

Paolo Legrenzi and Carlo Umiltà, tr. Frances Anderson
Neuromania: On the Limits of Brain Science.
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In recent years, brain science has become a major contestant in the never-ending battles of disciplinary imperialism. It seems as if new neuro-versions of traditional disciplines are popping up all the time, such as “neuroethics,” “neurotheology,” “neuroaesthetics,” etc. *Neuromania* is devoted to cutting the brain sciences back down to size by demonstrating the limitations of brain-imaging techniques and neurological reductionism while also exposing the tendency of lay opinion to be unduly swayed by fMRI images and neuroscientific explanations.

Neuromania is a very short book. Its hundred-or-so pages of text are small and uncramped, and it is divided into a mere three article-length chapters or sections. The first chapter, “At the origins of the mind-brain relationship,” offers a reasonably good historical introduction to the project of localizing brain functions. It makes due mention of Paul Broca and the less-well-known Angelo Mosso (who discovered back in the 19th century that blood flow increases to activated areas of the brain), of the conflict between holistic theories (which claim that all of the brain is used in every cognitive process) and modular theories (which associate different cognitive processes with different brain areas), and of the eventual exploitation of Mosso’s discoveries towards the development of today’s functional brain imaging technologies. Next, the authors explain the method of “cognitive subtraction” used to localize different mental functions in the brain. The idea is that there are always activated areas of the brain which lack any special connection with the mental phenomenon whose neural correlates we are trying to map. If we produce images of a brain engaged in all those various ancillary activities, they can be statistically “subtracted” from images of that brain engaged in the particular activity we want to study, leaving us with a clean localization of the latter. Legrenzi and Umiltà’s account of functional brain imaging is critical, and they make a number of telling points along the way. For instance: functional MRI depends upon Mosso’s observation that blood flow is higher to activated areas of the brain, but changes in blood flow lag at least five seconds behind the much profoundly quicker changes in neuronal activity. Furthermore, cognitive subtraction is a very iffy business requiring assumptions that are sometimes questionable; the pretty images it produces are not straightforward pictures of reality but rather the artifacts of complicated statistical analyses. These complaints lead straight into one of the book’s pet theses, that the representation of the highly processed data from brain scans in the form of vibrantly colored images makes hypotheses about the localization of cognitive processes especially convincing and fascinating to the general public. Legrenzi and Umiltà believe that to a great degree it is visual aesthetics, rather than any genuine advance in the science, that has established the authority of the brain sciences in contemporary culture.

The first chapter concludes with a discussion of “mirror neurons,” the cells in the brain which seem to be responsible for our empathic tracking of other people’s activities and experiences. This example is used to illustrate one of the other major theses of the book, namely, that many of the purportedly new insights gained by neuroscience are in fact recycled versions of

ideas belonging to older disciplines. Thus, the authors complain that the conceptually innovative element in the theory of mirror neurons had already been proposed fifty years ago by Alvin Meyer Liberman in his “motor theory of speech perception,” according to which “we are able to perceive the invariance of speech sounds because our acoustic system transforms them into the motor program (of the phonation muscles) required to produce them” (36–7). The authors conclude that “it is extremely difficult to find something truly new in neuroscience” (36).

Chapter two, “Mind, body, and the explanations of behavior,” begins with a description of the recent rise of naturalism and reductive paradigms in the human sciences. The authors complain that reductionism fails to take account of the legitimacy of higher levels of explanation. Just as we are often more in need of acquaintance with a cell-phone’s software than with the physics behind its technology, it is also often better to study human behavior at the psychological level than to try to reduce it to biology or the physical sciences.

At this point Legrenzi and Carlo Umiltà offer their most intriguing evidence for the irrational seductiveness of brain-science discourse. They describe at some length a study performed by Deena Skolnik Weisberg and her colleagues at Yale University indicating that laypeople are more prone to accept uninformative circular explanations of human behavior if those bad explanations make reference to some aspect of brain anatomy. (Neuroscientists—but not students who had completed an introductory course in neuroscience—were immune to this bias.) Legrenzi and Umiltà further argue that brain-images are a new source of wonder, comparable to the weird objects displayed in the “cabinets of curiosities” assembled in the 16th through 18th centuries. Today’s popular media takes advantage of this social phenomenon by publishing scientific “scoops” which systematically overstate the explanatory value of fMRI images in order to attract larger audiences and readerships. While the authors are happy to witness the demise of the previous social constructionist orthodoxy in the human sciences, they remain worried about brain-science overplaying its cards. The chapter concludes with a quick overview of the empty hype and genuine insights produced by the new “neuro-disciplines” of neuroeconomics (mostly a success story), neuromarketing, neurodesign, neuroaesthetics, neurotheology, and neuropolitics (rife with charlatanism). The book’s conclusion attempts to expand upon the theme of the popularity of brain-scientific explanations, claiming that it is symptomatic of a larger cultural move towards focusing on the body rather than the mind. In medical ethics, this bodily focus generates greater concern for saving lives (where life is defined in terms of the physical condition of the brain) than for promoting broader values of well-being.

There is much wrong with this book. It is not clear how blame should be apportioned between the authors and their translator, but together they have produced a text riddled with seeming self-contradictions and which all-too-often resorts to allusions and rhetorical questions when explicit statements would be much more communicative. The book’s conclusion is especially difficult to follow. It vaguely links the rise of brain science with unspecified but apparently objectionable views held by the Vatican regarding medical ethics. Perhaps this section is more accessible to an Italian readership.

The book’s critique of brain imaging is all stage-setting with no payoff. If the technique is so problematic, why is it so good? After so much build-up, I fully expected to share a chuckle with the authors over some tale of hapless researchers being led astray by fMRI and cognitive

subtraction, but no such story was forthcoming. More generally, if we are all being bamboozled by brain-scientific explanations of human behavior, why don't the authors offer a clear example of a brain-scientific explanation proved false instead of harping on the psychology of our gullibility?

Finally, Legrenzi and Umiltà seem to have no use for the recent philosophical discussions which have accompanied the rise of brain science (not counting their over-simplified discussion of levels of description). It is possible to learn some interesting and important things from *Neuromania*, but I will conclude with a quotation which demonstrates how exasperating it can be for the philosophically inclined reader: "According to the traditional Cartesian mind-body dichotomy, the focus is on the body. It is the body that suffers, that thinks, that decides" (95). *Sic!*

Berel Dov Lerner

Western Galilee College, Israel