

# Yoga Research: Yes, No, or How?

*A Contribution to the Dialogue —by Nina Moliver, PhD, RYT*

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Many of us who listened to Dr. Tim McCall's keynote speech, "Toward a More Blissful Union of Yoga and Science," at the 2009 SYTAR<sup>1</sup> knew that we were hearing some words of truth. Yet in a response to Dr. McCall in this publication, Dr. Marshall Hagins<sup>2</sup> voiced the concern that Dr. McCall may have unfairly been giving science a "black eye." I'd like to take a closer look at what Dr. McCall said in his speech, and I'd like to show that far from giving science a "public drubbing," Dr. McCall was inviting the scientific community to broaden its vision of what science can contribute to the understanding of Yoga.

Dr. McCall has cited several specific problems with scientific studies of Yoga. First, double-blinding a Yoga experiment is not possible. Second, experiments are performed with standardized protocols, but Yoga in the real world is not practiced according to standardized protocols. Third, experiments are expensive—and the sponsors of experimental studies are often responsible for biasing and corrupting the results. Fourth, Yoga studies tend to involve fixed protocols, whereas Yoga instructions are normally based on an interactive response to empirical observation. Fifth, Yoga studies tend to involve exclusion criteria, whereas in normal Yoga instruction, every person is welcome to practice, and it is the job of the instructor to adapt the practice so that it is comfortable and safe for the individual. Finally, the evaluation of short-term changes is usually most effectively accomplished by studying beginners. Thus, the research tends systematically to underestimate the long-term potential of Yoga. All of these issues are issues not with science, but with randomized, controlled trials.

## What Kind of Yoga Research?

The randomized, controlled trial (also known as the clinical trial, the efficacy study, or the experiment) was introduced by the pharmaceutical industry in 1948 to test new drugs.<sup>3</sup> The clinical trial is properly suited to interventions where experts select the treatment, where the treatment is essentially forced on the body, and where the role of consciousness plays little or no role in the outcome. When we want to test other kinds of interventions, or treatments, or behaviors, we may need to use other kinds of scientific tools.

Dr. McCall is by no means the first scholar to raise these issues with regard to the scientific investigation of a complex, self-chosen, whole-health wellness practice, which is what Yoga is. Dr. McCall has echoed researchers in many fields—including psychotherapy,<sup>4</sup> acupuncture,<sup>5</sup> nutrition,<sup>6,7</sup> homeopathy,<sup>8,9</sup> nursing,<sup>10</sup> herbalism,<sup>11</sup> and even the biological and social sciences,<sup>12,13</sup>—who have argued that applying the methods of the clinical trial to complex, nonpharmaceutical interventions will create unreliable results, particularly false negatives. Dr. Martin Seligman<sup>14</sup> declared that the randomized, controlled trial was simply "the wrong method" for evaluating a practice when crucial elements of the practice in a real-world setting are omitted, and that random assignment was not desirable for studying complex behaviors in the field. More recently, Dr. Bo Forbes<sup>15</sup> and Dr. Scott Laurence<sup>16</sup> have expressed similar concerns about using evidence-based medicine for Yoga, because evidence-based medicine is based on a reductionist, analytical, short-term, expert-centered model, which is not the model on which the Yoga approach is designed or claimed to work.

Quantitative research has much to offer us for studying patterns involving groups of people, instead of just individuals.

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As Dr. Laurence so correctly stated, we need not turn our backs on Yoga research to address the defects of the randomized, controlled trial. There is a middle way known as the observational design, also called the *outcome-based study* or the *effectiveness study*.

In an observational study, participants live and practice in their natural settings. Typically, they answer questions about their feelings or behavior in the setting where they live or work, often by completing a survey. Usually they answer these questions only in retrospect. Participants are not told what to do, where to do it, or with whom or how often or when or for how long.

## The Validity of the Observational Design

How valid are studies using observational designs? Researchers argue that with an observational design, we cannot determine cause and effect. For example, if a researcher didn't randomly assign the participants, it is not possible to know if Yoga practitioners are happier because they practiced Yoga, or if people who were happier were naturally attracted to starting a Yoga practice. Thus, any number of untallied factors could be confounding the results.

There are ways to address this argument—for example, support from prior research, a multiplicity of studies, proof of biological plausibility, and (in scientific parlance) a dose-response effect.<sup>17</sup> As Leslie Kaminoff<sup>18</sup> pointed out, Yoga doesn't cause wellness—it removes obstacles to it. Most importantly, however, the argument against the observational design has to be weighed against the many risks that Dr. McCall and others have pointed out in designing an experiment. The next step, then, is to weigh these two tradeoffs, in what Dr. Hagins has identified as the internal/external validity issue—an issue well-known in the scientific literature.

Conventional wisdom in medical science is that the randomized, controlled trial is the "gold standard," superior to an observational study. However, empirical evidence substantiating this claim is surprisingly absent.<sup>3,10,20,21</sup> Empirically, results from observational studies within the field of medicine have proved more accurate than those from clinical trials. In randomized, controlled trials, inconsistent and contradictory findings have been found in almost all topics studied.<sup>7,22,23,24</sup> The same cannot be said of observational studies.

Thus, we return to the issue of tradeoffs. Dr. McCall accurately identified the tradeoff issue when he asked, "Who says that a statistically accurate and clean look at plastic Yoga, that nobody in the real world does, is more valid than a statistically muddier look at what real Yoga therapists actually do?" This question was *not* an attack on science. It was a focus on the tradeoff issue—a healthy discussion within the scope of scientific inquiry. Observational designs are statistically muddier from the point of view of isolating variables and proving causation. But when we take the longer view—the view of external validity, or the "real world"—observational designs will actually give us results that are more accurate and more likely to reflect what happens when Yoga is actually practiced. That's a finding of science.

