

Excerpted from Lewis Vaughn, chapter 4 of The Power of Critical Thinking, 6th edition, Oxford University Press, 2019.

Reasons for Doubt

“Besides learning to see, there is another art to be learned—not to see what is not.”
—*Maria Mitchell*

Impairment

...If our perceptual powers are somehow impaired or impeded, we have reason to doubt them. The unambiguous cases are those in which our senses are debilitated because we are ill, injured, tired, stressed out, excited, drugged, drunk, distracted, or disoriented...Memories can be affected by many of the same factors that interfere with accurate perception. They are especially susceptible to distortion if they are formed during times of stress—which helps explain why the memories of people who witness crimes or alleged ghosts are so often unreliable...

Contrary to what many believe, [our cognitive faculties] are not like recording devices that make exact mental copies of objects and events in the world. Research suggests that they are more like artists who use bits of sensory data or memory fragments to concoct creative representations of things, not exact replicas. Our perception and memory are *constructive*, which means that what we perceive and remember is to some degree fabricated by our minds. Some of the more blatant examples: You see a man standing in the shadows by the road—then discover when you get closer that the man is a tree stump. You anxiously await a phone call from Aunt Mary, and when the call comes and you hear the person’s voice, you’re sure it’s her—then realize that it’s some guy asking for a charitable donation. While in the shower you hear the phone ring—but no one is calling, and the ringing is something your mind is making up.

The constructive workings of our minds help us solve problems and deal effectively with our environment. But they can also hinder us by manufacturing too much of our experiences using too little data. Unfortunately, the constructive tendency is most likely to lead us astray precisely when our powers of perception and memory are impaired or impeded. Competent investigators of alleged paranormal phenomena understand this and are rightfully skeptical of paranormal claims based on observations made under dubious conditions like those mentioned here. Under the right conditions, the mind is very good at showing us UFOs and midnight ghosts that aren’t there. Likewise, juries are expected to be suspicious of the testimony of eyewitnesses who swear they plainly saw the dirty deed committed but were frightened, enraged, or a little tipsy at the time.

More on Eyewitnesses

The memories of eyewitnesses are notoriously unreliable. One reason is that your memory of an event can be altered if you later receive new information regarding the event. Research shows that your memory can be changed in this way, but you won’t know it. You will be sincerely convinced that your altered memory is the original memory. Research studies have uncovered this phenomenon again and again. Here’s a description of the classic case:

...A man (whom we'll call Mike) stumbled upon an armed robbery in a hardware store. The robber rummaged around the cluttered store brandishing a silver weapon; finally, he stole all the money. Then, almost as an afterthought, he grabbed a hand calculator and a hammer...The police were summoned immediately, but before they arrived, Mike talked to another customer about the robbery...[She] told Mike that she saw the robber grab a calculator and a screwdriver...The police arrived, and when they questioned Mike, he recounted the robbery at some length: He described in detail the silver weapon, the money, and the calculator. When the police asked him about a tool that they heard had been taken, "Did you see if it was a hammer or a screwdriver?" he said, "Screwdriver."¹

[Consider also] this study that made headlines in 2007:

Brandon L. Garrett, a law professor at the University of Virginia, has, for the first time, systematically examined...200 cases, in which innocent people served an average of 12 years in prison... "A few types of unreliable trial evidence predictably supported wrongful convictions," Professor Garrett concluded in his study, "Judging Innocence," to be published in *The Columbia Law Review* in January. The leading cause of the wrongful convictions was erroneous identification by eyewitnesses, which occurred 79 percent of the time. In a quarter of the cases, such testimony was the only direct evidence against the defendant.

Expectation

A tricky thing about perception is that we often perceive exactly what we expect to perceive—regardless of whether there's anything there to detect. Ever watch the second hand on an electric clock move—then suddenly realize that the clock is not running at all? Ever been walking through a crowd looking for a friend and hear her call your name—then find out later that she was ten blocks away at the time? Such experiences—the result again of the constructive tendencies of mind—are common examples of how expectation can distort your perceptions.

Scientific research shows that expectation can have a more powerful effect on our experiences than most people think. In numerous studies, subjects who expected to see a flash of light, smell a certain odor, or feel an electric shock did indeed experience these things—even though the appropriate stimuli were never present. The mere suggestion that the stimuli would occur was enough to cause the subjects to perceive, or apparently perceive, things that did not exist.

Our tendency to sometimes perceive things that are not really there is especially pronounced when the stimuli are vague or ambiguous. For example, we may perceive completely formless stimuli—clouds, smoke, "white noise," garbled voices, random-patterned wallpaper, blurry photos, lights in the night sky, stains on the ceiling—yet think we observe very distinct images or sounds. In the formlessness we may see ghosts, faces, and words and hear songs, screams, or verbal warnings...Or the mere suggestion of what we should perceive helps us perceive it. This

¹ From Loftus, E.F. & Hoffman, H.G. (1989). Misinformation and memory, the creation of new memories. *Journal of Experimental Psychology* 118: 100-104.

phenomenon is a kind of illusion known as *pareidolia*. It's the reason some people claim to hear Satanic messages when rock music is played backward, or to observe a giant stone face in fuzzy pictures of the surface of Mars, or to see the perfect likeness of Jesus in the skillet burns on a tortilla.

Scientists are keenly aware of the possible distorting influence of expectancy, so they try to design experiments that minimize it. We too need to minimize it as much as possible. Our strong expectations are a signal that we should double-check our sensory information and be careful about the conclusions we draw from it.

Innumeracy and Probability

When we make an off-the-cuff judgment about the chances of something happening (whether an event in the past or one in the future), we should be extra careful. Why? Because, generally, we humans are terrible at figuring probabilities.

Here's a classic example. Imagine that your classroom has twenty-three students present including yourself. What are the chances that at least two of the students have exactly the same birthday? (Not the same *date of birth*, but the same birthday out of the 365 possible ones.) The answer is neither 1 chance in 365 ($1/365$), nor 1 in 52 ($1/52$). It's *1 chance in 2* ($1/2$, or fifty-fifty)—a completely counterintuitive result.

A common error is the misjudging of coincidences. Many of us often believe that an event is simply too improbable to be a mere coincidence, that something else surely must be going on—such as paranormal or supernatural activity. But we mustn't forget that amazing coincidences occur all the time and, in fact, *must* occur according to elementary laws of statistics. The probability that a particular strange event will occur—say, that an ice cube tossed out of an airplane will hit the roof of a barn—may be extremely low, maybe one in a billion. But that same event given enough opportunities to occur may be highly probable over the long haul. It may be unlikely in any given instance for you to flip a coin and get tails seven times in a row. But this “streak” is virtually certain to happen if you flip the coin enough times.

What are the odds that someone will be thinking of a person she knew, or knew of, from the past twenty-five years then suddenly learn that the person is seriously ill or dead? Believe it or not, such a strange event is likely to occur several times a day. If we make the reasonable assumption that someone would recognize the names of a few thousand people (both famous and not so famous) from the past twenty-five years and that a person would learn of the illness or death of each of those few thousand people in the twenty-five years, then the chances of our eerie coincidence happening to someone somewhere are pretty good. We could reasonably expect that each day several people would have this experience...

The lesson here is not that we should mistrust all judgment about probabilities, but that we shouldn't rely solely on our intuitive sense in evaluating them. Relying entirely on intuition, or “gut feeling,” in assessing probabilities is usually not a reason to trust the assessment, but to doubt it.