

Interactive Destiny

Andrew Soltau

Abstract: Mitra demonstrates that memory erasure can cause the observer to end up in a different sector of the multiverse with a different destiny, events in the future remote to any possible influence of the observer having radically different probabilities. The concept only applies to an observer defined by a structure of information, so cannot apply to the physical bodies of human observers. However, Everett defines the functional identity of the observer as the contents of the memory, a structure of information, thus in principle Mitra's effect would apply. Here it is shown that not only is this very minimal definition of the observer entirely in accord with the subjective experience of identity of human observers, it is also the only possible definition of a transtemporal observer in a no-collapse universe.

With respect to human observers, selective elimination of data is not possible due to the distributed manner in which information is stored in the neural network of the brain, but addition of data works on exactly the same principle. Thus, while it would not be possible to alter the destiny of the observer to reduce the probability of unwanted events to background probability, as in the example Mitra uses to demonstrate the principle, it would be possible to increase the probability of desired events. This would appear to verify certain aspects of folklore which otherwise appear entirely mythical and imaginary.

1 Introduction

Mitra shows that eliminating key records of correlations from the memory of an observer alters the sector of the multiverse that observer is in (2009). As Tegmark states, this may well apply only to a physical observer due to the entanglement of the body with the state of the environment (Chown,2009). However, for an observer defined solely as a structure of information Mitra's startling dictum regarding the effect of memory on the definition of the effective universe of the observer must hold. Thus this kind of observer can change the probabilistic future, the destiny of its physical reality, even with regard to remote events which the observer could not possibly influence.

Although Mitra's logic is simple and effective, the concept of changing which sector of the multiverse one is in by deleting information from memory is deeply counter-intuitive. However, this accords precisely with the principles of relational quantum mechanics, in which the physical environment of the observer is defined solely by the correlations established with the environment, by the observations made by that observer. Naturally enough in such a context, if correlations are eliminated the observer is no longer correlated with those aspects of the physical environment. This would not apply in the context of Rovelli's Relational Quantum Mechanics because that in theory observations are physical interactions, and eliminating correlations at the physical level would presumably be impossible. In any case such correlations involve entanglement with the environment, which also cannot be eliminated to order. However, for an observer defined by a structure of information, as in Mitra's example, the only correlations that apply are those defined by that structure of information, records that this observer has about the world in memory. In this case the information defining the correlations can be deleted, and as a result the observer is no longer correlated with those aspects of the physical environment.

Although Mitra's principle cannot apply to the human observer as ordinarily defined, as a physical body, in Everett's formulation the effective functional identity of an observer is the state of the memory, a structure of information. In this case the principle applies to us directly. There is still an inherent difficulty in the deletion of information, however, because it is not possible to selectively eliminate memory from a neural network. On the other hand, adding information is elementary and occurs with every observation the observer makes. Thus by addition of information and the creation of correlations, observers could alter the effective destiny. In a relational quantum mechanics, the determinacy of the physical environment is defined solely by the correlations the observer has made with that environment. Thus if the observer can add information to memory, artificially creating new correlations which enhance the probability of desired events, this would be as effective as the machine intelligence deleting information in the memory and thus reducing the probability of unwanted events to background probability. In both cases the observer interacts with and deliberately alters the apparently immutable future of the reality, the destiny. This phenomenon would provide a scientific basis for the effectiveness of all kinds of deliberately engineered observations, which on any rational basis we would otherwise consider to be entirely ineffectual except as psychological exercises. Although solely in the subjective environment of the observer, prayer and spells should work!

2 Mitra's Disaster Avoidance

Mitra describes the resetting of memory in the face of an unavoidable disaster, such as a huge asteroid hitting the planet and all of humanity being destroyed. By resetting the memory of an observer so that this impending catastrophe is not defined, the observer is no longer correlated with the sector of the multiverse in which this is so. Thus the inevitable disaster returns to background probability, one very improbable possibility amongst all of the usual possibilities. Since the evidence for this impending disaster is no longer part of the definition of the universe this observer is in, the future is entirely open, and due to the reset the inevitable disaster is turned into a very unlikely possibility. As Mitra concludes “Assuming the validity of the MWI, we are forced to accept that by resetting the memory to a previous state, the reason why the memory was reset is no longer determined” (2009,4).

