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October 16, 2010

Magic by Numbers

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I RECENTLY wound up in the emergency room. Don't worry, it was probably nothing. But to treat my case of probably nothing, the doctor gave me a prescription for a week's worth of antibiotics, along with the usual stern warning about the importance of completing the full course.

I understood why I needed to complete the full course, of course. What I didn't understand was why a full course took precisely seven days. Why not six, eight or nine and a half? Did the number seven correspond to some biological fact about the human digestive tract or the life cycle of bacteria?

My doctor seemed smart. She probably went to one of the nation's finest medical schools, and regardless of where she trained, she certainly knew more about medicine than I did. And yet, as I walked out of the emergency room that night with my prescription in hand, I couldn't help but suspect that I'd just been treated with magic.

Certain numbers have magical properties. E, pi and the Fibonacci series come quickly to mind — if you are a mathematician, that is. For the rest of us, the magic numbers are the familiar ones that have something to do with the way we keep track of time (7, say, and 24) or something to do with the way we

count (namely, on 10 fingers). The “time numbers” and the “10 numbers” hold remarkable sway over our lives. We think in these numbers (if you ask people to produce a random number between one and a hundred, [their guesses will cluster](#) around the handful that end in zero or five) and we talk in these numbers (we say we will be there in five or 10 minutes, not six or 11).

But these magic numbers don't just dominate our thoughts and dictate our words; they also drive our most important decisions.

Consider my prescription. Antibiotics are a godsend, but just how many pills should God be sending? [A recent study of antibiotic treatment](#) published in a leading medical journal began by noting that “the usual treatment recommendation of 7 to 10 days for uncomplicated pneumonia is not based on scientific evidence” and went on to show that an abbreviated course of three days was every bit as effective as the usual course of eight.

My doctor had recommended seven. Where in the world had seven come from?

Italy! Seven is a magic number because only it can make a week, and it was given this particular power in 321 A.D. by the Roman emperor Constantine, who officially reduced the week from eight days to seven. The problem isn't that Constantine's week was arbitrary — units of time are often arbitrary, which is why the Soviets adopted the five-day week before they adopted the six-day week, and the French adopted the 10-day week before they adopted the 60-day vacation.

The problem is that Constantine didn't know a thing about bacteria, and yet modern doctors continue to honor his edict. If patients are typically told that every 24 hours (24 being the magic number that corresponds to the rotation of the earth) they should take three pills (three being the magic number that divides any time period into a beginning, middle and end) and that they should do this for seven days, they will end up taking 21 pills.

If even one of those pills is unnecessary — that is, if people who take 20 pills

get just as healthy just as fast as people who take 21 — then millions of people are taking at least 5 percent more medication than they actually need. This overdose contributes not only to the punishing costs of health care, but also to the evolution of the antibiotic-resistant strains of “superbugs” that may someday decimate our species. All of which seems like a rather high price to pay for fealty to ancient Rome.

Magic “time numbers” cost a lot, but magic “10 numbers” may cost even more. In 1962, a physicist named M. F. M. Osborne noticed that [stock prices tended to cluster around numbers ending in zero and five](#). Why? Well, on the one hand, most people have five fingers, and on the other hand, most people have five more. It isn't hard to understand why an animal with 10 fingers would use a base-10 counting system. But according to economic theory, a stock's price is supposed to be determined by the efficient workings of the free market and not by the phalanges of the people trading it.

And yet, research shows that fingers affect finances. For example, a stock that closed the previous day at \$10.01 will perform about as well as a stock that closed at \$10.03, but it will significantly outperform a stock that closed at \$9.99. If stocks close two pennies apart, then why does it matter which pennies they are? Because for animals that go from thumb to pinkie in four easy steps, 10 is a magic number, and we just can't help but use it as a magic marker — as a reference point that \$10.01 exceeds and \$9.99 does not. Retailers have known this for centuries, which is why so many prices end in nine and so few in one.

The hand is not the only part of our anatomy that gives certain numbers their magical powers. The tongue does too. Because of the acoustic properties of our vocal apparatus, some words just sound bigger than others. The back vowels (the “u” in buck) sound bigger than the front vowels (the “i” in sis), and the stops (the “b” in buck) sound bigger than the fricatives (the “s” in sis). As it turns out, in well over 100 languages, the words that denote bigness are made with bigger sounds.

The sound a number makes can influence our decisions about it. **In a recent study**, one group was shown an ad for an ice-cream scoop that was priced at \$7.66, while another was shown an ad for a \$7.22 scoop. The lower price is the better deal, of course, but the higher price (with its silky s's) makes a smaller sound than the lower price (with its rattling t's).

And because small sounds usually name small things, shoppers who were offered the scoop at the higher but whispery price of \$7.66 were more likely to buy it than those offered the noisier price of \$7.22 — but only if they'd been asked to say the price aloud.

The magic that magic numbers do is all too often black. They hold special significance for terrestrial mammals with hands and watches, but they mean nothing to streptococcus or the value of Google. Which is why we should be suspicious when the steps to sobriety correspond to a half turn of our planet, when the eternal commandments of God correspond to the architecture of our paws and when the habits of highly effective people — and highly trained doctors — correspond to the whims of a dead emperor.

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