pearson correlation analysis was performed to examine the bidirectional interactions and dynamics between the 12 factors. Using exploratory factor analysis (EFA) with the principle components method, the significant factors influencing the public's perception of the animal celebrity were identified. The analysis's feasibility was evaluated using the Bartlett sphericity test and the Kaiser-Meyer-Olkin index (KMO). According to the Kaiser criterion, this study included factors with an eigenvalue greater than 1. Field's criterion was applied, which suggested that the factor loads in this type of study must be equal to or greater than 0.40. The structure was examined using Promax rotations, which reduced the number of factors involved in the distribution of items.

Table 3. Demographic summary of participants.

Demographic Categories	Frequency	Percentage
Gender		
Female	1164	59.4
Male	798	40.6
Age		
0–17	139	7.1
18–24	419	21.4
25–34	853	43.4
35–44	364	18.6
45–54	88	4.5
55–64	63	3.2
65+	36	1.8
Origin		
First-tier cities	337	17.2
Second-tier cities (Chengdu included)	1228	62.6
Other cities	397	20.2
Education Background		
Less than a bachelor's degree	835	42.6
Undergraduate	918	46.8
Postgraduate and above	209	10.6
Visiting frequency		
The First time	1275	65.0
The second time	388	19.8
The third time and above	299	15.2
Visiting Purpose		
Holiday and vacation	1100	56.1
Spending time with friends and family	537	27.3
Popular science education	222	11.3
Business	32	1.6
Other	71	3.6

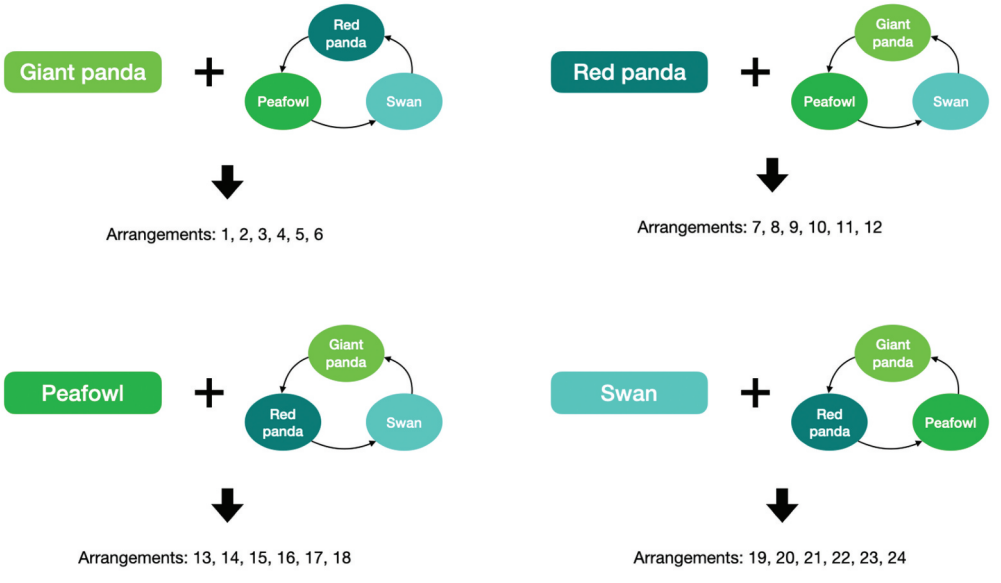

Figure 1. Coding 24 arrangements.

4. Results

Table 3 provides a demographic summary of the 1962 survey respondents. Females (n = 1164, 59.4%) participated in the survey more actively than males (n = 798, 40.0%). 90.5% of the participants were younger than 45 years old, while 79.8% of participants were urban dwellers of first- or second-tier metropolitan areas. 89.4% of participants possessed no more than a bachelor's degree. Notably, most participants (n = 1275, 65%) were first-time visitors to the Panda Base. More than half of the respondents (n = 1100, 56.1%) reported seeing the animals during holidays and vacations.

Figure 2 summarises 12 characteristics influencing the public's perception of the four animals. The graph displays the distribution of top-ranked animals from the 1962 participants and demonstrates that the giant panda is superior in all aspects to the other three animals. While participants rated the panda less favourably regarding the animal's aggression, intelligence, interaction, and degree of freedom, the panda's celebrity continues to prevail in these areas as a result of the animal's cuteness, the public's desire to donate and learn about it, the social context, and the animal's preference.

