Teaching Current Directions in Psychological Science

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Aimed at integrating cutting-edge psychological science into the classroom, Teaching Current Directions in Psychological Science offers advice and how-to guidance about teaching a particular area of research or topic in psychological science that has been the focus of an article in the APS journal Current Directions in Psychological Science. Current Directions *is a peer-reviewed bimonthly journal featuring reviews by leading experts covering all of scientific psychology and its applications and allowing readers to stay apprised of important developments across subfields beyond their areas of expertise. Its articles are written to be accessible to nonexperts, making them ideally suited for use in the classroom.*

Health Psychology Meets Neuroscience: Brain↔Body

by David G. Myers

Erickson, K. I., Creswell, J. D., Verstynen, T. D., & Gianaros, P. J. (2014). Health neuroscience: Defining a new field. *Current Directions in Psychological Science, 24*, 446–453.

How does our brain influence our health? How does our health influence our brain? The new field of health neuroscience — the study of how the brain *affects* and *is affected by* physical health — seeks answers. In their 2014 article, Kirk I. Erickson, J. David Creswell, Timothy D. Verstynen, and Peter J. Gianaros defined "health" as the absence of illness and discomfort and of biopsychosocial risk factors for such.

To introduce health neuroscience, instructors might invite students to offer examples of its two core ideas:

- The brain influences the body, top-down, and
- the body influences the brain, bottom-up.

For example, concerning top-down brain–body interactions, students might note that

- embarrassed, we blush;
- irritated, our blood pressure rises;
- afraid, our stress hormones flow; and
- experiencing sustained stress or repeated anger, we become more vulnerable to heart disease or addiction.

Our brain and its mind play the strings of our bodily health. Concerning bottom-up brain–body interactions, students might note the following:

- Aerobic exercise reduces dementia risk.
- Smoking and other substance use change the brain.
- Nutrition affects cognition.

- Inflammation feeds depression.

But precisely how does the brain enable its top-down influence on health, and how does it receive the bottom-up influence? How does our brain's activity get under our skin, and how do bodily events under our skin reach into our brain?

Health neuroscience explores how stress, anger, and depression affect health via neural circuits. Psychological experiences arise from the brain's hardware. Thus, noted Erickson and his colleagues,

- the stress we feel when facing time pressures or social threats is mediated by the amygdala and medial prefrontal cortex;
- our cognitive regulation of negative emotions engages the anterior cingulate cortex, which in turn affects inflammation and hardening of the arteries; and
- smoking cessation is supported by neural activity in inhibitory brain regions.

Such research offers psychology teachers a chance to acknowledge and invite their students to engage in "neuroskeptic" doubts about how much neuroscience really contributes to human understanding and to health intervention. Playing devil's advocate, neuroskeptics might note that one can skillfully drive a car with minimal awareness of the underlying mechanics. Is it, practically speaking, any more important for us to know about the limbic system and prefrontal cortex than for a driver to know about fuel injection, crankshafts, and drive trains? (Students could be invited to name various items they use daily without knowing how they work — from smartphones and laptops to medications and efficient lightbulbs.)

So, what do colorful brain-scan splotches tell us that we didn't already know? Didn't we already assume that brain activity underlies behavior and health — that everything psychological is also biological?

In response to such skepticism, students might respond, for example, that a neuroscientific explanation may be unnecessary for some purposes and vital for others. One can do psychology without biology, biology without chemistry, and chemistry without physics, because each discipline has its own principles. Yet each also builds upon the more basic underlying science.

Students could be invited to imagine themselves as foundation grant officers and to brainstorm what, given $1 million to award, they might want health neuroscientists to explore.

And students could be reminded that one may not need to know the mechanics of combustion or electric engines to operate a car, but when a car breaks down, it helps to have those who understand and can intervene. Erickson and colleagues noted that health neuroscience likewise can point to effective interventions when health issues arise. We have learned, for example, that exercise strengthens not only the muscles, including the heart, but also the brain. And this knowledge is now being used in physical therapy interventions for the treatment of Alzheimer's disease and memory loss.

Health neuroscientists also are exploring how hypertension leads to cognitive deficits in memory and executive function via specific brain structures and functions (Scullin et al., 2013). This neuroscientific evidence supports healthcare professionals' awareness of cognitive risks among hypertensive patients and can point the way to preventive treatments.

Ergo, concluded Erickson and colleagues, "health neuroscience can have a significant impact on improving and transforming public health."

References

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