METHODS AND SYSTEMATIC REFLECTIONS

UNITARY STATES, FREE WILL AND ULTIMATE REALITY

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1. INTRODUCTION

1.1 *Free Will and Determinism*

The concepts of free will and determinism have puzzled human beings virtually since our first attempts at understanding ourselves. The argument has usually focused on whether or not we have free will in our actions and thoughts or whether everything that happens to us and everything that we do is determined. Part of the difficulty in determining if we have free will revolves around how we define choice or free will. Eventually the argument comes down to two opposing view points. Those who believe in free will suggest that we have the ability to alter our destiny based solely on our own volitions. However, when one considers how any choice is made, it is always based, at least in part, on previous events or data. This might imply that all choice is determined. Those who support the notion of free will might argue that even though there are determined components to our destiny, that we have some ability to change that destiny apart from any determining factors. Therefore, we do not have to make the choices that we do (Double, 1991). Those who support the notion of a completely determined world argue that we are completely constrained by previous events such that our entire future is necessarily determined prior to its happening. Free will is merely an illusion such that we believe that we have free will even though we truly do not.

The free will question is fundamental to understanding how we as human beings function within the universe. Whether or not we have free will bears directly on our entire existence, our reasons for existence, and our sense of justice and moral responsibility (Double, 1991, p. 4; Dennett, 1994, p. 24). However, the free will question goes deeper because it relates directly to our understanding of how the human mind and brain work. After all, if we do have free will, then our ability to choose is based

somewhere in the realm of our brain and mind. More specifically, it is usually thought that the part of the mind responsible for generating choice is consciousness. Thus, free will usually refers to conscious choice.

Of late, certain concepts related to quantum mechanics have been utilized by those defending the existence of free will and final causality (Quay, 1995, 9–14) because the randomness that exists within the framework of quantum mechanics is believed to allow for the possibility of free will. This analogy has shortcomings because randomness is not choice and there is no direct evidence to indicate whether or not the brain functions on a quantum level. The addition of quantum mechanics into the conundrum of free will and determinism has not clarified things as initially hoped.

1.2 *Unitary States*

By 'unitary states' we mean states of consciousness beyond the 'normal' range of humans into which practitioners of certain forms of meditation enter. Their effort is to attain a 'really real' state of ultimate reality in which their ego and its free will do not operate and consciousness as a descriptive category seems to disappear.

We have described this state as Absolute Unitary Being (d'Aquili and Newberg, 1993a & b) and have attempted to describe the neurophysiology of deep meditation. In these states of deep meditation the subjects involved report a new and more profound sense of their free will, which is free of the influence of the ego and therefore contentless. A person in Absolute Unitary Being experiences a universal free will.

The question of free will and determinism touches all of these issues. In this paper we will present the preliminary aspects of a new synthesis of free will and determinism. This synthesis suggests a specific relationship between free will and determinism that impacts both on the function of the universe and on the function of the brain. In the end, we hope to arrive at a fundamental concept that binds together the human brain and the reality that the brain perceives. In other words, the present paper is an attempt, with the help of quantum mechanics, to explore, in a deeper way, the notion of free will and unitary states as well as to suggest that they have some relevance to Ultimate Reality and Meaning.

2. FREE WILL

2.1 *An Ancient Philosophical Conundrum: Is there such a thing as free will?*

Unfortunately, it has been most difficult to prove objectively that we have free will. This has been the problem that has most perplexed those philosophers, theologians, and scientists who believe in free will. This inability to find free will is perhaps the most compelling argument for those who believe in determinism. Free will is seen by them as an illusion. For them, although we have a sense of free will, it does not, in fact, exist.

