

# The Sexy Skeptic: Marketing Critical Thinking to a New Generation

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## Abstract

This paper argues that it is a matter of public health to have a populace that is able to distinguish between science and pseudoscience. There are several human factors that make public acceptance of the scientific method difficult. Some of these dynamics include a belief in a just world, discomfort with incompleteness, the need for emotional affiliation and community, and anti-intellectual cultural pressures. Rejection of critical thinking, difficulties understanding scientific studies, and an ignorance of appropriate applications of statistics can cause incidents of harm. The spectrum of such harm may range from a waste of financial resources, to preventable disease outbreaks, to ‘therapies’ that kill. Strategies for overcoming the natural resistance of many people to some of science’s most basic tenets are discussed.

## Introduction

At first blush, the concerns of public health educators and practitioners seem relatively far removed from the issues facing science educators, science policymakers, and science advocates. Traditionally, Public Health has been focused on determining effective interventions for prevention and amelioration of disease. However, the implementation frameworks that are used to design and execute programs in the interest of population health can be used to address the crisis of scientific competency in the United States. The sub-discipline focused on these strategies is known as *social marketing*. Social marketing has a population health focus and draws its inspiration from for-profit marketing strategies coupled with conceptual psychological models of information management.

Ultimately, the failure to understand and value the scientific method as a way of acquiring new information has a substantial public health impact. In the last few years, the United States has seen outbreaks of childhood diseases in middle to upper-class families who can afford vaccinations, who do not have any religious objections to vaccination, and who have reliable access to healthcare. These are diseases that should otherwise be controllable and have historically been controlled through childhood vaccination. While outbreaks of common childhood diseases like measles amongst college students are not necessarily indicative of a societal problem, the social factors playing a role in outbreaks of diseases like pertussis (whooping cough)

are problematic, as many younger physicians have never seen a case of pertussis (due to successful control through vaccination) and may misdiagnose it in infants or toddlers.

One only has to turn on the television to see an expose on the possible dangers of vaccination and thimerosal, even though no scientific evidence links vaccination to autism. Upon interview, many parents will state that they are afraid that vaccination is more risky than non-vaccination. Since “everyone else” is vaccinated, there is therefore no need to vaccinate their own child and subject the child to the perceived risk. The frequency of such decisions may be increasing, in spite of the fact that the actual risk of negative vaccination side effects is low, and in spite of the fact that the CDC stresses the probable negative outcomes of a decrease in herd immunity.<sup>1</sup>

The tentacles of vaccination fear have also wrapped themselves around the animal world. While many veterinarians feel that vaccination yearly is not required and instead recommend titers, some pet owners and breeders have become suspicious of vaccination<sup>2</sup> and outbreaks are feared by some veterinarians. This writer has had conversations with several purebred dog breeders who have strongly advised against certain vaccinations in spite of veterinarian recommendations because they believe the breed is “sensitive” to vaccinations or because veterinarians are “ruining” dogs with over-vaccination and are only interested in money. While this experience is obviously anecdotal, the sentiment is worth serious investigation. Such statements are remarkable for their congruence with the seeming rise in distrust of physicians, empiric medicine, and the medical establishment. It is possible that the only reason that rabies outbreaks are not on the rise is because not vaccinating against rabies is illegal; abandoned animals in shelters receive vaccinations when the animal’s prior medical history is unknown. Pet owners appear to be blissfully aware that rabies used to be a substantial public health problem, and that zoonoses continue to be a key concern investigated in some of the best research institutions of the United States and across the world.

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<sup>1</sup> [www.cdc.gov/nip/vacsafe](http://www.cdc.gov/nip/vacsafe)

<sup>2</sup> Davis-Wurzler, D.M. (2006). Current vaccination strategies in puppies and kittens. *Veterinary Clinics of North America*, 36(3). 607-640.

In general, then, a lack of familiarity with the scientific method, difficulty identifying logical flaws in an argument, and problems assessing objective risk are contributing to public health problems. From an economic perspective, the inability to distinguish between effective and ineffective, high risk and low risk, and science and pseudoscience causes millions of dollars to be invested in quack ‘cures’ while delaying investment in therapies that are empirically supported.

