Modern Language Models Refute Nothing

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Consider the propositions regarding the validity of cognitive modeling (adapted from (1))

P: MLMs[1] are a theory/model of human linguistic capacities, or "do what humans do"

Q: MLMs correlate with/predict human behavioral and/or neuroimaging data

Modus Ponens, appropriate causality (1): $P \to Q, P \vdash Q$

Under this situation, Piantadosi (2) asserts Q to yield P, fallaciously affirming the consequent. As induction is deduction from a tacit explanatory theory (3), Piantadosi asserting $Q \to P, Q \vdash P$ only replaces fallacy with "inappropriate causality" (1). However, model errors $\neg Q$ can disconfirm via

Modus Tollens, appropriate causality(1): $P \to Q, \neg Q \vdash \neg P$

Piantadosi next conjures a hypothetical physicist *ingénu* to assert "there is no bright line between 'just' fitting parameters and advancing theory". In physics, geocentric models of planetary motion predicted planets' trajectories with incredible quantitative accuracy, by fitting ever larger numbers of epicycle-deferent parameters which could even generate square trajectories. Galilean/Copernican heliocentric theory with circular (elliptical) orbits predicted worse, yet explained far more. Pretending "the theory is certainly in there", even for understood parameterizations, is poor physics that leads away from real principles and understanding to overgenerating nonsense. Explanatory power, not predictive adequacy (4), forms the core of Newtonian mechanics, variational principles, and ultimately modern science. Ironically, Piantadosi's highly contrived use of inverse-square-law gravitation is *the* canonical success story of the move away from geocentric parameter-fitting, toward a fundamental theory of motion. General relativity explained Mercury's anomalous perihelion precession, also preserving prior physics without including unattested phenomena, contra Piantadosi's obsession with unconstrained "anything goes" theories. In falsificationist terms, "we do not seek highly probable theories but explanations; that is, powerful and highly improbable theories" (3).

Ergo, MLMs refute nothing. Regressing from theory to a tool-driven kludge is, in Piantadosi's terms, "a humiliation for everyone". Like epicycles, MLMs may still be useful to predict horoscopes.

References

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[1]we appreciate the unintended abbreviation coincidence with Multi-Level Marketing scams