

The Basketball Game Thought Experiment

A shorter paper focused on the basketball thought experiment, assuming familiarity with the Schrödinger's cat thought experiment, to which there is reference. Analysis of 'Is the Moon there when nobody looks?' Has been left out as it can be separately read. As has other evidence of the unseen and unmeasured existing.

Rules of the game are set out as is the apparatus. Where there is logical similarity to the Schrödinger's cat thought experiment it is pointed out. The game ending either by stopping it before a basket is scored or after the first basket is scored is considered. As is the implication of having an observer observe the observer. i.e. not directly observing the outcome sent from the game

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Familiarity with the Schrödinger's cat thought experiment is presumed. Analysis of the question, Is the Moon there when nobody looks? by Georgina Woodward is recommended as evidence.

The Basketball Game Thought Experiment

The game involves two teams in a 'sudden death' play off. The game ends when either team scores one basket. When that will happen is not known but it will happen given sufficient time. When the game ends players are required to wait and rest, passively on the sidelines.

A basketball court is locked so no one can come in or leave. Inside the court there is a game starting device. It has a small radioactive source. When the source decays randomly it emits a particle which activates a detector. The detector sends a signal to a device activating an air horn, starting the game. (linking a quantum event to macroscopic one, instead of instigating process that will lead to a cat's death in the Schrödinger's cat experiment it's decay leads to starting of the game and so inevitable progression towards score of 1, if the game is allowed to run its course) The game is stopped when the score is acquired from the separate press room, if not already over. Whether the game ends with a basket being scored or is stopped, players are required to wait and rest, passively on the sidelines

Scoring a basket is like release of poison killing the cat. (While the state of play is unknown instead of supposed live-dead quasi real cat there would if modeled and interpreted the same way, game over and ongoing play simultaneously. There may be objection that the two teams are not a single entity like the cat. Each player could be considered.) Basket ball going through hoop is like the cat encountering poison; The existential relationship outcome. They are obviously materially dissimilar scenarios but logically similar. The poison ends the cats life, the basket ball going through the hoop ends the game.

Opening the box and noting the condition of the animal is like writing on the score card. The score-like, state outcome has come into existence upon box opening, preceded by the existential condition of the animal. The basketball does not possess the score prior to being thrown

State of the game outside of the court is unknown until score is acquired.

What is the state of the game going to be found to be? Either 1 or 0 Likelihood fluctuating as ball goes back and forth. A mix of future outcome score to be found and imagined future that will not be found. This is abstract and not the material existing players (Nor players and court ensemble, or material ball and hoops.)

When a basket is scored it is detected and a signal is sent to the score board causing it to change its display from 0s indicating no baskets and game is still in play, to 1 indicating a basket has been scored and game is over. (The score is an abstract entity that can be represented and recorded in various ways, obviously different from the current activity of the existing, material team members.)

The score board sends the result to the separate press room. A journalist in the press room and collects the update on the game. At once the journalist knows if the game is over if a score of 1 is seen. If just 0s seen the game is still in play. it's not known how much play time has elapsed unless a stop clock in the press room is activated along with the air horn starting the game.

The 0 showing game still in play, is akin to a live cat outcome being acquired, 1 game over, a dead cat noticed and remembered or recorded. The outcome of seeing the score in the press room is knowing 1 or 0 with implications of that. If 0 the game is stopped at once. An air horn could be activated again with press of a button, in the press room, to signify the end of the game.

Stopping the game is akin to opening the box and rescuing the live cat. Getting the game score outcome is akin to forming a new observation product of cat on opening the box, such as a visual image, but could involve cinematography, video, movement detection. The game outcome acquired (game then stopped 'at once', by pressing the stop button, if not already over) is not the material players and/ or ball and hoop. It is a separate abstract entity. The mentally held or memorized or recorded vitality state of the cat is a separate abstract entity from the material animal.

Different people can become aware of the recorded outcome at different times without effecting the play that has already taken place. In the same way that watching a sports replay does not effect the earlier game or post game activity. Each person's viewpoint of the state of play (assuming they think they are getting live feed) depends on when they receive the information. There is nothing paradoxical this is just relative perspectives. This is like the time difference between Wigner and friend receiving

information on the vitality state of the cat. (“Wigner's friend is a thought experiment [by] Eugene Wigner,... developed by David Deutsch An observer observes another observer who performs a quantum measurement on a physical system. The two observers then formulate a statement about the physical system's state after the measurement...” Wikipedia, Wigner’s friend)

The game outcome acquired, (game then stopped ‘at once’), is not the material players and/ or players and court/ ball/ hoops ensemble or ball and hoop. It is a separate abstract entity.

Measurement problem

Wikipedia: "In quantum mechanics, the measurement problem is the problem of how, or whether, wave function collapse occurs."