Deutsch casts doubt on Mitra's logic “based on the probabilities of outcomes in parallel universes” saying that such conclusions are speculative, while also noting that “probability is not yet sufficiently well understood to say so definitively” (Chown,2009). However, in a relational quantum mechanics no speculation is required, the physical environment of the observer is defined by, and only by, the correlations with the environment. If a correlation is eliminated, then the aspect and properties of the environment with which the observer was correlated are no longer properties of the environment of this observer. As will be shown, the Everettian formulation implies a relational quantum mechanics.

3 The Human Observer

Mitra's concept can only apply to observers defined by a structure of information, such as the machine intelligence he uses for his example, because any physical observer would be entangled with the environment and thus unable to alter the sector of the multiverse they were in by deleting memory.¹ As physical beings it seems highly unlikely we would qualify for this interesting phenomenon. However, in Everett's no-collapse formulation he makes the 'function of the memory contents' the sole causal functional process of the observer.

If we consider that current sensory data, as well as machine configuration, is immediately recorded in the memory, then the actions of the machine at a given instant can be regarded as a function of the memory contents only, and all relevant experience of the machine is contained in the memory. (1957,457)

Although Everett describes a physical entity as a model of an observer, a mechanical automaton, it is solely with reference to the 'state of the memory' of versions of the observer that he shows

¹ As Mitra points out there is still a way that physical observers can use this principle to their advantage. We can avoid examining aspects of our world where we might discover evidence of a low probability catastrophe that we would be unable to do anything about, and thus avoid the possibility of making the irreversible discovery that defines us as being in the sector of the multiverse in which it is a certainty.

there is the appearance of collapse, and hence the resolution of the measurement problem by requiring only the linear dynamics, 'pure Process 2 wave mechanics'.

Judged by the state of the memory in almost all of the observer states, the probabilistic conclusion of the usual "external observation" formulation of quantum theory are valid. In other words, pure Process 2 wave mechanics, without any initial probability assertions, leads to all the probability concepts of the familiar formalism. (462)

In this definition the memory, the integrated sum of the observations made, is the functional identity of the observer. This is the identity at the operational level of subjective experience, the experience itself and the record of experiences as distinct from all the processes which go to make up subjective experience. This corresponds to a specific cut in the von Neumann chain at the level of the subjective experience of the sensorium, the interface between the subjective experiencer and everything which is experienced as sensory information in the sensorium. From this experiential perspective the sensory information from the body's sensors is the input to the neural system, while the sensory images formed and experienced comprise the output, along with thoughts, emotions and other formulations of the neural system. The world hologram is the integration over time of this output, corresponding to the contents of the memory of the recording automaton in Everett's view.

4 The World Hologram

The human brain integrates and synthesises information from all observations to form a map or model of the world, the internally constructed subjective reality. This structure of information is intensely familiar to each observer because it is the reality the observer knows, the 'known world'. It is this structure of information that is accessed whenever one brings to mind any part of the world remote to one's immediate location. Since this structure of information is experienced as spatially distributed, while in fact being encoded in the neural network of the brain, it is effectively a hologram of the world known through observations, which is added to and updated with each new observation. Each new experience is the observation of the present moment, the immediate and lucid view of the real world, which is added to this structure of information at each moment.

Naturally, this world hologram has at its centre a formulation of the body of the observer, a subsidiary hologram, the physical self identity. Just as the world hologram is the known world, this hologram of the body is the physical self one knows oneself to be. One identifies cognitively with the body as a whole, but one knows only that much of the body which one has observed. One observes the body not only externally in mirrors but internally through proprioception and enteroception, and all these observations are added to the self identity figure in the world hologram. Similarly one is aware of being a mind, the thinking, feeling, cybernetic entity resident in the neural network of the brain, but again one does not know the whole of one's mind. Neural network patterns are altered with each neural impulse and associations and ingrained responses

are built up as a result. The vast majority of this information is inaccessible to and unknown by the individual; all that one knows are all the mental properties one experiences, such as thoughts, feelings, memories and expectations, all of which are observations and are added to the self identity in the world hologram. This accessible self identity is the sum total, both physical and mental, of everything one knows oneself to be, and it is built up entirely of experiential information, observations. Thus, unsurprisingly, Everett's definition of the observer subsumes the ordinary self identity of the observer.

This experiential identity of the observer does seem rather clearly to be only a subsidiary phenomenon to the real existence of the observer as a physical entity. However, as shown in *Universe Superposition* (Soltau,2008), in the Everettian no-collapse universe the experiential identity can be seen as very much more fundamental than the identity as an ordinary physical object. The world hologram define the world one knows, including all that one knows oneself to be, but in an Everettian universe solely this defines the determinacy of the effective universe of this observer, including the body of the observer, as explained in the next section.

