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A Sound Check For the Ages

Regarding the origins of language and music, history is silent. Early man was likely imitating something he heard—but what?

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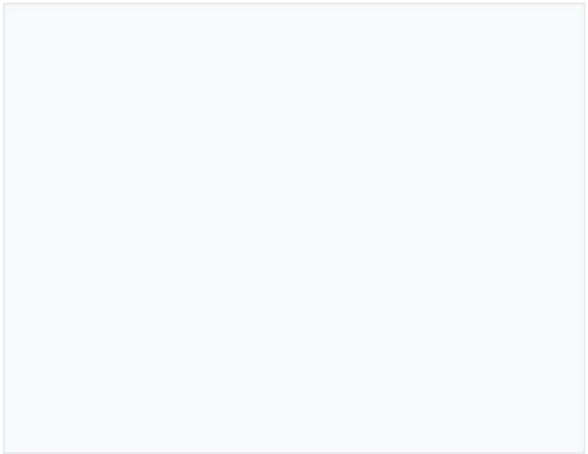
By DANIEL J. LEVITIN

Evolutionary biologists have a difficult job. It can be hard to figure out, long after the fact, why a given trait evolved, and common sense is often no help. Consider bird feathers: They evolved for flying, we assume, because that's how we see birds use them. But biologists now believe that feathers evolved for warmth and were only later co-opted for flight.

So what are we to make of music and language and the adaptive problem they solved? Both are characterized by their ubiquity and their antiquity: No known human culture lacks them, and musical instruments are among the oldest human artifacts, dating to the Late Pleistocene about 50,000 years ago. Whether music or language came first is a topic of current debate, one that can influence theories of brain development and the treatment of brain injury and disease.

Music and language are remarkable in their diversity. It's usually impossible to figure out what someone else is saying if you don't speak the language, and even facial and hand gestures—paralinguistic cues—can confuse. (In Greece, nodding your head up and down means "no.") The music produced in a culture foreign to one's own can also be surprisingly uninterpretable. Most of us in the West can't distinguish "happy" from "sad" in music such as Chinese opera or Indian ragas.

Central in all this is how much we enjoy music and language—when behaviors become so intimately bound with our pleasure and daily routine, they raise intriguing questions about their role in human development and evolution.



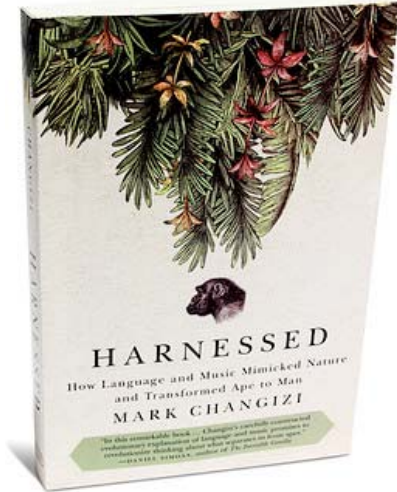
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Harnessed

By Mark Changizi
(BenBella, 242 pages, \$16.95)

extension of the pan-hoots of chimpanzees, the grunts, shrieks, barks, cries and calls of our animal ancestors. Across tens of thousands of years, we heard the sounds of frogs, birds, wolves, and cicadas; our speech and music may have in part been imitating them.

"Harnessed" maintains that language instead comes from imitating three basic "solid-object physical events," the "hits, slides and rings" of one thing coming into contact with another. Mr. Changizi illustrates his message with charts and graphs and even a readout that shows how the sound measurements for a book striking a table directly or hitting a "wrinkly paper" on a table resemble the measurements for the sound of the author saying the word "bee" and the word "pee." "Voiced plosives," we're told, "are like rigid, elastic hits, and unvoiced plosives like nonrigid, inelastic hits." This may be interesting for readers who put great faith in extrapolating from coincidence, but others interested in science may be tempted to utter a few choice plosives of their own.

To bolster his claim that speech sounds like colliding objects, he writes: "Human speech does not sound human." Yet this is starkly contradicted by a seminal study in 2000, in which Pascal Belin found that a region of the brain (the upper bank of the superior temporal sulcus) responds selectively to sounds made by humans, such as speech, laughs, cries and sighs, but not to environmental sounds or the sounds of nature. The sounds of "humanness" are specifically encoded in the brain.

Most of "Harnessed" is devoted to discussing the origins of the sounds we make, but that is far from the most interesting part of the story. To use language and music, humans needed to evolve brain mechanisms for symbolic manipulation and representation (to speak of things that are not there, to be able to talk about anger without feeling anger), and mechanisms for recursion (the ability to string together words or musical phrases in new and meaningful ways).

Mr. Changizi focuses instead on what his own suppositions tell him. Where does music come from? Let's look, he says, at the visual system, because we evolved in a world where visual and auditory events interacted. But look where? Google, of course, for images of musical notes. The search results, Mr. Changizi says, show many pictures of

A number of prominent scientists, including Darwin, have explored these questions. Now evolutionary neurobiologist Mark Changizi enters the fray with "Harnessed," a book that aspires, as the subtitle has it, to explain "how language and music mimicked nature and transformed ape to man." The book, though, is not a scientist's report on what the latest research finds. Rather it is a loosely organized collection of introspections, what-ifs and untested ideas. And there is barely a mention of apes.

Mr. Changizi, who does not suffer from modesty (he boasts about classrooms of undergraduates standing in awe of him), claims to reveal the "big secret" to the origins of music: that language imitates the sounds of "collisions of solid objects" and music is based on the sound of human movement. But this "secret" ignores the simplest facts of evolution. Our speech and music are a natural



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musical notation on what appear to be rippling scrolls—"just what one might expect if music's secret is that it sounds like people moving." Or just what one might expect if that is what one is looking for.

An essential question goes unaddressed in "Harnessed": *Why* do humans have two forms of communication, music and language? Scientists don't know, but clearly music excels at emotional and metaphorical expression; language is more logical and concrete. Music fosters cooperation: A group of people singing together, each with a different part, can make something both pleasing and communicative; but if they all try to talk at the same time, no one understands anything. Across millennia, music, among other cognitive displays, has indicated the presence of the creative mind as well as physical fitness and motor coordination. Darwin's view was just this: that music assisted sexual selection, indicating reproductive fitness, mental and emotional flexibility.

Music, speech and brains have clearly co-evolved in an interrelated dance of biology and culture. This is a fascinating and rich story yet to be told. But, for now, we've got rhythm, we've got music—and as the wise man said, who could ask for anything more?

Dr. Levitin is a cognitive neuroscientist and professor at McGill University. He is the author, among other works, of "This Is Your Brain on Music."

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