

## COMMENTARY

### Experimental Replicability

HENRY H. BAUER

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Editorials in the last two issues of this *Journal* have discussed flaws inherent in the notion that observations or measurements must be reproducible or replicable if they are to be accepted as properly scientific. The arguments and examples are compelling, and I would like to add more emphasis to one of the points that the Editorials touch on implicitly more than explicitly. That point is that human beings differ from one another in innumerable ways, as well as to varying degrees in those capabilities that they may have in common; even more important, human beings are not exactly the same *from moment to moment*—they are inherently unreproducible.

To demand reproducibility in observations or measurements presumes that what is being studied is itself so stable or regular as to be able to reproduce itself on demand, at least in principle. That is simply not the case with phenomena involving human beings; indeed, it is not the case for phenomena that concern the behaviors of any living systems.

Demanding that being scientific requires observations and measurements to be replicable would therefore bar, from being accepted as scientific, not only parapsychology but all of medical science and social science.

A related and no less basic issue concerns what type of knowledge is even attainable. In chemistry and physics, dealing with inanimate objects that are identical with one another and that do not change over time, it has been possible to derive quantitative universal laws and fundamental constants that are Nature-given: Planck's constant, the speed of light, and so forth. Furthermore, the degree of attainable replicability and the limited number of relevant variables are such that it is often possible to identify specific, often unique, causes of an observed phenomenon. By contrast, in the social and behavioral and medical sciences, the attainable knowledge is of a statistical nature, whereby the attempt to identify causes is fraught with all sorts of difficulties: Association or correlation never proves causation.

In my view, the current fuss about failures of replication in medical science and in the social sciences misses the point, which is that we want knowledge of definitive causes, even though that sort of knowledge is often simply not attainable in the medical and social sciences to the degree that has often been gained in physics and chemistry; that's not because of any failure of researchers to perform properly reproducible studies, but because of the nature of what is being studied.

These points are treated in more detail in my recently published book *Science Is Not What You Think: How It Has Changed, Why We Can't Trust It, How It Can Be Fixed* (McFarland Publishing, 2017; <https://mcfarlandbooks.com/product/science-is-not-what-you-think/>)