

Do lab rats dream of testing chambers?

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If you are interested in animal dreaming, I can recommend the book “When Animals Dream” from David M. Peña-Guzmán⁵, which gave me the idea and knowledge for this article (not to be confused with Danish horror film When Animals Dream).



People have speculated about animal dreaming for a long time. The scientific and philosophic community however, has been hesitant to ascribe internal states to non-human animals in the past, perhaps out of fear of anthropomorphisation. Indeed, some people argue that dreaming is an entirely human affair. But again, many things once thought to be exclusively human characteristics turned out to be not that exclusive after all. Now, the question that needs to be answered to prove animal dreaming is whether the animals have phenomenological experiences during their sleep. This is unfortunately a difficult question to answer, since the experiences of others are not directly measurable for us. This means we need to approach this question from different angles and look at different kinds of evidence for animal dreaming.

But what evidence is there for animal dreaming? While there has been basically no dedicated research on the topic of animal dreaming, researches about animal sleep and learning can give us insights into the nightly experiences of animals. Studies in zebra finches showed that neural activation patterns during their sleep were very similar to the patterns they produce when they sing during their waking time¹. This mental replay happens at a similar timescale to the real world, and is accompanied by (silent) movements of the vocal chords and heavy activity of the auditory regions of their brains. Similar findings were made in other species, for example rats². In particular, rats that had just run through a testing track displayed very similar neural activation patterns in cells responsible for tracking one's location while sleeping and while actually running through the track. This research indicates that animals undergo a kind of mental replay during sleep, particularly during REM sleep,

which is the phase of sleep most associated with dreaming in humans as well. There is also behavioural evidence for animal dreaming. You can find countless clips on Youtube where animals can be seen performing all kinds of behaviours during their sleep, from dogs moving their legs as if they were walking, to octopuses changing colours during their sleep. But are these so called oneiric behaviours really evidence for conscious experiences of these animals during sleep?



Now we know that for humans both talking in your sleep and signing in your sleep, if you are a person that uses sign language, is heavily associated with dreaming.

Interestingly, a group of captive chimpanzees who had learned some signs of American Sign Language, sometimes correctly and fully formed signs from ASL³. This is very unlikely to happen by pure chance. It stands to reason that if this is an indicator for dreaming in humans, the same can be true in one of our closest relatives.

There is more evidence for animal dreaming, this time of neuroanatomical nature. This has to do with muscle atonia, the phenomenon that keeps us lying in our beds while we run around in our

dreams. When lesions were induced in a particular region of cat brains, these cats lost their muscle atonia during sleep⁴. This meant that they would walk around, clean themselves and meow while they were asleep. They would even see things that were not there and would try to hunt or fight them. This indicates that these cats were in fact dreaming, and experiencing actual narratives grounded in their experienced reality.

In conclusion, dreaming might not be an exclusively human trait, but one shared by a lot of animals. Many animals mentally replay waking situations during their sleep in a similar timescale and these replays are also accompanied by physiological characteristics of arousal, and often connected to oneiric behaviours. Removing muscle atonia can also reveal more behaviours associated with the mental replay. The behaviours displayed could be interpreted as responses to experienced situations which are relevant for the animals.

But whether the animals experience dreams while all this is happening is a question that cannot be definitively answered, at least right now. However, I think that the evidence does point towards animals having experiences while these mental replays are happening, or in other words: (some) animals dream! Whether this could open up new questions about animal consciousness and carry some moral implications is a topic for another time.

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