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Original Paper

An Examination of the Potential for Quantum Consciousness in the Fruit Fly

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Abstract

This proposal seeks to perform an experiment to determine whether lower-level species such as fruit flies can interact in a causative way with a quantum mechanical system. Its specific aim is to investigate whether certain supposedly random quantum mechanical choices can be biased for the natural selection, with fruit flies as the species of interest. This work will shed empirical light on the causal roles of observers with presumably much lower levels of consciousness than humans.

1. Background and Motivation

The most common interpretation of quantum mechanics, which is termed the "Copenhagen Interpretation," holds that the collapse of the wave function that describes the characteristics of a particle occurs with the measurement of that particle. This "observation collapse" seems dependent on observation by a conscious being (Neumann, 1955; Stapp, 2007). Several recent award-winning experiments have revealed that this observation can be strictly mental, that is, performed without physically looking at the system (Radin, Michel, Galdamez, Wendland, Rickenbach, & Delorme, 2012; Radin, Michel, & Delorme, 2016). In these experiments, experienced meditators imagined looking at the particles in a double-slit interference system. During the times that they imagined looking at these particles, the system showed significantly altered behavior than the times that their attention was elsewhere. The behavior during the times the meditators imagined looking at the particles was consistent with what occurs when an observer physically measures the particles. This result is profound, in that it is in line with the beliefs of the major framers of quantum theory—one of whom stated that it is consciousness itself that collapses the wave function. In accord with Niels Bohr, "it is no longer possible to make predictions without reference to the observer or the means of observation." It is also

controversial, so attempts at replication are underway in two physics labs. One has just recently communicated that the effect was replicated (Mossbridge, Tressoldi, & Utts, 2012).

If humans can use their minds to influence a quantum system directly, it is almost certainly an ability that should be exploited by lower-level organisms to support survival. Thus, it is reasonable to ask whether this causal property exists in other species, even lower-level species like fruit flies. Of course, we cannot ask fruit flies to meditate, but we can put them in a life-threatening situation that can be resolved via the adaptive use of this mental causation ability if they possess it. To that end, in the proposed experiment, fruit flies will be released into a container, and a Quantum-based Random Number Generator (QRNG) will be used to determine whether a poison is released into the receptacle. If fruit flies have some ability to interact causally with the QRNG via their consciousness, we should see the survival of more fruit flies (and the release of less poison) than predicted by chance (via a binomial test with 50/50 probability).

2. Experiment

We proposed the next experiment, experiment which involves six stages:

1). For each trial, the experimenter prepares ten fruit flies in a receptacle.

2). There is a QRNG designed (and confirmed) to give a 50-50 choice between its “Yes Poison” and “No Poison” possible outputs.

3). At time t_1, the QRNG chooses whether to release poison (insecticide) into the receptacle.

4). Then, at time $t_2>t_1$, the poison is released or is not released into the receptacle according to the output of the QRNG. If the fruit flies can adaptively save their lives via causal interference with the QRNG, during the experiment, the QRNG should show a greater-than-chance proportion of trials in which the poison is not released.

5). After the poison should have killed the fruit flies, and if it had been released, the experimenter is allowed to see the fruit flies and observe whether they are dead or alive. Note that no such observation of the QRNG or the fruit flies must be made until this point. Otherwise, the wave function will collapse, and the fruit flies will not have an opportunity to interact with it.

6). In total, we plan to perform 2000 trials. According to previous studies (Radin, Michel, Galdamez, Wendland, Rickenbach, & Delorme, 2012; Radin, Michel, & Delorme, 2016), with 2000 trials we should have an 80% probability of observing the effect if it exists.

The receptacle will be made of plastic. One of the walls will have a small opening, opening through which the poison will be released (or will not be released) into the receptacle according to the output of the QRNG.

The entire process will be vetted by psi skeptics to be sure that there is no possibility of leakage whereby the QRNG would be biased, and the full history of communications will be sent to both the psi friends and the psi skeptics in an encrypted format to avoid any possibility of errors. Also, members of the skeptics and psi communities would examine the methodology being used and trials would not

continue until everyone was satisfied. Thus, we will guarantee that our data collection will be done using a method that will satisfy both skeptics and psi researchers.

3. Expected Findings

If we do not confirm the effect in fruit flies, the conclusion would be that perhaps only higher-level organisms, possibly specifically human beings, are capable of using their conscious mental activity to influence a quantum mechanical system.

If we confirm the effect in fruit flies, the implications of these results are far-reaching for both physics and neuroscience. The importance for physics is that the framers of quantum theory were correct in that there is something about the mental activity itself (the observation process) that can act on quantum systems. For neuroscience, the implications are: 1) mental interactions with quantum systems have adaptive value and are likely present in multiple reasonably complex organisms, and 2) examining neuronal activity in relation to influences on quantum systems can be a fruitful area of research.

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