PROFILE

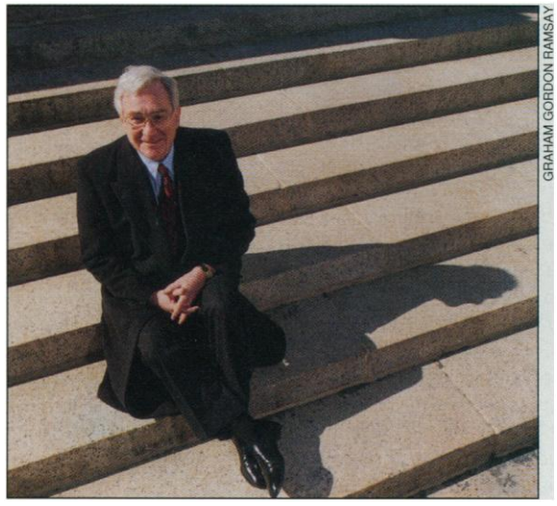
Herbert Benson: Mind-Body Maverick Pushes the Envelope

BOSTON—In 1972, leading cardiovascular researcher Lewis K. Dahl of Brookhaven National Laboratory on Long Island gave a prestigious lecture to members of the High Blood Pressure Council, gathered that year in Cleveland, on the causes of hypertension. Dahl had bred a strain of laboratory rats, called S, whose blood pressure soared fatally high if they ate too much salt; the rats also seemed susceptible to several other suspected causes of hypertension. But there was one factor, Dahl said, that could be ruled out: psychological stress. He had harried S rats with random electric shocks, a classic stressor, and found no rise in blood pressure.

It was an uncontroversial point. Amid the polite applause, however, a lone challenger at the back of the auditorium rose to speak. "With all due respect," he said, "it's not that stress isn't important—you just did the experiment the wrong way." Dahl glared at his young questioner and waved off the comment. But the criticism so irritated him that upon returning to Brookhaven he got the best grad student he could find, an experimental psychology student named Richard Friedman, to—as Dahl put it to him—"design a psychology experiment where even fanatics like this guy can see that stress isn't important." In a study that grew into his Ph.D. thesis, Friedman designed an alternate stress experiment, shocking the S rats on a random schedule after they pressed a lever to obtain a food pellet. They promptly developed much higher blood pressure—proving, as Friedman reported in *Science* in 1976, that Dahl's critic had been right: Stress does have profound physical consequences.

Years later, Friedman joined the lab of cardiologist Herbert Benson at Beth Israel Hospital in Boston and joked to his new mentor about how the provocation of a nameless "fanatic" at the back of the hall in Cleveland had helped launch his career. Benson laughed: That fanatic, he said, was me.

Today, the once-heretical notion that mental state can influence blood pressure is part of mainstream medical thinking, and Friedman is Benson's right-hand man at the Mind/Body Medical Institute (MBMI), a nonprofit research and education center they founded in Boston in 1988. And Benson, with appointments at Beth Israel Deaconess Medical Center and Harvard Medical School, has made a career out of provoking the biomedical research community to accept ideas once considered fringe. He's famous coast to coast for his work on the "relaxation response"—a term he coined to describe physiological changes, including a decrease in stress hormones and heart rate, seen during states of relaxation. He has promoted meditation to help treat everything from hypertension to headaches, and he has at least partially succeeded: Today, relaxation therapies are taught in 60% of U.S. medical schools and offered by many major hospitals.



GRAHAM GORDON RAMSAY

Stepping too far? Harvard cardiologist Herbert Benson has made a career out of pushing science to its limits.

In the research world, Benson still faces many critics who charge that his science is skimpy. Recent studies have even raised questions about his best known work on the effectiveness of the relaxation response. Yet, Benson is a well-established researcher, with an endowed chair in his name at Harvard and a string of grant awards from the National Institutes of Health (NIH)—from the medical institutes, not from the Office of Alternative Medicine. Just last month, NIH's National Heart, Lung, and Blood Institute awarded MBMI nearly $500,000 to study relaxation as a treatment for insomnia. He's also a wildly successful popularizer—with millions of copies of his books in print—who distances himself from pop gurus like Deepak Chopra by claiming scientific evidence for all his ideas. "Benson is to be congratulated for opening the door" to the links between mind and body, says former Surgeon General C. Everett Koop. "Good doctors have always used anything available to them in the healing of their patients. I would caution against the skepticism that [says] this is all bunk."

