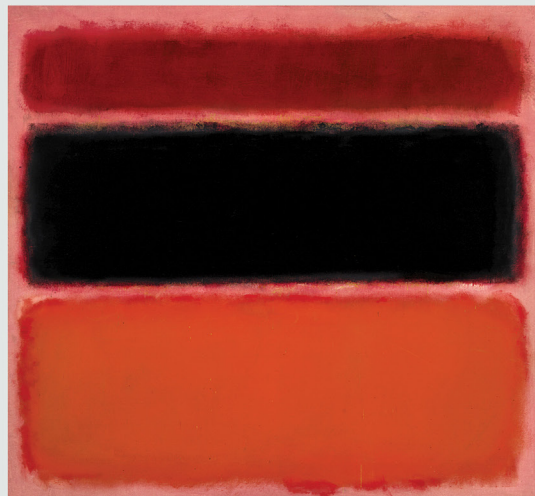


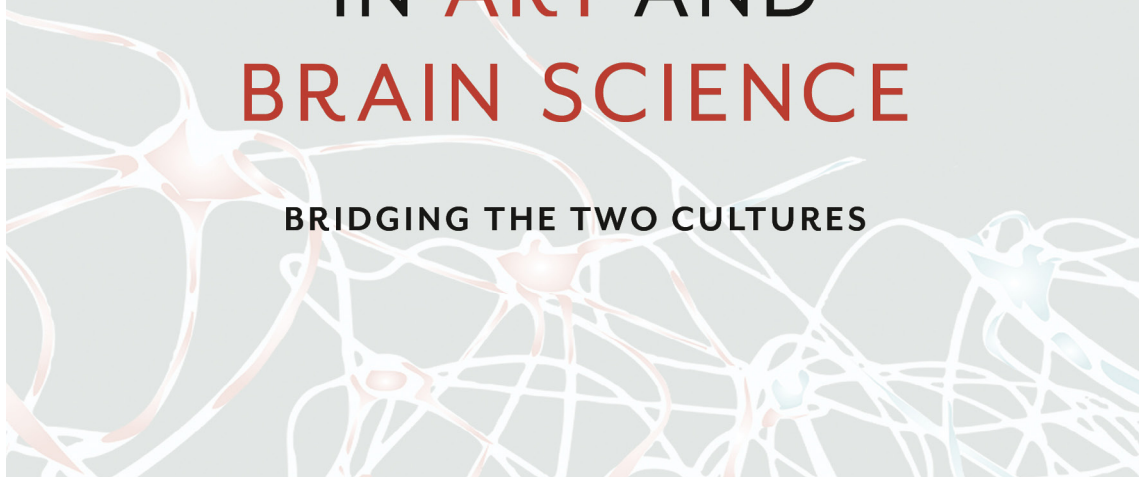
ERIC R. KANDEL

Winner of the Nobel Prize



REDUCTIONISM  
IN **ART** AND  
**BRAIN SCIENCE**

BRIDGING THE TWO CULTURES



## MUTUAL REDUCTION

*a review of Eric Kandel's Reductionism in Art and Brain Science*

By Noah Hutton

*Guest Contributor, Founder of The Beautiful Brain*

Like a once-perfect couple drifting apart, art and science are still trying to speak to one another in new ways. As two of the more prominent fractions of the intellectual whole, this pair has received some of the most ardent and impassioned attempts at reconnection: from C.P. Snow's "third culture" to E.O. Wilson's plea for "consilience" between the humanities and sciences, the quest to unify is always accompanied by the promise of a great intellectual flourishing thereafter. But modern trends of specialization have worked against these romantic ideals, driving knowledge into even narrower corners. So before we strike out to try once again, perhaps we ought to first ask why—and for whose benefit—we continue to hope these two will get back together.

When academic turf battles ensue around this issue, these romantic analogies are perhaps best replaced by political ones. The hope upon entering an interdisciplinary exchange is always to create something mutually enriching, something that is more than the sum of its parts. But all too often interdisciplinarity resembles the now-withered concept of bipartisan political compromise, where, like a bill that is stripped of its most potent actions so that it can pass, attempts to bridge a divide risk leaving behind the most virtuous elements of each in the pursuit of a valorized middle ground. It's that strange feeling in the room after an interdisciplinary exchange, when it seems the artist and scientist have talked at and through, but not really with, one another.

In mathematics, two fractions can combine to form a whole, like we'd hope to do with art and science. But to properly align their fractional parts, you've got to first find their least common denominator—that mutually agreeable state which allows for their transformation but sacrifices their original forms. Though this is always risked in interdisciplinarity when stubborn differences are twisted until they smooth out into useful points of connection, we seldom pause to consider what gets lost in these transformations, what high-vibrating parts of a discipline don't get packed for the journey. A comprehensive quest for unification ought to collect these sub-

tractions with as much fervor as it traces new connections, for when art and science are thrust into mutuality, what is lost can be as interesting as what is gained.

