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Retroactive prayer: lots of history, not much mystery, and no science

Jeffrey P Bishop, Victor J Stenger

Many claims are made for the power of prayer, but the idea that it could work retrospectively has caused considerable controversy. It is also beyond current scientific knowledge

Department of Internal Medicine, University of Texas Southwestern Medical Center, 5323 Harry Hines Boulevard, Dallas, TX 75390-9030, USA

Jeffrey P Bishop *associate professor of medicine*

Department of Physics, University of Colorado, Boulder Campus Box 232, Boulder, CO 80309-0232, USA

Victor J Stenger *adjunct professor of physics*

Correspondence to: J P Bishop jeffrey.bishop@utsouthwestern.edu

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Leibocivi first raised the possibility of retroactive prayer in 2001. He reported a study that showed prayer done for patients well after they had left the hospital, had reduced the length of stay in hospital and duration of fever from blood stream infections.[1] In short, prayer somehow seemed to act backward in time to shorten patients' stay in the hospital. The study was intended lightheartedly to illustrate the importance of asking research questions that fit with the scientific model of the world.[2] Olshansky and Dossey subsequently argued that a logical explanation might be found for Leibovici's results.[3] They point to numerous other randomised controlled trails to support their thesis that prayer could work at a distance of space and that it might be plausible that prayer could act retroactively in time. We argue that their claim is built on a confusion and lacks a deep physical model. There is considerable fogginess about what science means in relation to the world of spirituality, and we wish to throw some light on the subject.

Examining the clinical science

The latest reported clinical trial of intercessory prayer is a three year study of 750 patients in nine hospitals and 12 prayer groups from around the world, including lay and monastic Christians, Sufi Muslims, and Buddhist monks.[4] Prayers were even emailed to Jerusalem and placed in the Wailing Wall. Patients awaiting angioplasty for coronary artery obstruction were selected at random by computer and sent to the 12 prayer groups. The prayer groups prayed for complete recovery of patients. The clinical trial was double blind; neither the hospital staff nor the patients knew who was being prayed for. The findings were reported at the American College of Cardiology's

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Praying at the Wailing Wall

second annual conference on the integration of complementary medicine into cardiology and showed no significant differences in the recovery and health between the two groups. Olshansky and Dossey cite an earlier study by this same group as supporting their thesis. However, this also found no significant differences between the two groups on any of the 18 outcomes.[5] These results seem to conflict with the hypothesis, not support it.

Next, consider the study by Harris et al that examined the effects of intercessory prayer on clinical outcomes of 466 people who were prayed for and 524 who had usual care.[6] This study found a difference in only 1 of 35 individual comparisons (P = 0.03 for that measure) and a significant difference (weighted score 6.4 *v* 7.1, P = 0.04) for the primary outcome of overall complications. No differences were found on a global measure (Byrd score) or on length of hospital stay. The significance for the difference on the primary outcome was reduced (6.2 *v* 7.0, P = 0.05) when corrections were made in response to letters to the editor.[7]

Finally, the first study that Olshansky and Dossey reference examined the effects of distant healing, including prayer and psychic healing, on health outcomes over six months in patients with AIDS.[8] Outcomes, as reported in the article, were new AIDS defining illnesses, illness severity, doctor visits, hospital admissions, days in hospital, and mood scores. All outcomes were marginally (but significantly) better in the 20 participants randomised to distant healing than in the 20 control participants.

After one of the lead authors (Targ) died, however, a reporter discovered some disturbing information about how the study was done.[9] The study was designed to measure mortality, not AIDS related illnesses or other cited outcomes. When the authors broke the blinding and found no difference in mortality (because of a low number of deaths), they scoured the data for differences on secondary measures such as HIV physical symptoms and quality of life. When these analyses showed no differences between groups, they analysed other outcomes (P values were not corrected for these multiple comparisons). They then decided to reblind the study and collect more data on outcomes by conducting a chart review (targeting AIDS related illnesses, doctors' visits, and hospital admissions). The chart review raises concern about bias since the two lead authors did the chart reviews themselves and thus failed to meet blindness criteria. The reported results are therefore probably an artefact of sifting and resifting of the data, unblinding and reblinding, and collecting new data in a questionable manner after the primary analysis until a result is found that supports the investigators original expectations. Such a study can hardly be set forth as exemplary.