The Pearson correlations between the 12 components are displayed in Table 4. Except for the relationship between social context and aggressiveness (p = 0.081), the results indicate that all elements determining animal celebrity are significantly, and positively, connected (p < 0.01). The association between preference and willingness to learn about animals is the greatest among the 12 factors (r = 0.502, p 0.01), indicating that tourists are more interested in learning about their preferred animals than other animals. We observe a significant correlation between the public's willingness to know and willingness to donate (r = 0.474, p < 0.01), preference for the animal and its social context (r = 0.461, p < 0.01), willingness to know and social context (r = 0.452, p < 0.01), and preference for the animal and willingness to donate (r = 0.441, p 0.01). The link between the degree of freedom afforded to the animals and the interaction with tourists is moderately positive (r = 0.393, p 0.01). The willingness to donate (r = 0.363, p < 0.01), the willingness to learn (r

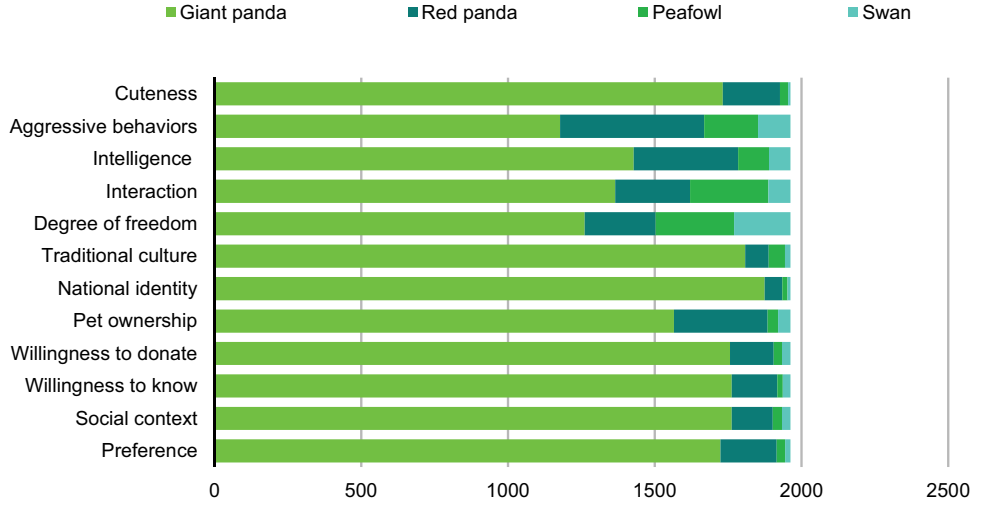

Figure 2. Distributions of the top-ranked animals across 12 factors for 1962 participants.

Table 4. Pearson correlations of 12 factors influencing the public's perception of the animal celebrity**.

	1	2	3	4	5	6	7	8	9	10	11	12	
1. Cuteness	1.000												1.0
2. Aggressiveness	0.142	1.000											0.6
3. Intelligence	0.174	0.175	1.000										0.5
4. Interaction	0.200	0.160	0.233	1.000									0.4
5. Degree of freedom	0.139	0.169	0.217	0.393	1.000								0.3
6. Traditional culture	0.185	0.130	0.162	0.184	0.217	1.000							0.2
7. National Identity	0.157	0.085	0.178	0.133	0.132	0.323	1.000						0.1
8. Pet ownership	0.274	0.114	0.182	0.278	0.265	0.232	0.272	1.000					0
9. Willingness to donate	0.201	0.079	0.197	0.130	0.130	0.190	0.309	0.363	1.000				
10. Willingness to know	0.246	0.065	0.204	0.179	0.153	0.170	0.246	0.329	0.474	1.000			
11. Social context	0.226	0.039#	0.168	0.170	0.156	0.138	0.243	0.242	0.356	0.452	1.000		
12. Preference	0.285	0.063	0.189	0.200	0.147	0.207	0.226	0.392	0.441	0.502	0.461	1.000	

$N = 1962$.
**Coefficients in this table are all significant at the 0.01 level (2-tailed).
#Correlation is not significant at the 0.01 level (2-tailed).

