

SUPPORTING INFORMATION

Temperament profiles and social compatibility in captive female long-tailed macaques (*Macaca fascicularis*)[†]

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S1 Temperament Assessment (Schapiro 2017)

Table S1 presents the ethograms used to assess the temperament of long-tailed macaques (*Macaca fascicularis*). Behavioural responses were classified into five temperament categories: aggressive, neutral, affiliative, anxious, and fearful. Each category was defined based on characteristic observable behaviours and their corresponding descriptions.

An aggressive temperament is characterized by behaviours associated with threats or confrontations, such as an aggressive charge, open-mouth threat, stare threat, cage shaking, and barking. A neutral temperament is characterized by relaxed or non-confrontational behaviours, including scanning the room, self-grooming, playing with objects, and exploring the cage environment. An affiliative temperament is characterized by positive social communication behaviours, such as lip-smacking, presenting body parts for grooming, and cooing.

Behaviours related to anxiety included yawning, scratching, and stereotypic repetitive movements, which are often associated with tension or stress in captive animals. Fear-related behaviours were identified through submissive or defensive responses, including fear grimaces, freezing, submissive presenting, alarm calls, and rapid lip-smacking. These behavioural indicators were used as the basis for categorizing the temperament profiles of individual macaques during the observation period.

Table S1. Temperament Assessment for *Macaca fascicularis*

Temperament	Behaviour	Notes
Aggressive	Aggressive charge	Move forward in a firm manner, which may end in an abrupt stop
	Open mouth threat	Aggressive movements where the mouth is open and the teeth are visible
	Stare threat	An expression where the head and neck are facing forward and the eyes are wide open.
	Cage shake	The behaviour of holding part of the cage and shaking it quickly so that the cage moves and vibrates.
	Bark	Calls used in response to predators or other threats
Neutral	Scanning room	Maintaining a static position with a normal or relaxed posture without any other behaviour
	Self-grooming	Look for and remove dirt or parasites on the surface of the skin and hair individually.
	Play with toys	Playing with an object
	Explore cage	Exploring sometimes without any repetitive movements
Affiliative	Lip smack	The mouth opens and closes slightly rhythmically. When the mouth is opened, a smacking sound is heard.
	Present	Exposing the belly, neck or other body parts for grooming
	Coo call	Vocalization with moderate pitch and intensity, mouth open in a circle
Anxiety	Yawn	Breathing air through an open mouth with teeth bared, usually the eyes are too exaggerated
	Scratch	Scratching motion using the arms or legs with nails on the skin
	Movement stereotype	Rhythmic or repetitive movements
Fear	Fear grimace	A submissive facial expression with the corners of the lips pulled back, exposing the lower and upper teeth.
	Freeze	A stiff, immobile posture, usually accompanied by averted gaze.
	Submissive present	The animal's position is with its back turned and its tail raised.
	Alarm call	Loud, high-pitched fear vocalizations
	Fast lip smacking	The mouth opens and closes with a rapid smacking sound.

References

Schapiro SJ (Ed). 2017. Handbook of Primate Behavioral Management. Boca Raton (US): CRC Press

S2 Results of accumulation of temperament assessment

Table S2 summarizes the temperament distribution of individual female long-tailed macaques (*Macaca fascicularis*) housed in the two cage groups. Across all individuals, neutral behaviour represented the dominant temperament category, with proportions ranging from 26% to 93%. Most individuals in both cages exhibited high levels of neutral temperament, indicating generally relaxed behavioural states during observation.

In group A, individuals 1–3 showed a strong predominance of neutral behaviour (69–90%), with occasional aggressive or anxious responses. Individual 3 exhibited the highest anxiety-related behaviour within this group (29%), while individual 4 displayed a markedly different profile, characterized by a high proportion of fearful behaviour (72%) and a relatively low proportion of neutral behaviour.

In cage group B, a neutral temperament also predominated among most individuals (48–93%). However, greater variability in affiliative behaviour was observed compared with cage group A. Individual 5 showed the highest proportion of affiliative behaviour (34%), whereas individuals 8 and 10 also displayed affiliative tendencies, although at lower levels. Anxiety-related behaviour was observed in several individuals, particularly individual 9 (13%). Additionally, individual 11 exhibited both aggressive (12%) and fearful (13%) responses, suggesting a more reactive temperament profile.

Overall, the data indicated that although neutral behaviour dominated in both groups, cage group B exhibited greater behavioural diversity, including affiliative tendencies that were absent in cage group A.

Table S2. Results of accumulation of temperament assessment

Animal ID	Cage	Temperament (%)				
		Aggressive	Affiliative	Neutral	Anxiety	Fearful
1	A	8	0	90	1	0
2	A	6	0	82	0	6
3	A	1	0	69	29	0
4	A	0	0	26	1	72
5	B	7	34	48	8	0
6	B	24	0	70	0	0
7	B	3	0	93	3	1
8	B	0	8	87	3	2
9	B	0	0	87	13	0
10	B	4	9	87	0	0
11	B	12	0	73	0	13