

## CASE TEACHING NOTES for

# Prayer Study: Science or Not?



by  
**Kathy Gallucci**  
Biology Department, Elon University, Elon, NC

---

## INTRODUCTION / BACKGROUND

The scientific study of prayer is not a new area of research for the scientific community. In 1872, an interesting proposal was made in Great Britain to study the effects of prayer by making one ward or hospital the “object of special prayer by the faithful,” over and above the “background” prayer offered by the patients themselves and their families. This proposal set off a flurry of controversy in two prestigious publications of the time, *The Spectator* and *The Contemporary Review*. The objections, from both a religious and scientific viewpoint, were published in a book-length collection entitled *The Prayer-Gauge Debate* (**Tyndall et al., 1876**).

Interest in studying the effects of intercessory prayer has resurfaced since the publication of a landmark study by Randolph Byrd in 1988, which used rigorous scientific methodology. Since then, many other studies have been funded by government agencies at prestigious universities and medical centers (**Krucoff et al., 2001; Kwang et al., 2001; Sicher et al., 1998**). Medical acceptance of prayer has grown since studies present their data within the parameters defined by science, but others call it “voodoo science” (**Hales, 2003; National Public Radio, 2003**).

This case is intended for use in an introductory biology course for non-majors at the freshman or sophomore level and can be used to evaluate students’ understanding of the scientific method. Students learn the basics of the scientific method (hypothesis testing, collection and analysis of evidence, and making valid conclusions) in experimental as well as observational science. They are taught that because of its “method,” science is empirical and can only study phenomena that can be empirically investigated. Science is different from other “ways of knowing” because of its method. In the laboratory portion of the course, students learn how to identify independent, dependent, and controlled variables, and the difference between controlled variables and a control (**Gallucci et al., 2002**).

Before the “Prayer Study” case is presented, students obtain tools for skeptical thinking from Carl Sagan’s “Baloney Detection Kit” (**Sagan, 1996**) and learn to apply these tools to examples of science studies from their textbook and the media. They learn to recognize the fallacies of studies when a part of the scientific method is abused (see **scientific method concept map**). These abuses of the scientific method have each been given their own epithet.

For example, “pseudoscience” proposes hypotheses and makes predictions that are not falsifiable, or cannot be tested. These “pseudohypotheses” speak to powerful emotional needs that science cannot fulfill (**Sagan, 1996**). Pseudoscience cases that I use in the classroom include claims made by astrologers and psychics as well as accounts of UFO sightings and alien abductions.

“Junk science,” a term coined more recently in the media, uses faulty, insufficient, unreliable, twisted, “dredged,” or biased data (see <http://www.junkscience.com>). There are several good examples of junk science presented in a special report entitled “Junk Science: What You Know That May Not Be So” ([ABC News, 1996](#)). Even though the video itself is a good example of media slant, the cases on breast implants, nicotine addiction, and dioxin in the environment are especially useful. In these cases evidence was ignored or unconfirmed in order to further the agenda of an interested party.

“Antiscience” makes conclusions based on cultural norms, popular ideas, or personal biases, rather than objective evidence ([Sagan, 1996](#)). These are cases that have sometimes given science a bad name in the past. “Witch hunts,” the application of Darwin’s ideas about natural selection to social behavior, and the claims of intelligence differences among the races are examples of faulty conclusions based on the culture of the time.

Students also learn to recognize that the popular media typically omit important information necessary to evaluate the validity of a study. If students understand the scientific method, they should be able to ask key questions about the missing information, and when the information is provided, be able to reevaluate the study.

This case may be adapted for courses in the allied health and rehabilitation fields, and perhaps courses in sociology, psychology, and religious studies as well. Many objections to the scientific study of prayer have come from the religious community who contend that prayer is not “petty dictation to God” and that “prayer is not for God’s instruction, but for ours” ([Tyndall et al., 1876](#)). Larry Dossey, M.D., claims to speak for both the scientific and religious viewpoints, based on experience with his patients ([Dossey, 1993](#)). Hospital chaplains who agree and disagree with Dossey discuss their views in *Scientific and Pastoral Perspectives on Intercessory Prayer* ([VandeCreek, 1998](#)).

## Objectives

After completion of the case, the student should be able to:

- Describe why science is distinct from other ways of knowing.
- Explain that science is defined by its method and describe the essential parts of the scientific method (hypothesis testing, collecting and analyzing evidence, and making conclusions).
- Identify the independent, dependent, and controlled variables in a study.
- Identify the control group and the experimental group in a study.
- List the assumptions made by researchers in a study.
- Use skeptical thinking to analyze a news story about a study.
- Identify missing information that would be essential or helpful in making an objective assessment.
- Analyze reports of studies in the news media as “pseudoscience,” “junk science,” or “antiscience.”

## CLASSROOM MANAGEMENT

Before the students evaluate the study for its scientific validity, they must first understand the scientific method. They become familiar with the components of the scientific method in the lab and in class by identifying those components in neutral examples that do not incite emotion (see previous examples). It is important that they learn that the scientific method cannot be applied to every question. The hypothesis must be testable and falsifiable, the method must be objective and controlled, and the conclusions must be made without professional or personal bias.

This case has been used for the lecture portion of a general studies course in biology that fulfills the requirement for a lab science. In an 80-minute class of up to 60 students, I have the students read the news article silently, and then allow small groups to discuss the questions or a subset of them. The

answers to the questions are then compared in a class discussion. I try to identify weaknesses in their thinking during the class discussion. Throughout the discussion, it is important to promote respect for students' religious faith and the separation of scientific questions from religious ones.

There are several options for dividing the class into groups, dependent on class time and the size of the class. Each member of the class could vote on which viewpoint they would like to defend, whether the case is an example of:

1. proper use of the scientific method,
2. pseudoscience,
3. junk science,
4. antiscience, or
5. not sure what it is.