This raises another aspect of the free will question which has to do with how we perceive reality. We have previously argued that the brain is that part of us which gives us all of our perceptions of the world (d'Aquili and Newberg, 1993a, 1993b). Unfortunately, it is difficult to prove whether those perceptions are accurate. The

'baseline' state that we perceive as reality, which includes our friends, family, job, material possessions, everyday activities, usually carries a strong sense of being real. However, there are other phases of consciousness such as states induced during intense meditation, that are perceived as being more real than the everyday baseline reality even when recalled from baseline reality. Thus, the functioning of our brain is the only mechanism by which we come to know reality. But if different states of the brain give us the perception of different realities, how do we know which is the true reality? This is the problem of neuroepistemology that we have considered in previous papers (d'Aquili, 1978, 1993).

2.2 *A New Synthesis*

2.2.1 Choices

The first part of our new synthesis of free will and determinism is to consider exactly what choice is and to determine where choice originates within the mind. We have mentioned that choice is usually considered to exist in the realm of consciousness. It is our consciousness that helps weigh different sides of a situation and then makes a decision regarding what will be done next. However, there is much evidence to support the notion that choice may originate in a part of the mind that is not part of consciousness.

One example of this is blindsight (Dennett, 1991, p. 322). In this condition, the primary visual cortices are intact, but the connections between the primary visual cortex and the secondary and tertiary visual association cortices (involved in the complex analysis of the visual field) are severed. The result is that a person can see objects, but is not conscious of this sight. This suggests that sensations can occur outside of consciousness. However, a person with blindsight can successfully navigate a room without any consciousness of his sight that is helping him avoid objects. Hence, the person can choose his direction in order to avoid objects, but has no consciousness of why he or she chooses to go in a certain direction.

Other evidence of choice being made outside of consciousness is in split brain experiments (Gazzaniga, 1978; Joseph, 1988; Churchland, 1990, pp. 174-193). Patients with severe epilepsy sometimes undergo surgery to disconnect the two cerebral hemispheres by cutting the interconnecting neural pathways through the corpus callosum and the anterior and posterior commissures. The result is that each hemisphere can experience things without the other hemisphere knowing about it. Thus, an object presented to the right hemisphere cannot be described verbally because language is a function of the left hemisphere. However, the person can draw the original object because drawing is a function of the right hemisphere. Furthermore, they cannot describe why they are drawing the object.

Given these and other 'consciousness paradoxes' of split brain patients, it appears that there may be a non-conscious component involved in making decisions about various choices.

The work by Libet (Libet et al, 1979; Libet, 1981) further supports the notion that choice is occurring somewhere outside of consciousness, in some other part of the

mind. In his experiments, Libet found that the brain is activated several milliseconds before a decision enters consciousness. Thus, there seems to be a part of the brain that makes decisions prior to our consciousness being aware of those decisions.

This is not to say that there are no conscious components to making a decision. In fact, there is a great deal of conscious input into the mind prior to the making of any decision. However, it would seem that the moment of decision must lie outside of consciousness. After all, for consciousness to occur, a reflexive self-awareness is required. This must occur over a finite period of time because whatever is being presented to consciousness must enter the mind in order to be presented to it. In a similar way, for consciousness to become aware of a choice, the choice must first be made as to whether this must be made within consciousness or outside of it. Once the choice is realized by consciousness, then we become aware of that choice. But it necessarily takes a brief instant in time for the decision to be presented to consciousness. Thus, the mind must make the decision first and then inform consciousness of that decision.

The question is – when does the mind begin to form a choice? One might answer that in the part of the mind that occurs outside of consciousness, we begin to make a choice dependent on facts that are presented as possibilities to the mind. Choice must follow the facts or else there would be nothing to choose between. However, the choice may begin to occur prior to the completion of the input of the facts. Also, choices may begin to occur before these facts have been presented to consciousness.

Therefore, the initial choice may be a 'virtual' choice based on an opening set of possibilities. It is virtual because it is not based on the completed facts necessary for the true decision. Interestingly, as the choice is formed, it probably alters our perception of the objects of choice which then causes the choice to be readjusted. This process continues until there is a choice based upon a completed set of facts regarding the objects of choice. This final choice is then presented to consciousness.

