

Review of

"Music, The Brain, and Ecstasy: How music captures our imagination."

Robert Jourdain. New York: William Morrow and Company, 1997.

Daniel J. Levitin, Ph.D.

Stanford University
and
University of California at Berkeley

Appears in Musicae Scientiae, 3(1), 122-126.

Just fifty years ago, there was so much less known about the world in which we live that a university education could expose one to the great ideas in every scientific field - physics, geology, astronomy, chemistry, biology, mathematics, and psychology. As the millennium comes to a close, acquiring a broad education has become far more complicated. One cannot hope to keep up with all the developments in one's own discipline, let alone across the major fields of scientific inquiry. Those who don't want to be left behind in the information revolution have created a need for a new type of book, an overview of scientific research for outsiders. Thus we have Stephen Hawking to explain astrophysics to us; Fritjof Capra to explain quantum physics; Jan Gullberg to explain mathematics; Stephen Kosslyn to explain neuroscience; and now journalist/composer Robert Jourdain to explain Music Cognition and Perception.

It's about time. Finally, when perplexed colleagues or relatives at family gatherings express an interest in knowing what it is we really do for a living, there is a book to which we can direct them.

Or is there?

Frequent flights of factual fancy

"Music, the brain, and ecstasy" describes the work of many readers and contributors to this journal and does so accurately in most cases, although almost always without citation, relying on the annoying pseudo-journalistic device "Researchers have shown..." But in a large number of cases, the author represents as facts things which are simply untrue and can lead to serious confusions.

For example, he gets the Fletcher-Munson curves backwards, writing that they flatten out as sounds get softer (p. 42). He also gets his intervals backwards (p 46), stating that the A=420 Hz of Handel's day was equivalent to our present day A# (with A=440 today, 420 Hz is lower than A, and in fact it equals Ab + 20 cents). Although this is a trivial error for those who understand the material, such mistakes can be devastating for those just beginning to comprehend scales and

tuning, and those are presumed to be the target audience for this work.

On page 46 he claims that increasing the string tension on a violin string by 6% will increase the pitch by 6% (but as we know from Mersenne, if not from first year college physics, vibration frequency is proportional to the square root of tension, so that in this case roughly a 12% increase in string tension would be required). On page 20 Jourdain erroneously claims that humans are able to accurately localize sound in the front/back plane. And later he states, "research has shown that we can actually detect sound waves to 40,000 cycles per second" (p. 42). What research? I'd like to see it.

It is usually not a good idea to use "never" or "always" in the behavioral sciences. Jourdain writes (p. 150) "Savants possess a keen ear for harmony and are always endowed with perfect pitch," but this is untrue (although there does seem to be a relatively high incidence of absolute pitch among savants). He also claims, perplexingly, that the "rhythms of most rock music are no more complicated than those of a waltz" (p. 122), falsely leading neophytes to believe that rock is in 3/4, or worse, that the term "waltz" refers to 4/4.

The most annoying are those statements in which Jourdain sweepingly condemns important work, as in this passage from page 282: "On the whole, too much is made of lateralization...There's more to be gained by understanding the parceling of the brain from front to back and from center outward, than from side to side." Well, there goes thirty years of research. One only hopes the program officers at the various funding agencies are less persuaded by Jourdain's jaunty prose than by the actual results of major laboratory studies.

Of course it is the author's job to simplify, but he must not oversimplify to the point of obscuring the truth. I suppose it is forgivable (and understandable) that on page 32 he treats overtones, harmonics, and partials as equivalent. But his section on listening to prerecorded music (pp. 23-24) would lead one to believe that it is impossible to create any kind of coherent presentation of music through recording, ignoring all the work done by Amar Bose, Ken Kreisel, Thomas Holman, Ray Dolby, and others to combat the so-called second venue problem. Why don't book publishers send these things out for review?

Exploring the etiology of emotion and ecstasy

But what about the narrative goal - where does Jourdain promise to take us, and how good a job does he do of getting us there? On page 5 the author distills the goal of this book: "Ultimately, we'll ask what is going on in our brains when music grabs hold and rattles us to the core."

