

# Music, the brain, and ecstasy: How music captures our imagination.

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## **SOUND WORK**

Review by Robert Zatorre

### ***Music, the Brain, and Ecstasy: How Music Captures Our Imagination***

By Robert Jourdain  
William Morrow,  
New York, 1997 (\$25)

Imagine a distant alien civilization observing our human world from light-years away. After some time simply watching us, they would probably be able to discern without much difficulty how and why we eat, breathe, walk, sleep and mate. They might even figure out that we used sound signals emitted by our mouths to communicate with one another. But imagine how perplexed they would be by music: people all over the planet pound on objects of all sizes, blow through tubes, scrape or pluck strings and vibrate their vocal cords, sometimes for hours on end, to make all manner of strange noises, all with no evident explicit purpose. In fact, we ourselves do not have much insight into this inexplicable realm of sound: most people listen to music because they like it, and no more explanation than that is needed.

In his book Robert Jourdain probes this question: Why do we like music so much? He illuminates for the interested reader everything from psychoacoustics to neuroscience, with many an entertaining musical anecdote in between. The book is well suited to the musician who knows little of science but is eager to know more as it relates to music and to the scientist who may enjoy music but does not know much about its structure. Most of all, it is fun, exploring all aspects of what could be a difficult topic with wit and vim. Jourdain manages a good balance between scientific accuracy and journalistic license: most of the facts are correct, but he knows when to simplify details that are relevant only for the specialist.

Music, the Brain, and Ecstasy starts at the most basic level with an explanation of how sound is produced and proceeds through progressive elaborations to tone, melody, harmony and the more complex aspects of music. Jourdain takes a look at how music interacts with the brain during listening, performance and understanding, culminating with the emotional aspect of music--the "ecstasy" of the title. In some ways, this chapter may prove a bit disappointing to a reader who expects "the answer" to emerge. Jourdain cannot even hint at a solid scientific explanation for the emotional power of music. He provides thoughtful

considerations, but he does not (and could not reasonably be expected to) give clear-cut explanations.

Even without a final answer to the conundrum that music has posed for millennia, science does have a great deal to say to music lovers. In recent years, many research labs have begun to explore the neural underpinnings of music. This development is a timely one for Jourdain, who has assimilated a large amount of relevant information from various sources; he even has a knack for anticipating what new research may elucidate. At the same time, he performs an extremely useful service by showing due skepticism in the presentation of neuroscience findings that too often fall into the gee-whiz school of science reporting. When he discusses the specialization of the two cerebral hemispheres, for example, Jourdain is quite careful to point out how much nonsense has been written about the "coldly logical" left hemisphere and its twin, the "emotional, mystically intuitive" right hemisphere. No such simple division is possible.

Jourdain does a good job of debunking these notions without throwing the baby out with the bathwater. There are important functional differences between the two sides of the brain, and those differences are relevant to music in many ways. Furthermore, techniques such as brain scanning can yield all manner of information about how the brain processes patterns of sound. But that does not mean one can speak of something like musical appreciation as being located in one hemisphere or one region just because it lights up during a brain scan. Jourdain conveys the subtler, less flashy mainstream thinking of contemporary neuroscience in describing how different brain modules--which may indeed be localized within a particular brain region--interact in myriad ways via complicated circuitry to produce the multifaceted phenomenon we call music.

Jourdain also explains many basic psychological functions that happen to be relevant to music, in particular the concepts of working memory and pattern recognition. Working memory is such a fundamental component of music and indeed of all auditory perception that it is often passed over without comment. Sounds unfold over time: melodies extend over many seconds or even minutes. For our brain to make sense of them, it must be able to hold on to a sequence of recent acoustic events to compare them with what is happening now. The resulting capacity to perceive relations among musical elements is central to our musical enjoyment. It is these relations and their hierarchical organization, Jourdain argues, that form the core of music.

Musical pattern recognition, especially being able to hear a tune in the "mind's ear," is similarly crucial to our enjoyment of music. It allows a kind of internal rehearsal of musical sounds even when the real sound is absent. Although Jourdain speaks of such musical imagination primarily in the context of the supposed extraordinary abilities of composers, it is an ability that almost all people possess to some degree. This fact brings up an interesting issue, which Jourdain sidesteps to some extent: Should music be thought of as a special

cultural artifact, an ability reserved for expert, trained performers and listeners? Or is it perhaps better conceptualized as an innate, species-specific behavior, ubiquitous in all humans, resulting from the very makeup of our brain?

Most of the information in his book clearly favors the latter view, yet Jourdain seems to favor the former. He downplays the musicality of infants and children, for example, pointing out how poorly controlled a toddler's singing is. And yet, as in the old joke about the talking dog that gets the punch line wrong, the fact that small children can sing and recognize tunes at all is remarkable. When babies first walk they are pretty clumsy, too, but unless there is something quite wrong, they all become expert walkers. And so it is with music: no special training is needed to perform sophisticated tasks, such as recognizing the Sesame Street theme when played in a new key on a different instrument and then singing it back, albeit off key.

Artificial-intelligence algorithms are not up to this task, and yet most kids do it without prompting (indeed, sometimes despite parents' pleas to the contrary!). In this sense, essentially all normal people are expert musicians.

Jourdain takes a somewhat idiosyncratic approach to the issue of expert musicianship as well, occasionally allowing his biases to come through the otherwise careful prose. When he asserts that the "phonograph has been as disastrous to the development of the musical imagination as television has been to the literary imagination," Jourdain appears grumpy rather than reflective. Putting aside the fact that there are arguably as many fine authors and poets now as ever, television notwithstanding, there is not a shred of evidence that musical recordings have had any deleterious effect on music in any way. As Jourdain later admits, people today are exposed to vastly more and a wider variety of music than at any time in history, all thanks to recordings.

The amazing diversity of styles and genres that one can currently sample is without parallel, and this, coupled with the relative economic accessibility afforded by recordings, in fact fosters much more musicality in the population (even if you do not happen to like what they are listening to). When he claims that "the growing use of synthesizers may only worsen this trend," he sounds like a medieval bishop railing against the use of newfangled pipe organs. Synthesizers and computer music in general offer yet another novel way for us to play with sound--that is the essence of music, after all.

Music will probably always inspire some controversy, but that is perhaps as it should be. If music can lead people to experience ecstasy, it can also engender loathing, and this is part of its power over us. After reading Jourdain's book, nothing will feel better than sitting down to listen to a Bach fugue--or a Piazzolla tango or a Balinese gamelan ensemble or whatever you prefer. We may not yet know why we like these sonic objects; still, we should all be thankful for the specialized circuitry in our brains that allows us to enjoy them.

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