The evidence reviewed by Olshansky and Dossey seems weak for an even ordinary scientific claim, let alone one that might support the extraordinary claim that prayer works retroactively or distantly. Now we will show that quantum physics provides no basis to expect such a phenomenon.

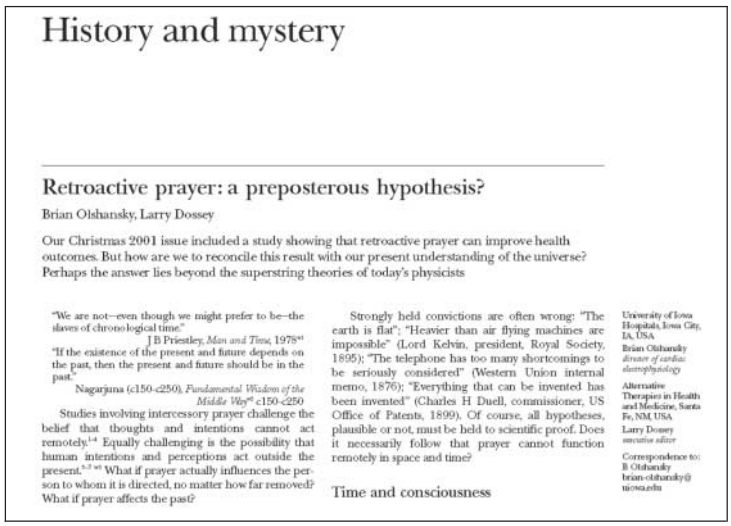
Physical mechanisms

The notion that human consciousness can supervene the material principles of physics is often found in the literature on parapsychology and complementary medicine. Olshansky and Dossey refer to experiments by Schmidt in which humans attempt to mentally affect radioactive decays, which are inherently quantum events.[10] Although Schmidt claims positive results, they are not significant and have not been replicated in the 35 years since his first experiments were reported.[11 12]

The claim that quantum mechanics implies that human consciousness can control physical reality can be traced to a misinterpretation of wave-particle duality.[12] Popular, non-technical literature often reports that quantum mechanics shows that an object is either a wave or a particle, depending on what you measure. If you measure its wavelength, then it is a wave. If you measure its position, then it is a particle. Since measurement is an act of human consciousness, then the implication is that thought processes in fact determine reality. Human consciousness is also often invoked as the mechanism for the so called collapse of the wave function when a measurement is made. Again we can find no basis for this in quantum theory, where some formulations do not contain wave function collapse or even wave functions.

The popular picture of particles as somehow also being waves is an oversimplification used pedagogically to explain interference and diffraction effects in familiar terms. All experiments detect particles, and our theories describe these particles as the "quanta" of quantum fields and not as waves. This theoretical description does not imply a dual reality in which one form of reality is changed to another by the act of measurement or human thought. Olshansky and Dossey also suggest that modern quantum physics provides a plausible mechanism for the backward causality implied by retroactive prayer. Although the results of some quantum experiments may be interpreted as evidence for events in the future affecting events in the past at the quantum level, no theoretical basis exists for applying this notion on the macroscopic scale of human experience.[13 14]

The human body and its parts, such as cells that are normally considered microscopic, are too large and contain too many particles to exhibit quantum effects in their collective behaviour. For example, the motion of the neurotransmitters that carry signals across synapses and constitute part of the mechanism for our


History and mystery

Retroactive prayer: a preposterous hypothesis?

Brian Olshansky, Larry Dossey

Our Christmas 2001 issue included a study showing that retroactive prayer can improve health outcomes. But how are we to reconcile this result with our present understanding of the universe? Perhaps the answer lies beyond the superstring theories of today's physicists

"We are not—even though we might prefer to be—the slaves of chronological time."
J B Priestley, *Man and Time*, 1978[1]

"If the existence of the present and future depends on the past, then the present and future should be in the past."
Nagarjuna (c150-c250), *Fundamental Wisdom of the Middle Way*[2] c150-c250

Studies involving intercessory prayer challenge the belief that thoughts and intentions cannot act remotely.[3,4] Equally challenging is the possibility that human intentions and perceptions act outside the present.[5–7] [8] What if prayer actually influences the person to whom it is directed, no matter how far removed? What if prayer affects the past?