But now, even some of the 61-year-old Benson's supporters wonder if he's gone off the deep end. His latest forays have been in an even more provocative realm: religion. In his 1996 book *Timeless Healing: The Power and Biology of Belief*, he contends that humans are "wired for God"—that believing in God can improve your health and is in fact an evolutionarily adaptive trait. "Perhaps instinctively, human beings [have] always known that worshipping a higher power was good for them," Benson writes. In the book and in a Harvard Medical School continuing education course run by MBMI, Benson argues that the calm instilled by faith itself can be a powerful force for healing.

If that suggestion were not provocative enough, Benson now plans to test the power of prayer. Using funds donated by a private foundation, MBMI is planning a study of whether "intercessory" prayer—prayer for someone else's recovery—works. Certainly, the U.S. public thinks it does: A recent *Newsweek* survey found that 87% of adults believe God sometimes answers their prayers—and a *Nature* poll found that 40% of all biologists, physicists, and mathematicians believe in a God who answers prayers.

Not surprisingly, the notion of putting prayer under a scientific lens strikes many scientists as quixotic, embarrassing, or worse. New York University rheumatologist Gerald Weissman, who has described meditation as akin to "magic potions," says Benson and other mind-body practitioners such as Chopra "are all mesmerians, shills of the worst sort preying on the sick." Even if the study found a significant effect from prayer, adds Dan Blazer, an epidemiologist and psychiatrist at Duke University, "clinical studies like this necessitate taking the next step and asking what is the mechanism by which that effect works. [With prayer], we can't even begin to know how to ask that."

Those who have raised questions about Benson's past work say that's just the problem—that he avoids or skips over the questions nearest and dearest to most researchers' hearts: the mechanisms behind the effects he studies. Even some of those who study mind-body effects are wary. "The person in me says 'Of course, I believe emotions have something to do with disease,' but the scientist in me says 'Prove it to me,'" says Esther Sternberg, a rheumatologist at the National Institute of Mental Health, who is part of a network of mind-body researchers organized by the John

D. and Catherine T. MacArthur Foundation. Benson, she says, has served mainly as a champion of popular beliefs, and it has taken a second wave of hard-nosed researchers to explore the mechanisms of the mind-body link.

Benson—who recently began taking his own medicine by meditating 10 minutes each day—remains unflustered and unfailingly cordial in the face of such criticism. Now nearing the end of his career, the silver-haired, suavely dressed scientist asks calmly: Who better to examine the possible effects of prayer than representatives of the biomedical establishment?

Tension over hypertension

Benson's calmness in the face of criticism today isn't surprising, given that he's been in the firing line for more than a quarter of a century. Benson, who got his M.D. from Harvard Medical School in 1961, was among the first to explore the idea that combating stress through mindful relaxation might lower blood pressure, and he has published a string of studies in peer-reviewed journals showing that this is so; one of his first was a study published in *Science* in 1971. But in spite of such papers, the idea that hypertension could be counteracted by calming the mind was considered bunk back then. Colleagues giggled when he spoke about relaxation during medical rounds, Benson recalls. " 'It's all the placebo effect,' they'd say. 'Psychological processes simply don't exert that powerful an influence.' 'Do you know what you're doing? Throwing away your career.' "

But as things turned out, few medical careers have been more publicly successful. Benson's book *The Relaxation Response* has sold 4 million copies worldwide, and physicians and other caregivers flock to his courses. (Nearly 3000 attended recent offerings on "Spirituality & Healing in Medicine.") Biomedical researchers were slower to take interest, but many now take the mind-body link seriously; a 1993 meta-analysis, for example, found 857 studies in the medical literature between 1970 and 1991 on the treatment of hypertension using cognitive or behavioral techniques such as relaxation.

Many physicians and researchers agree that Benson has helped kick off what is now a legitimate field of research, albeit an offbeat one; indeed, there are now scores of studies on the biochemistry of the links between the nervous and immune systems, a field called psychoneuroimmunology (*Science*, 14 February 1997, p. 930). "I admire somebody like Dr. Benson who has the guts to tackle tough issues and to bring good, hard-core science to bear on them," says David Felten, a leading psychoneuroimmunologist at the University of Rochester in New York. "He is the pioneer who pointed the way."

GRAHAM GORDON RAMSAY

Champion of the spirit. Benson says spirituality and healing deserve scientific study.

One measure of the sway Benson's ideas acquired over the years is the success of MBMI, which earns income from grants from NIH and private foundations—and also makes a tidy sum from corporate programs in relaxation and medical continuing-education courses. All told, the 30-person institute, which has six affiliated centers in other cities, had total revenues of $2.6 million in 1996.