5 Universe Superposition

In any kind of no-collapse universe there are inevitably a large number of identical copies of the observer, in parallel versions of reality. In Everett's formulation, the universe is a simultaneity of all possible variations of the determinacy of the universe, the parallel realities, and all of these copies are not only coexistent but coincident. If the copies of the observer are truly identical this would mean that there is only one observer, existing simultaneously in all of those versions of the world, which are therefore effectively superposed. The physical bodies of these 'identical' observers are entangled with different versions of the world, thus they are not truly identical, but, naturally, their experiential identity must be. Subjectively they are identical, thus there is only one single experiential identity, a specific world hologram, that is present in all of those versions of the world. Subjectively, from the perspective of the world hologram as the observer, the experiential identity as a *ding an sich*, it is in all of them. As stated in *Universe Superposition* this is simply a conceptual tool.

This 'universe superposition' is a philosophical device, not a causal explanation; it is a metaphor for the un-localised nature of the Everettian universe, with respect to which indexical version of the universe an observer is in, for an observer present in many such versions. (2008,2)

Since this structure of information is simultaneously present in all of these versions of the universe, the functional frame of reference of this subjective identity is the effective superposition of all of them. Subjectively they are all superposed, and the reality experienced is the effective superposition of all of them. Since the reality experienced is the effective superposition of all possible physical variations of the universe commensurate with the existence of this structure of information, only two things are determinate, being identically the same in all of these variations of the universe, and all else is indeterminate. These are the world hologram itself, and that much

of the physical universe which is correlated with the world hologram. This, therefore, gives rise to a relational quantum mechanics at the experiential level, since each observer has a unique correlations record, and thus encounters a unique physical environment.

In the light of the concept of universe superposition it is easy to see why, at the experiential level, the principle of Mitra's concept must apply. The world hologram is a virtual reality², defined by a structure of information, and so it can be changed simply by changing the information. But it also defines the determinacy of the effective universe of the observer, the universe superposition; thus it defines the determinacy of the physical environment, the effective universe of this observer. If records of observations are lost or deleted from the world hologram, the universe superposition the observer is thereby in is one in which events which were recorded by that aspect of the memory are now indeterminate; as are also the implications and consequences of those observations. It seems obvious that one is a body, and that while one is also a mind, and indeed possibly simply a world hologram, these structures of information exist in the body, and are simply properties of the body. The conceptual shift of universe superposition is that while this is indeed, quite unarguably, the case, it is equally true that as an experiential entity, as a world hologram, the observer is simultaneously in a very large number of bodies, and that the effective universe is the simultaneity of all of the universes in which those bodies exist.

An unexpected consequence is that the body of such an observer is largely indeterminate, like the rest of the effective universe. Since all possible variations of the universe exist, there are variations of the physical body of the observer which have the same identical world hologram, but are not physically identical, differing with regard to minor physical details of the body, details which have never been observed. When all the bodies having the same identical world hologram are superposed, aspects of the body which have never been observed are a superposition of all of the ways they could possibly be, given this world hologram, and thus the body in the superposition is indeterminate except where it has been observed. In this case the experiential definition of the observer is necessarily the fundamental one, the body is determinate only where defined by the world hologram, and only an observer defined in this manner can observe the appearance of collapse, and thus a transtemporal reality.

6 Multisolipsism

While it is obvious we are ordinary bodies, an even more fundamental sense of identity and existence is the subjective life of each person, the stream of consciousness, the flow of observations and the experience of the process of reality. On this view, each individual is primarily an information process in the overall system of the Everettian universe, one defining at each point in time the determinacy of both the body and the effective universe of that observer. The reason each individual is in a personal physical parallel reality, with each person in a

² As Deutsch states, Imagination is a straightforward form of virtual reality. What may not be so obvious is that our 'direct' experience of the world through our senses is virtual reality too." (1997,120).

different personal version of the effective universe, is because each individual is the sole referent for a specific version of the determinacy of the physical reality. As Rovelli states, "... a quantum mechanical description of a certain system (state and/or values of physical quantities) cannot be taken as an "absolute" (observer independent) description of reality, but rather as a formalization, or codification, of properties of a system relative to a given observer." (1996,6).

