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Book Review

*The Birth of the Mind: How a  
Tiny Number of Genes Creates the  
Complexities of Human Thought*

Cristian Bodo  
*3rd Year, Neuroscience*

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by Gary F. Marcus  
Basic Books, 2004  
New York, USA  
ISBN 0-465-04406-9

When describing the reasons that led him to write this book, cognitive neuroscientist Gary Marcus argues that he tried to sketch an accurate picture, based on the latest developments in the field, of the genetic mechanisms that determine the architecture of the neural systems and therefore, at least in humans, the characteristics of what we know as the mind. In doing so, he specifically sets out to refute the view of those who claim that the human mind is far too complex to be explained simply by the interaction of gene cascades during development, even though they readily accept this explanation when considering the origin of any other organ in the body.

Admittedly, there are powerful psychological reasons to put the brain in a category of its own: after all, it is widely accepted in the scientific community nowadays that the sum of our psychological traits, what we usually refer to as 'us', is coded somehow in the structure of our individual brains. But postulating that this in turn is the result of a self-regulated program of genetic interactions that would run its course without the need of our intervention at any point seems at first as the absolute victory of determinism over free will. In other words, it requires us to accept that we have absolutely no saying at the time of determining what we will become.

The author acknowledges that giving all the power to the genes in the shaping of the brain may seem to lead us directly into this trap and recognizes that these rather unpleasant logical consequences may as well be the reason why so many people fail to take that last step and grant the brain the same status as other organs, in which a purely deterministic developmental explanation seems to be much less 'offensive'. Therefore, the book becomes essentially a long argument in which the

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author tries to dispel this misconception by explaining how the mechanisms of neural development, although undeniably based on complex interactions of gene products, are flexible enough to include the input of external information ('experience') at multiple points and, even more important, be modified as a consequence of this.

On this particular aspect, the book is undoubtedly an accomplishment: Marcus manages to weave together cutting-edge results from several disciplines into a coherent (and compelling) model using a language that is depured of scientific jargon but yet manages to avoid oversimplifying what is arguably a highly complex field, and even indulges frequently on the inclusion of pop culture references (ranging from comedian Steve Martin to Star Wars) to help the layman reader to connect with the abstract models that are necessary to address. His ultimate goal is to make a case against the rigid, time-honored "Nature vs. Nurture" debate when thinking about cognitive development, by arguing that it is not necessary to place all the bets for one of the other, since what we already know about the phenomenon points to an exquisitely fine-tuned interaction between the two at the time when decisions have to be made by the organism on the particular characteristics that the developing structure will exhibit.

And yet, when reading the book, one cannot help but wonder if Marcus is not oversimplifying the opposing view in order to make it easier to defeat. It is difficult to conceive these days that within the scientific community someone would deny the role of the genes (or rather their products) in stablishing the architecture of the neural system: after all, it is nearly impossible to conceive ANY biological structure that is not a product of the expression of a particular subset of the genome. Conversely, an astonishing bulk of evidence has accumulated over the years on how external factors can alter the final characteristics of virtually any of these structures. The reason why we still keep framing our theories about development within these two opposing poles is that it is still highly relevant for us to determine to what extent one or the other influences the final characteristics of a certain trait, something that becomes evident when considering how often we read in the media about a gene for obesity, a gene for aggression, a gene for risk-taking, and so on. Hardly anyone would deny that the visual system that we use to perceive the frescoes that Michelangelo painted on the walls of the Sixtine Chapel is the product of a developmental program specified by the genetic characteristics of our species and running its course in relative independence (that is why cats will always beat us when it comes to night vision with the naked eye, no matter how much time we spend getting used to it in dark places: their genetic program for that particular trait is simply better than ours). But do genes have some kind of influence when we are appreciating the frescoes? Is the term talent, which is often invoked when describing a particular individual's outstanding abilities for verbal communication, memory, abstract thinking, and a long etc;

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just an informal description of a particularly advantageous genetic background on the individual for an specific mental activity?

The answers to these questions are obviously important to us, since they deal with no less than with a theoretical limit to our potential mental abilities imposed...by our own genome. But just stating that our mind is the final product of an interaction between a self-regulated program of neural development and the multiple inputs that we receive from the external world along the way doesn't really help us to get any closer to those answers. On this respect, Marcus' book has been criticized for merely restating the obvious. Nevertheless, its value lies in being a good review of what is being done to answer these admittedly extremely difficult questions, what kind of experimental approaches have been used to tackle them, and what are the lines of research that seem to hold more promise for the future, all of this on a down-to-earth language that makes the field more accesible to the general public. In the end, and in spite of the lack of any major revolutionary idea, this is enough to make it a highly recommended reading.

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