

From busking pigeons to head banging sea lions – can animals feel the beat?

March 14 2019, by Robyn Grant



Credit: AI-generated image ([disclaimer](#))

A pigeon bopping along to a busker playing "[Blurred Lines](#)" by Robin Thicke and Pharrell Williams set Twitter abuzz in 2013. It's certainly a catchy tune that I can't help but tap my foot along to, but is that really what the pigeon is doing?

This pigeon seems to hop to the beat on one foot, or he may only have one leg. Either way, this would mean that it and other [pigeons](#) are capable of beat matching – thought to be a precursor to dancing and a uniquely human skill. [In order to beat match](#), an animal must be able to match a complex pattern across a range of beats at different speeds (or tempos) and replicate the beat in a different format, known as a modality. In the pigeon's case, this would mean hearing the music – sound is one modality – and dancing in response – movement is another modality. It would also need to predict when the beat is coming.

Many animals make repetitive, rhythmic movements, such as head bobbing in lizards and birds, chirping in crickets and frogs, and flashing in fireflies. When many of these animals come together, the rhythms of their songs and movements can align. This can be seen in fireflies, which [flash on and off together at the same time](#). This is called rhythm entrainment.

But this is simpler than beat matching. The fireflies flash in [complex patterns](#) and tempos, so it's not just a simple rhythm but they aren't capable of quickly changing between tempos. And the entrainment is all in the same modality – they see flashing and produce flashing, which could just be simple mimicry.

Another important criteria for beat matching is that humans can predict when the beat is coming. When I tap along to Blurred Lines, I tap directly on the beat because I predict when it's coming. Many animals, such as rhesus monkeys, can change the timing of their beats so they're roughly in time with music, but most of their taps will occur after the musical beat, and will [not be as accurate as a human doing it](#).

Many scientists think that [only animals with vocal learning skills](#) should be able to tap along to a beat. These are animals that can learn complex vocal signals like human speech and mimic sounds. They include parrots,

hummingbirds, elephants, some whales and dolphins, seals and bats. This is because scientists think that [brain areas](#) controlling sound-mimicking are likely also to be [involved in detecting a rhythm](#).

On camera

There are some [convincing videos](#) of parrots bobbing along to a song, and being able to talk quite proficiently, too. A pigeon, however, is a non-vocal learner, so would it have the capacity to perceive the rhythm that it is supposedly bobbing along to?

There is evidence that some non-vocal learners are able to tap along to beats, including [sea lions](#) and chimpanzees. As someone who spends time working with seals and sea lions, the study with [Ronan the California sea lion](#) really caught my attention.

Researchers at the University of Santa Cruz in the US showed, after months of training, that Ronan could nod her head to different tempo beats, including those in Everybody (Backstreet's Back) by the Backstreet Boys. This suggests that vocal learning isn't essential for beat matching – careful training and exposure to beats and sounds can also help to develop this behaviour.

Ronan took a long time to learn this behaviour and did not show evidence for spontaneous beat matching – she couldn't hear a rhythm and instinctively move to the beat, she had to be trained to do so. I was really interested in exploring whether other sea lions could do spontaneous beat matching. A previous study I worked on showed that sea lions made repetitive, cyclic, rhythmic movements [during ball-balancing to keep the ball on their noses](#). In particular, they did "keepie-uppies" or large head sways [to keep the ball balanced](#). I decided to focus on these movements and measure whether they changed pace with the tempo of a complex beat.

To design the beat, I partnered with [Jingyu Chen](#) – a composer from the Royal Northern College of Music. Jingyu designed some songs that matched the tempo of slow, medium and fast-moving head motions during ball-balancing. So far, it looks as if spontaneous beat matching does not happen in sea lions. Rather, with a lot of patience, training, fishy treats and exposure to music, some animals just appear to get there in the end.

Now let's think back to the pigeon. It's likely to be untrained and is not a vocal learner – you've never heard a pigeon "parrot" a sentence back to you – so it's probably unable to perceive the beats in the music. In fact, on close inspection of the video, it looks as if the pigeon isn't really bobbing in time to the music.

While the music is complex, the pigeon's bobbing is a simple rhythm that is likely to fit a number of different tunes. Therefore, the pigeon in this video is unlikely to be dancing. Despite first appearances, it does not move like Jagger.

This does not mean that pigeons cannot bob along to music. They naturally make rhythmic head-bobbing behaviours, and may, like the sea lion, be able to bob along to music. They just need a bit of time, treats and exposure to [music](#).

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