We encounter each other in physical reality, and thus it seems entirely obvious that we are all in the same physical reality. However, in each individual reality other observers are, like any other property of such a reality, highly indeterminate. Functionally, the presence of other observers in the personal reality can best be understood as the presence of icons, each one representing another subjective universe superposition, a personal parallel reality. This is how an observer is able to encounter other observers, each existing in their own personal parallel reality, each one a unique universe superposition. The situation is subjectively solipsistic in that the observer holds a very different status to other observers perceived in the reality. However, objectively it is the exact opposite, in that all observers are inherently of equal status; all observers are acknowledged as equally real, but each in a personal parallel reality. This is a many worlds situation where each world is a solipsistic personal universe superposition, in which other observers are icons of other worlds. It's multisolipsism!

7 The Dynamics

The universe superposition is a physical universe, defined by the superposition of all of the wave functions of all the versions of the universe in which this observer exists. The linear dynamics defined by this wave function defines a range or spectrum of possible next moments, different possible states of the system instantiating different observations of the next moment, with the quantum probabilities for these states defined in that linear dynamics. Objectively, they all exist with equal status, while subjectively, in each version of subjective reality, only one of them happens. Subjectively, the making of a specific observation is experienced, and the functional frame of reference becomes the functional frame of reference of this observer a moment later, having made that observation. The making of the observation is the adding of that structure of information to the contents of the memory, the world hologram. The experience of the making of that observation is the experience of the transition from one moment to the next, from the moment in which the observation has not yet been made to the moment in which it has. This is the subjective enactment of transtemporal reality. Objectively nothing changes, but subjectively, effectively, the observation is added to the definition of the functional frame of reference. This is the transtemporal dynamics, which is of course the collapse dynamics, the effective collapse of the wave function with the consequent change to the linear dynamics. The new version of the linear dynamics, defined by the new wave function, defines a spectrum of possible next moments, and the cycle continues indefinitely. This provides the appearance of collapse proposed by Everett and it applies directly to the structure of information defined by the cumulative sum of observations he proposes as the functional identity of the observer. The result is an iterative information process, the subjective passage of time in a transtemporal physical reality.

8 Interactive Destiny

Mitra demonstrates a clear and simple rationale for interactive destiny, the changing of the sector of the multiverse the observer is in by the alteration of memory, but the phenomenon seems inevitable in the light of the direct equivalence between the inner world of the observer and the physical environment of that observer, as described in Universe Superposition. The world hologram, the personal construct formed by an integrated synthesis of all of the observations of that observer, is the sole determinant of the physical environment, the effective universe of that observer. In this context, the relation to the sector of the multiverse takes on such an immediacy it has a different meaning. The observer *is* the determinant of the physical environment, the world hologram defines the determinacy of the real world, and the extrapolated future of the world hologram is the determinacy of the future of the real world. Thus the dynamics of the internal world of this observer is the subjective form of the linear dynamics of the physical environment, they are two different expressions of the same structure of information; changing the definition of the future in the world hologram is changing the linear dynamics of the effective physical environment. This is interactive destiny.

Given that we are observers of this nature, this would mean that in principle we could avoid the consequences heralded by bad news by eliminating the observations of the bad news from memory. However, this avenue is still not open to us since it is not possible to selectively eliminate information from human memory.³ However, although elimination of records is not an option, at least with our current understanding, addition is straightforward. Addition must in principle work as surely as elimination, for if the information deleted from Mitra's observer is reinstated, the observer is back in the sector it started in. Thus the addition of a 'fake' observation to the memory of the observer has the same effect as a real observation.

All observations change the sector of the universe the observer is in, but in the context described here, fake observations, adding information directly to the memory of the observer, must have the same effect on the sector of the multiverse as making a real observation. If a change in the memory can be induced which is exactly the same as it would be if a real observation of events in reality were made, it must inevitably establish the same correlation as the real observation would have done. If the observer generates a fake observation of a desired future event happening in reality, a visualisation, this only affects the inner world of the observer, but the inner world is the world hologram, and this defines the determinacy of the effective physical reality. If the events observed in this manner do not conflict with any established aspect of the reality defined by the world hologram, it would seem that this must establish a correlation with the version of the universe in which this desired and visualised event is more likely to happen in the future. If this is the case, a number of longstanding points of folklore would be borne out by this kind of effect.

3 This is a well known problem in clinical psychology; there is, unfortunately, no way to eliminate a negative memory because information is distributed throughout the neural system. The best one can do is to add new experiences which are incompatible with the one that one wants to do away with. This, however, is definitely an art rather than a science.

