

# Profile of Shelley E. Taylor

The first psychology experiment Shelley Taylor conducted as an undergraduate at Connecticut College in New London, Connecticut, turned her on to the thrill that comes from collecting and analyzing data.

"I was transported," says the University of California Los Angeles distinguished professor of social psychology. That research experience led her to graduate school at Yale University's (New Haven, CT) psychology department and eventually to an illustrious career in research psychology, highlighted by her role as one of the founders of social cognition, health psychology, and social neuroscience.

Elected to the Institute of Medicine in 2003 and the National Academy of Sciences in 2009 and awarded the American Psychological Association's Lifetime Achievement Award in 2010, Taylor is well known for her work showing that people tend to hold positive illusions of themselves and that it can be healthy to do so, the mechanisms by which stress affects health, and the influence that early experiences can have on how our bodies process stress.

In her Inaugural Article (1), she reviews findings from her own laboratory and those of others to provide an overview of the research linking stress to physical and mental health. "I wanted the PNAS audience to see that you can bring biology and behavior together to look at a specific problem," she says.

## Hooked on the Thrill of Discovery

Taylor was born in 1946 in the small village of Mt. Kisco, New York. She grew up in nearby Chappaqua, New York, about 1 hour north of New York City and near the Connecticut border. Chappaqua was a wonderful place to grow up as an only child, she says, because her neighborhood was full of children. Her mother taught piano, her father taught history, and although Taylor liked science in school, she liked to read more and imagined herself a librarian for much of her childhood.

Her father's experience as a psychiatric nurse during World War II, which he spoke of often, led Taylor to take her first psychology course in college.

He built the first mental hospital in Eritrea—literally built it by hand with two friends and villagers—to treat shell-shocked soldiers. It was hearing him talk about those experiences that led me to take a psychology course as one of my first courses in college.

That vague interest in psychology was the only plan she had when she started at Connecticut College (New London, CT)



Shelley E. Taylor.

in 1964. But at the end of Psychology 101, the instructor invited her and two other students to become psychology majors. The offer was such a flattering one that Taylor decided to take it with the thought that she would eventually become a clinician.

That plan changed after a summer as a volunteer in a Volunteers in Service to America (VISTA) pilot project working in a mental hospital. "I was assigned to a ward of schizophrenic men, mostly older and heavily medicated," recalls Taylor. "As a clinical experience, it wasn't very satisfying. And when I came back, I decided I wanted to do research."

After completing her first study on women's roles in society, she was hooked on research. By the time graduation loomed, she had decided to attend graduate school to become a research psychologist. She applied and got accepted to Yale's renowned psychology program, where she was attracted to the fledgling social attribution work of Dick Nisbett.

"I was interested in exploring how people understand the causes of their own and others' behaviors," says Taylor. For her dissertation (2), she asked study participants to rank order a list of people in terms of attractiveness. Then, she gave them false feedback about how they reacted physiologically to pictures of the people they had ranked. The feedback suggested that they were more attracted to people lower down on their list than their rankings indicated. She found that if

the feedback was completely discrepant to reality, study participants rejected it out of hand. However, if the feedback was close—say that they were most attracted to the second or third person on their list—they accepted the information and reevaluated their assessment.

After completing her doctorate in 1972, Taylor moved to Harvard University (Cambridge, MA) to be part of the department of social relations, which was an interdisciplinary collaboration between psychology, sociology, and anthropology. "I liked the broad scope of the department and the interdisciplinary focus," she says.

Her first student at Harvard was an undergraduate named Susan Fiske, with whom Taylor has collaborated since that time. "I've had lasting relationships with a number of students," says Taylor. "With Susan, we became close friends, and she always brought something to the research other than what I brought, which made collaboration very fruitful."

Together, they worked to expand the nascent field of social cognition, which examines the ways people think about other people and the influences on those thoughts. In fact, in 1984, they coauthored the Bible of social cognition, *Social Cognition* (3), in which they defined the scope and ambition of the field. In 1991, they published a second edition (4), and in 2007, they completed a sequel titled *Social Cognition: From Brains to Culture* (5).

Much of Taylor's work at Harvard involved the issue of salience (6–8): the idea that people believe something is more important if it stands out. She and her students tested this idea in a series of experiments in which they asked study participants to act out scripted interactions with other participants. Typically, someone in the group was different in some way—an African-American among Caucasians or a Caucasian among African-Americans, for example. The studies showed that people are more likely to think that someone who is more salient is controlling the situation, and they are, therefore, more likely to stereotype them, a finding that, in part, explains why people tend to stereotype people who are different from themselves.

