



## Commentaries

### Analogies

**My son, the philosophy major, overheard** me talking to a lawyer about case in which a patient had developed painful dystonia, possibly from a car accident. I was trying to explain that some people developed what we thought was bona fide torticollis, but many had psychogenic disorders and experts couldn't tell them apart. I then expounded a bit about conversion-disorders versus organic disorders versus malingering and then on the difficulty I had understanding psychogenic disorders. My son suggested a wonderful analogy for understanding the differences between organic and psychogenic disorders but suggested that relying on analogies was dangerous, at least in philosophy. I didn't think this was true in medicine.

In politics we hear that our government is like a household and can't keep borrowing money, although governments seem to be able to do it just fine for years and years. We were told a few decades ago that if Viet Nam "fell" a "domino effect" would cause all the countries in the region to fall, one after another. We hear that Haiti is a "sinking ship," and that donations are a waste of money because it is going to sink anyway; changing attitudes (foreign affairs, economics, social compacts) are "like turning a super tanker;" it takes a lot of time and must occur slowly. The list is endless. We like analogies because they make some concept we have trouble understanding more experiential.

Having initially been trained in mathematics, and not having gotten, at least in conceptual terms, beyond understanding integration, for example, as a means to approximate the area under a curve, rather than as a "linear functional" that could be defined in abstract terms, I recall being unable to understand a concept in a graduate level math course and asking the professor to explain. I was looking for something akin to the area concept for integrals (as an aside, I realized, many years later, that if you have difficulty understanding a math concept and need an analogy,

the odds are good that you've picked the wrong field). He, in fact, came up with something, which was quite helpful to me. I had an image of the concept, rather than, as with logic theory, having only a theoretical argument. Some math derives from reality but most does not.

Physics derives from analogies. Mathematical models are developed to explain observed phenomena. These models are analogies. The mathematics is then made "rigorous." Rules are created, and then, following our ordinary, everyday logic, deductions are made which prove theorems, ideas that **MUST** be true if the hypotheses are true. In physics the derived theorems are back-translated from math into "reality" and tested. When the test confirms the prediction, we get supportive evidence that the hypotheses for the mathematical analogy were correct, but we never obtain "proof" of their correctness.

So, what does this have to do with medicine? I use analogies, and I'm sure all of the readers do too. I don't view them as slippery slopes because I know they are analogies, and, unlike analogies, are not the real thing, just as mathematical theories of reality are used to predict, not to prove. An analogy I developed that I have been particularly proud of is the "hurdler analogy." Families tell me that the Parkinsonian patient could get up from a chair last week but can't this week. Why the sudden decline? I point out that the patient had trouble getting out of the chair before and now he simply can't. The decline, like that of a hurdler, was slowly progressive. The hurdler's coach noted that he'd been clearing the hurdle by less and less each month and one day he hit the hurdle. No big change in physiology, but a big change in function. It's like the straw that broke the camel's back.

My son's analogy was that the difference between a psychogenic neurological problem and an organic one was like the difference between a hardware problem and a software problem. Organic disorders

are "hard wired" or "hardware" while psychogenic disorders are "software" errors. Thus, one can alter a program with another program to affect input or output whereas hardware needs to be modified with some physical intervention. One can also modify the effects of hardware problems by suitably altering programs to cope with missing or altered input/output.

We have data showing that Parkinson's disease patients whose motor function improves with placebo have measurable increases in dopamine secretion in the basal ganglia that account for the benefit. We know that people with psychogenic tremor have metabolic changes that are demonstrable on fMRI when their psychogenic tremor is active but not when they purposefully, that is consciously, mimic the exact same tremor. In other words, the motor program for an "unconscious" but psychogenic tremor differs from the motor program for a consciously voluntary tremor despite the fact that the two appear identical. Thus malingers and conversion-disorder patients may have the same objective signs but different brain mechanisms accountable, although both have no "organic" disease. How can I understand this? Same hardware, different software. How does placebo cause dopamine release in one person and not in another although their brains look the same by all currently available tools? Again, hardware versus software.

I think this a good analogy and plan on using it to explain the problem to my patients with psychogenic disorders. My goal for using analogies is not to plan experiments, but to explain. We all have similar hardware but very different software. A brain "software program" is partly environmental (e.g. our social interactions) and partly genetic and always changing. Perhaps with this explanation more conversion disorder patients may be willing to obtain help by modifying their aberrant "software" with "reprogramming" rather than by tinkering with the hardware with medications or operations.

