The Inextricable Theoretical Dependency of Measurement: Why Epistemic Loops Lead to Coherentism

David Checchi, Department of Philosophy College of Staten Island
Faculty Mentor: Barbara Montero

The General Problem

How do we know that the temperature inside is 65 degrees on a beautiful sunny spring day? Well, we start by checking to see from our thermometer that the temperature reads 65 degrees, but what if we wanted to verify it? Should we use another thermometer based on the same exact mechanics as the first one is? That sounds awful a lot like deciding to measure the length of a meter stick using another meter stick. Here sit’s the general problem: how can we determine that measurement results are true and accurate outside the context of the very theories that we use to interpret their reading in the first place?

Convergence is not sufficient for the confirmation of an objective feature of the world. To illustrate this, I propose a thought experiment which considers the geocentric model of the solar system from what would have been the perspective of those who were among the first us to study the cosmos

M1: The earth is still. T1: The motion of an object is detectable by means of direct contact.
M2: The earth is still. T2: If the earth were moving, stars would appear to change in position relative to the earth.
Mc: The earth is still

Here, two independent observations backed by separate theoretical commitments arrive at the same conclusion. The corroborated conclusion, when considered with the direct observation that the earth and the sun have a rotational relationship leads to the deduction that the sun rotates the earth. Since the sun and earth have a rotational relationship, and the Earth is completely still, then the sun must rotate the earth. But the Earth is not still, hence convergence is insufficient for the confirmation of an objective feature of the world

The Proposed Solution

In “Epistemic Loops and Measurement Realism” (2019), Alistair Isaac argues that “epistemic loops” – the general ways in which scientific theories and measurements are interdependent – do not disqualify the view that empirical knowledge can objectively represent features of the world. In support of his claim that successful measurements objective theory neutral features of the world, Isaac points to multiple measurement examples such as that of Avogadro’s number to demonstrate instances where nearly identical results have been attained across experiments backed by multiple theoretical commitments. In these cases, Isaac argues the theory is qualitatively factored out from the measurement, resulting in objective facts about the world.

In “Epistemic Loops and Measurement Realism” (2019), Alistair Isaac argues that “epistemic loops” – the general ways in which scientific theories and measurements are interdependent – do not disqualify the view that empirical knowledge can objectively represent features of the world. In support of his claim that successful measurements objective theory neutral features of the world, Isaac points to multiple measurement examples such as that of Avogadro’s number to demonstrate instances where nearly identical results have been attained across experiments backed by multiple theoretical commitments. In these cases, Isaac argues the theory is qualitatively factored out from the measurement, resulting in objective facts about the world.

The Insufficiency of Convergence

The Necessity of Convergence Points to Coherentism

Although that convergence on a value across multiple theoretical commitments is insufficient for the verification of the objectivity of an observation, convergence lowers the likelihood of theoretical influence on experimental results. By decreasing the likelihood of the contribution of theory on a result, convergence ultimately increases the credibility of that result. It is by virtue of this increased credibility, that convergence provides justification for a conclusion the way a single, self-contained experiment does not. Given that the credibility of a conclusion is predicated on a corroborative relationship between a series of results, the necessity of convergence for the achievement of credibility in the empirical practices points to coherence as the defining feature of success in empirical measurement.