## Moving into Health Psychology

Near the end of Taylor's 7 years at Harvard, Judy Rodin, who was then on the faculty at Yale, was consulting with

This is a Profile of a recently elected member of the National Academy of Sciences to accompany the member's Inaugural Article on page 8507 in issue 19 of volume 107.

a West Coast cancer foundation and asked Taylor to write a position paper on what psychology had to say about managing breast cancer.

I told her, "Nothing." But I wrote the position paper anyway and decided that it was nuts that psychology didn't have a foothold in the medical field. There was so much we could speak to, from adjusting to chronic illness to adhering to treatment regimens.

Taylor summarized her ideas about how social psychology could inform medical practice in an influential paper that helped jumpstart the field of health psychology (9). In fact, the president of Harvard at the time, Derek Bok, was so taken with Taylor's ideas, he provided her seed money for a health psychology course. "I talked to him about what I wanted to do, and he gave me a check for \$10,000," says Taylor. "It was great to have that kind of confidence."

Despite that support, Taylor was passed up for tenure, and therefore, in 1979, she accepted a position at the University of California Los Angeles (UCLA). "I was excited to be on such a diverse campus where psychology is in such close proximity to the medical school," says Taylor, who felt at home in Los Angeles.

When she got there, her UCLA colleague Bert Raven had just begun to develop a training grant in which he wanted to include health-related issues. He asked Taylor to take over the grant and start a program in health psychology. "I wasn't leaving social cognition behind but using it to discover how it affects how people react to and are vulnerable to health-related disorders," says Taylor.

Based on her work on breast cancer, Taylor's first health psychology study examined the role that women's thoughts and beliefs had on how they adjusted to having breast cancer. She recorded hours of interviews with 78 women. "During the course of those interviews, several things became clear to me that seemed to predict whether someone would adjust more favorably to breast cancer," she says.

In particular, women who could find some meaning for their experience and those who felt a sense of mastery over the disease or their reaction to the disease were able to restore their sense of self-esteem.

The paper she wrote documenting her findings (10) is probably her favorite. It was influential not just in the area of breast cancer but as a way to think about stressful events in general. Additionally, it got the ball rolling on many other areas of research. For one, it was the first time that she recorded, in print, a finding that she would become famous for: people harbor false illusions about themselves.

Indeed, many of the women in Taylor's breast cancer study claimed to have mastery over their disease even when it was clear, to Taylor and others, that their prognosis was grim. Even more fascinating, says Taylor, was that they were not devastated when the cancer returned. "It was the first time I realized that there are positive illusions," she says. "This is what spawned the positive illusions work, which moved beyond how people react to trauma and asked, 'What about everyday thought?'"

The idea that positive illusions—being unrealistically optimistic, exaggerating your sense of personal control, or exaggerating your sense of self—could be adaptive rather than maladaptive was counterintuitive at the time, says Taylor. Her first paper laying out the concept and showing evidence for positive illusions was the most cited paper in psychology for a time (11). Since then, Taylor and her colleagues have shown that positive illusions are associated with both mental and physical health outcomes.

Along with the influences that the breast cancer study had on Taylor's professional life, it also inspired her personal life, leading her to rethink her decision not to have children. "Interviewing those women about the insights that came from their disease, so many said that it makes you realize that relationships are the most important thing you have and that children were the most important thing they did with their lives," recalls Taylor. "I went home and talked with my husband, and we thought about having a child."

They subsequently had two children: a daughter who has her PhD in health policy and works on breast cancer issues and a son in political science. Having children was the best decision of her life, says Taylor.

### Understanding Pathways

The third phase of Taylor's career began in 1981 when she received a 10-year career development award from the National Institute of Mental Health to learn biological assessments and methods. The training allowed her to begin examining the influences that behavior and cognition have on physical health, a field now called social neuroscience. "It's one thing to say that you believe people do better under these various conditions, but it's another to show how, and to do that, we needed to understand the pathways," says Taylor.

Biological psychologist John Libeskind was helpful to her through much of her learning, providing feedback and teaching her techniques. "It was so exciting to start to be able to look at the impact of stress on stress regulatory systems,"

says Taylor, "and subsequently, we broadened out from there to look at the immune system and proinflammatory cytokines."

They found that stress affects how the body responds to stress (12–15). "We've been able to show things like people who are optimistic and feel good about themselves confront stressful situations with lower biological responses to stress," says Taylor. If you multiply that moderated response by years and years and multiple stress events, Taylor believes, you'll get less cumulative damage. That's an idea that she credits to neuroscientist Bruce McEwen, who first suggested that people can move from compromised stress regulation to disease through an accumulation of smaller stressful events.