There is no existing state prior to measurement. There is no relation with the measurement apparatus that can give a singular 'measured this way' outcome. This had been widely interpreted as meaning it is not something actual, rather than lacks a relative to a specific observer viewpoint or measurement process. The existing unseen, unmeasured object can still exist (in absolute relation to everything else existing locally). Object permanence is relevant. We do know from object permanence that things can exist without being seen or measured. Quantum physics does not allow for this, and has particles becoming real at measurement with random outcome.

Not existing and not being seen are not the same situation. The fun of peekaboo is in the ‘magical’ reappearance of an object, often a face, that had disappeared from view. Older children are not amused by the game, having awareness that objects obscured from view probably still exist unseen. Coming into and out of view is ordinary.

“Psychologist Jean Piaget conducted experiments with infants which led him to conclude that this awareness was typically achieved at eight to nine months of age.” “He claimed that infants before this age are too young to understand object permanence.” Wikipedia peekaboo,
<https://en.wikipedia.org/wiki/Peekaboo>

Where is the unseen existing object located? If the child observer isn’t constructing an observation product semblance in ‘observation product spacetime’. The observation independent existing thing exists in another space than the products of observation. A space that is not relative to an observer, (there is no reason for it to be relative), but absolute. Here things are existing in relation to other existing things forming a unitary pattern of all existing. Other evidence comes from analysis of the question, Is the Moon there when nobody looks? by Georgina Woodward. Further evidence of

continued existing unseen and unmeasured is; Appearing and transformation illusions, using concealed objects, such as fire into doves using doves concealed within the magician's dove pan, and rabbit from an 'empty' hat.

In place of what there is (existing), until we have a singular description, is consideration of the likelihood of finding different outcomes when measurement takes place. These outcomes do not yet exist as they can only be formed when the measured object and measuring apparatus relation happens. So pre-measurement there is contemplation of one future outcome that will be actualized and other outcomes that are just imaginary; unless using the Many worlds theory. This is therefore not something real.

The wave function is not physically real, that is not existing physically because it is partly pertaining to the future and partly imaginary. It is not correct to think it represents the object. Its actually what will be and is imagined but won't be the outcome. The outcome should be regarded as a new abstract entity that can be 'in mind ', written on paper, memorized, recorded by a device. Having acquired that score like outcome, the wave function that was in use pre-measurement is no longer relevant. Measurement is not bringing objects into existence but new score like abstract entities are being introduced.

Quantum Mechanics, (QM), is about measurement. Prior to measurement things are not modeled as existing. QM is about measuring not about representing a world full of existing things.

QM: Instead of an existing thing pre-measurement there is a superposition of outcome states (post measurement states). They can not be actual because the measurement relation with the apparatus is needed to form them. Only one will be actualized in the Copenhagen interpretation. Which means only one of the pre-measurement states was the actual future state to be the rest were imaginary. Which makes the superposition a **smearing of future actualization and imagination**, *rather than existence*. Or if we go with the Many Worlds interpretation all of the superposed states will in the future be actualized, but in different universes. Using Occam's razor to evaluate the speculation it is not reasonable. There is not conservation of energy within that proposed multiverse.

To Conclude: The solution to the measurement problem of quantum physics can be given.

Found by considering what a wave function is in relation to existence. A wave function is not physically real being a pre-measurement superposition of; what will be the outcome after the measuring process has happened and imagined outcomes that will not come to be. It does not collapse causing the

definite state object to come into being. There is nothing physically real to collapse. It is just replaced with a new abstract entity, which is a score like outcome. The outcome 'score' can be recorded in different ways, be held in mind (thought) or memorized.

The object after measurement is a different entity from the abstract score like outcome. When the replacement is done the wave function is no longer relevant. What might be is replaced by what is known to be. What is before the knowledge is acquired and part of mental awareness or stored for future access is another matter. There will be temporal delay between the physical 'measurement' interaction happening and registering of a detection. Thinking of Schrödinger's cat, the cat and poison interaction can have happened some time before opening the box but until the box is opened what might be found (to be found and imagined but will not be found) is still relevant. Keeping in mind the wave function is not the animal.

This also makes Wigner's friend type problems not paradoxical. The knowledge of friend, who is told the outcome by the observer, and direct observer of the cat can be different without logical contradiction. Its about whether or not the abstract outcome score has been acquired (individual replacement of wavefunction i.e. what might be found) not the condition of the system under consideration in the meantime. That different observers replace the wave function at different times, when they have access to the information, is no more strange than relativity. Individuals forming their own observation products when they have received the information and not before.

Useful reading

1. Wikipedia peekaboo, <https://en.wikipedia.org/wiki/Peekaboo> "Object permanence is an important stage of cognitive development for infants." Wikipedia, Peekaboo
2. Analysis of the question 'Is the Moon there when nobody looks?' by Georgina Woodward, Submitted to viXra, history and philosophy archive, 22 Jan 2023. Also available via FQXi.org <https://fqxi.org/community/forum/topic/3698>