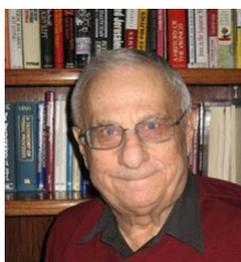


One of Us

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Bill Uttal was one of us, but is no more. After a good life, Bill died a good death on February 9 at the age of 83, at peace, surrounded by his wife and three daughters.

Bill started his career as a geek—after earning a BS in physics he joined the Air Force Institute of Technology, where he programmed analog computers and headed the fledgling computer laboratory, and thence to North American Aviation, where he got digital. He wanted more, so on to Ohio state and a PhD (1957) in experimental psychology and biophysics. His first job was at IBM; he had to salvage his first computer from death by recycling. After proving his mettle with it he was given state-of the art gear, and rolled up his sleeves. He jury-rigged nine terminals to an IBM 1410 to make the first multiple terminal system at IBM. With it he developed teaching machine programs (German, statistics, stenography, analytic geometry). His boss wanted auditory feedback, so he took the recording and playback heads from of a tape recorder and wired them in to provide it: “Yes, correct; Very good!”

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Bill moved to the University of Michigan in 1963, where he conducted elegant experiments comparing behavioral and neural responses to stimulation in various sensory modalities. He later moved to Hawaii for an idyllic 3 years, and in 1988 to Arizona State University, to be chair of the psychology department. This is where our friendship began.

I first knew of Bill from his *Psychobiology of Sensory Coding* (Uttal, 1973), a great book for its time. Once at ASU he turned to computer vision research, and to the writing of books. Every 18 to 24 months a new one would appear. At heart Bill was both an engineer and a scholar. Engineers build things to work; scholars talk about things, some of which work, some of which don't. Bill had an engineer's expectations—research should be solid and should stand, hopefully as long as structures, like bridges. He became disturbed by the low replicability of cognitive research and in particular cognitive neuroscience and its technicolor displays (Uttal, 2013). He knew how fMRIs worked, and PETs and SQUIDS; and he knew how to analyze data, and things just weren't adding up. His most famous reflection on this was *The New Phrenology: The Limits of Localizing Cognitive Processes in the Brain* (Uttal, 2001), updated in 2008. As one reviewer observed while ducking, “He comes out with guns blazing.” Most reviewers were disappointed in his conclusions: “You can't get there (localization of function) from here (fMRI and other imaging work); and in fact you can't get there from anywhere” (Uttal, 1990). Anticipating the results of Vul and associates (Vul, Harris, Winkielman, & Pashler, 2009), he noted that “by carefully (i.e., in judiciously) selecting from among the vast amount of data in a brain image, support for almost any model of modularity or distribution can be sustained” (Uttal, 2008, p. 45). Few of his reviewers could find fault in his analysis of the status quo—despite many of them having a gut reaction to “his thinly veiled behaviorism.” In this and successive books he argued for distributed neural processing—most parts of the

brain are active during any task, no part of the brain is uniquely associated with any task, replicability of identified regions is very poor—except for early sensory and late motor activations. His arguments were always based on thorough review and analyses of empirical data and were consistent with the theories of “the positive manifold” (Anderson, 2010), and “neural reuse” (Rabaglia, Marcus, & Lane, 2011). What bothered most readers were that his conclusions were generally negative, and he did not offer a solution to the deep problems he critiqued. Had he been able to do so, he would have earned a Nobel Prize by now. As Herb Roitblat (2017) said of Bill, “He was intellectually deeply curious and deeply honest . . . in calling to task scientists who would oversell their ideas, [he would] do it with such grace and good humor that I don’t think anyone ever really minded” (para. 2). I think that they minded, but what could they say? For Bill was never confrontational; just clear and data-based and sympathetic.

Not all of Bill’s books concerned localization of function. Consider *Psychomythics* (Uttal, 2003), which provides a helpful review a wide range of models in psychology, the first section ending with “mathematics is neutral in terms of internal mechanisms. The result of ignoring this dictum is the inevitable proliferation of psychomyths” (p. 103). Thereafter the book enumerates such myths, which researchers of any age, but especially ones new to the business and not yet committed to a myth, would profit from reading. Bill was an expert witness, and so wrote books on neuroscience and on human factors in the courtroom. Some titles that would be especially dear to this audience are *Dualism: The Original Sin of Cognitivism* (Uttal, 2004), *Toward a New Behaviorism: The Case Against Perceptual Reductionism* (Uttal, 1998), and *The War Between Mentalism and Behaviorism: On the Accessibility of Mental Processes* (Uttal, 1999).

For 15 years Bill and I and several colleagues—a physicist, a historian of mathematics, a perceptual and a cognitive psychologist, and later a behavioral neuroscientist and a bioengineer, would meet every other month to discuss philosophical and scientific ideas. It seems that half the time the target of our discussion was Bill’s framework of scientific realism—even

though all of us shared many elements of that worldview. In his last book he wrote “of all of the scientific mysteries confronting our inquisitive species, none is more profound or challenging than understanding how the tangible brain can give rise to intangible thought” (Uttal, 2016). The bitter-sweet paradox of Bill’s life was that while he spent his career searching for ways to solve that mystery, being unwilling to relax his scientific standards, he could discover, time and again, only reasons why it was insoluble.

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