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From the American College of Epidemiology

Is epidemiology correcting its vision problem? A perspective on our perspective: 2012 presidential address for American College of Epidemiology

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ABSTRACT

Epidemiology, like all disciplines, exists within and is shaped by a culture that frames its ways of understanding. In the last 60 years epidemiology as a discipline and scientific approach has undergone major transition, but remains challenged by vestiges of the limiting frameworks of our origins which shape the way we approach questions, and even the questions we choose to investigate. A part of the current transformation is a reframing of our perspective and a broadening of our methods to encourage creativity and to encompass new types of evidence and new approaches to investigation and interpretation. Epidemiologists are developing innovative ways to approach increasingly complex problems and becoming more open to multi-disciplinary approaches to solving epidemiologic challenges.

Today is September 11—9/11—the 11th anniversary of the World Trade Center, Pentagon, and Flight 93 attacks. The date means many things, somewhat different for each of us, depending on where we're from or our perspective, something not unrelated to what I want to talk about this morning. For now, I will not focus on the significance of this date and will make no further reference to it, but it is present in my conscious and subconscious thought, and may be in yours as well, and I trust each of you will remember the day in your own way.

My wife said this address as a whole was too serious. So, because humor stimulates creative thinking, for you right-brain folks, if there are any of you in here: Rene Descartes of "I think, therefore I am" fame walks into a tavern and has a tankard of ale. The tavern keeper asks if he would like another and he says, "I think not." And, poof, he disappears.

And for the left-brain folks: There are 10 types of people in the world: those who understand binary and those who don't. By the way, a colleague and I devised a scoring system for how you respond to this joke. If you read the first phrase as TWO to start with, you are an über-geek who probably not only speaks Klingon, but dreams in Klingon. But if you still don't get it after an explanation, you should probably think about becoming an art major. No offense to art majors, who have a lot to teach us about how to see, as I will mention below.

Now that we have established my geek credentials, I want us to think about how we do epidemiology, especially our perspective, how we see the world and our work.

Visually empirical culture

We live in a visually oriented culture. I don't mean just that we live in the TV age although that is surely part of it, and in fact, we may even be passing out of the TV age for the smartphone, iPad, Utube, and Twitter age. Phones now are used more for texting than for talking. The ads prominently mention the quality of the camera in the phone, but nothing about the quality of the calls it can make. We live in a culture that orients itself in the world visually and whose primary metaphors for learning and understanding are visual. When the light finally breaks—and that, too, is a visual metaphor—we say, "Ah, now I see." It goes back long before TV. Some say the Ancient Greeks set the course for the way we see the world [1]. Even in that sentence I talked about how we *see* the world. I am inclined at this point to use the common expression "You see?" to inquire if you have understood what I am saying.

The language we use reflects the primary modes of our understanding, and our language is loaded with words and expressions that emphasize the priority of vision. Is that true for all cultures? Not necessarily. In 1960 Thorlief Boman wrote an influential little book called *Hebrew Thought Compared with Greek* [1]. Although it may have fallen out of favor now, the idea can still be informative by analogy to other cultures or perspectives. He argued that the ancient Hebrew people were more oriented toward hearing than seeing and that explains in no small part the importance of the oral tradition. Boman tied this to the emphasis on history, which, like

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speech, extends over time. My point is that we may gain new insight when we consider other modes of perception beyond the visual.

Our culture is not just visually oriented; it is also a visually empirical culture. Seeing not only constitutes the fundamental metaphor for understanding, in our empiricist culture seeing is required for believing. For something to be credible, it must be proved to us by the senses, and the chief of the senses to be persuaded, and we suppose the toughest and hardest to fool, optical illusions aside, is seeing. Isn't that why we rely so heavily on "eye witnesses?" My impression had been that questions about the unreliability of eyewitnesses was the result of recent research, but the research actually dates to the early 20th century, with a significant resurgence in the psychology literature in the 1980s and 1990s [2]. So perhaps we would do well to cast a critical eye toward our emphasis on the visual and acknowledge that our scientific approach also requires reliance on prior experience and discovery, on the work of other people, on research we may not understand or even know about, and on larger scale epistemological frameworks. More on that later.