This work connecting stress to biology got Taylor thinking about what environmental factors affect stress regulation. Her UCLA colleague, Rena Repetti, pointed out that study after study showed that certain childhood characteristics related to certain outcomes. For example, studies showed that children growing up in low socioeconomic status (SES) families had worse health outcomes than children who did not, even when controlling for adult SES. Still others found that an early family environment marked by abuse, conflict, or neglect predicts adverse health outcomes.

From those findings, Repetti, Taylor, and Teresa Seeman wrote a paper, which Taylor affectionately calls the "risky families" paper (16), that lays out the argument that the early family environment may be the point of origin for a poorly regulated stress response. With colleagues who could help Taylor examine stress regulation in the brain, they were able to show that kids from risky families do not do a good job of regulating stress responses (17). "That was quite a thrill, seeing the differences in the brain," says Taylor.

From the start, says Taylor, it was clear that genes were implicated. She tested that idea in a paper on the serotonin transporter gene (5-HTTLPR) (18), which has two predominant alleles: a short form and a long form. Research in other labs indicated that people who are homozygous for the short allele may be at higher risk for depression. However, Taylor's research suggests that the environment may mitigate some of the genetic risk. In fact, Taylor and colleagues found that, compared with people with just one or no copies of the short allele, people with two copies of the short allele have significantly less risk for depression if they come from a supportive early environment but significantly greater risk for depression if their early family environment was harsh.

They found the same pattern when they assessed people's current living

environment. A stressful environment confers enhanced risk for depression among those homozygous for the s allele, but a supportive environment confers less risk for depression. The research suggests that there is a robust gene–environment interaction, says Taylor. Therefore, having two copies of the short allele may not be a risk factor for depression but instead, may make people more sensitive to their environment, and therefore, they are more at risk for depression in highly stressful environments but thrive in nurturant, supportive environments. “What I love about the outcome of that study is that you can flip the risk for depression based on the environmental situation,” she says. “Seeing that in our data was thrilling.”

Although the serotonin transporter system is the most interesting to Taylor, her lab has examined gene–environment interactions with many other genes, including those for dopamine, oxytocin, and the  $\mu$ -opioid receptor.

### Tend-and-Befriend: Building Models

Throughout her career, Taylor has enjoyed pulling together the strands of her research into broad theories that she can then test in her lab. One theoretical paper that made a big splash was a 2000 paper in *Psychological Review*, describing what Taylor calls the “tend-and-befriend” model (19). The model contends that, although stress certainly triggers the well-accepted fight or flight response, it can also activate a more social response, particularly in women. This tend-and-befriend response is underpinned by

hormones such as oxytocin, and it pushes women to tend to vulnerable others and reach out to friends during stressful times.

That paper came out of the sense that the finding that social support is protective of mental and physical health was underrated. It’s at least as strong as smoking and lipids in predicting health outcomes. I was interested in the hormones that regulate the social system and the hormonal consequences of social relationships.

Since that paper, Taylor’s laboratory has worked to support the model with research. They summarize that work in a 2010 article in *Psychological Science* (20), explaining the theory and providing evidence for the role of oxytocin and vasopressin in the tend-and-befriend response.

“The media and a number of researchers have regarded oxytocin as a cuddly hormone,” says Taylor. “But it doesn’t map onto psychological states that well. It goes up when our most important relationships are threatened as well as when we’re socially satisfied. It’s clear that oxytocin is implicated in positive and negative relationships—I think because it stimulates us to seek social contact, good or bad.”

The tend-and-befriend model is an example of what Taylor believes is her biggest contribution to psychological science: the integration of biological parameters with psychological ones. “I hope that one of my most lasting contributions will be that both the behavioral and biological sciences recognize the importance of in-

tegrating biological and behavioral factors,” she says. She explains how she has gone about that in her Inaugural Article (1), a review that summarizes the work her laboratory has done to explain the links between early life stress and adult health.

“My Inaugural Article seemed like the best vehicle for highlighting the different facets of our work,” she says, “and our work on early life stress and health outcomes seemed to make a natural-package.”

In the article, Taylor uses findings from her lab and those of others to show how genetics and a harsh childhood without strong social support can cause the dysregulation of several physiological systems, including the body’s stress regulation system. As a result, Taylor shows, the body responds less flexibly to stress and that may lead to many health-related outcomes, including metabolic disorders and heart disease.

The article also allowed her to highlight the collaborative nature of her work. More than the actual findings from her research, Taylor is most proud of the students that she has trained over the years who have gone on to have stellar careers of their own. She is uncomfortable being singled out for recognition, because science is a collaboration. “Even the competition is part of the collaboration, because other labs force you to do things you wouldn’t do otherwise,” she says. “Individual scientists matter little; what matters is what we pass along to the next generation.”

—Beth Azar, *Freelance Science Writer*

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