

EDITORIAL

Neuroscience and the Liberal Arts

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"Liberal education is not tied to certain academic subjects, such as philosophy, history, literature, music, art, and other so-called "humanities." In the liberal-arts tradition, scientific disciplines, such as mathematics and physics, are considered equally liberal, that is, equally able to develop the powers of the mind."

Mortimer Adler

Astonishingly, almost 25 years after the publication of "A Nation at Risk," the clarion call for a radical overhaul of America's education system, our Nation continues to find its students performing poorly on international exams in mathematics and sciences. In the spring of 2007, the National Academy of Sciences' Committee on Prospering in the Global Economy of the 21st Century published the most recent indictment of the American educational system and proposed several key steps to ensure that science education and research flourish within our national borders. Among these, undergraduate science education is identified as needing dramatic improvement since it is a pivotal point for the production of future K-16 science teachers and future research scientists.

Is there any unique contribution that the neuroscience education community can make to our Nation's effort to promote science education among liberal arts colleges and universities, which educate large numbers of our Nation's undergraduate students? Indeed, does neuroscience even have a place in liberal arts settings? Arguably, studying interdisciplinary fields such as neuroscience can enhance "the powers of the mind," if what Adler means by such a phrase includes developing intellectual skills in critical thinking, sound reasoning, and integrating knowledge from multiple levels of analysis.

As documented in a report by the National Academies on interdisciplinary research, the intersection of fields from the natural sciences, social sciences and humanities is the fertile terrain from which solutions to society's most vexing problems will germinate. By definition, neuroscience is an interdisciplinary science operating in a fluid intellectual environment wherein disciplinary boundaries are often so porous as to be essentially nonexistent.

A growing number of colleges and universities are wisely embracing the notion that interdisciplinary neuroscience programs can enrich the intellectual life of a liberal arts institution. Although one might argue that concentrating precious institutional resources on a field that may appear to be narrowly focused on a single system of organs such as the nervous system is antithetical to the spirit of a liberal arts education, the curriculum of a neuroscience program in fact is emblematic of the liberal arts spirit. Students who are exposed to a sound

neuroscience education gain in-depth experience in disciplines spanning the sciences and the humanities, such as anthropology, biology, chemistry, computer science, mathematics, philosophy, physics, and psychology. Courses in neuroscience pose problems ranging from the molecular to the metaphysical, from how a protein channel in a neuronal plasma membrane functions to how a highly integrated aggregate of neuronal protoplasm begets consciousness. Students at this disciplinary nexus are engaged in fashioning answers that draw from multiple disciplines and require integrative thinking at a level rarely encountered within traditional disciplinary boundaries.

Neuroscientists are poised to transform the higher education establishment. Challenging disciplinary boundaries will provide an interdisciplinary crucible from which the next generation of our Nation's leaders, problem solvers, and visionaries will emerge. An interdisciplinary education embedded in neuroscience will prepare this next generation to lead us on our quest to reveal the mysteries of the human brain, the organic basis of our humanity.

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