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Horia I Petrache* (hpetrach@iupui.edu), Department of Physics, Indiana Univ. Purdue Univ. Indianapolis, Indianapolis, IN 46202. *Removing bias: the case of the Dirac equation*. Preliminary report.

I will argue that inherent human bias is often in the way of discovery. However such bias becomes obvious only in retrospect, after discovery is made. The Dirac equation for electrons and positrons is one such example of the interplay between mathematical insight and discovery. By attempting to reconcile Schrodinger equation with spacetime invariance, Dirac has used the insight that the four dimensions in spacetime needed to be put on equal footing. Although this requirement was obvious, the mathematical approach was not: it required relinquishing the natural bias that coefficients appearing in the equation must be simple commuting numbers. Once this bias was removed, Dirac equation led to new discoveries involving spinors and bispinors as the appropriate mathematical construction for fermions. It also predicted the existence of positrons, the antiparticle of electrons, as the "extra" solutions of the equation. I will discuss briefly the Dirac equation and how it further led to the use of covariant derivative in the standard model of interactions. (Received September 16, 2014)