

# Unwritten rules may help subjects survive

Fan XU<sup>1\*</sup>, Fang Fang LIU<sup>2</sup>, Linli CHEN<sup>3</sup>, Jie CHEN<sup>4</sup>, Jiayuan Peng<sup>1</sup> and Peter POH<sup>5</sup>

<sup>1</sup>Department of Public Health, Chengdu Medical College, China

<sup>2</sup>Art College, Southwest Minzu University, China

<sup>3</sup>Department of General Medicine, West China Hospital of Sichuan University, China

<sup>4</sup>School of Chinese Medicine, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong China

<sup>5</sup>Child Psychology Practice Garmisch, Garmisch-Partenkirchen, Germany

## Abstract

In biospheres, natural evolution allows subjects with the best genetic traits to survive. Jungle law is dominant in the biosphere; however, the biological mechanisms of unwritten rules as a supplementary section of jungle law remain unclear. Here, we report an interesting phenomenon in nonhuman primate society, where the subject adopts a strategy to jump the previously stable feeding sequence by copulating with the dominant monkey, consequently taking food when the higher-ranking members do. This strategy helps weaker subject(s) survive in nature.

## Introduction

When the biosphere developed, administrative law also developed, known as the law of the jungle [1]. At the time when Darwin first described natural selection [2], this law had been active for many centuries. This law can be divided into superficial and unwritten layers, which govern everything that occurs in nature.

In the biosphere, obtaining enough food (life-dependent resource) is crucial for subject survival. Interestingly, the feeding order is dominated by social hierarchy in monkey colonies with relatively stable social relationships. Shively reported that social hierarchies are linear in nonhuman primate communities [3,4]. Stronger group members who can protect the weaker members and infants are given priority in receiving food. Therefore, the priority in which a member receives food is the best indicator of their social rank in a community [5]. Here, we report an interesting phenomenon in the nonhuman primate community; namely, a lower-ranking monkey exchanged sex with the dominant male monkey for feeding priority.

## Methods

### Study Site and Focal observation

We did the field observation in the *M. fascicularis* feeding base of Sichuan Life Science Biotechnology Co., Ltd. (hereinafter “the Company”), from November 2016 to May 2018. Subjects were focally observed by trained observer, each with a high-definition digital camcorder (SONY DCR-SR43, 1100M). All *M. fascicularis* subjects were supplied by an operating subsidiary of the Company (license number SXIK [SC] 2012-0038). All subjects were housed in a free enclosed environment measuring 10 × 4 × 3 m, with a wild male-to-female ratio of 1:8-10. No significant gender ration differences across the free enclosures (Fisher’s exact test,  $P > 0.01$ ). In this study, we reported all measures and exclusions.

### Ethics Statement

The research complied with protocols approved by the Committee on the Ethics of Animal Experiments at Chengdu Medical College

(Approval No: 20160031), adhered to the legal requirements of the People’s Republic of China, and adhered to the American Society of Primatologists (ASP) Principles for the Ethical Treatment of Non-Human Primates. Animal care and housing procedures were compliant with Chinese regulatory requirements and Association for Assessment and Accreditation of Laboratory Animal Care, AAALAC statements. All procedures described were observational under normal rearing circumstances and involved no physical manipulation of the subjects or changes in their environment or diet. Complete animal husbandry and veterinary care was provided daily.

## Results

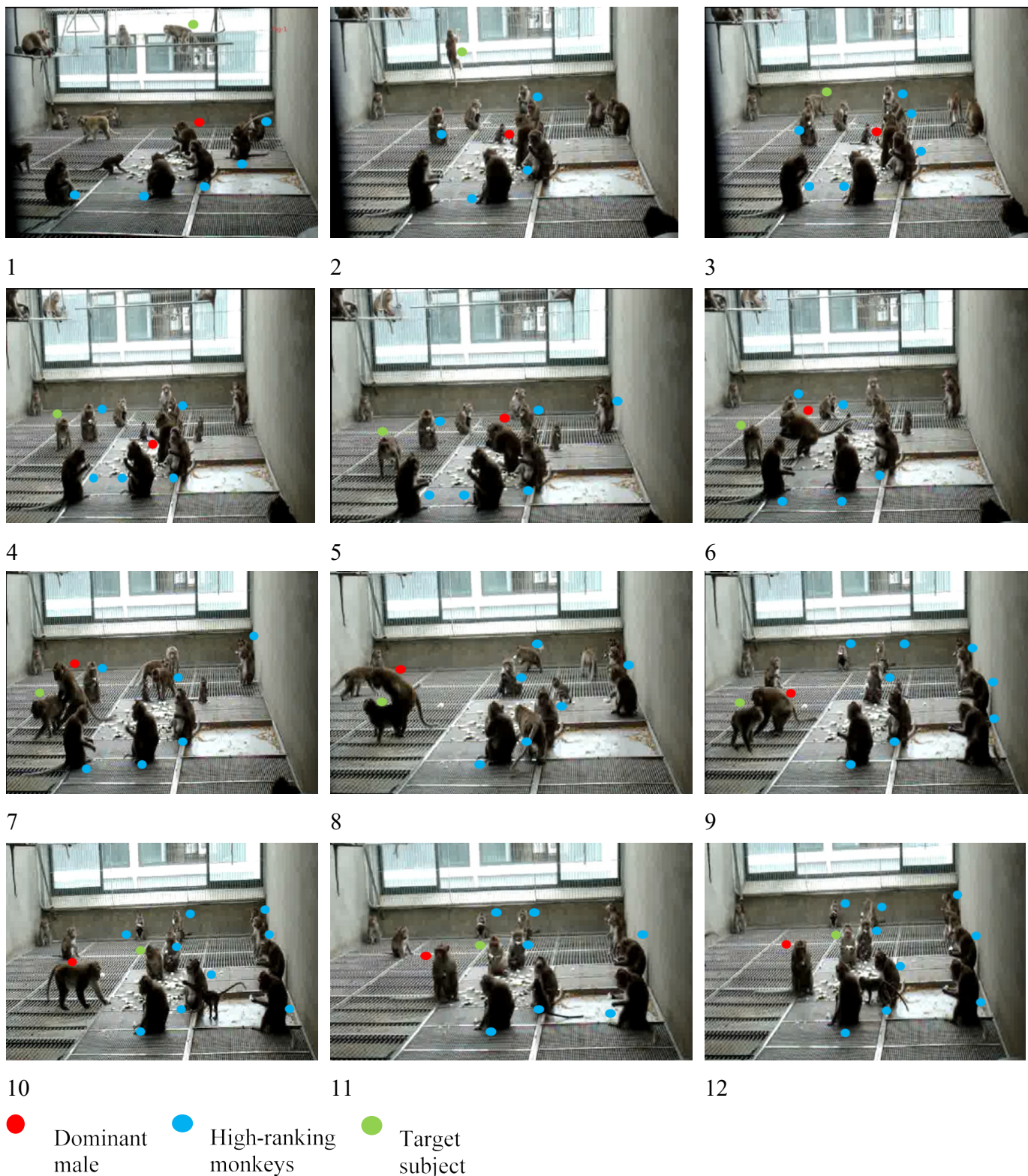
Here, we illustrate the observation in detail. The feeding order in the monkey colony was organized linearly by social hierarchy [3,4]. Our colony was similar to other monkey colonies found in the wild. The dominant male monkey and higher-ranking females took food first during the feeding phase. The lower-ranking monkeys could not take food until the higher-ranking monkeys finished eating; otherwise, they would be severely punished, bitten, or threatened by the higher-ranking monkeys.

