



AMERICAN MUSIC CONFERENCE ~ The Voice of Music Making

[Music Making](#) | [Music Education](#) | [Music Research](#) | [News & Events](#) | [PSA's](#)

News



News & Events

[Press Releases](#)
[Message from the AMC President](#)
[AMC Newsletters & Publications](#)
[Articles](#)
[Movies](#)

Join Or Donate Today!
Sign Up for AMC's eNews!

Copyright © 2005 American Music Conference

[HOME](#) . [ABOUT US](#) . [CONTACT US](#)
[PARTNERS](#) . [SEARCH](#) . [JOIN AMC](#)

Articles

"Rhythm of Life"

New Scientist, August 4, 2001

According to the August 4 issue of New Scientist, there's a metronome inside your head that helps you keep track of time, dance the fandango and understand speech. As feature writer Trisha Gura investigates, most people tend to tap their fingers at about 600 milliseconds per beat, a little slower than half a second, and the similarities don't end there. It's another sign that making music lies deep in the human existence.

"Why?" she asks. "Some researchers believe that the tapping rate echoes a primal pulse inside each of us. The beat, scientists say, is central to our existence. We use it not only to make music, but to coordinate our brains and bodies, keep track of time, and filter the stream of events that assail us in this unpredictable world."

As researcher Carolyn Drake of CNRS, Rene Descartes University in Paris notes, human engage in a variety of rhythmic activities, and their rates tend to be consistent. "When you look at the rate people walk, their heartbeat and infant suckling rates, they are all in the same range," she says. Without an external cue, each activity tends to follow the same drummer.

The first person to notice this preferred timing was cognitive psychologist Paul Fraisse in the 1940s and 1950s. Then in the 1970s, neuropsychologist Mari Reiss Jones of Ohio State University in Columbus suggested that the physical tempo corresponds to an internal pulse that regulates our attentions. Other neuroscientists have been slow to accept the idea, but now they are starting to come round.

One reason is the phenomenon of "absolute tempo." Some conductors can beat 60 to the minute, or any other tempo you ask for, with astonishing accuracy. Daniel Levitin of McGill University in Montreal thinks we all have this ability. He asks people to sing a well-known song that they have only heard in one version, and finds that they get the tempo just right. Hard to explain if we don't have some precise internal metronome to guide us.

But apart from making music, what is the timekeeper for? There must be cultural advantages in being able to join in a knees-up or a hoedown, but it goes a lot deeper than that, Gura reports. Reiss Jones and Drake believe that we perceive the world in pulses, rather than as a stream of consciousness, and that our internal metronome sets the pace. Senses such as sight and hearing rely on the idea of contrast, because it's more efficient to confine your attention to places where things change - the edge of an object, for example.

The same is true of time, says Drake. She believes we sample the world roughly twice a second, checking on each sense to see if sounds or sights have changed. She goes on to suggest that we perceive the world best during these pulsed check-ups. It's how we filter out information that would otherwise overwhelm us.

According to Bjorn Merker of the Royal University College of Music in Stockholm, more complicated rhythms are merely variations on simple cadences that humans can entrain to. You have to start with the beat - the subdivision of time that makes the next downstroke of the conductor's baton predictable. "Beneath different kinds of rhythm is a very simple thing, a steady dub, dub, dub," he says. "If it is not there, the rest falls apart quickly."

Most people prefer fairly simple rhythms, because they are easy to entrain to. Drake's experiments suggest that when there is a main beat of 400 milliseconds, for example, the brain automatically sets up other oscillations at multiples and fractions of this - 100, 200, 800 and 1600 milliseconds. So when each second or fourth beat of a bar is emphasized, for example, two pulses can easily be excited in the brain. More complicated rhythms such as 5/3 need other multiples, so they may fall outside the average listener's ability to discriminate, and the less able performer's ability to play.

Another reason to reset your metronome is to join in with a group. From an evolutionary perspective, coordinating rhythms with other animals can have real benefits. When a group of chimps hoot in unison, for example, the sound is far more likely to reach a potential mate, say, than shouting alone, says Merker, who has studied the way male chimps call and dance in synchrony during their carnival displays. Even insects can entrain to the sounds and sights of their neighbors. Cicadas, crickets and fireflies buzz or beam together as part of clever mating games.

Although humans might not shout and whoop in chorus to attract a mate - except perhaps in nightclubs - we do communicate en masse. Physicist Albert-Laszlo Barabasi from the University of Notre Dame in Indiana and his colleagues studied crowds applauding at the end of opera and theatre performances (*Nature*, vol 403, p 849). Audiences lapsed into synchronized clapping at roughly half the average initial rate of individual members of the crowd. This seemed odd to Barabasi's team, since the average noise intensity decreased with such a slowing - not a good way to convey enthusiasm. But the volume of each clap rose greatly, the scientists noted. Just like chorusing chimps, audience members seem to realize unconsciously that they have a larger impact as a group working in synchrony. We probably use the same mechanism to coordinate group activities such as rowing, dancing and marching.

The rhythm instinct may also enable us to learn language, Gura posits. Infants seem to concentrate on the rhythm of language, first simple patterns, then more complex ones, long before putting the significant sounds together into meaningful words and sentences.

Reiss Jones now thinks that people are born with many oscillators. She and others hypothesize that, perhaps because of early experiences, infants begin to focus heavily on certain well-used tempos, while leaving others dormant.

The full text of this article is available online to subscribers of *New Scientist* magazine. For more information, visit www.newscientist.com.
