BODILY ROTATION IN THE GESTURING, PLAY, AND DISPLAY OF GREAT APES

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Study of the gesturing and displays of great apes is, arguably, fundamental to understanding the evolution of human language, as well as other forms of human expression like dance. This paper examines the case of bodily rotation in ape gesturing and display, such as in various forms of spinning, rolling, flipping, etc. Such rotational movements are a recurring element in the intentional communication of great apes, for example, noted by Byrne et al. (2017) in six distinct gesture types and variants: *pirouette*, *pirouette with object, ice skating, side roulade, somersault,* and *rope spinning*. Byrne et al. hypothesized that these gestures, and dozens of others, are part of the innate repertoires of ape species, evolved through phylogenetic ritualization. By this idea, although such gestures are used intentionally and flexibly in context, they lack the open-endedness in form that is characteristic of human language. This hypothesis also implies that the human propensity for rotating their bodies—common in creative activities like dance and play—is not related to similar looking behaviors in apes, as it is doubtful our own diverse behaviors stem from a shared inventory of innately specified gestures. Alternatively, humans and great apes might spin, roll, and flip for homologous reasons, perhaps for the stimulating, dizzying effects of these behaviors, which drive their widespread occurrence.

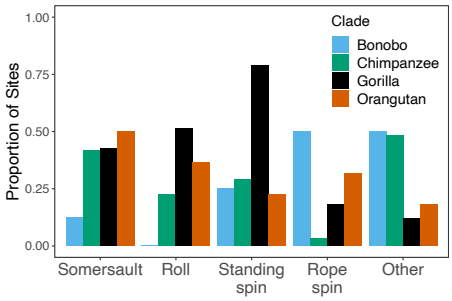
Here, the rotational behavior of great apes was analyzed in a large sample of online videos collected from YouTube. Videos were identified by search phrases that combined terms for primate clades (e.g., chimpanzee, gorilla, ape) with different rotational movements (e.g., spinning, rolling, flipping). Data include 276 videos of great apes performing 793 rotational behaviors comprising 361 single rotations and 442 sequences ranging from 2 to 40 rotations. Video captions

available for about half of the videos confirm footage from many different sites. Table 1 shows the number of observations by clade, including the number of behaviors, videos, and caption-confirmed sites. Sites included zoos and sanctuaries, animals handled as pets and trained acts, and animals observed in the wild.

Clade	*Behaviors*	*Videos*	*Zoo/Handled/Wild*
Bonobo	60	18	7 / 1 / 0
Chimp	195	49	17 / 12 / 2
Gorilla	332	117	30 / 0 / 3
Orang	206	92	19 / 3 / 0

Table 1. Number of observations by clade.

Analysis shows that individuals across species, ages, and sexes performed a range of rotational behaviors, including those previously documented (Byrne et al., 2017), and others like *backflips* and *leaping 360s*. Behaviors were most often performed in contexts of play and display. Figure 1 shows the frequency of major behavior types by clade, measured as the proportion of confirmed sites at which the behavior was observed. For example, gorillas are notable in their frequent performance of *standing spins*—spinning around the vertical bodily axis while standing upright on varying numbers of hands and feet—in about three-quarters of sites. Not visible in this plot is that, although the behaviors are classifiable as types based on certain formal characteristics, they often show great variation and creativity, produced with distinctive movements tuned to particular features of the environment (e.g., ropes, swings, hills, water, floor types, various objects).



different rotational behaviors were observed.

These preliminary results are interpreted as evidence that apes perform rotational behaviors for similar reasons to humans, a primary one appearing to be that they are fun as a result of being perceptually stimulating and dizzying. Similar-looking inventories of rotational behaviors across ape species might result from this shared inclination channeled through the affordances common to our ape bodies. Importantly, the data show that the forms of rotational behaviors are flexible and subject to creativity, suggesting that they are open-ended, perhaps comparable to human language and gesture.

References

Byrne, R. W., Cartmill, E., Genty, E., Graham, K. E., Hobaiter, C., & Tanner, J. (2017). Great ape gestures: intentional communication with a rich set of innate signals. *Animal Cognition*, *20*, 755-769.