In this case, the dominant male monkey and higher-ranking monkeys were given priority in eating the seasonal fruit melons (Figure 1, red and blue circles), while the target monkey climbed down from the window and walked around the food disk (Figures 2 and 3, green circles). The target subject made eye contact with the dominant male monkey (Figure 4, red and green circles). Once the agreement

\*Correspondence to: Fan XU, Public Health School, Chengdu Medical College, Chengdu, Sichuan China, Tel: +86 134 3800 1231; Fax: +86 28 6273 9570; E-mail: frank\_cqmu@126.com

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**Figure 1.** Red and blue circles, the dominant male monkey and higher-ranking monkeys were given priority in eating the seasonal fruit melons  
**Figures 2-3.** Green circles are the target monkey climbed down from the window and walked around the food disk.  
**Figure 4.** Red and green circles, the target subject made eye contact with the dominant male monkey.  
**Figures 5-8.** Red and green circles, Once the agreement (unwritten rule) was made, the dominant male monkey walked to the target subject to copulate  
**Figure 9.** The target subject made a sharp call, seeming to deliver the message “it is my turn” when the copulation ended  
**Figures 10-12.** green and blue circles, consequently, the target subject walked to the food disk and ate peacefully with higher-ranking monkeys

(unwritten rule) was made, the dominant male monkey walked to the target subject to copulate (Figures 5-8, red and green circles). The target subject made a sharp call, seeming to deliver the message “it is my turn” when the copulation ended (Figure 9). Consequently, the target subject walked to the food disk and ate peacefully with higher-ranking monkeys (Figures 10-12, green and blue circles).

## Discussion

This was an interesting phenomenon observed in a monkey colony, in which the lower-ranking subject used their intelligence to form an agreement to exchange copulation with the dominant male monkey for permission to eat first. The consequence of this exchange behavior was that the lower-ranking subject benefitted from priority in taking food; otherwise, the low food quality and quantity could not maintain the level of survival that this subject needed.

Social hierarchy plays a crucial role in group administration. It is automatically formed linearly and maintained stably when the group members form a union [3,4]. This distinguishes their rank, specifically during feeding, according to who is more submissive and who is more aggressive, as in our previous research [6]. The obvious advantage of this type of administration is that every subject must abide by social laws during group life, specified by taking social resources (resting place and copulation) in order. However, this may lead to polarization because the stronger subjects will become stronger, and the weaker subjects will become weaker. The best indicator is fur quality, as higher-ranking subjects present excellent, uniform and complete fur luster [7]. The default feeding order in the colony was changed by this unwritten rule between the target subject and the dominant class subject(s) successfully; however, this type of strategy is unpopular in this community, as it was only observed in a few subjects.

Several similar reports also found this intelligent strategy in other mammals [8,9] and in chimpanzee societies [10]; thus, we infer that this strategy was conserved during natural evolution. Food is significant for the survival of all animals. When the quality and quantity of food does not meet the population needs for a species, social hierarchy will be administered and known as law. Regarding the supplementary section

of group administration, unwritten rules are also revered and help lower-ranking subjects obtain priority for survival resources, including a comfortable resting place and food.

These types of unwritten rules exist in human society as well, as numerous scandals are reported [11], possibly led by greed. Although this strategy remains controversial and contradicts ethics, the significance of this strategy may help lower-ranking subjects survive.

## Author contribution

FX conduct the field observation and analysis of the data, FFL prepared the graph abstract, LLC and JC observed the video and capture the image, JYP prepared the observation, PP discussed the idea and format the manuscript.

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