The students could then designate a spokesperson who will argue their position to the fifth group in an effort to convince them of their stand. The answers to the questions would be part of their presentation. Meanwhile, the fifth group could prepare a list of questions they will ask each spokesperson. At the end of the presentations, the fifth group would vote as to whether this case is scientific, pseudoscience, junk science, or antiscience, based on the arguments proposed during the four presentations.

Alternately, students could count off by fives and join one of the five groups, using multiple sets in large classes. In this option students may have to defend a position with which they personally disagree.

Students typically want to know more about the study ([Harris et al. 1999](#)) and the scientific community's objections to it ([Archives of Medicine, 2002](#)). Additional information serves to reinforce the scientific method, an understanding of science as a distinct way of knowing, the identification of questions that cannot be studied by science, and the value of peer review.

I have also used this case study as a homework assignment and as an essay for an hour exam.

## ANSWER KEY

Answers to the questions posed in the case study are provided in a separate answer key to the case. Those answers are password-protected. To access the answers for this case, go to [the key](#). You will be prompted for a username and password. If you have not yet registered with us, you can see whether you are eligible for an account by reviewing our [password policy and then apply online](#) or write to [answerkey@sciencecases.org](mailto:answerkey@sciencecases.org).

*Editor's Note:* The news article in the case is made up, based on an original AP news story, "Patients fare better with prayer, study says" (Anonymous, 1999).

## REFERENCES

- ABC News. 1996. "Junk Science: What You Know That May Not Be So" (A special one-hour report).
- Anonymous. 1999. "Patients fare better with prayer, study says." *Greensboro News and Record*, 26 October (Associated Press).
- *Archives of Internal Medicine*. 2000. 160(12):1735-1870. (Several articles with specific objections to and defenses of the initial study.)

- Byrd RC. 1988. "Positive therapeutic effects of intercessory prayer in a coronary care unit population." *Southern Medical Journal* 81(7): 826-829.
- Dossey, Larry. 1993. *Healing Words, the Power of Prayer and the Practice of Medicine*. Harper Paperbacks, a Division of HarperCollins Publishers, NY.
- Gallucci, K.K., L. Carloye, and M. DeVries. 2002. *An Inquiry Approach to Biology, second edition*, McGraw-Hill, Primis Custom Publishing, Boston.
- Hales, Diane. 2003. "Why Prayer Could Be Good Medicine." *Parade, the Sunday Newspaper Magazine, Greensboro News and Record*, 23 March (Parade Publications).
- Harris, William S., Manohar Gowda, Jerry W. Kolb, Christopher P. Strychacz, James L. Vacek, Philip G. Jones, Alan Forker, James H. O'Keefe, and Ben D. McCallister. 1999. "A randomized, controlled trial of the effects of remote, intercessory prayer on outcomes in patients admitted to the coronary care unit." *Archives of Internal Medicine*, 159 (19):2273-2278.
- Krucoff, Mitchell, W., Suzanne W. Crater, RN, Cindy L. Green, Arthur C. Maas, Jon E. Seskevich, , James D. Lane, Karen A. Loeffler, Kenneth Morris, Thomas M. Bashore, and Harold G. Koenig. 2001. "Integrative noetic therapies as adjuncts to percutaneous intervention during unstable coronary syndromes: Monitoring and Actualization of Noetic Training (MANTRA) feasibility pilot." *American Heart Journal* 142:760-767.
- Kwang Y. Cha, Daniel P. Wirth, J.D., and Rogerio A. Lobo. 2001. "Does prayer influence the success of in vitro fertilization-embryo transfer? Report of a masked, randomized trial." *Journal Reproductive Medicine* 46: 781-787.
- Milloy, Steven. 2003. "Junk Science?"  
<http://www.junkscience.com/define.htm>
- National Public Radio. 2003. "Power of Prayer." Interview with Marilyn Schlitz and Annie Laurie Gaylor by Tony Cox. The Tavis Smiley Show, March 26, 2003.  
<http://discover.npr.org/features/feature.jhtml?wflid=1206323>
- Sagan, Carl. 1996. *The Demon Haunted World: Science as a Candle in the Dark*. Random House, NY. (Ch. 12, "The Fine Art of Baloney Detection" is available online at  
<http://www.ictp.trieste.it/~mblau/sagan1.html>)
- Sicher, F., E. Targ, D. Moore, II, and H. Smith. 1998. "A randomized double-blind study of the effect of distance healing in a population with advanced AIDS." *Western J. Medicine* 169: 356-363.
- Tyndall, John, Francis Galton, *et al.* 1876. *The Prayer-Gauge Debate*. Congregational Publishing Society, Boston.
- VandeCreek, Larry, ed. 1998. *Scientific and Pastoral Perspectives on Intercessory Prayer, an exchange between Larry Dossey, M.D. and Health Care Chaplains*. Harrington Park Press, Binghamton, NY.

**Acknowledgements:** This case was developed with support from The Pew Charitable Trusts as part of a Case Studies in Science Workshop held at the University at Buffalo, State University of New York, on June 10-14, 2002. I would also like to gratefully acknowledge the assistance of Dr. Judith Kubicki, Assistant Professor of Theology, Fordham University, for her theological insights and help in securing reference materials.

**Date Posted:** 09/03/03 nas

Originally published at [http://www.sciencecases.org/prayer/prayer\\_notes.asp](http://www.sciencecases.org/prayer/prayer_notes.asp)

Copyright © 2003 by the [National Center for Case Study Teaching in Science](#). Please see our [usage guidelines](#), which outline our policy concerning permissible reproduction of this work.

# Concept Map of Scientific Method