= 0.329, $p < 0.01$), and the preference for an animal ($r = 0.392$, $p < 0.01$) influence the public's desire to build a more intense and stronger relationship with the animals. The social context positively influences the willingness to give ($r = 0.356$, $p < 0.01$). In contrast, factors such as cuteness, aggressiveness, intelligence, interaction, freedom, traditional culture, and national identity have exhibited relatively weak connections across the board, with most coefficients falling below 0.3. Specifically, correlations regarding the animal's aggressiveness have shown negligible associations with coefficients less than 0.200.

Exploratory factor analysis (EFA) was utilised to determine the pattern of the 12 factors influencing animal celebrity (See Table 5). The Kaiser-Meyer-Olkin (KMO) adequacy measure was determined to be 0.847, and the Bartlett sphericity test was significant ($p < 0.01$), indicating that we were able to conduct exploratory factor analysis. The research findings indicate that three factors account for 49.445% of the variance. The level of cuteness, the first item, was eliminated because it had no loadings above 0.30 after the Promax rotation. An analysis of the scree plot indicated that the most significant change in slope came after

Table 5. Item communality and final exploratory factor analysis results.

		Factor loading		
Item description	Communality	1	2	3
10. Willingness to know	0.614	0.808		
12. Preference	0.619	0.801		
11. Social context	0.523	0.761		
9. Willingness to donate	0.536	0.678		
8. Pet ownership	0.409	0.413		
4. Interaction	0.569		0.762	
5. Degree of freedom	0.640		0.746	
2. Aggressiveness	0.287		0.520	
3. Intelligence	0.290		0.462	
6. Traditional culture	0.640			0.792
7. National identity	0.657			0.790
1. Cueness	0.256			

Extraction Method: Principal Component Analysis; Rotation Method: Promax with Kaiser Normalization; a Rotation converged in 5 iterations; Loadings less than 0.40 omitted.

three factors. Factor 1 validates the accumulation of lively capital in the construction of the animal celebrity. The willingness to know, preference for animals, social context, willingness to donate, and pet ownership are grouped together under factor 1, which accounted for 29.450% of the variation. This dimension's components contribute to an explanation for the media-driven materialisation of the animal celebrity. The desire to learn more about the animal strongly correlates with the public's existing knowledge and investment interest in the animal celebrity. Factor 2 demonstrates that the interspecies interaction, freedom, aggressiveness, and intellect of the animal cluster into a distinct group, further explaining 11.636% of the total variance. The third factor refers to the cultural dimension of animal celebrity, including animal representations in traditional culture and national identity. In this study, factor 3 explains 8.359% of the overall variance.

5. Discussion and conclusion

The extant literature on animal celebrity is based, primarily, on individual case studies. Adding to this previous research, our study was framed on the basis that animal celebrity results from a process of accumulated lively capital. The hypothesis was empirically evaluated using 12 factors that have shaped the public's view of the animal celebrity. In addition, we analysed how interrelationships and interactions between the 12 factors have contributed to the animal celebrity's accumulation of lively capital. The survey confirms the celebrity status of the giant panda, as participants weighed all 12 factors of the giant panda against those of the other three animals. Our findings concur with Rojek's (2001, p. 10) definition of celebrity as the 'attribution of glamorous or notorious status to an individual in the public sphere'. We found that the public endorsed the giant panda with their attention and preference, elevating it to prominence over all other animals. However, this status can be founded on 'faux ecstasy' (Rojek 2001), which consists of inventive fantasies and misleading interpretations. For example, as a bear family member with a carnivorous diet and a body mass greater than 100 kg, the giant panda is the most aggressive and hazardous animal towards humans of the four species investigated. Despite this, our research shows that a significant number of respondents believed that the giant panda is neither harmful nor a threat to humanity. In contrast, the three species that pose less of a threat, including the red panda, peafowl, and swan, were found to be more aggressive. Red pandas, peafowl, and swans at the panda base are all free-roaming animals that visitors can interact with closely. In contrast, pandas are captive animals who live in enclosures and have minimal face-to-face interaction with tourists. Despite this situation, respondents felt that the giant panda enjoys the most freedom.