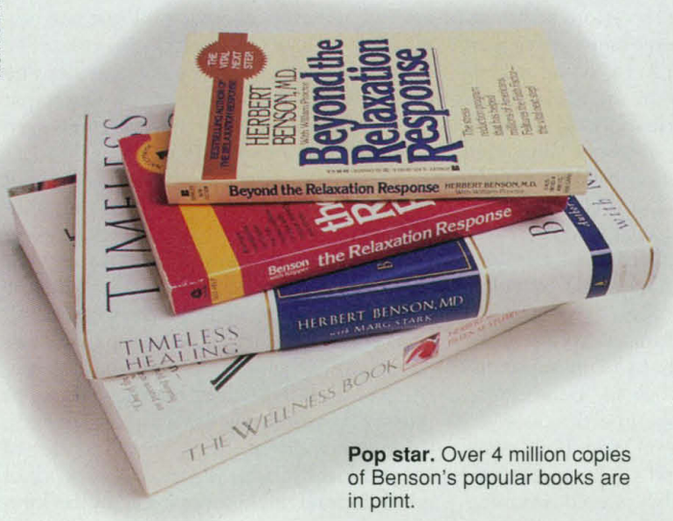
Along the way, however, there have been critics who call Benson a better showman than a scientist. In the early 1980s, when Benson requested more space for his research at Boston's Beth Israel Hospital, the chief of medicine assembled an outside committee to evaluate his work. Psychoendocrinologist Bob Rose, himself a former editorial board member of the journal *Psychosomatic Medicine*, led the review panel—and emerged skeptical of Benson's science. He remains so today, as director of health programs at the MacArthur Foundation and chair of its mind-body research network. "Herb has claimed to do the very basic kinds of biological research that document the psychobiological mechanisms underlying the relaxation response, but it turns out when you look very carefully that he hasn't done that," says Rose, who was also Benson's classmate at Harvard Medical School. Indeed, a detailed critique of *Timeless Healing* finds many scientific holes (see Book Review, p. 369).

Benson insists that his interest in mechanism "goes back to my very roots" as a physiology fellow and instructor at Harvard. He says he and his collaborators have always tried to define the relaxation response in state-of-the-art terms, using the latest measuring devices, including electroencephalograms (EEGs). "We are vitally interested in mechanism. But there is another fundamental issue here. ... Mind may never be defined in reductionistic terms, because of its very nature." In other words, if researchers can't say how the brain gives rise to consciousness, they can't ascertain exactly how mental states initiate changes in the body. "Therefore, to be criticized for studying only the effects of psychological states is an absurdity."

And Benson's science does have its supporters: Felten says Benson's data correlating relaxation and physiological change "are as solid as any measurements of physiological systems can be" and that Benson's critics sometimes ask too much. "We still want to study the underpinnings, the mechanisms, but the fact that we can't give you all of them right now, today, doesn't mean the connection doesn't exist."

Still, recent studies have raised questions about whether the relaxation response does indeed lower blood pressure and suggest that the effects may be restricted to certain populations. For example, in 1992 a major NIH-coordinated study of 2100 subjects on the verge of hypertension found that weight loss and sodium reduction significantly decreased blood pressure—but relaxation did not. On that basis, researchers contributing to this "Trials of Hypertension Prevention" study decided not to test relaxation in a larger Phase II study, which is still under way. Other studies, including the 1993 meta-analysis, find that relaxation is better than no therapy at all in lowering blood pressure, but it isn't much better than a placebo.

RICK KOZAK



Pop star. Over 4 million copies of Benson's popular books are in print.

Benson says the problem is simply that these studies lump subjects together. Those whose initial blood pressure is highest, or whose hypertension was clearly linked to mental stress, do benefit, he insists. Indeed, when psychologist Wolfgang Linden of the University of British Columbia controlled for differences in pretreatment blood pressure in his own 1994 meta-analysis, he found that psychologically based therapies, including relaxation, did lower blood pressure significantly.

And Benson points to dozens of studies that underscore other health benefits of relaxation. A 12-member Technology Assessment Panel convened last year by the Office of Medical Applications of Research at NIH, for example, found "strong evidence" that relaxation techniques are an important weapon against chronic pain.

The faith factor

Yet, even as his message spread, Benson found himself thinking seriously about some of his critics' charges. From the outset, skeptics had derided the physiological changes Benson observed in his meditating subjects as "nothing but the placebo effect," that mysterious but undeniable pattern in which a certain fraction of patients in clinical trials—about 35%—get better even if given a sugar pill or other dummy treatment. Most scientists have attributed this to some sort of shadowy mind-body interaction: Believing in a treatment may help it work. And Benson decided that there was some truth to the idea that patients' belief in the relaxation response was enhancing its benefits.