2.2.2 The Analogy of Heisenberg's Uncertainty Principle

There is a problem with this mechanism for making choices which has to do with whether or not there is ever a 'completed' set of facts regarding the objects of choice. This brings the issue of free will face to face with the notion of Heisenberg's Uncertainty Principle. Heisenberg's Uncertainty Principle states that one cannot know the position and the momentum of an object, such as an electron, at the same time (Goswami, 1993, p. 35). With regard to free will, there appear to be two similar parameters which cannot be known at the same time. These two parameters are the objects of choice and the state of the chooser. To make the analogy even closer, we might suggest that the objects of choice are similar to positional coordinates in that they help determine precisely the nature or location of a given choice. The state of the chooser is similar to the concept of momentum since this is what determines in which direction the choice will move (i.e., which object of choice the chooser will be directed toward). Thus, the chooser and the objects of choice are parameters of the choice itself. The chooser in our analysis of free will is the human mind. The objects are any particular set of possible options from which a choice will be made. The ques-

tion is whether or not both the state of the chooser and the state of the objects of choice can be determined at the same time.

When considering how a decision is made, the chooser and the objects of choice are not isolated from each other, but continually evolve both together and separately. Let us consider a simple hypothetical example of choosing between a piece of cake and a piece grapefruit. The choice is not merely between the cake and the grapefruit, but it is between different emotional states, different hunger states, different states of taste, and different diets. The list, in itself, could be almost endless. But each of these factors is reducible to choices between brain activation, neuronal connections, neurotransmitter activities, and neurotransmitter receptor densities and sensitivities. These, too, are further reducible to a particle, and eventually, perhaps, to subatomic particles.

There is also the problem of what the objects of choice are and how they change and interact with the chooser. Since the chooser is not a part of the objects of choice, the chooser must perceive the objects of choice. In this way, the input from the objects of choice affects the state of the chooser. In the human mind, this usually is mediated by sensory input. With time, the state of the objects of choice may actually change (i.e., the cake may become stale or the grapefruit may become rotten) or the perceptions of these objects may change (a chocolate cake may become more and more enticing). Either way, the objects of choice are not constant and are as easily reducible to infinitely small detail as is the state of the chooser. What complicates matters further is that the state of the objects of choice and the state of the chooser interact with each other, and in so doing, continually alter each other. In the end, there are virtually an infinite number of possible states of the chooser and of the objects of choice. It is this particular problem (the interaction between the objects of choice and the chooser) that makes it impossible to measure the state of the chooser and the state of the objects of choice simultaneously to an infinite degree of certainty. Thus, there must be some inherent finite uncertainty in our ability to determine the states of the chooser and the objects of choice.

It should be remembered that, in our analogy, the objects of choice and the chooser are both parameters of the choice itself and should not be considered individually. Similarly, the Heisenberg Uncertainty Principle refers to the two parameters of an object, namely its position and momentum. It should be noted that this uncertainty regarding choice is not a practical uncertainty such that our ability to measure the parameters of a choice is limited. Rather, it is a necessary uncertainty due to our inherent inability to escape from our own consciousness to measure the parameters of any given choice.

Another way of looking at this problem is that the state of the objects of choice and the state of the chooser are both derived from the brain. The state of the chooser is understandably derived from the brain, but the state of the objects of choice are also determined by the brain. Since all of our understanding and experience of the external world must necessarily pass via our senses and into the brain, it is not the actual state of the objects of choice that is directly relevant to choice itself, but our perception of the objects of choice. Thus, when we refer to the state of the chooser

and the state of the objects of choice, we are actually describing two parameters of the brain. Once again, these two parameters will fall into the same inherent uncertainty based upon the above argument.