## Using a clinical trial to study the outcomes of a long-term Yoga practice is like putting a square peg into a round hole. And making this statement doesn't give science a black eye.

### Using a Randomized, Controlled Trial to Study Wellness

A Yoga experiment rarely lasts more than three to six months, perhaps with follow-up questions a few months or years later. Anything more is usually too expensive—it requires more grant money and professional researchers, and grant funders are reluctant to give money for studies not designed in the drug paradigm. We can't realistically extend many experiments much longer—certainly not for decades. Many Yoga experiments have lasted a few weeks or even a few days.

Learning what Yoga can accomplish in the immediate term is a worthwhile and admirable endeavor. What these experiments fail to do, however, is to investigate what happens additively and cumulatively with a committed Yoga practice, when synergistic outcomes begin to emerge. And, as Dr. McCall noted in *Yoga as Medicine*,<sup>25</sup> even six months is a drop in the bucket for a Yoga practice. By privileging short-term studies and standardized protocols, we are forever studying beginners, we are systematically underestimating the healing potential of Yoga in our research, and we are systematically excluding an understanding of these synergistic and cumulative effects of the practice. In short, we are shortchanging the potential of our scientific inquiries.

Using a clinical trial to study the outcomes of a long-term Yoga practice is like putting a square peg into a round hole. And making this statement doesn't give science a black eye. We do not undermine science when we insist that researchers use the most appropriate scientific method for the problem at hand. We undermine science when we clip its wings and narrow our topics to fit a preconceived paradigm. As Dr. McCall so accurately stated, Yoga will always come up short when measured with a pharmaceutical yardstick. We therefore need to examine our scientific tools and use the tools that are the best fit for studying what we want to study.

### The Observational Study: Making the Marriage of Science and Yoga Work

Dr. McCall pointed the way forward in his address when he made two recommendations for future scientific Yoga studies: (a) study Yoga over a longer time frame, and (b) do more outcome studies. Outcome studies offer a number of advantages that cannot be realized in brief trials. The subjects in an observational study typically represent the target population more closely than do the subjects in an experiment.<sup>26,27</sup> Medical researchers acknowledge that observational designs play an important role in investigating treatment outcomes in large, heterogeneous populations with complex, chronic conditions.<sup>21</sup> In an observational study of wellbeing, we can measure long-term personality changes that are deeper and more enduring than are changes in mood.

Observational studies cost much less money than experiments do. An impecunious graduate student like me was able to conduct an observational study over the Internet, without renting space or hiring a teacher. This means that many more studies can be conducted under the radar of the pharmaceutical industry, its largesse, and its expectations. In addition, an observational study can include many more participants. Finding even 100 participants for a Yoga experiment is a substantial, and costly, accomplishment. Many Yoga

experiments have included between 10 and 20 participants. It is easy to miss significant findings with such a small group. In contrast, observational designs can include thousands of participants. More participants give more robust, reliable results. All of this points to the possibility that the observational design should be given a much stronger place in Yoga research than it has been given so far.

I argue that by using an observational design, we can gather good data about a complex, long-term Yoga practice, which operates outside of the rules of linearity and causality. With an observational study, we do not need to trace the mechanisms or sort through the impossibly complex complexities of whole lives. We focus on the outcomes. That is why the observational study is also called an *outcome study*. In complexity and systems research, the complex system is regarded as a black box. We don't know what happens inside of the black box—we ask only what went into it, and what came out of it. Despite the infinite complexity of each person's life, at the end of the day, many of the differences between subjects will iron out, and we will be able to ask, "Do the statistics suggest that Yoga may have made a difference?"

In my study, they did. I distributed a one-time survey to hundreds of older women, many of whom had Yoga practices extending back as far as 50 years. The longer and the more often these women had practiced Yoga, the more those low levels of psychological and physical well-being dissolved from my spreadsheets. There was no plateau. Results held true after correcting for a range of other lifestyle factors. Differences among the different yoga traditions were not significant. Low scores kept getting higher with more time and practice. I never could have discovered this pattern with an experiment—certainly not in a reasonable timeframe, with a reasonable budget, and with hundreds of long-term Yoga practitioners.

What about all those confounding variables? I argue that the confounders confuse the researcher, but not the *yogi* or the *yogini*. For the Yoga practitioner, these so-called confounders—a healthier diet, a simpler lifestyle, more time outdoors, more kindness and compassion, more loving relationships, more bike-riding, a better path to right livelihood—are not confusing. They are mutually enhancing and reinforcing. These so-called confounders act synergistically, *coproducing* the outcomes: wellness, joy, serenity, and self-actualization.

Long-term *yogis* and *yoginis* have been largely invisible to Yoga researchers. I argue that this gap has occurred because Yoga researchers have unevenly focused on performing artificially constructed experiments with beginners. Nothing I say here is meant to demean the value of these experimental contributions. On the contrary, these experiments have been invaluable to Yoga researchers, and I have endlessly drawn on them for all of the teachings they have given us. These experiments help us interpret our long-term, observational studies and support our contentions that Yoga is behind all of these improvements for which we have been unable to prove causation.

My argument is simply that short-term Yoga studies have inherent limitations and can therefore give us only one side of the story. We need to balance the picture with observational designs. And we need to elevate the importance and the legitimacy of the observational design in Yoga research, putting it on a par with the clinical trial in giving us the type of information we need. **YTT**



Nina Moliver, PhD, RYT, is a research consultant in Boston, Massachusetts. She has experience as a Yoga teacher and a mental health counselor. Her Yoga research study won the Dissertation of the Year award at Northcentral University.

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