– JOSEPH H. FRIEDMAN, MD

#### Disclosure of Financial Interests

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Conflicts: In addition to the potential conflicts posed by my ties to industry that are listed, during the years 2001-2009 I was a paid consultant for: Eli Lilly,

Bristol Myers Squibb, Janssen, Ovation, Pfizer, makers of each of the atypicals in use or being tested.

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## The Irsome Myths of Cancer

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**Each disease seems to have its own non-biological baggage, its special taboos, its fantasies, its degrees of social acceptance, its myths of origin, its apocryphal tales of inheritance.**

Cancer, however, is no quirky myth. Sometime during their lifetimes, about one American in five will be afflicted with systemic cancer. It is conservatively estimated that 460,000 Americans die annually of the disease.

Cancer generally arrives unannounced, entering our body without first knocking. Often, a routine laboratory or X-ray procedure proclaims the sobering presence of an uninvited intruder called cancer. And the news changes us, sometimes irreversibly so.

It is a stealth disease; but surely it is not communicable, and yet some of us treat it as though it were a malevolent contagion. Watch when relatives or friends visit a newly-diagnosed cancer patient in the hospital. They will often place their chairs at a distance from the bedside, if they visit at all.

Cancer, in truth, is more than a tangible disease: it is a state of mind, sadly a cause for societal quarantine; even to some a punitive judgment. It is a disease not to be discussed freely or accepted neutrally. When Aunt Minnie dies of breast cancer the world is told that she succumbed "after a lengthy illness." No disease possesses as many euphemisms as cancer.

Cancer is a humiliating disease, involving intensely private visceral organs such as uterus or prostate or breast. Cancer is a punishing disease since its therapies often deprive us of the very organs that give us our gender-identity, our sense of intactness, wholeness, even corporeal beauty. And, after treatment, we often emerge as less than whole, nor to the world, wholesome.

In the minds of many, cancer is not thought of as an intrinsic disease or even a metabolic failing but as an alien invader, a malignant stranger assaulting the citadel of our bodies, an unwelcome aggressor almost extraterrestrial in character infesting us, consuming us, an obscene predator with neither compassion nor feelings. Most people hear cancer not as a word but as a sentence, a death sentence.

Living with cancer sounds almost like "living with Sylvester" as though the cancer were a separate entity much like a boarder in a small boarding house, perhaps like an interloping stranger with his own identity card. It is astonishing, too, of the frequency with which military metaphors are employed when defining or describing cancer and its therapies: Nixon's war against cancer; it is often called an invasive disease, a malignant ailment requiring a crusade, a killer disease. We don't manage cancer the way we manage psoriasis or asthma; with cancer we attack it, which perhaps justifies heroic interventions. And when someone finally succumbs to cancer the obituary—if it mentions cancer at all—will note with sorrow that Mr. X "lost his battle with cancer" or "succumbed after a lengthy siege."

How pervasive is the mythology of cancer? How, in general, is this disease viewed? Certainly as a "taint" upon the family much as hemophilia and Huntington's disease are construed as genealogical missteps to be assigned to the family attic or closet. Cancer, curiously, is thought of as a middle-class disease although substantive epidemiological data would show that the highest frequencies of most cancers burden the poorest classes of citizens.

Whom do we blame when we fall victim to Lyme disease? At best, to the wandering tick than transmitted the disease to us. Certainly the bizarre thought that Lyme disease is a moral failing never crossed our minds. Most adults ascribe their usual illnesses to random happenstance rather than moral lapse or divine wrath. Indeed, with the great majority of diseases afflicting humans, the thought of blame never materializes, except perhaps with the sexually transmitted infections. But how often does the victim of cancer ask: "What did I do to get this?" or worse, "What did I do to deserve this?" And the ultimate unanswerable question: "Why me?"

Cancer is undeniably a burden partly because our imperfect bodies, unintelligently designed in many ways, react excessively to certain external forces such as solar rays, X-rays or particular toxins abetted by certain inheritable vulnerabilities. In the majority of human cancers, a very secular, mundane cause can be assigned. But fertile human imagination, knowing no statutes of limitation, adds unnecessary impediments transforming cancer from a serious disease into a metaphor for moral inadequacy, deadly astrological influences, urban rot and even alien invasions. This might be amusing to an objective sociologist but the humor of being placed in the same category as a leper is lost upon a person afflicted with that very human disease called cancer. The cancer patient has sufficient, tangible problems to confront without the unwarranted burden of despairing guilt.

Cancer should not be disguised as something morally sinister; it remains resolutely within the domain of abnormal biological activity and is ultimately solvable by rational interventions and simple compassion.

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