Asking questions from a different perspective

It would be interesting to trace the historical development of theories of knowledge since Francis Bacon, sometimes called the father of modern science, with something like this scenario in mind. (For this, I am indebted to the late Professor Robert E. Cushman of Duke University, my first dissertation advisor.) In his 1620 work *Novum Organum* [3], Bacon divided the universe into two realms, and he associated certain of Aristotle's four types of causality, as he reinterpreted them, with each of those domains. Simplistically put, scientists were primarily concerned with knowing *how* things happen so they can have power over the natural world. He left to the philosophers and theologians the questions of meaning and purpose, the ultimate *whys* of things happening. He said such questions lay outside the domain of science, therefore, could not be answered by science. In his talk to the Health Disparities Workshop just prior to this meeting, Dr. Damon Arnold of Chicago State University and former director of the Illinois Department of Public Health said that when he was part of an intervention team after Katrina, they went in with the usual approach of the scientist, with answers to "How?" questions, but he said his team had answers to the wrong questions, because the people they went in to help weren't asking so much "How?" as "Why?" His was a wonderful illustration of a point I had already planned to make, except in an abstract way. Dr. Arnold's story put flesh on the theoretical bones. Perhaps we need to be open to considering questions of *why* as well as *how*.

Productive stupidity, fiduciary frameworks, and openness to novel ideas

You may have some perplexity about *how* one does that and maybe *why* one should. That's good. Research begins in perplexity. As one writer put it, we need to learn to be "productively stupid" [4]. As a precursor to a project I'll describe later, Sandy Sulsky, Nancy Kreiger, and I wrote an article for the May 2012 *Annals of Epidemiology* [5] in which we said:

> Above all, certain values and characteristics are necessary to our search for creative science: respect for new ideas and the dignity of our colleagues, no matter their position relative to our own; humility; and a willing acceptance of perplexity. To do science (well) is to admit that there are unknowns and to be comfortable in working within the realm of not knowing: not knowing answers, not knowing which questions are important, and not knowing which observations are foundational, until later. Michael Polanyi [6,7]. … argued that it is often only in retrospect that we understand the importance and meaning of what we have learned or discovered, and then are able to see and understand how the pieces fit together into something much greater than the sum of the parts. Accepting this thesis suggests a level of agnosticism when faced with a new or unfamiliar idea that might allow freer exploration of paths that lead in new directions, to new lines of inquiry.

Plato has Socrates explore this issue in the dialog with Meno [8], who raises what Socrates describes as an old argument that says it is impossible to ever ask a real question because, if you don't have any idea what the answer is, you have no way to know the correct answer when you see it, but if you have some idea of the correct answer to start with, then you really don't have a question. I'm paraphrasing and oversimplifying. If you've never read this dialog, you're in for a treat. I'll forego Plato's solution but will suggest a response that is somewhat in the Platonic lineage by way of Kant, himself a Plato scholar, Polanyi, and Kuhn [9].

To make sense of things, we rely on certain scientific and cultural frameworks that shape our vision and understanding, our knowing, and exploring. This reliance constitutes a type of trust, some might call it faith, though we know that these frameworks can and are called into question and are challenged from time to time and sometimes overturned and replaced. Michael Polanyi [7] called them fiduciary frameworks, and he said we indwell them, that is, we live in and rely on them as we live in and rely on our bodies, and we experience and make sense of the world from the perspectives of these frameworks, just as we experience the world and make sense of it from the perspective of our embodied existence. These frameworks constitute the basis for what we see and how we see it, but they also sometimes constrain our vision or our perspective. We cannot change them while we rely on them, but we can, on occasion, critically examine them, often with the help of others who have a different perspective. The question for us—at least one of the questions—is how can we discriminate between the legitimate challenge to the framework and the off-the-wall, crack-pot idea that only leads to chaos? The distinction is not always as clear as we would like, but it does require a certain amount of openness to the novel idea.

In Ann Patchett's novel *State of Wonder* [10], set in the Amazon basin, Dr. Annick Swenson, a complex character worthy of much more consideration than I can give her, quotes her own mentor about science: "Never be so focused on what you're looking for," she says, "that you overlook the thing you actually find." Reliance on our frameworks, something like what Kuhn called "paradigms" [9], makes discovery possible but can also inhibit recognizing the new thing, the thing outside the box, what Kuhn called anomalies, that must either be integrated into the dominant paradigm or ultimately challenge it.

I want to be clear that I am not arguing for the irrationalism and anti-intellectualism that seem to be enjoying a resurgence. No, this is not intended to give aid and comfort to the fundamentalists of the world in their various manifestations. Nor am I proposing the view described by William James [11] as that of the school boy who said, "Faith is when you believe something that you know ain't true." (By the way, neither is this the same sort of thing Miguel Hernan talked about yesterday in "An Application of the g-formula to Lifestyle and Heart Disease," when he discussed the all-too-common practice of doing analyses when we have little reason to believe the assumptions of the methods and the models are true or perhaps even reason to suspect they are not [12].) Earlier in the same essay James wrote: "Are there not somewhere forced options in our speculative