

Summary

Consciousness must have had an influence on the evolution of our species; otherwise there would be no connection between the content of our conscious experiences and the behavior of our bodies. This has nothing to do with free will. Consciousness has a cause and effect relationship to matter – like everything else in nature. Following this line of thought, an *experiment is proposed* that makes use of PET scans or the techniques of autoradiography to establish the extent to which pleasurable experiences can influence the degree to which opiates are taken up by receptors in the brain.

The Born interpretation of quantum mechanics says that solutions to Schrödinger equation are probability amplitudes. They predict what *an observer will probably observe*. I propose a different interpretation (called the q-rules) that introduces probability as a current J that flows from one component to another. This probability does not predict the experience of an observer; but rather, it predicts what *the system will probably do*. It is a more objective interpretation of quantum probability in that it concerns the behavior of systems rather than the experience of observers. This objectivity overcomes the paradoxical ambiguity (as in the cat paradox) that obscures the status of conscious states in quantum mechanics. If we are ever to include conscious systems into the universe we must begin with a physics that allows decisive inclusion to occur. The objective clarity of the q-rules provides such a beginning.

An *experimental test* of the q-rules is proposed that involves collisions in a rarified atmosphere at 4.2°K. These rules predict a collapse of the wave function that is different from other theories that posit spontaneous particle decay, or require an interaction with a macroscopic instrument or with an outside observer. Under the q-rules, the probability current at a time dt is all that is needed to initiate a possible collapse at that time. No further prompting is required.

If consciousness is causally influential then the question is: How does that influence express itself physiologically? We distinguish two kinds of experiences: Anchor and Non-anchor, where anchor experiences have the capacity to influence and non-anchor do not. Anchor experiences are motivational or emotional like pleasure, pain, anger, love, or fear. These are causally influential forms of consciousness. Non-anchor experiences, like vision, are only informative. They do not directly influence physiology. Experiences like touch, taste, and smell can be either anchor or non-anchor depending on context. Physiologically, these two kinds of experiences are processed differently.

Call-up sites for consciousness are assumed to be in the neo-cortex. A possible organic model for one of these sites is proposed. *Production sites* are found throughout the body and brain and are different for anchor experiences than they are for non-anchor experiences. However, consciousness *manifests itself* at sites that are generally different from the call-up sites or the production sites. So the manifestation sites of anchor and non-anchor experiences are in different places, and their production sites operate differently.

We return to the evolutionary argument to see how the mechanism that initially introduced causal consciousness also gives us clusters of anchor and non-anchor experiences. We look at the current status of this mechanism.

The present philosophical outlook of both psychology and physics is very subjective. I contrast this with my own views that are far more objective.

The principle of relativity traditionally requires the invariance of equations under coordinate transformation as a way of removing the influence of coordinates in physics. But it is shown that invariance, however broad, does not really remove that influence. The only way to 'fully' remove this influence from physics is to not use coordinates at all – to not introduce them in the first place. This is the program of *trans-coordinate physics*. We assume the existence of a Riemannian manifold onto which we define a particle's wave function at every event covered by the particle. It is possible to locally define space and time derivatives of that function at each event without introducing coordinates. This can be done in a completely invariant way.

The lack of coordinates makes it impossible to give a fundamental meaning to regional conservation principles including the Einstein field equation. We are the ones who make use of regional conservation, but we can only do that with the addition of coordinates with the necessary symmetries. Nature sometimes supplies those symmetries through the Riemannian manifold, but nature does not recognize or make use of regional conservation because nature does not use coordinates.

We follow this program as it concerns quantum and classical electromagnetic theory and general relativity. We find among other things that gravitational waves *do not exist*. Trans-coordinate physics predicts that *LIGO and Weber bar detectors will not work* inasmuch as they are not constructed to measure graviton radiation.

The q-rules are finally joined with trans-coordinate physics to show how entangled trans-coordinate spin states respond to measurement, and how a Hamiltonian can be applied to these states.