

Logically fallacious

James V. Macri

Granger, Ind

Are we currently living in a post-truth world where facts no longer matter? In our society today, it would appear that this is the case. We see it every day in commercials that are trying to sell us something and in politics where our ideas and principals are being manipulated. It is all too common in everyday news programs, where bias toward one belief or another shapes the stories to persuade us into believing that which often is not the truth. Many of the opinions held by factions of the dental profession are presented as fact, when in reality they are factitious. Fallacious concepts and opinions are distributed through hotel- and other non-university-based classes to unsuspecting practitioners. The charlatans are espousing questionable opinions, which are being taken as fact by some practitioners who seem to lack critical thinking skills. The popularity of such programs suggests that there is no shortage of practitioners looking for something they feel was missing from their dental education.

Critical thinking is defined as the ability to identify errors in reasoning known as logical fallacies. A logical fallacy is an error in reasoning that renders an argument invalid; in logic, an argument is a list of statements. Arguments are used to support viewpoints, and include premises, assumptions, and conclusions. It is important to understand that one negative premise results in a false conclusion.

In our specialty, the practice of using false assumptions or premises to support a false argument has become all too common. Even when the evidence-based research does not support the conclusion of a false premise, charlatans continue advancing their products or opinions as fact. For example, the idea that certain types of brackets move teeth faster, with less discomfort and better results, is still advanced by some. The idea that the removal of teeth during orthodontics is responsible for temporomandibular problems or sleep apnea is not supported by evidence-based dentistry. There are very few absolute facts that govern our decisions, but we must base our beliefs on concepts that follow the

best principles of information gathering and meta-analysis. To ignore the best evidence when making decisions about what is best for our patients because of preconceived biases, or for personal gain—whether financial or ego—is inherently dishonest.

The concept of truth has not changed; what has changed is our willingness to sacrifice our intellectual integrity for information that supports our beliefs, personal values, and ideologies.

After practicing for many years, critical thinkers will become scientific skeptics, a term coined by Carl Sagan. He wanted every citizen to have a “baloney detector” as a defense against sham in commerce and politics as well as science. The modern use of the term “skeptic” does not mean cynic or naysayer, rather it refers to an appreciation for the limits and flaws of the human brain combined with the power of the self-corrective approach of science. It puts in place a rational filter through which all claims of what is purported as knowledge must pass.

Everything our brain takes in is immediately highly processed and stored as a memory. Once it becomes a memory we can begin the process of rebuilding that memory based on our preconceived biases and start the journey up the inference ladder. The reconstruction of what we see or hear begins the ascent up the ladder as first described by Chris Argyris and used by Peter Senge in *The Fifth Discipline*. An understanding of the frailties and flaws of the human brain may help us understand why misinformation and pseudoscience continue to exist in our specialty, despite copious amounts of evidence-based research that is contrary to what is falsely proclaimed and accepted as truth by so many.

The importance of applying critical thinking and scientific literacy in everyday life and the importance of teaching these skills to future generations must be a major goal in our education system. To date, it would appear we have a long way to go to meet our goal of instilling scientific skepticism in all members of our profession.

It is not my intent to demonize or denigrate anyone, but rather to bring to light the problems we have, the reasons we have them, and what we could do to correct them. I have had the good fortune to practice the specialty of orthodontics in the dental profession, but as

my career comes to an end, it is my hope that things will change for the better, that as practitioners and educators we will teach our students about critical thinking rather than memorize some information that has trickled down through the ages from so-called experts. It is important that we teach our students to ask questions, in a respectful manner, about everything and from everyone who stands before them, that we plant the seeds that will ultimately influence their beliefs and strengthen their “baloney detector.” Scientific skepticism and critical thinking will teach them to come to conclusions with the use of deductive rather than inductive reasoning.

In 1897 Leo Tolstoy said, “The most difficult subjects can be explained to the most slow-witted man if he has not formed any idea of them already, but the simplest thing can not be made clear to the most intelligent man if he is firmly persuaded that he knows already, without a shadow of a doubt, what is laid before him.” If you have seen the movie “The Big Short,” then you may remember the quote that was flashed on the screen as the movie begins. Some say it is erroneously credited to Mark Twain, but it is simply stating what Tolstoy said in a folksier way: “It ain’t what you don’t know that gets you in trouble. It’s what you know for sure that just ain’t so.”