Maternal Attachment to a Stuffed Toy by a Macaque

Margaret S. Livingstone

Department of Neurobiology, Harvard Medical School, Longwood Ave, Boston, USA

Corresponding author: Margaret S. Livingstone, Department of Neurobiology, Harvard Medical School, Longwood Ave, Boston, MA 02115, USA, Tel: 6174321664; E-mail: mlivingstone@hms.harvard.edu

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Abstract

There have been dozens of reports of non-human primate females carrying around the corpses of their dead infants. This is surprising considering their complex social behavior and specialized brain systems for recognizing the faces and bodies of conspecifics. Here I report a fortuitous observation that indicates that the template for triggering initial maternal attachment is surprisingly non-specific and is hormonally driven.

Introduction

Harlow’s observations on infant bonding have had a profound impact on science and society, but such experiments probably would no longer be considered ethical. I made a fortuitous observation that indicates that maternal attachment in monkeys is similar to Harlow’s infant attachment findings in its minimal requirements, and, further, has a hormonal basis. Though the sample size is 1, the behavior was sustained, clear, and documented. I believe this is an extraordinary observation that could only have been found by accident nowadays and will be of profound interest to many fields.

Results

An 8 year old primiparous female macaque mulatta in our breeding colony delivered a stillborn infant. She was holding the lifeless infant to her chest when first observed in the morning. Veterinary care required that the dead infant be removed and examined. To accomplish this, the female was briefly and lightly anesthetized with ketamine (1 mg/kg) and dexmedetomidine (0.01 mg/kg). When the female recovered a few minutes later, she exhibited significant signs of distress: she vocalized loudly and constantly. Other monkeys housed in the same room also began to vocalize and behave in an agitated manner. To try to reduce the level of distress in the room I placed a stuffed animal in the cage with the female. It was a 10 cm high, soft, furry toy; a stuffed mouse, chosen because of its availability and its lack of potential choking hazards, such as sewn-on eyes. The female immediately picked up the stuffed toy and held it to her chest. She stopped vocalizing, and became calm while holding it. She held the toy to her chest continuously for 4 days, without any signs of distress. During this time she behaved in a manner indistinguishable from other mothers in our colony with live infants, in that she held the toy to her chest, and she exhibited very aggressive behavior towards co-housed monkeys and towards humans whenever they approached her. This enhanced level of defensive behavior is characteristic of females with nursing infants. On the fifth day after delivery, two things happened: the bright pink coloration characteristic of pregnancy on her rump, peri-umbilicus, and areolae faded to a paler pink, and she discarded the stuffed toy, without any apparent distress (Figure 1).

Carrying of a dead infant corpse by its mother has been observed in more than a dozen non-human primate species, including macaques [1]. This behavior may include grooming the dead infant and usually lasts for only a few days after the death of the infant. Though it may seem maladaptive for a primate to carry around a corpse, such behavior is a persistence of the normal nurturance of a living infant, or...
at least a recently birthed fetus, and there are many physical similarities between a living infant and a recently deceased one. Some great ape mothers have been observed to carry around their dead infants for more than a month [2], despite putrefaction, or even mummification, of the corpse. One could rationalize this behavior on the grounds that maternal attachment must have initially occurred normally, and the transformation of the corpse from something that resembled the mother’s infant to something that did not was gradual enough that maternal attachment could be maintained. In our case, however, there was no continuity between the stillborn fetus and the stuffed toy. Moreover, the same stuffed toy was not an acceptable substitute to two other mothers of infants more than a week old, when those infants were briefly removed from the mother for procedures.

Discussion

Harlow and Zimmermann [3] found that soft texture is critical for the attachment of infant monkeys to inanimate surrogate mothers, and that soft texture is even more important than the ability to provide nutrition for fostering an infant’s attachment. My fortuitous intervention and subsequent observations indicate that postpartum maternal attachment behavior may also be driven primarily by texture. I did not have the presence of mind to test other potential surrogates, so I am unable to evaluate the relative importance of size, shape, color, and texture, though a simultaneously present rubber Kong toy did not elicit any nurturing behavior. The stuffed toy matched a normal infant only in size, color, texture and crude shape, but did not possess any other infant characteristics such as odor, facial features, hands, feet, vocalization, movement, grasping, or suckling. The dismissal of the toy concomitantly with the fading of the female’s pink coloration is consistent with the idea that maternal behavior is triggered by hormones produced by pregnancy and/or parturition, and maintained by hormones produced in response to lactation [4].

Thus I conclude that the hormonal state of parturition or late pregnancy triggers an innate drive to nurture, but that the innately defined template for this nurturing behavior is non-specific, and may be as simple as a requirement for soft furry texture. The sparseness of

this template for triggering maternal behavior patterns is surprising considering the complex social organization of this species and the existence of specialized brain domains, comparable to those in humans, for face and body recognition [5-8]. Once the nurturing target is fixed upon, experience can adjust, refine, and maintain the template for the recognition of the target for maternal attachment.

Materials and Methods

This observation was made on a female macaca mulatta in our breeding colony. Animals are maintained on a 12 h/12 h light dark cycle and are socially housed. The stuffed toy was purchased commercially.

References

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