In *Reductionism in Art and Brain Science*, the esteemed Nobel laureate Eric Kandel has launched another journey into interdisciplinarity, inspired by C.P. Snow's third culture, for the second time. In 2012, Kandel published *The Age of Insight: The Quest to Understand the Unconscious in Art, Mind, and Brain, from Vienna 1900 to the Present*. And to trace another branch of Kandel's contribution to the third culture, one could look beyond his own books to those of his former Columbia lab technician, the scandal-plagued author Jonah Lehrer, whose *Proust was a Neuroscientist* lobbied for an ahistorical reading of artists and humanists as anticipating the later findings of neuroscience. At the time I found *Proust* to be impressive in concept but thin in explanatory weight: behind the initial delight of each chapter's Davos-optimized pairing I remember feeling a sneaking suspicion that anything could work in this game of different people in different fields dealing in their own ways with the universal human condition, anticipating the dealing of later, more scientific dealers. And I wondered what Kandel made of Lehrer's book: were there any artists he viewed as having anticipated, in their art, Kandel-type neuroscience?

It turns out he did, and, with this new book, does: *Reductionism* almost seems like the professor's answer to his acolyte's romantic idea. But contrary to Lehrer's approach, Kandel wisely sheds the idea of cross-disciplinary prediction in artists' finished products and instead examines their methods themselves, opening up an intriguing parallel between the reduction of form, color, and perspective in abstract art and the scientific reductionism of complex mental phenomena, like memory, to their physical components. The book thus unfolds along two parallel tracks: on the one hand, a narrative about abstract art that is primarily interested in the 20<sup>th</sup> century shift from pictorial representation, photorealism, and three-dimensional depth to pure abstraction, and, on the other hand, a narrative about science that

places contemporary neuroscience—like the kind that won Kandel his Nobel prize—at the end of a triumphant series of material reductions that did away with folk psychology and rooted the human condition in cells and helices.

There is something viscerally right about this parallel, like lining up Picasso's spatial distortions and Einstein's theory of general relativity. But it's a fleeting sense of rightness, for if viewed in the terms of a scientific paper, *Reductionism* sails in its methods section and then stalls in its discussion. After the discussion of methodological analogies, Kandel's particular bridge between art and science begins to bear more weight than it can support. What were Pollock's and Rothko's ultimate aims with their work? While he continually refers to the "spiritual" and "expansive" qualities of their abstract art—where methodological reductionism seems to have paradoxically expanded the inner experience of the work for the viewer—Kandel sums up the parallel aim of neuroscientific reductionism in a stroke of recursive banality: it can "help us better understand how we respond to, and perhaps even create, works of art." And when it comes to Kandel's own legendary work on memory, he reduces himself to a scientist mentioned in the third person:

"Certain simple behaviors may involve fewer than 100 neurons. This numerical simplicity makes it possible to identify precisely an individual cell's contribution to a given behavior. Scientists therefore set out to delineate in this simple animal the simplest possible behavior: the gill-withdrawal reflex (Kandel 2001; Squire and Kandel 2000)."

Missing from *Reductionism* is the author and scientist himself describing, with all the warmth he lends his discussion of the art, what it feels like to have dedicated his life to studying the building blocks of the mind, or even an account of the expansive emotional space opened up at the specific moment that animal's gill withdrew. The sublime ought to be an equal opportunity affair, as Cajal knew. In books and articles about art and neuroscience, all too often it's the scientist who waxes poetic about art but goes cold and rational to the touch when talking about his own work, only widening the divide in the process.

Neuroscience may not have the same aims as art, and that's okay. But in the act of finding its lowest common denominators with art, books like *Reductionism* force bland, recursive platitudes like "understanding why we appreciate and create art" or "understanding the human experience" as what neuroscience is all about these days, and seem to lack subjective accounts of the quasi-spiritual feeling many scientists must feel when pondering its vast, ever-unspooling terrains. And beyond the personal, these brain-platitudes obfuscate the technocratic world we've created around ourselves, and how that world

is eager to employ all this new science—even the basics of Kandel's gill-withdrawals. For in a world where more than half of the U.S. BRAIN Initiative is funded by DARPA, where tech companies edge ever-closer to creating their own brain-modeled, deeply-learned algorithms to maximize revenue, what is the full range of what 21<sup>st</sup> century neuroscience will pursue and enable? How can we paint a more complete picture of its aims?

The neuroscientist would undoubtedly stand behind the ethical shield of disease prevention and treatment—an entirely valid stance. But as the reductionistic methods Kandel triumphs begin to probe deeper into the subjectivity of the human mind, and as pharmaceutical corporations pump their prices and pathologizations, this Valid and Good stance is no longer enough. This is what Yuval Noah Hariri alludes to in his new book *Homo Deus*, noting that "No clear line separates healing from upgrading. Medicine almost always begins by saving people from falling below the norm, but the same tools and know-how can then be used to surpass the norm."

By omitting any such contextual discussion, valorizations of neuroscience like those in *Reductionism* ignore the ethical and political embeddedness of the field, and thus risk distancing the general public from the crucial interrogations ahead of us. As in most contemporary books on brain science, we instead receive unfettered utopianism, as in Kandel's closing lines: "the new science of mind seems on the verge of bringing about a dialogue between brain science and art that could open up new dimensions in intellectual and cultural history." I wish I was as optimistic, but the world I see around me suggests a more ethically complex picture of some of the places brain science may be employed, like DARPA gobbling up those BRAIN insights to help drone operators stop sweating their remote deeds and start forgetting them faster. One might protest that a harmless text on neuroaesthetics is the last place to mount such a political critique. I would argue that the exact opposite is true. As neuroscience increasingly encroaches on the domain of human subjectivity, the discussion of "what happens in the brain when we view or create art" becomes merely a proxy conversation for the real change ahead: the reduction of subjectivities to their constituent parts so that they can then be put back together again in more sublime ways, if you can afford it.