But rather than discount the placebo effect, Benson wondered if he could make use of it. That's where his recent interest in religion and health comes in. "The most profound belief people can have" is belief in a higher power, he says. Benson, himself a believer in God, also noted that most of the world's major religions feature prayer rituals resembling meditation.

Many epidemiological studies have shown that churchgoers have better clinical outcomes than do atheists—but that finding is often attributed to the extra social and community support people gain from belonging to a church. Benson is proposing something far more radical: that belief itself could affect health. "I was coming closer to defining a biological role of belief in God, a line of inquiry I wasn't sure either scientists or theologians would appreciate," Benson writes in *Timeless Healing*.

That didn't stop him. Eager to test the link between religiosity and health, he and colleagues developed an index that roughly quantifies the depth of subjects' spiritual feelings. In a study reported in 1991 in the *Journal for the Scientific Study of Religion*, the group taught the relaxation response to adult outpatients with a variety of disorders; they found that subjects who scored high on their spirituality index—those who, in Benson's words, "felt the presence of a power, a force, an energy close to them" during meditation—seemed to benefit more.

Of course, it's not necessarily surprising that "spiritual" people gain more from meditation than do skeptics. And it's conceivable that belief in a higher power might help some people deal with stress. But Benson's latest studies focus on a proposition that is hard to rationalize: whether praying for someone's else's health actually helps those being prayed for to get well. Benson's interest was piqued by a controversial study reported in the *Southern Medical Journal* in July 1988, indicating that 192 coronary intensive-care patients who were prayed for by born-again Christians had better clinical outcomes than did 201 controls, although no one but the Christian "intercessors" knew who was prayed for. Many researchers, including Benson, found flaws in the study's design, including an imprecise definition of a "good" clinical course. But Benson and Friedman are interested. "Why not have a look at this in a scientific fashion?" asks Benson.

GRAHAM GORDON RAMSAY

Right-hand man. Benson's provocations inadvertently launched Richard Friedman's career.

So, he, Friedman, and colleagues have designed a controlled, randomized, double-blind study of intercessory prayer, funded by the John Templeton Foundation, a private foundation that aims to "use scientific evidence to reveal knowledge about God." The MBMI team is wary about revealing details of their study: If well-wishing such as prayer can exert action at a distance, Friedman explains, then negative thoughts from skeptics could just as easily skew the results. They did disclose, however, that intercessors in the study will pray for two of three groups of coronary bypass patients. One group will know that it is being prayed for, while the other two will know that one of them is being prayed for, but not which one. The study thus aims to probe two different questions: whether there is a health benefit from knowing that others are praying for you, and whether intercessors can affect the world through pure thought. "Somebody needs to replicate the [1988] study, if only because it's so widely quoted," says Friedman.

The research world is skeptical, to say the least, that such a study can produce any sort of useful result. Without the standard tools of clinical and epidemiological investigators, it simply isn't science, scoffs the MacArthur Foundation's Rose. "For example, is there a dose-response curve—is there a difference between 1 hour of praying for someone else and 3 hours? Otherwise, we're just going back to voodoo, orgone energy, karma, and vibes." Epidemiologist Blazer of Duke adds that "It would be very difficult to convince most people that you really had valid controls"—a point that is even echoed by some religious scholars. "There can be no such thing as a controlled study of prayer," says Hector Avalos, a former child faith healer who is now a professor of religious studies at Iowa State University and director of the Committee for the Scientific Evaluation of Religion, a group of skeptical scholars who investigate paranormal religious claims. "You can never confirm that someone was not prayed for. There might be one person praying for all the sick people in the world. How could you possibly control for something like that?" Others question whether medical science should intrude in matters of the spirit. "Religion is there to provide faith, not to heal," says David Spiegel, a research psychiatrist at Stanford University School of Medicine who did a pioneering study showing that group therapy boosts the survival of women with breast cancer. "I worry about doctors treading in a domain they don't know much about."

Other researchers, however, say they at least admire Benson's courage. "He's pointing out something that the public is talking about," says Margaret Chesney, a research psychiatrist at the University of California, San Francisco. "Science has been fairly devoid of spirituality, and Herb is putting it out on the table," she says. "We need that, but it's a tough position to be in—you open yourself up to criticism." And Blazer, even though he says "I don't think [the study] is going to inform us in the long run about whether prayer works," adds that he's pleased that Benson is carrying it out, as it "will stimulate a conversation about whether science can actually help us study this area."

Whether the research world is interested or not, Benson is continuing with his plans. He says his greatest hope is that his career has helped to "lessen the medical suffering of humans," by using science to narrow the gap between mind and body. He still has a long way to go, jokes one leading mind-body researcher: "Tell him I'm praying for him."

–Wade Roush