### Sisyphus Revisited

What is it about human nature that makes teaching the scientific method and scientific values feel equivalent to rolling a boulder uphill for eternity? In general, people tend to gravitate toward explanations that are complete, minimize personal responsibility, and decrease cognitive dissonance. These preferred types of explanations tend, in the writer’s view, to be more emotionally-based constructs rather than evidence-based. When a person makes a commitment to continually re-evaluate her core beliefs based on new evidence, this is a commitment to a path of psychic pain. It simply *does not feel good* to revisit hard-won conclusions when faced with information that contradicts one’s world view. Most people simply do not do it. People especially do not do it when the conclusion points in the direction of human insignificance and randomness in the universe.

The general public’s view of science and scientists in general is alarming. In 2003 and 2004, a large scale Internet-based study was administered by Knowledge Networks.<sup>3</sup> The probability based sample was reflective of the 2000 census. The incentive for participation was the provision of no-cost Web access in exchange for answering survey questions on an ongoing basis.<sup>4</sup> Amongst many other items, the survey participants were asked:

- Agree or disagree: Because of their knowledge, scientists have a power that makes them dangerous.
- Agree or disagree: We depend too much on science and not enough on faith.

41.2% of respondents indicated that they ‘agreed’ or ‘strongly agreed’ that scientists have a power that make them dangerous, and 46% indicated that they strongly agree or agree that there is not enough reliance on faith. 74.3% reported not buying a book on science, technology, or mathematics in the past year when computer or software manuals were excluded.

On a positive note, 70.7% of respondents indicated that they disagreed with the statement that “it is not

important [for them] to know about science in [their] daily life.” However, this rate leaves over 25% of survey respondents unsure (1.9%) or agreeing (24.1%) with this statement. On a good day for science, then, 1 out of 5 individuals dismiss the idea that science is relevant and pertinent.

### A Public Health Approach

Public health is a discipline that is focused on population management and behavior change, and a public health program is an effort organized to protect, promote, and/or restore health to a population. Population needs for primary, secondary, and tertiary prevention are empirically identified and ethically implemented at the organizational or individual level. Advocacy strategies have also long been the keystone for public health approaches.

Andreasen (1995) defines social marketing as “the application of commercial marketing technologies to the analysis, planning, execution, and evaluation of program designs to influence the voluntary behavior of target audiences in order to improve their personal welfare and that of their society.”<sup>5</sup> The primary objectives of social marketing are to influence voluntary behavior of the targeted population, to elucidate the benefits of acting in the desired direction, and to remove barriers to action. Success is determined by the program’s contribution to the population’s overall well-being or relevant decrease in the targeted symptoms or disease.

Social marketing goes beyond education. It seeks to modify the *attractiveness* of the target behavior through benefits and incentives. Grounded in positive reinforcement, effective social marketing explains the immediate and measurable benefits the target population will receive upon adoption and execution of the preferred behavior. It also reduces perceived costs and barriers to the chosen behavior. Laws can be used (a “sin tax” on cigarettes is an example) in a non-coercive fashion for behaviors that are extremely resistant to change due to competition from other behaviors or if it is very difficult to convey benefits.

Regarding usage of the law to obtain behavior change, Maibach, Rothschild and Novelli (2002) placed social marketing solidly in the middle of a continuum between education and law.<sup>6</sup> In an educational approach, it is easy to demonstrate benefits, there is

<sup>5</sup> Andreasen, A.R. (1995). *Marketing social change: Changing behavior to promote health, social development, and the environment*. San Francisco, CA: Jossey-Bass.

<sup>6</sup> Maibach, E., Rothschild, M. & Novelli, W. (2002). In K. Glanz, B. Rimer, & F. Lewis, (Eds.), *Health Behavior and Health Education* (pp. 437-461). San Francisco, CA: Jossey-Bass.

<sup>3</sup> www.knowledgenetworks.com

<sup>4</sup> Data courtesy of Jon Miller, PhD, Michigan State University

very little competition from reinforcing alternatives, and people are likely to behave in that direction with little intervention. A need for use of the law is implied when people are resistant, when it is very difficult to demonstrate the benefits of behaving in the desired direction, and there is unmanageable competition to behaving in the desired direction.