The majority of the book is geared toward addressing this issue, and to answering one basic question: why do we experience ecstasy and emotional reactions to certain music? There are no new insights here for the seasoned researcher (nor were any promised) but Jourdain does an admirable job of explaining the idea of musical expectancy, albeit in somewhat watered-down terms:

"All emotions are either negative or positive. Negative emotions arise when experience falls short of anticipation. You expect your car to start and it doesn't. You expect your cat to greet you at the door and find out that it has been run over. Conversely, positive emotions come about when experience exceeds anticipation. You expect to work all day but are given the day off. You expect to pay a lot of money for something and find that it has been marked down. Because most anticipations are minor ones, and most discrepancies are small, little of

our emotional life registers as surges and outbursts. Most emotion bobs up and down as small waves on a sea of motivation. But we experience a feeling of well-being when small positive emotional events occur continuously, and we become depressed or irritable when a train of small negative events accost us.

"From these principles, it's easy to see how music generates emotion. Music sets up anticipations and then satisfies them. It can withhold its resolutions, and heighten anticipation by doing so, then to [sic] satisfy the anticipation in a great gush of resolution. When music goes out of its way to violate the very expectations that it sets up, we call it 'expressive.' Musicians breathe 'feeling' into a piece by introducing minute deviations in timing and loudness. And composers build expression into their compositions by purposely violating anticipations they have established." (p. 312)

Although clearly written, Jourdain's one-dimensional reading of Meyer's 1956 expectancy theory does not reference other important and related work by Langer, Berlyne, Kivy and others. And to hang so much on this one aspect of Meyer's early work seems unfair, given that Meyer himself has more recently considered the relationship between musical aesthetics and political ideology. New findings that challenge simple expectancy models are coming in all the time. Laura-Lee Balkwill and William F. Thompson, for example, have found that Western listeners who are unfamiliar with North Indian music (and consequently have no schematic expectations) can reliably distinguish happy and sad ragas based on low-level psychophysical cues such as tempo, melodic and rhythmic complexity.

Entries of exceptional erudition

With its many factual errors and distortions, one might be tempted to dismiss this book, but this is not so easy to do. Jourdain does do a commendable job of covering the field of Music Perception & Cognition research in broad strokes. That is, he more or less sketches out the main issues on which researchers are working, gives the flavor of what is going on, and he trumpets the field's achievements and challenges in such a way as to convey its true excitement.

And in fact, some passages are exceptionally good. In particular, the section on composers is extraordinary, and I don't believe that this is merely a contrast effect. Jourdain brings insightful anecdotes about Rosemary Brown, Saint-Saëns, Mozart, and Mendelssohn to a wonderfully coherent chapter on the process of composition, and the musical and emotional goals of that process. In fact, this chapter is so good, and sufficiently self-contained that it is worth the price of the book and could be read entirely separately.

Jourdain also does a fine job of navigating through the tricky waters of comparing music to visual art:

"When a giant canvas by Rubens is reproduced in an art book, every relationship among the painting's contents is preserved. You still see very much the same painting as you would if you were gaping upward at it in the Louvre. Although scaled down forty to one, the satyr still chases the nymph while Zeus looks on approvingly. But if you were to listen to a Mozart symphony played forty times faster than normal, you'd hear only a roar and a squeal. Even at just twice the usual speed, much of the symphony would verge on noise.

"The comparison between painting and music is not fair, of course. Your eyes are free to

scan both the original Rubens and its reproduction at roughly the same pace. But music always sets its own rate of observation. When speed is doubled, the brain has twice as much to do in the same period of time." (pp. 139-140).

Conclusions.

Because of its many factual errors, I would not recommend this book to those who want to receive an accurate picture of our field's accomplishments and findings. On the other hand, it is not bad as a "broad strokes" introduction, and does give the flavor of what we do. As such "Music, The Brain and Ecstasy" might make a suitable undergraduate text (provided the instructor is willing to correct the mistakes). And there are several passages of great insight that come close to justifying the time spent finding them.

If I had to recommend one recent book for the layperson who wants to think about why music is important to people, and doesn't mind glossing over important details, I would suggest Anthony Storr's "Music and the Mind": it is better written, shorter, more factually accurate, and much more fun to read. Unlike Jourdain's book, Storr's does not purport to summarize recent developments in the field (and it doesn't) but it is a thoughtful collection of the author's own ideas about musical meaning, artfully mixed with an exegesis of what Schopenhauer and Nietzsche have had to say about it. And as to Jourdain - maybe it's better just to wait for the movie.

[Return](#) to Daniel Levitin's Home Page