Yawning found to last longer in mammals with higher cortical numbers

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Credit: Petr Kratochvil / public domain

(Phys.org)—A trio of researchers with the State University of New York has found a link between yawn duration and neuron density. In their paper published in the journal *Biology Letters,* Andrew Gallup, Allyson Church and Anthony Pelegrino describe a study they carried out comparing yawn lengths between species, what they found and their ideas on the purpose of yawning.

Everyone yawns, mostly when tired, bored or when seeing someone else yawn—but nobody knows why we or other animals do it. But now it appears that we humans, in addition to being smarter than all the other animals, also yawn longer—and the researchers behind this finding believe it is because we have the most cortical neurons in our brains.

Despite multiple research efforts, scientists still do not really understand why animals yawn—some have suggested it helps cool the brain while others have theorized that it is nothing more than an attempt by the brain to jolt itself back to clarity after becoming drowsy (and by association to cause others in the group to do the same when they mimic the action). In this new effort, the research trio set out to discover if there might be a connection between 'smart' animals and the amount of time an animal yawns.

The research consisted of searching for animals (including people) who were caught on video yawning on YouTube and other sites found via Google—and then timing each yawn. They report that 205 full yawns were viewed with 177 individuals across 24 taxa—and that the duration of the yawns ran from 0.8 seconds with mice to 6.5 seconds for humans. Oddly, camels came in second, followed by dogs. The team then looked

at a variety of factors that might be linked to yawn length such as body size, brain size, jaw length, etc. and report that the only correlation they could find was neuron numbers in the cortex. This, they suggest, bolsters the theory that the purpose of yawning is to quickly cool the brain—the denser the cortex, the more heat produced, and thus, the need for more cooling. They also suggest more research needs to be done to explain why adults yawn longer than infants and to find out if the variations between individuals and unique events vary by species.

More information: Andrew C. Gallup et al. Yawn duration predicts brain weight and cortical neuron number in mammals, *Biology Letters* (2016). DOI: 10.1098/rsbl.2016.0545

Abstract
Research indicates that the motor action pattern of yawning functions to promote cortical arousal and state change through enhanced intracranial circulation and brain cooling. Because the magnitude of this response likely corresponds to the degree of neurophysiological change, we hypothesized that interspecies variation in yawn duration would correlate with underlying neurological differences. Using openly accessible data, we show that both the mean and variance in yawn duration are robust predictors of mammalian brain weight and cortical neuron number (ρ-values > 0.9). Consistent with these effects, primates tend to have longer and more variable yawn durations compared with other mammals. Although yawning has long been considered a stereotyped action pattern, these findings reveal substantial variation in this response and highlight the importance of measuring yawn duration in future research.

https://phys.org/news/2016-10-longer-mammals-higher-cortical.html