Researchers explore how infants infer social dominance relationships

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Credit: CDC.gov

(Medical Xpress)—The adaptive advantage of dominance relationships is obvious: In competition for food, mates and other resources, humans and animals try to minimize the cost of fighting by predicting their chances of succeeding in a conflict. Many species specifically exploit this sensitivity; for example, there are birds and animals that express postures under threat that make them appear to be larger. Biologists and anthropologists broadly accept that evolution has favored sensitivity to dominance relationships, but how these ancient perceptual functions work is still a subject of research.

Existing studies have shown that 10- to 13-month-old human infants are able to represent the dominance relationships between two agents in terms of their physical size, an appraisal in which larger size = more dominant. However, younger infants fail to do so. Are they failing to

represent dominance relationships in general? Or do they lack sensitivity to physical size as a dominance cue?

Researchers at the University of British Columbia in Vancouver, B.C. have addressed this question by exploring whether infants younger than 10 months showed sensitivity to another marker for social dominance: numerical group size. They have published their results in the *Proceedings of the National Academy of Sciences*.

Inferring social dominance from group size is a key adaptive function for many species including lions, primates, birds and humans. The researchers note that while patrolling the borders of their territory, groups of chimpanzees engage in noisy hoot-pant calling in order to advertise their numbers. Biologists have noted that both chimpanzees and lions will refrain from intergroup conflict when outnumbered by such chimpanzee groups.

Noting that previous studies of human children aged six to eight years have demonstrated sensitivity to group size as a cue for social dominance, the researchers designed a video study to test children younger than 10 months old for similar sensitivity. Infants were introduced to two groups of different sizes; they were then introduced to a single agent from each group. When both agents attempted to cross a platform simultaneously, they bumped into each other, and the only way they could progress is if one agent yielded to the other.

The researchers recorded the infants' looking time for each trial, reasoning that if infants were sensitive to numerical group size for inferences of social dominance, they would be more surprised and therefore look longer when an agent from a numerically inferior group prevailed. The results demonstrated a high degree of sensitivity among these infants to group size as a cue for dominance.

The researchers write, "To our knowledge, this is the first study to demonstrate that infants as young as six months of age can represent the dominance relationship between two competing agents in terms of the numerical size of their respective social groups." While older studies showed that infants in this age range were insensitive to physical size (surface area) of individual agents, they are sensitive to other cues. "Thus, our data suggest that the reported failure among younger infants to represent social dominance in this earlier study may have been due to the specific cue tested—specifically, understanding the relationship between physical size and social dominance may require more time for infants to learn."

They suggest that future studies might explore how infants weigh the benefits of increased group size, and what expectations infants have of group members during an intergroup conflict.

More information: Infants use relative numerical group size to infer social dominance. *PNAS* 2016 ; published ahead of print February 16, 2016, DOI: 10.1073/pnas.1514879113

Abstract

Detecting dominance relationships, within and across species, provides a clear fitness advantage because this ability helps individuals assess their potential risk of injury before engaging in a competition. Previous research has demonstrated that 10- to 13-mo-old infants can represent the dominance relationship between two agents in terms of their physical size (larger agent = more dominant), whereas younger infants fail to do so. It is unclear whether infants younger than 10 mo fail to represent dominance relationships in general, or whether they lack sensitivity to physical size as a cue to dominance. Two studies explored whether infants, like many species across the animal kingdom, use numerical group size to assess dominance relationships and whether this capacity emerges before their sensitivity to physical size. A third study ruled out

an alternative explanation for our findings. Across these studies, we report that infants 6–12 mo of age use numerical group size to infer dominance relationships. Specifically, preverbal infants expect an agent from a numerically larger group to win in a right-of-way competition against an agent from a numerically smaller group. In addition, this is, to our knowledge, the first study to demonstrate that infants 6–9 mo of age are capable of understanding social dominance relations. These results demonstrate that infants' understanding of social dominance relations may be based on evolutionarily relevant cues and reveal infants' early sensitivity to an important adaptive function of social groups.