



BY JARROD SHAPIRO, DPM

Metacognition

It's your most important skill.

Practice Perfect is a continuing every-issue column in which Dr. Shapiro offers his unique personal perspective on the ins and outs of running a podiatric practice.

There usually is one commonality to all of the situations in which a patient's treatment from a prior doctor has failed. In almost all cases, complications occurred from thought process errors. These include choosing the wrong procedure, using the wrong fixation, making the wrong diagnosis despite obvious signs to the contrary, or failing to recognize a complication. In each of these situations, cognitive errors lead providers in the wrong direction. Clearly, there are a lot of other reasons errors may occur, such as poor technical execution, but the vast majority stem from cognitive mistakes. It becomes important for each of us to be proficient in understanding how we think. Metacognition, then, is our most important skill.

Metacognition consists of two primary components: knowledge and awareness. Metacognitive knowledge also consists of subparts:

- 1) Declarative knowledge—the knowledge of facts (knowing “stuff”).
- 2) Procedural knowledge—knowing how to do things
- 3) Conditional knowledge—knowing when to use the other two types of knowledge

Awareness is broken up into planning, monitoring, and evaluating. A third component to metacognition is motivation, which is obviously necessary to consider the other aspects. Effort has to be sustained over time in order to actually complete a task. The person who has a full understanding of this process has the ability to understand him/herself better.

One part of metacognition that might not be immediately obvious is



the relatively recent body of research that clearly demonstrates that we are all subject to a series of cognitive errors and ingrained shortcuts that significantly affect our thought processes and responses to various situations. We are subject to a slew of cognitive biases, heuristics, and logical fallacies. Essentially, we delude ourselves much of the time.

The reality of this aspect of the human mind has been delineated by the work of cognitive psychologists, none more famous now than Daniel Kahneman, recipient of the Nobel Prize in Economics for his work on

cognitive biases. His book *Thinking Fast and Slow* is a comprehensive and highly readable summary of his work. For those of you interested, you might also consider Jerome Groopman's *How Doctors Think* and David McRaney's *You Are Not so Smart*.

Since there are literally numerous books about this subject, it's beyond the scope of this article to cover all of the ways we delude ourselves, but let's metacognitively examine an example of each of these processes to garner a feel for their power on our behaviors.

The Availability Heuristic

This mental shortcut relies on the idea that if something can be easily recalled, then it must be true. An example of this is the common misconception in the public that flying in airplanes is more dangerous than driving cars. The media propagates this when it televises the relatively

ly rare plane crash, often with many people dying. On the other hand, the multiple car crashes in which many people die are not shown on television to a great extent. As is obvious today, more people die in car accidents (over 40,000 in 2016)¹ than plane crashes (in 2015 there were 428 fatalities).² Obviously, when a plane crashes more people die at one time, making the tragedy that much worse. But looking at the overall numbers, we are much safer traveling by air than by car, despite what the availability heuristic tells us.

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In medical practice, providers must be careful about using this heuristic. For example, we see a lot of sick diabetics with wounds in our practices. It would be very easy for us to fall prey to the availability heuristic and believe that all diabetics are going to have foot wounds. In fact, the numbers indicate that 2-6% of diabetics will develop an ulcer yearly.³

Base Rate Fallacy

Fallacies are patterns of reasoning that are incorrect due to a flaw in their logical structures. In the case of the base rate fallacy, we make the error of failing to pay attention to how common or uncommon something actually is. The base rate of an event is the probability of that event occurring. In order to commit this error, one must discount the statistical nature of that thing and consider how frequently it appears. However, to know the truth of the situation, we would need to calculate the probability of an event happening in the first place. The rarer an event is, the more unlikely it is that what you think is happening actually is occurring.

Confirmation Bias

This cognitive error occurs when we seek out information that confirms our previously held belief about something and discount information that might prove it wrong. This is the opposite of the scientific method, where we attempt to disprove our hypotheses.

For some reason, we see errors in diagnosis occurring from this bias rather frequently in practice in relation to heel pain. Commonly, you'll see a patient for a second opinion where the prior diagnosis was plantar fasciitis. However, the patient's complaints are not consistent with this diagnosis. For example, s/he has burning heel pain that radiates to the medial arch. Yet despite this picture, which looks more neurological in origin, the patient will have received steroid injections, foot orthoses, and stretching exercises over several office visits.

The prior doctor made the mistake of pinning the diagnosis on the patient and no longer looked for another cause. In reality, this scenario is consistent with a combination of confirmation bias (looking only at evidence that supports the diagnosis) and the anchoring effect (another

bias in which we anchor ourselves to an opinion once formed).

The key to prevention with all of these cognitive errors is educating ourselves about ways in which this may occur and constantly being on the lookout for them in ourselves and others. It is important to think about the details because that is where the truth usually lies. It's no easy task, but the cognitive science of metacognition provides us the tools to be more effective thinkers. **PM**

References

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² Airplane Crash Statistics. Statistic Brain. <https://www.statisticbrain.com/airplane-crash-statistics/> Last accessed August 12, 2017.

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