

January 2000

Society, science, and values

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Recommended Citation

Heller, Morton A., "Society, science, and values" (2000). *Faculty Research and Creative Activity*. 14.
http://thekeep.eiu.edu/psych_fac/14

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Guest editorial

Society, science, and values

“Hey guy, you are trying to make blind people think sighted!” This comment came, very recently, from a congenitally blind person in the midst of an experiment on the perception of linear perspective in tangible drawings. Blind people bring a variety of preconceptions to research on tactile perception. For the researcher, the most difficult of these biases derive from a history of people (both sighted and blind) telling blind people what they can and can not do. Another congenitally blind person also stated: “I bet that you find out what blind people can’t do.” I quickly assured her that I am interested in finding out what people can do, not what they can not do.

My interests are scientific: I am interested in determining if congenitally blind people have an appreciation for geometric perspective, since many people conceive of linear perspective as a purely visual phenomenon (but see Heller et al 1996). I found in earlier work that congenitally blind people did not spontaneously produce foreshortened, tangible drawings of a board at a slant. However, they quickly learned to interpret perspective drawings, even without feedback. One would not conclude that Van Gogh did not understand linear perspective, because the painting of his garret was curvilinear and ‘distorted’ (see Heelan 1983, page 116). Heelan took this ‘distorted’ depiction as evidence that psychological space is curved (eg Kappers and Koenderink 1999) and nonlinear. Note that Van Gogh was influenced by Japanese art, and often looked at scenes at oblique points of view.

Blind people have experienced a lifetime of people (including psychologists and rehabilitation counsellors in the USA) telling them that they can not understand pictures, and that pictures are for sighted individuals. This discouragement can affect performance when a blind person is first confronted by a novel task involving pictures or drawings. I once met a blind person, more than 10 years ago, who seemed unable to produce a simple raised line on her first attempts when using a drawing kit produced for blind people. This individual was able to generate interesting drawings on another occasion, many months later, but not when first exposed to drawing. She clearly was convinced that she could not produce drawings, and this mistaken belief prevented her from even trying to do so.

Gregory and Wallace (1963) have described the frustration experienced by a congenitally blind person upon the restoration of sight. At least part of the emotional distress this person experienced was probably due to the difficulties involved in making new adjustments to society.

Unfortunately, many educated blind people (in the USA) have had little exposure to tangible drawings. Most congenitally blind people have suffered a form of ‘benign neglect’ ... they were denied contact with pictures, on the assumption that it was a waste of valuable resources to try to teach them something that is dependent upon vision or visual experience. Unfortunately, educators of blind people do not know this for certain, but merely assume it, without empirical data. The unfortunate consequence for blind people is that they were denied the educational opportunities that we normally give our sighted children.

One blind person recently recounted her frustration at having to rely on verbal descriptions while taking a standardized test that is required for admission to many graduate schools in the United States. This person had already earned a doctorate, and was interested in education in another academic area. She was forced to rely on verbal

descriptions of maps, graphs, and geometric problems provided by a sighted reader. How many of us would perform well on a standardized test, if we had to rely on verbal descriptions of graphical information? Imagine taking a test of one's mathematical skills, but the test administrator would not provide tangible graphics, when needed? Relying on the verbal description of a reader would certainly try my patience if I needed to solve problems in geometry!

Educators of the blind have made these critical rehabilitation decisions. These educators have generally had some exposure to psychological research, but are often capricious in how they interpret the evidence. For example, I once met a blind person who was taught to read Braille with his right index finger parallel to the lines of Braille and with his wrist bent at an awkward angle. His teacher thought that this was the best way to teach blind children to read. I certainly regret the lack of sufficient contact between psychologists, educators, philosophers, and the community of blind people (see Heller and Cornoldi 1999). Recently, cognitive science has attempted to bridge a similar gap (eg Akins 1966; Popper and Eccles 1986). It is interesting that Reichenbach (1958) expressed concerns about the chasm between philosophers and scientists more than 70 years ago. Academicians tend to overspecialize, largely because of time constraints.

The point of these comments is to illustrate the complex relationship between scientific psychological problems, society, and issues that involve values. This is a knotty problem, and one that most scientists would like to be able to ignore. However, people do not leave their attitudes and life experience at home when they enter a psychology laboratory. Unfortunately, preconceptions can alter an individual's cognitive functioning, in and out of the laboratory, even when his/her erroneous views have little or no empirical basis. There is a complex interaction between social forces, the influence of psychology upon society, and doing science. If the scientist is not careful, he or she may find that psychology can cause damage to individuals, rather than foster the growth of knowledge.

Ethics and application

Popper has also provided some comments that are worthy of consideration in discussing the moral responsibility of scientists (Popper 1994, page 123). Popper proposed a modified 'Hippocratic oath' for scientists. Two of his points are well-worth repeating. According to Popper: "The first duty of every serious student is to further the growth of knowledge by participating in the search for the truth—or in the search for better approximations to the truth." While this may seem to be an obvious statement, it is not so acceptable if one believes that all theory is a human construction, and that there is no 'reality' that we must learn to understand. However, if we adopt this Constructivist viewpoint, then we have little way to distinguish between reality, fantasy, dreams, and hallucinations.

A second point made by Popper refers to an ethical dilemma that we all face, whether we are aware of it or not. According to Popper (1994):

"The overriding loyalty. This he owes to mankind ... every kind of study may produce results which may affect the lives of many people, and he must constantly try to foresee and guard against ... any ... possible misuse of his results, even if he does not wish to have his results applied." (page 143)

This second ethical admonition of Popper is more difficult to cope with. I believe that the best strategy that a scientist can take is to keep an open mind and objective attitude, "avoid intellectual arrogance", and remain aware of "the fallibility of our knowledge and the infinity of our ignorance".

