



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

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ABSTRACT: Long-tailed macaques (*Macaca fascicularis*) may exhibit agonistic behavior when housed in groups due to individual incompatibility, which can negatively affect social stability and animal welfare in captive settings. Temperament assessment has been proposed as a useful approach for evaluating individual compatibility prior to grouping. This study aimed to identify the temperament profiles of individual female long-tailed macaques housed at the Primate Research Center, IPB University. Temperament assessment was conducted on 11 adult females divided into two cage groups using the human intruder test in the profile phase. Behavioral responses were categorized into five temperament types. The results showed that four individuals exhibited neutral-aggressive temperament, three neutral-affiliative, two neutral-anxious, one neutral-fearful, and one fearful-neutral temperament. Comparative analysis indicated that cage group B displayed a higher proportion of affiliative-oriented individuals and greater overall compatibility than cage group A.

Keywords:

animal welfare, behavior, temperament, *Macaca fascicularis*

■ INTRODUCTION

The long-tailed macaque (*Macaca fascicularis*) is one of the most commonly used non-human primate models in biomedical research due to its similarities to humans. Captive-bred populations remain valuable for experimental studies (Ernita *et al.* 2021). Maintaining appropriate husbandry and welfare standards in research facilities is essential for ethical compliance and reliable scientific outcomes.

The Primate Research Center IPB University (PSSP IPB) utilizes non-human primates as experimental models, including long-tailed macaques (*Macaca fascicularis*). In captivity, this species' behavioral repertoire reflects natural patterns, including social behaviors and individual activities.

Because macaques are highly social animals living in structured groups, social dynamics critically affect their welfare in captivity. Incompatible social interactions may lead to aggression and injury, thereby compromising animal welfare. Although behavioral observations of captive macaques have been reported (Clark *et al.* 2023), information on the social patterns of captive long-tailed macaques in Indonesian facilities remains limited. Understanding social behavior within captive groups is essential for improving management strategies and reducing aggression.

■ MATERIALS AND METHODS

This study was conducted at the Primate Research Center (PSSP), IPB University, to compare the temperaments of two colonies of adult female long-tailed macaques (*Macaca*

fascicularis). All procedures were approved by the PRC-IPB Ethics Committee (approval no. PRC-22-B004). The materials included ethogram sheets, walking boards, writing instruments, stopwatches, and personal protective equipment (PPE), with 11 adult female macaques as study subjects.

Behavioral data were collected over a 30-day period, including temperament assessments using the Human Intruder Test (HIT) in the profile phase. The observer positioned themselves away from the cage in the profile orientation while recording the animals' responses for 2 min (Schapiro 2017). This approach evaluates temperament through reactions to a mildly stressful social stimulus. Behavioral data were summarized using a descriptive qualitative analysis.

■ RESULTS AND DISCUSSION

Temperament assessment is used in captive management for pairing *Macaca* spp. to minimize agonistic interactions (Schapiro 2017). In this study, temperament was evaluated to assess social compatibility among long-tailed macaques (*Macaca fascicularis*). Behavioral responses were categorized into five types—aggressive, affiliative, neutral, anxious, and fearful—based on the criteria in Table 1.

The assessment revealed temperament differences between the cage groups. Group A included two individuals

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with neutral-aggressive temperament, one neutral-anxious, and one fearful-neutral. Group B included three individuals with neutral-affiliative temperament, two with neutral-aggressive temperament, one with neutral-anxious temperament, and one with neutral-fearful temperament.

Individuals with neutral-aggressive temperament (1A, 2A, 2B, and 3B) displayed both relaxed behaviors, such as resting and self-grooming, and occasional agonistic signals, including open-mouth threats. Schapiro (2017) noted that neutral-tempered individuals exhibit relaxed behaviors, whereas aggressive individuals display threats, such as staring and chasing conspecifics.

Individuals with a neutral-affiliative temperament (1B, 4B, and 6B) were commonly observed in relaxed states and engaged in self-grooming, as well as affiliative social behaviors such as coo calls and lip-smacking when initiating allogrooming. Lip-smacking has been widely associated with affiliative communication and grooming interactions in macaques (Fedurek *et al.* 2015).

Two individuals (3A and 5B) showed neutral temperament with anxious tendencies, displaying repetitive behaviors, such as yawning and scratching. Anxiety in captive macaques may arise from aggression or social integration difficulties (Schapiro 2017). Individual 3A exhibited alopecia linked to self-directed behaviors, a condition associated with temperament in captive primates (Coleman *et al.* 2015).

Individual 6B displayed a neutral temperament with fearful tendencies, exhibiting freezing during agonistic events. Individual 4A showed a fearful temperament with neutral tendencies, freezing when the staff approached routine activities. Freezing behavior is commonly interpreted as a defensive response to perceived threats (Bethell *et al.* 2019).

Temperament composition differed between cages A and B (Figure 1). Cage A showed aggressive, anxious, and fearful traits, lacking affiliative individuals. Cage B contained affiliative individuals. Cage A was dominated by neutral-aggressive members (50%), whereas cage B had neutral-affiliative (42.9%) and neutral-aggressive (28.6%) individuals. Neutral-anxiety and neutral-fearful temperaments occurred in both groups at lower rates. Affiliative individuals in cage B may enhance social compatibility by buffering agonistic tendencies.

Table 1 Temperament profile of *Macaca fascicularis* in different cage

Animal identity	Temperament
Colony Cage A	
1A	Neutral - Aggressive
2A	Neutral - Aggressive
3A	Neutral - Anxiety
4A	Fearful - Neutral
Colony Cage B	
1B	Neutral - Affiliative
2B	Neutral - Aggressive
3B	Neutral - Aggressive
4B	Neutral - Affiliative
5B	Neutral - Anxiety
6B	Neutral - Affiliative
7B	Neutral - Fearful

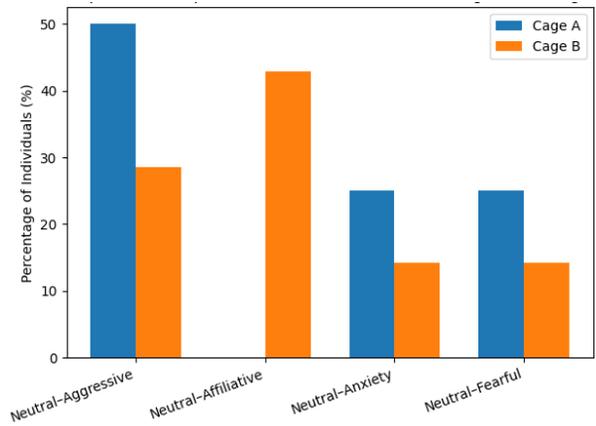


Figure 1. Aggressive-affiliative temperament balance between colonies of adult female long-tailed macaques (*Macaca fascicularis*). Cage A shows higher aggression with no affiliative individuals, whereas Cage B shows greater affiliative behavior and lower aggression, indicating better social compatibility.

CONCLUSION

Temperament composition varied between macaque colonies, with group B showing higher social compatibility than group A. Group A had aggressive temperaments, whereas group B had affiliative ones. These findings suggest that temperament assessment can guide effective grouping to improve the welfare of captive macaques.

ASSOCIATED CONTENT

Supporting Information

†The parameters and accumulation of temperament assessment were submitted in PDF form as supporting information.

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