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Opinion

Beyond Observation: Asymmetric Definability in Theoretical and Biomedical Models

Kaiden Jones*

Philosopher & Independent Researcher, UK

***Corresponding author:** Kaiden Jones, Independent Researcher, 63 Moss Ln, Liverpool, L9 8AE, UK.

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Introduction

As a philosopher and independent researcher exploring perception, systems theory, and metaphysical modelling, I have often found that the foundational assumptions embedded in our scientific language shape the conclusions we're able to reach. One such assumption, almost universally present across disciplines, is symmetry, mutual interaction, mutual access, or mutual definition. But in both theoretical physics and biomedical science, there are edge cases where such symmetry breaks down. My work has been focused on what happens at those boundaries.

In a recent conceptual paper titled Half-Silvering Dimensions, I explored the idea of asymmetric definability: a system where one layer can define or observe another, but not vice versa. This isn't just a metaphor. In physics, quantum decoherence suggests an environment can influence a particle without the inverse being fully true. In medicine, cellular signalling pathways or neurobiological hierarchies often operate in a top-down fashion, where higher-order systems define states below them without reciprocal clarity. These structures are not merely hierarchical, they are unidirectionally causal in terms of definitional power.

This has implications for how we model systems, especially in biology and neurology. Consider the relationship between consciousness and subcellular processes. While neurons and synapses constitute the infrastructure of thought, the phenomenological experience of being, subjectivity, is not something that can be fully reduced to chemical interactions. Instead, we might consider whether higher-order cognitive states define meaning for lower processes without being reducible to them, a one-way mirror of awareness.

This reframing invites a broader interdisciplinary conversation. In digital systems, identity is often constructed from data that reflects a user's behaviour, but the user does not always have access to the logic that defines their profile. The system observes the user more deeply than the user can observe the system. This too is a form of asymmetric definability. What began as a model rooted in philosophical logic has proven useful when thinking about power, perception, and systemic transparency in everything from AI to healthcare to politics.

In biomedicine, I believe we could gain valuable insight by designing models that intentionally account for non-mutual information flow, particularly in cases like neuroplasticity, trauma encoding, or epigenetic feedback. There is no reason to assume all definitional systems are reciprocal. Some may only be half-silvered.

My aim here is not to dismantle existing models but to enrich them. By considering asymmetric logic as a formal tool rather than an anomaly, we can refine how we describe emergent behaviours and gain a more accurate language for the edges of scientific understanding, where ambiguity, hierarchy, and causality intersect.