8.1 Folk Lore

Prayer is one of the oldest traditional ways of seeking what one wants to come about by other than physical action. Certainly this is done in the context of a request to a deity, nonetheless, the process must involve a formulation of the desired result. Similarly, spells of all kinds are based around the formulation of the desired result; the 'spell' is the spelling out of what is desired and intended. The more modern technique of 'creative visualisation' applies solely the practice of clearly, vividly, and repeatedly making as real an image as possible of the desired objective or outcome, with no ancillary mumbo jumbo. Many practitioners report success, but this is hardly conclusive, the results can often be attributed to ordinary events, often orchestrated by the person themselves, and on top of that good luck must on balance operate as often as bad. However, at the experiential level defined by Everett's observer it would appear that the inevitable effect of an observation increasing the degree of correlation of the observer with the version of the universe in which the implications of this observation are borne out, extends to observations which are faked by the addition of information directly to memory.

9 Conclusion

If Mitra's concept holds, not only can the deletion of memory cause the observer to end up in a different sector of the multiverse, the addition of fake observations to the memory must be equally effective; interacting positively with the destiny must work as well as doing so negatively. Inevitably, such concepts are likely to arouse disbelief in the majority of the scientifically minded; all of our rational thinking up to this time suggests that these kinds of magical and fantastical goings on can only be part of the imagination in a physical world; but these phenomena occur only in the subjective transtemporal reality of the observer. The red flag to which one is inevitably inclined to react negatively is the way in which physical reality is purportedly changed solely by mental activity, but given the concepts outlined here it is clear that physical reality is not affected at all. Only the subjective perspective on the physical is affected.

Mitra's thesis deals with the macrostate of the observer, a definition in terms of the subjective experiential information, and thus defined at the same level as Everett's observer and the world hologram. At this level, the time evolution of the experiential state of the observer is a change in the subjective functional frame of reference, and this is a process of different logical type to the physical. As described in some detail in *Universe Superposition*, the physical is defined by the linear dynamics, and the collapse dynamics is the change to this physical dynamics, and thus of inherently different logical type. The experiential reality operates at this different logical level, and it is only at this level that there is the appearance of collapse and the passage of time; at this level there is also the complete equivalence between the identity of the observer and the determinacy of the physical environment of that observer, as has been shown. At this level, to change the world hologram is to change the determinacy of the effective physical environment, but this is not a physical process, it is a literally meta-physical process, hence the very different properties to the physical.

It would seem that visualisations of desired outcomes would tend to increase the probability of these events being experienced, since they would be added to the world hologram and thus influence the destiny, the probabilistic definition of the future of the effective physical environment. Since the world hologram is the subjective form of the linear dynamics of the effective universe of an Everettian observer, any addition of observations must have some effect on the version of the universe the observer is correlated with, altering the sector of the multiverse the observer is in. If we are influencing the probabilistic definition of the future with every idea we allow into our minds, there may well be room for a great deal of improvement in our condition with remarkably little effort in the ordinary sense. On this view, every kind of mental event is to some degree a self fulfilling prophecy, and in this case we would presumably do well to train ourselves to hold an optimistic viewpoint and expect the best at all times. If there is a complete equivalence between the observer, at the experiential level, and the determinacy of the effective physical environment, then the body-mind is well considered a temple: it holds the definition of the destiny of the individual, and approached correctly it can be changed, by the addition of desired outcomes to the future. It is not just one's concept of the world that one holds in memory but also the definition of the determinacy of the effective physical environment one encounters, the actuality and the destiny of the real world.

References

- Chown, M.: 2009, "Avoid a future cataclysm: Forget the past", New Scientist issue 2704, <http://www.newscientist.com/article/mg20227044.200-avoid-a-future-cataclysm-forget-the-past.html>
- Deutsch, D.: 1997, *The Fabric of Reality*, Allen Lane The Penguin Press, London.
- Everett, H.: 1957, "'Relative State' Formulation of Quantum Mechanics", *Reviews of Modern Physics* 29: 454-462.
- Mitra, S.: 2009, "Changing the past by forgetting", available online at <http://arxiv.org/abs/0902.3825v1>
- Rovelli, C.: 1996, "Relational Quantum Mechanics," *International Journal of Theoretical Physics* 35 (1996) pp. 1637-78, Revised: arXiv:quant-ph/9609002 v2 24 Feb 1997.
- Soltau, A.: 2008, "Universe Superposition, Relational Quantum Mechanics, and the Reality of the No-Collapse Universe", available online at <http://philsci-archive.pitt.edu/archive/00004393/>