

# Modern Language Models Refute Nothing

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Consider these propositions (adapted from (1))

$P$ : MLMs<sup>1</sup> 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):  $P \rightarrow Q, P \vdash Q$

Under this situation, Piantadosi (2) asserts  $Q$  to yield  $P$ , fallaciously affirming the consequent. If Piantadosi instead considers  $Q \rightarrow P$ ,  $Q \vdash P$  replaces fallacy with “inappropriate causality” in cognitive modeling (1). To discuss  $Q$  appropriately, we can safely use

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

Piantadosi imagines a hypothetical physicist *ingénu* to claim “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 parameters, “deferents and epicycles”. In contrast, Galilean/Copernican heliocentric theory with circular orbits (now elliptical) predicted worse, yet explained far more. Pretending “the theory is certainly in there”, even with understood parameterizations, is therefore nonsense. Ironically, Piantadosi’s highly contrived use of inverse-square-law gravitation is *the* canonical example of moving away from geocentric parameter-fitting, toward a general theory of motion. Explanatory power, not predictive adequacy, is directly responsible for Newtonian mechanics, calculus, and ultimately, modern physics. 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, they may still be useful to predict horoscopes.

## References

- [1] Olivia Guest and Andrea E Martin. On logical inference over brains, behaviour, and artificial neural networks. *Computational Brain & Behavior*, pages 1–15, 2023.
- [2] Steven Piantadosi. Modern language models refute chomsky’s approach to language. *Lingbuzz Preprint*, [lingbuzz/007180](https://lingbuzz.net/lingbuzz/007180), 2023.
- [3] Karl Popper. *Conjectures & Refutations: The growth of Scientific Knowledge*. Harper and Row, New York, 1963.

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<sup>1</sup>we appreciate the unintended abbreviation coincidence with Multi-Level Marketing scams