In order to accept and incorporate a new behavior, an individual must:

1. Have exposure to the message
2. Pay attention to the message
3. Find the message personally relevant
4. Understand the message
5. Personalize the message
6. Accept the change
7. Remember the message and continue to agree with it
8. Be able to retrieve the message from memory
9. Make decisions based on this retrieval
10. Behave as decided
11. Accept positive reinforcement for the behavior
12. Accept the behavior into his/her life.<sup>7</sup>

As can be seen, it is not easy to change behavior and the person has to really see the benefits of changing. Resistance or denial to the concept results in an uphill battle for the messenger.

### Developing Programs for Critical Thinking

Social marketing provides a framework for designing programs to increase acceptance of science, and there is no reason why promotion of science and scientific thinking should not be considered as important as disease prevention when thinking about population health. Many of the roadblocks related to the historical non-application of this theory are likely related to the widespread feelings that designing such a program will be overwhelming, as well as the pervasive idea that science and thinking scientifically is its own, intrinsic reward. While science is indeed intrinsically rewarding for scientists, as can be seen from the Knowledge Networks study it is clearly not necessarily true for the general public. In general, there seems to be resistance within the scientific community to the idea that one needs to “market” something that is largely believed to be merely “doing the right thing.” As previously demonstrated, for a good amount of the populace, “doing the right thing” is uncomfortable, forbidding,

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<sup>7</sup> McGuire, W. (1991). Using guiding-idea theories of the person to develop educational campaigns against drug abuse and other health-threatening behavior. *Health Education Research*,6(2), 173-184.

and is something that only “pointy headed intellectuals” do.

### Program Design

Several steps must be completed as a program to market acceptance of science and critical thinking is developed.

**Stage One** is planning the approach. At this stage, a program developer would examine the existing best practices and literature to determine what sorts of approaches have been effective in the past. In the absence of existing programs, there are many programs that can be adapted and their frameworks used.

**Stage Two** involves defining messages and channels. Again, existing programs can provide a guideline, or a program can use social marketing consultants who specialize in message development and channel maximization.

**Stage Three** involves developing and pre-testing materials. If a survey is designed, for example, during this stage, survey questions would be tested for readability and revised accordingly.

**Stage Four** is program implementation. Outcome measurement should be built into the program from the first day so that the program can be enhanced and improved in the future.

**Stage Five** is the evaluation and reporting of results in accordance with funders,' sponsors,' or programmatic requirements.

**Stage Six** is revising the program, incorporating feedback and re-implementing an improved product.

### The Four Ps

When designing a program, the Four P's of consumer marketing provide a guideline. The four Ps are product, price, place, and promotion. *Product* is the knowledge, attitude, or behavior the marketer wants adopted. A sample product statement is:

“The target audience will appreciate the unscientific and ineffective nature of homeopathy to treat disease.”

*Price* is what your target population gives up to attain the benefits of program. Price (or costs) may range from mild cognitive dissonance or disappointment to economic impact (prior certification as an herbalist) to loss of all hope (terminal patient). Obviously, in the latter case the person or group has a good amount invested in not hearing the program's message, as it requires acceptance that all realistic treatment options have been exhausted.

*Place* refers to how the message is spread. Channels to spread the message can include the traditional and new media, schools, doctors' offices, health fairs, shopping

malls, workplaces, and others. Place is also influenced by price.

The final P, *Promotion*, is the means for persuading the public that the result is worth the price. This persuasion can result from the teaching of skills, a mass media campaign, and provision of alternative activities. In order to change a behavior, a behavior must be replaced with another behavior.

Use of these 6 steps and adherence to the 4 Ps will provide substantial structure for developing a program dedicated to disseminating the importance of science and critical thinking.

### **Conclusion**

Critical thinking can become part of a curriculum through social marketing campaigns like mentorships for middle and high school students in science, media awareness seminars for children and teenagers, more television shows related to the scientific method, and video games requiring critical thinking rather than merely well developed fine motor skills. The options are limited only by the program developer's imagination. A public health approach can inform comprehensive social interactions, and a good many programs exist that can be adapted to meet the needs of a society at risk. There will be resistance to the idea that critical thinking is as necessary as compliance with medical orders or as pivotal for societal health as health literacy. However, since the ability to critically evaluate scientific evidence is rapidly becoming an essential tool for survival in an increasingly complex, immediate and automated society, it is nothing short of a moral imperative for scientists and skeptics to reach out and educate a populace that is clearly suffering the negative health effects of scientific illiteracy.