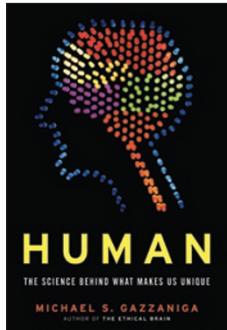


Are humans unique?



Human: The Science Behind What Makes Us Unique

By Michael S Gazzaniga

HarperCollins, 2008

464 pp, hardcover, \$27.50

ISBN: 0060892889

Reviewed by John T Cacioppo & William Patrick

Michael Gazzaniga is a neuroscientist of distinction. He is also an alumnus of the Dartmouth College fraternity that inspired the film *Animal House*. Both elements of his biography are evident in *Human: The Science Behind What Makes Us Unique*. The book reveals a vast knowledge and deep understanding of the human brain, yet it is written in an affable and engaging style that lets Gazzaniga's loveable 'wise guy' persona shine through. In teeing up the deeply philosophical issue that the book will examine—whether there is a continuity or discontinuity between us and the rest of the animal kingdom—Gazzaniga eschews lofty allusions and asks very plainly, "What is the deal with humans?"

Although Gazzaniga's approach may be lighthearted, he contributes substantially to a debate that has a venerable history. Charles Darwin reasoned that the difference in mind between man and the higher animals, great as it is, certainly is one of degree and not of kind. For most of the twentieth century, research emphasized the similarities between the mind, brain and biology of human and nonhuman animals, demonstrating that we are not unique in our use of language, tools, cultures, syntax or even teachers. Although granting that most human activity can be related to antecedents in other animals, Gazzaniga reminds us that a foggy mist is made up of "the same stuff" as an iceberg. "Just as gases can become liquids, which can become solids," he writes, "phase shifts occur in evolution, shifts so large in their implications that it becomes almost impossible to think of them as having the same components."

Gazzaniga clearly sides with those who see something like a phase shift having occurred on our path to becoming human, yet he grants, "There simply is no one thing that will ever account for our spectacular abilities." He sees "our aspirations, and our capacity to travel mentally in time to the almost infinite world beyond our present existence" as a result, in part, of the modular nature of our brains, combined with a degree of connectivity that is exponentially greater than that found in any other species.

And yet specific benchmarks do emerge: the anatomy of the human throat that allows for speech, our ability to inhibit our emotional

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responses, our highly sophisticated abilities with regard to perspective-taking and communication, and perhaps our singular advantage, the extent of our sociability, including our ability to form and reform pairs, groups and alliances for various functions on an *ad hoc* basis. These elements remain, however, merely highpoints in Gazzaniga's broad survey of modern neuroscience in an evolutionary context.

Gazzaniga opens the book by challenging the notion that more nerves is sufficient to explain more brain power, showing that the human brain differs from nonhuman brains in more fundamental ways than simply by the number of neurons. He concludes this review with the question: "Our brains are different in detail, so why should our minds not also be different?" The evidence supporting the differences in details continues to mount. An article in a recent issue of *Nature Neuroscience* showed that neuronal synapses themselves are not the same in all animals, but instead show an evolutionary expansion and anatomical specialization of synapse proteome complexity. Precisely how our brains differ and with what specific consequences is a story that has only begun to be written, but Gazzaniga has made a forceful argument for its need and importance.

Gazzaniga does an admirable job of bringing multiple perspectives to issues ranging from mirror neurons to brain lateralization to multilevel selection theory to theory of mind. He explores submissive behavior as a precursor to human shame and our uniquely human emotion of disgust as a factor in the origins of religion. In what is perhaps the most compelling and original chapter, he explores the intrinsic pleasure we find in beauty, a capacity that chimps seem to share, as well as the adaptive value and developmental benefit, of what he calls "making special"; that is, artistic creation.

Central to Gazzaniga's exploration of the arts, and indeed central to his entire discussion of our neurobiology, is a particular appreciation for what he calls The Interpreter, the meaning-making/narrative-forming function of the left brain. Those familiar with Gazzaniga's *The Integrated Mind*, published three decades ago, will recognize the concept of The Interpreter. It is this putatively unique human capacity that integrates the two hemispheres and many modules of the human brain to create the narrative (artistic creation) known as consciousness and a sense of a coherent self that makes sense of our inconsistencies in thought and action. It is this left brain function that also provides for our unique ability to process vast amounts of contingently true information, which in turn provides for our unique social, cognitive and environmental adaptability.

For any reader seeking a basic orientation in contemporary neuroscience, a category that includes students, *Human: The Science Behind What Makes Us Unique* is a superb introduction. If we have any complaint, it is that the book may partake too much of the survey course, which is to say that an even-handed modularity prevailed over The Interpreter. "What makes us unique?" is a fine heuristic, but it has certain limitations as the organizing principle for a book, and perhaps more focus and greater subordination of ideas would have been in order. But this is a minor criticism. By doing a bit of "meaning making" herself or himself, the thoughtful reader will come away not only with many new insights, but with a new appreciation of our species and what the neurosciences can contribute to an understanding of human nature. Gazzaniga offers solid evidence for human creativity, sociability and even altruism, which make us appear to be not such a bad lot. After all, as he shows to be our most distinctive trait, "No other species aspires to be more than it is." ■