

Simulation of leaf grooming as play by infant wild chimpanzee

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ABSTRACT

This article reports a new finding of a simulation of leaf grooming behavior as a form of play by an infant chimpanzee in Mahale, Tanzania. Leaf grooming, typically associated with external parasite removal, is a common behavior customary observed in M group chimpanzees in Mahale. However, the acquisition of this behavior by inexperienced individuals remains poorly understood. 3.5 year-old infant female chimpanzee, KP20, was observed simulating leaf grooming behavior while her mother participated in social grooming, but its function was unclear. The observed behavior displayed characteristics consistent with five criteria of play behavior, suggesting a potential role in acquisition of the techniques of leaf grooming in Mahale by infant chimpanzees. This case sheds light on the importance of play behavior in the development of tool using behaviors.

Keywords: leaf grooming, simulation, Mahale, play

INTRODUCTION

Leaf grooming is a behavior of chimpanzees that appears to be grooming a picked leaf (Goodall 1989; Nishida *et al.* 2010). In Mahale, leaf grooming occurs during or after social/self grooming, and its function is thought to be to place an external parasite, such as lice (*Pediculus schaeffi*) or egg of lice on it for inspecting and crushing them (Zamma 2002; 2006).

It is not clear how novice chimpanzees acquire leaf grooming behavior, which is one of the tool use cultures in groups such as Mahale, Gombe, and Kibale (Nishida *et al.* 2010). As for the development of tool using behavior in chimpanzees, the preparation for tool use hypothesis has been proposed that object holding and manipulation with unclear function such as object play during immature periods prepares them for functional tool using behavior in later matured periods (Inoue-Nakamura & Matsuzawa 1997; Koops *et al.* 2015). Although not all object manipulation, or object play in immatures prepares for tool use in chimpanzees (Koops *et al.* 2015), most object play provides an important opportunity for immature novices to learn the physical features of objects and acquire the skills to use functional objects as tools (Shimada 2021).

The purpose of this article is to report a case in which an infant chimpanzee in Mahale simulated leaf grooming behavior in the context of play, and to discuss the importance of object play by novice infants in the process to acquire functional leaf grooming behavior.

METHODS

Well-habituated wild chimpanzees of the M group in Mahale Mountains National Park, Tanzania were studied from 7 to 16 August 2023 during the dry season (seven observation days and 55.0 observation hours in total) (see Nakamura *et al.* 2015 for details of the research site).

OBSERVATIONS

On 10 August 2023, I found a party consisting only of adult females and their children at 8:57 h. The party consisted of four adult females, Koopy (KP), Puffy (PF), Zola (ZL), Zolfa (ZF, ZL's daughter) and a young male Peace (PC, PF's son, 9.3 year-old), two infant males Zigi (ZG, ZL's son, 4.5 year-old) and ZF21 (ZF's son, 2.5 year-old), and an infant female KP20 (KP's daughter, 3.5 year-old).

At 14:40 h, The party traveled along a trail and PF started self grooming, sitting on the ground. At 14:44 h, the rest of the members climbed down from a tree and KP and KP20 approached to PF. PF held KP20 in her arms and soon thereafter began grooming mutually with KP. At 14:45:35 h, PF groomed KP and KP20 started playing solitarily, rolling or lying on fallen leaves on the ground about 1 m away from KP and PF.

At 14:45:41 h, KP20 stopped playing, sat down on the ground and immediately tore off a leaf (approximately 4 cm long) from herb (*Psychotria peduncularis*) that was growing in front of her. At 14:45:45 h, KP20 plucked both ends of the leaf with her hands, brought her lips into contact with the leaf's surface, looked at the area, and then abandoned it. 14:45:51 h, KP20 tore off another small leaf (approximately 4 cm long) from the same herb, repeatedly brought his lips into contact with the surface of the leaf and pressed the area with his right thumb for several seconds (Figure 1). At 14:46:01 h, KP20 abandoned the second leaf, and PF stopped grooming KP. At 14:46:06 h, KP20 resumed playing solitarily raking the fallen leaves, lying on her back on the leaves, covering herself with the leaves, and rolling over the leaves (Video 1 available online at <https://doi.org/10.57760/sciencedb.08808>).

It could not be ascertained whether KP20 carried microscopic material from its lips or nothing when she repeatedly brought her lips into contact with the leaves.



Figure 1. KP20 is performing leaf grooming (front), and PF is grooming KP (back)

None of the two leaves could be collected. On this day, they ranged only with the same members throughout rest of the day.

DISCUSSION

The sequence of KP20's leaf grooming is considered to be an accurate copy or a simulation of functional leaf grooming behavior (Goodall 1989; Zamma 2002; Nishida *et al.* 2010). KP20 has been rolling playfully on fallen leaves on the ground before and after her leaf grooming. And KP20's leaf grooming was observed when her mother was grooming socially, but KP20 herself was not involved in social/self grooming, and thus, it is highly unlikely that the lice were actually removed and pressed or crushed it against the leaves.

KP20's leaf grooming behavior is considered one of the patterns of play behavior because it meets all of Burghardt's five criteria for play, i.e., unclear function, spontaneity, difference from functional behavior, repetition, and relaxed situation (Burghardt 2005). Firstly, although the primary function of leaf grooming is to crush lice and their eggs (Zamma 2002; 2006), it is unlikely that KP20 crushed lice or their eggs by leaf grooming, and therefore the function of KP20's leaf grooming was unclear. Secondly, there is no evidence that KP20 was forced by anything to perform leaf grooming, and it is believed that she performed leaf grooming voluntarily. Thirdly, the behavioral elements and their sequence in KP20's leaf grooming can be considered a simulation of functional leaf grooming, and KP20 performed leaf grooming during her mother's social grooming. However, chimpanzees primarily perform leaf grooming during and after grooming that involves themselves, and therefore, KP20 performed leaf grooming in a different context than the context in which chimpanzees primarily performed it. Fourthly, KP20 used two different leaves for her leaf grooming and therefore, a repetition of the behavior is evident. And fifthly, mothers in close proximity to KP20 are quietly grooming socially and the social and environmental situation can be described as calm and relaxed. Infant chimpanzees in Mahale frequently manipulate leaves in

play (Koops *et al.* 2015; Shimada 2021), but leaf grooming or its simulation have not been reported during play, nor have I observed (Shimada, unpublished data). In conclusion, this case is considered the first observation of an infant chimpanzee performing a simulation of functional leaf grooming as a pattern of object play.

It might be that infant chimpanzees are uncertain about the purpose of leaf grooming by skilled individuals, but acquire a simulation of leaf grooming and the context in which it occurs during play, and subsequently learn the purpose or function of leaf grooming behavior. Myowa-

Yamakoshi & Yamakoshi (2011) argued that wild infant chimpanzees in Bossou acquired information about the function of objects through careful, repeated observation and trial and error of the actions of skilled models of tool use behavior. In the present case, however, the mother in close proximity was grooming socially, but not leaf grooming, and there were no other individuals that could be as models of leaf grooming. Thus, it can be assumed that KP20 had already acquired the simulation of leaf grooming as a correct sequence of behavioral elements, not the function of leaf grooming, and that it was a behavior associated with grooming by the time of the observation.

This observation suggests that play is an important behavior that allows individuals to practice acquiring group-specific tool using behaviors (Groos 1991; Koops *et al.* 2015; Shimada 2021). It is necessary to accumulate observations of similar cases, as well as basic data such as the age at which chimpanzees begin to engage in leaf grooming during the actual social/self grooming in which they themselves are involved, or non-play context.

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