Strongly held convictions are often wrong: "The earth is flat"; "Heavier than air flying machines are impossible" (Lord Kelvin, president, Royal Society, 1895); "The telephone has too many shortcomings to be seriously considered" (Western Union internal memo, 1876); "Everything that can be invented has been invented" (Charles H Duell, commissioner, US Office of Patents, 1899). Of course, all hypotheses, plausible or not, must be held to scientific proof. Does it necessarily follow that prayer cannot function remotely in space and time?

Time and consciousness

University of Iowa Hospitals, Iowa City, IA, USA
Brian Olshansky
director of cardiac electrophysiology
Alternative Therapies in Health and Medicine, Santa Fe, NM, USA
Larry Dossey
executive editor
Correspondence to:
B Olshansky
brian-olshansky@uiowa.edu

Summary points

Claims have been made that prayer can act distant in space and time, including retroactively

Very few studies have been done on retroactive prayer

Studies on the effects of distant prayer are poorly designed and have weak results

Current scientific theory does not support effectual benefit of prayer distant in space or time

thinking processes can be described without recourse to quantum mechanics. Of course, the atoms in biological systems are quantum in nature, as are the atoms in rocks, but their collective behaviour does not exhibit any quantum effects. Although multiple body quantum systems, such as lasers and superconductors, exist, proposals that the brain is somehow a quantum device are not supported by any convincing evidence. What is more, even if the brain were a quantum system, that would not imply that it can break the laws of physics any more than electrons or photons, which are inarguably quanta.

Olshansky and Dossey use the term "non-local."[1 15] Non-locality refers to the apparent faster than light correlations exhibited between separated parts of some quantum systems. It is interesting that the problem of non-locality disappears when we allow backward causality, exactly the phenomenon that Olshansky and Dossey are attempting to exploit.[12 16] They can't have both. In any case, while non-locality and backward causality remain controversial topics in discussions on the philosophical foundations of quantum mechanics, they have little to do with religion, medicine, or parapsychology.

Conclusions

Health research using spirituality occurs in two types. One type of research examines the effects that religious or spiritual beliefs and practices have on mental and physical health through psychological, social, and physiological mechanisms that are well established in the traditional social, behavioural, and medical sciences.[17–19] In this research, no appeal to extraordinary mechanisms is made. We need apply only ordinary psychological, social, or physiological phenomena. Health benefits might reasonably result from the comforting belief that a spiritual world exists, even if it does not. Psychological and behavioural factors have well established health effects, so it is not a far step to accept that spiritual belief, or perhaps non-belief, also has health consequences.

Until recently, the scientific community has been sceptical that religious and spiritual factors can be quantified. Lately, however, methods have been developed to assess religiosity and spiritual beliefs. Some doubt remains on whether the methods are adequate or whether what science means by religious or spiritual beliefs is the same as what religious or spiritual traditions mean by these beliefs.[20] Yet, religiosity and spirituality can be reasonably related to health outcomes similar to other psychosocial factors. Within a scientific framework, the benefits of prayer might also be attributed to these factors.

The claims put forward by Olshansky and Dossey are quite different from health outcomes research, which might reasonably be related to religion or spirituality. They argue that prayer might be used instrumentally to bring about desired effects in the world at a distance of space and time. The studies they cite have very little or nothing to do with established psychological, social, or behavioural pathways. Firstly, the findings from human studies which Olshansky and Dossey cite are hardly robust; in places, they are clinically insignificant in terms of effect size and not uncommonly steeped in controversy. Secondly, they call on theoretical mechanisms that have, at best, a questionable connection to medicine. Without plausible mechanism, abundant data with strong significance is necessary. That evidence does not exist.

Contributors and sources: JPB is an internist, philosopher, and Episcopal priest. He wrote the introduction, clinical science section, and conclusion. VJS is professor emeritus of physics at the University of Hawaii and has published extensively on science and religion. He wrote the physical mechanisms section and the conclusion.

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