

Can a bonobo keep the beat?

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Humans have a remarkable ability to synchronize to complex, temporally structured acoustic signals, an ability which is believed to underlie social coordination and may be a precursor to speech. This ability takes years to develop. Although infants move to periodic rhythmic stimuli, children do not synchronize movements to frequency or tempo until the age of 8 or 9. Synchrony in young children is facilitated by social interaction, and promotes prosocial behavior in both children and adults. Rhythmic behavior has recently been observed in other animals, including parrots, budgerigars, sea lions, rhesus monkeys, and chimpanzees, although in the majority of these cases animals were explicitly trained to synchronize.

Because chimpanzees and bonobos are genetically similar to humans, understanding rhythmic abilities in these species has direct implications for understanding the evolution of speech and music. Indeed, chimpanzees and bonobos display bouts of rhythmic drumming as part of display or play behavior. In a recent paper published in the *Journal of Comparative Psychology*, Large and Gray (2015) assessed spontaneous and synchronized drumming tempo in a female bonobo (Kuni) who self-selected to participate by regularly approaching a human drummer in a designated research area within a bonobo zoo enclosure. Prior to the experiment, the bonobos (including Kuni) were exposed to a human drummer and were rewarded for any strike of the drum, but were not trained to produce a specific rhythm or to synchronize with the experimenter.

First, turn-taking interactions were examined to determine Kuni's spontaneous tempo. The experimenter drummed at a specified tempo

(synchronized to a metronome played to the experimenter only via headphones) until Kuni started drumming, at which point the experimenter would stop. On average, Kuni's spontaneous drumming tempo was 270 beats per minute, a tempo that is much faster than observed in human children. Moreover, Kuni's spontaneous drumming matched the tempo set by the experimenter in 64% of drumming episodes, and tempo-matching was more likely when the experimenter-set tempo was similar to Kuni's spontaneous drumming tempo.

Next, to examine whether Kuni could synchronize, the experimenter continued drumming when Kuni began to drum. Overall, Kuni synchronized her drumming with the human drummer on 54% of trials, and such bouts of synchrony ranged from 12 to 40 drum strikes (median 17 strikes). Kuni was more likely to synchronize when the experimenter-set tempo was close to Kuni's preferred tempo, but she nevertheless displayed tempo flexibility, as she synchronized to some degree to all tested tempos. Overall, these results are similar to those obtained in children, who synchronize intermittently and are also more successful near their preferred tempo.

The demonstration that a bonobo can temporally coordinate rhythmic movements in the context of joint drumming is consistent with other evidence that rhythmic capabilities are widely dispersed across species. However, the extent to which this depended on visual (i.e., observing the human drummer's arm movements) versus auditory rhythm information remains to be seen.

More information: Edward W. Large et al. Spontaneous tempo and rhythmic entrainment in a bonobo (*Pan paniscus*)., *Journal of Comparative Psychology* (2015). [DOI: 10.1037/com0000011](https://doi.org/10.1037/com0000011)

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