SCIENCE AND MEDITATION

Comparing Notes from Cognitive Neuroscience and the Laboratory of the Self

by Peter Nichols

Photos by Gregory Benson

Assistant psychology professor Amishi Jha and co-instructor Michael Baime, M'81, were discussing the week's homework with a dozen students around a seminar table.

"I just can't do it!" exclaimed a stymied student.

Another recalled, "I kept thinking, when is it going to end? I have way too much to do!"

The assignment was for the Cognitive Neuroscience of Meditation, a psychology course that probes ancient meditation practice with the data and ideas of a new science. The task seemed simple enough: sit still for at least 10 minutes each day and pay attention to the in-and-out flow of the breath.

Assistant psychology professor Amishi Jha.

"I have to have something to think about," protested an annoyed undergrad. "I can't do nothing!"

"Before I did meditation practice," another revealed, "I never realized how wordy my brain was."

To Baime, a clinical associate professor of medicine and director of the Penn Program for Stress Management, the cascade of complaint was clear proof that students had indeed been doing their homework. Baime teaches mindfulness meditation as a way of coping with stress. At each class, he leads the students through a mindfulness practice, and by week seven the exercises were yielding the expected results.

"We walk around feeling awkward and out of balance all the time," he told the class, "but we're usually not aware of it. When we sit down and do nothing, we really feel it. This is the human condition you're looking at, and although it's not always comfortable, it's the only place where you can know beauty or joy or love."

The course has no religious agenda but takes a rigorous scientific look at how meditation can change the brain. The students read and talk about current research papers on the cognitive neuroscience of compassion, depression, mind wandering, intrusive thoughts and other mental phenomena. They also practice a variety of meditation techniques, introduced by Baime and usually tied to the weekly academic content.

Jha leads the theoretical part of the course. In her lab, she carries out research on the brain's ability to focus and remember. "We've started investigating how mental training may enhance the functioning of attention and working memory using various protocols," Jha says. "The neuroscience of meditation has become a more central strand of my research." Last year she and Baime published "Mindfulness Training Modifies Subsystems of Attention," a series of experiments that showed how meditation improves certain aspects of mental focus and awareness. Other joint projects are in the pipeline.

Meditation cultivates awareness by turning attention, for example, to the breath, returning again and again to breath sensations every time practitioners notice they've wandered down some other thought trail. "Meditation practice makes students intimately familiar with the functioning of attention and memory in a way that doesn't come from just reading about it," Jha observes. "In this course, the mindfulness-training piece is the subjective laboratory that complements objective learning."

During the seminars, each student takes a turn leading discussion on one of the assigned neuroscience papers. Jha

(From left) Co-instructor Michael Baime, Anish Mehta, Nina Rostrup, David Hynes, and Amber Calloway.

punctuates their slide presentations with critiques, caveats, clarifications, contexts, and questions. She has found that the practice of meditation—the close-up, concrete experience of one's own mind—gives students a more nuanced insight for picking apart unwarranted assumptions about brain events as well as the subtleties and complexities of conducting neuroscience research on this topic. "It adds a richness to the conversation," she comments. Psychology major David Hynes, C'09, explains, "Meditation helps me understand some of the more-difficult-to-grasp concepts discussed in the scientific articles we read." Minjoo Kweon, C'09, another psychology major, reports, "Knowing the complexity of my own life experience in my own brain makes me far more critical of other research, as well as my own." Hynes adds that "the neuroscience part" supplies the vocabulary for "a better understanding of what's going on inside my head when I'm trying to meditate."

"It adds a richness to the conversation."

Following a student presentation on compassion, Baime invited the class to sit quietly—eyes closed, attention on the breath. He struck a tiny bell to mark the break from discussion. The students sat up in their chairs around the table. "Let your breath just flow around all those thoughts and distractions," he told them. The wall clock ticked off the time. An overhead fan clicked on and blew above the silence in the room. "See if you can be fully present with your mind wide open to what's happening," Baime instructed. "It might be hard and it might not be what you want, but it's real."

Watch senior Anish Mehta talk about his research on the neural effects of meditation for adults with ADD at www.sas.upenn.edu/mehta.