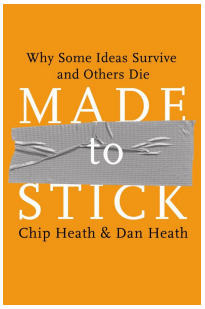
TESTABLE CREDENTIALS: BACTERIA CAUSE ULCERS

What follows is an excerpt from the book *Made to Stick* by Chip and Dan Heath, published by Random House in 2007. The passage below appears in the "Credible" chapter of the book.



OVER THE COURSE OF A LIFETIME, one person in ten will develop an ulcer. Duodenal ulcers, the most common type, are almost never fatal, but they are extremely painful. For a long time, the cause of ulcers was a mystery. Conventional wisdom held that ulcers developed when surplus acid built up in the stomach, eating through the stomach wall. Such surplus acid could be caused, it was thought, by stress, spicy foods, or lots of alcohol. Ulcer treatments traditionally focused on mitigating the painful symptoms, since there was no clear way to "cure" an ulcer.

In the early 1980s, two medical researchers from Perth, Australia made an astonishing discovery: Ulcers were caused by bacteria. The researchers, Barry Marshall and Robin Warren, identified tiny spiral-shaped bacteria as the culprit. (It would later be named Helicobacter pylori.) The significance of this discovery was enormous: If ulcers were caused by bacteria, they could be *cured*. They could be cured, in fact, in a matter of days, by a simple treatment with antibiotics.

The medical world, however, did not rejoice. There were no celebrations for Marshall and Warren, who had almost single-handedly improved the health prospects for several hundred million human beings. The reason for the lack of acclaim was simple: No one believed them.

There were several problems with the bacteria story. The first problem was common sense. The acid in the stomach is potent stuff—it can, obviously, eat through a thick steak, and it's (less obviously) strong enough to dissolve a nail. It was ludicrous to think that bacteria could survive in such an environment. It would be like stumbling across an igloo in the Sahara.

The second problem was the source. At the time of the discovery, Robin Warren was a staff pathologist in a hospital in Perth; Barry Marshall was a 30 year-old internist in training, not even a doctor yet. The medical community expects important discoveries to come from Ph.D.s at research universities or professors at large, world-class medical centers. Internists do not cure diseases affecting 10% of the world's population.

The final problem was the location. A medical researcher in Perth is like a physicist from Mississippi. Science is science, but thanks to basic

human snobbery, we tend to think it will emerge from some places but not others.

Marshall and Warren could not even get their research paper accepted by a medical journal. When Marshall presented their findings at a professional conference, the scientists snickered. One of the researchers who heard one of his presentations commented that he "simply didn't have the demeanor of a scientist."[i]

To be fair to the skeptics, they had a reasonable argument: Marshall and Warren's evidence was based on correlation, not causation. Almost all of the ulcer patients seemed to have Helicobacter pylori. Unfortunately, there were also some people who had Helicobacter pylori but no ulcer. And, as for proving causation, the researchers couldn't very well dose a bunch of innocent people with bacteria to see whether they grew ulcers.

By 1984, Marshall's patience had run out. One morning, he skipped breakfast and asked his colleagues to meet him in the lab. While they watched in horror, he chugged a glass filled with about a billion Helicobacter pylori. "It tasted like swamp water," he said.[ii]

Within a few days, Marshall was experiencing pain, nausea, and vomiting—the classic symptoms of gastritis, the early stage of an ulcer. Using an endoscope, his colleagues found that his stomach lining, previously pink and healthy, was now red and inflamed. Like a magician, Marshall then cured himself with a course of antibiotics and bismuth (the active ingredient in Pepto-Bismol).

Even after this dramatic demonstration, the battle was not over. Other scientists quibbled with the demonstration. Marshall had cured himself before he developed a full-blown ulcer, they argued, so maybe he had just generated ulcer symptoms rather than a genuine ulcer. But Marshall's demonstration gave a second wind to supporters of the bacteria theory and subsequent research kept amassing more and more evidence in its favor.

In 1994, ten years later, the National Institutes of Health finally endorsed the idea that antibiotics were the preferred treatment for ulcers. Marshall and Warren's research contributed to an important theme in modern medicine: that bacteria and viruses cause more diseases than we would think. It is now known that cervical cancer is caused by the contagious human papilloma virus, or HPV. Certain types of heart disease have been linked to cytomegalovirus, a common virus that infects about two-thirds of the population.[iii]

In the fall of 2005, Marshall and Warren received the Nobel Prize in medicine for their work. These two men had a brilliant, Nobel-worthy, world-changing insight. So why did Marshall have to poison himself to get people to believe him?

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[i] Haney, Daniel Q (1996, February 11). News that ulcers are caused by bacteria travels slowly to MDS. *Buffalo News.*

[ii] Kaur, Manveet (2002). Doctor who discovered `ulcer bugs'. *New Straits Times,* p. 6.

[iii] Beil, Laura (1997, March 24). A new look at old ills. Research finds some chronic diseases may be infectious. The Record, Northern New Jersey. H1.