The giant panda's celebrity is further manifested in consideration of traditional culture and national identity. In contrast to the frequent and prominent representation of swans and peafowls in traditional Chinese culture, the giant panda has received less attention (Songster 2018). However, panda celebrity holds enormous dominance in representing the national identity and participants agreed that the panda also plays a vital role in China's traditional culture. The findings suggest that animal celebrity status can involve distortion of and prejudice towards facts connected to the animal itself, yielding a different or conflicting story about the animal that is nevertheless generally accepted among the public.

The seemingly bizarre, imaginative, and even misleading stories about the panda celebrity may be better understood by examining the accumulation of lively capital in capitalist societies, i.e. animal celebrity as a process of lively capital generation and accumulation configures animal celebrity according to the logic and rules of capitalism. The Pearson correlation test and exploratory factor analysis revealed a clustering movement between what can be loosely categorised as 'cultural capital' (Rojek 2001) produced and reproduced in mass media communication. The development of panda capital of the panda celebrity adheres to the capitalist rule in which the public's desire and 'wanting' (Giles 2013) are directed towards the possession, 'having', and materialisation of the panda as a sought after 'object'. This suggests panda celebrity exemplifies the same capitalisation process through which the animal's vitality is transformed into a valued and desired product. In our findings, the building of lively capital is driven by factors such as the public's desire to learn more about the animal celebrity and affection towards the animal. The public is also more likely to invest in the giant panda and imagine an owner-pet bond with this species.

We observe that the public has already constructed a robust social context for the animal celebrity, indicating the acquisition of greater knowledge and comprehension of animal celebrities such as the giant panda. In the instance of the panda celebrity, this type of 'having' the giant panda through creating a social context through affection and knowledge has inspired the public's desire to learn more about the panda, which is similar to the link between capital investment and pet ownership stemming from the capitalist accumulation of lively capital.

While our empirical investigation of the factors contributing to the panda's celebrity demonstrates that animal celebrity is an accumulation of lively capital, Haraway (2013) argues the 'human labour power turns out to be only part of the story of lively capital' (p. 46), and animals have contributed to a distinct category of labour that has yet to be articulated and theorised in 'non-humanist terms' (p. 67). Thus, it is problematic to presume that animals and humans have achieved celebrity status on an equal footing. Indeed, there are firmly embedded asymmetries between humans and animals at wildlife attractions (Fennell 2022). Instead, we deem it useful to comprehend the formation, reproduction, and circulation of the story of animal's labour by examining the celebrity status of animals such as the giant panda.

The most significant finding of this study is the predominance of the capitalist principle in the construction of animal celebrity and the accumulation of lively capital. Our empirical research has led us to conclude that the animal celebrity enjoys a cumulative advantage in its ongoing social construction. While the public believes they already possess substantial information and comprehension of animal celebrity, they are also interested in learning about and investing more in it. The panda's fame, therefore, is consistent with the 'rich-get-richer' hypothesis of preference attachment and cumulative benefit that researchers have observed in the social structure of human celebrity (Ravid and Currid-Halkett 2013).

Furthermore, our research demonstrates that the servitude of animal celebrities cannot be glorified as a link between nature and the human world. Instead, the natural world in which animal celebrities are born has been deeply infiltrated by the transforming movement of lively capital governed by the capitalist system. We demonstrate that panda

celebrity rests on false beliefs, narratives, and imagery that the public has accepted as verified facts. Captured in the several spheres of lived realities that the capitalist movement has produced, animal celebrity cannot and does not speak the language of nature (Author, in press). Despite the shared omission and suppression in the anthropocentric production of capitalism, it is insufficient to view animal and non-human participants in the accumulation of lively capital as proletariat figures for their exclusion from the wage-earning class.

Finally, we argue that there is an urgent need to investigate the unique work that animal players give to their becoming, participation, and evolution in capitalist market. Without effective intervention, the oppression of the animal other as commodity will persist in the arena of capital accumulation. How this narrative plays out in successive studies considering the panda's connection to the natural world and its value in conservation schemes will be of added significance. Other studies, and other species, are thus needed to compare with our results in the assessment of the role that animals play in the accumulation of capital on many different levels and across cultures.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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