One's research is conducted within a social context that can nourish a research approach or squelch it. Government or private grants support a substantial portion of

research, and many researchers are driven by a need to obtain funding. This is not a pretty picture, or it is a delightful one, depending, of course, on one's grant status. This is one area where social factors can influence research. People may follow the call of money, and, consequently, fundable research approaches are more likely to flourish.

These comments do not do justice to the intricacies of the relationship between social factors and science. Kuhn (1970) made a persuasive case that scientific progress must be understood within the context of social validation. Certainly, our peer review system generally provides a useful strategy for validating scientific worth. The review process, whether it is for grants or publication in journals, helps researchers clarify their thinking and can lead to improved work. Popper (1994) viewed criticism by one's peers as an essential component of rational science.

Social validation of research can also constrain thinking in a field to fit an acceptable model. Peer review may serve to validate a prevailing point of view, and diminish others. This is especially likely when societies lose their concern for freedom of expression. Under some unfortunate circumstances, science can suffer, and only 'acceptable ideas' will be publishable. Even given the extraordinary freedom that we cherish in our modern world, ideologies may become influential in a field, and some people may attempt to suppress evidence that conflicts with their theoretical worldview.

The theoretical context can also be so persuasive that the most intelligent scientists may not be able to accept evidence that departs from their views. Max Planck reportedly rejected Einstein's photon theory in 1913. Einstein later received a Nobel Prize for this work in 1921. However, Max Planck and a number of other famous physicists essentially apologized for Einstein's 'error' while nominating him for membership in the Prussian Academy of Science. According to Popper (1994, page 15), they stated, when referring to Einstein: "That he may sometimes have gone too far in his speculations, as for example in his hypothesis of light quanta, should not weigh too heavily against him. For nobody can introduce, even into the most exact of the natural sciences, ideas which are really new, without sometimes taking a risk." While Max Planck did not try to suppress the photon theory, he was clearly unable to properly appreciate its value, 8 years after it was introduced in 1905.

Some individuals have explicitly claimed that reality is what we decide that it is. On this theoretical, Constructivist perspective, science is what society decides it should be (see Devitt 1997). Theories are not good or bad, per se, they are socially acceptable or not. On this view, there is no abstract notion of truth that can be supported or refuted by the evidence; rather, society defines science. The prevailing theoretical frameworks will set the stage for scientific acceptability (Kuhn 1970). One basic assumption of Constructivism is that the real world is beyond our grasp, and it is partly constructed by our theories (Devitt 1997, page 157).

I subscribe to a modified form of scientific realism. My views on how one should evaluate a theory are not identical to those of Popper, but are clearly influenced by them. We can approximate a good understanding of reality by an incremental process of hypothesis rejection (Popper 1979). Our theories may not always perfectly mirror 'reality', but it is clear that in some realms of inquiry, they can come pretty close to doing so. I approach research and theory from the assumption that it is possible to operationalize human functioning, and thereby test hypotheses. In this regard, I tend to agree with Millar's modified operationalism (Millar 2000). In everyday life, I am certainly a naïve realist, but I also know that, on a sunny day, the apparent shimmer of water on the highway ahead is a mirage, and not really water. Most of us do not uncritically accept all appearances for reality.

I have the firm conviction that scientific progress will ultimately lead to social benefits. The scientific method is the best source of information we have for an understanding of psychological reality. Ultimately, as we increase our understanding of

psychological processes, we will be able to improve the human condition. A lack of knowledge can only breed bias and delusions about perceptual functioning.

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References

- Akins K (Ed.), 1996 *Perception* (New York: Oxford University Press)
- Devitt M, 1997 *Realism and Truth* Princeton, NJ: Princeton University Press)
- Gregory R L, Wallace J G, 1963 *Recovery from Early Blindness: A Case Study* (Experimental Society Monograph No. 2) (Cambridge, UK: Heffer)
- Heelan P A, 1983 *Space Perception and the Philosophy of Science* (Berkeley, CA: University of California Press)
- Heller M A, Calcaterra J A, Tyler L A, Burson L L, 1996 "Production and interpretation of perspective drawings by blind and sighted people" *Perception* **25** 321–334
- Heller M A, Cornoldi C, 1999 "Guest Editorial. Papers from the San Marino Conference on Representation and Blindness" *Journal of Visual Impairment and Blindness* **93** 404
- Kappers A M L, Koenderink J J, 1999 "Haptic perception of spatial relations" *Perception* **28** 781–795
- Kuhn T S, 1970 *The Structure of Scientific Revolutions* (Chicago, IL: University of Chicago Press)
- Millar S, 2000 "Modality and mind: Convergent active processing in interrelated networks (CAPIN) as a model of development and perception by touch", in *Touch, Representation and Blindness* Ed. M A Heller (Oxford, UK: Oxford University Press) pp 99–141
- Popper K R, 1979 *Objective Knowledge: An Evolutionary Approach* (Oxford, UK: Oxford University Press)
- Popper K R, 1994 *The Myth of the Framework: In Defence of Science and Rationality* Ed. M A Notturmo (New York: Routledge)
- Popper K R, Eccles J C, 1986 *The Self and Its Brain* (New York: Routledge and Kegan Paul)
- Reichenbach H, 1958 *The Philosophy of Space and Time* translated by M Reichenbach, J Freund (New York: Dover)