This is not to say that the majority of choices are macroscopic so that the major deciding factors and the state of the chooser are reasonably certain. However, it can be argued that every minute action that we perform may lie on the level in which this uncertainty factor applies. This being the case, we might argue that even though some or many 'big' decisions can be considered to be 'determined', the majority of the little decisions are involved in a certain degree of uncertainty. That 'big' decisions may be more determined than the smaller ones is similar to the physics of the Heisenberg Uncertainty Principle in that it does not apply to large objects such as the moon, but does become an issue when considering quantum objects.

2.2.3 The Analogy of Schrödinger's Cat

The paradox of Schrödinger's Cat may be quite useful in understanding why the question of free will is so perplexing in the first place. The paradox of Schrödinger's Cat is designed to reflect a particular aspect of quantum mechanics (Goswami, 1993, p. 78). In the paradox, a cat is placed inside a box with a single atom of a radioactive element with a half-life of one hour. The decay of the radioactive element sets off a reaction that kills the cat. The problem is to determine whether the cat is alive or dead after one hour if you cannot open the box and directly observe the cat. Essentially, all that can be said after one hour is that there is a 50% chance that the cat is dead and a 50% chance that it is alive. But if one were required to describe the particular state of the cat, it would be impossible without some formulation in which the cat is half alive and half dead. However, once the lid is opened by a conscious observer, then the actual state of the cat would be known – the cat is either alive or dead. There is a similar problem in quantum mechanics. The actual state of particles such as the electron can only be expressed in terms of probability as long as one does not perform an experiment that, in effect, opens the box. The result of this is that if an electron's state is not specifically measured, it acts as if it is a wave. This is particularly apparent in the double slit experiments in which a beam of electrons passing through two narrow slits results in a diffraction pattern (Grangier, 1991; Aspect and Grangier, 1987; Grangier and Aspect, 1986). This diffraction pattern is essentially the same as that which would occur if a beam of light was shown through the slits. The problem is that the electron beam acts as a wave even though each individual electron must pick one slit or the other to pass through. Thus, if one designs an experiment specifically observing the path of the electrons, the result is a projected image of the two slits. If one merely looks at the results of the electron beam then the result is as if the electrons act as waves, passing through both slits simultaneously to generate a diffraction pattern.

This now brings us back to the question of free will and determinism. For our purposes, it might be helpful to rework the paradox of Schrödinger's Cat using our example of the choice between a piece of chocolate cake and a piece of grapefruit. In this example, the choice between the cake and the grapefruit exists in a box which is anal-

ogous to the mind. Within the box of the mind, the choice is made between the cake and the grapefruit. In this analogy, the cake and the grapefruit are not two different objects but rather are different components of the state of the objects of choice. In relation to Schrödinger's Cat, the cake and the grapefruit are like being alive or being dead. Thus, only one can be the final state of the choice. Consciousness occurs when one lifts the lid to see what decision was made by the mind (i.e., which object remains in the box). Interestingly, one might expect that if a large sample of people were allowed to decide between the cake and the grapefruit, then one could determine a probability for each choice. However, it would not be possible to determine which choice will be made by any given individual until after the box is open, or after the choice has entered into consciousness. The result of this hypothetical choosing situation is that, just like quantum mechanics, we can only consciously know the probability of the chooser's decision or, retrospectively, what choice has actually been made. However, consciousness can never know the individual decision that will be made for each choice. This clearly is similar in nature to the quantum properties of the electron in that we can only consciously determine the probability of its location in space. We can only measure it as a wave function. However, once we isolate its position, it no longer functions as a wave, but collapses into a particle. Similarly, we can only understand choice as a probability (or wave function) as long as the choice exists in the box of the mind and outside of the realm of consciousness.

As we mentioned in the introduction, one of the arguments against the use of quantum mechanics in the hope of establishing the existence of free will is that quantum mechanics describes probability and randomness, while free will implies choice. However, it is difficult to determine precisely what constitutes a choice. We would argue that a choice is a decision that is made between two or more random events. Hence, when a person is presented with two or more options, they can choose one or the other. That decision will be based on many possible factors including random factors. The problem here is that whenever we approach this problem from a conscious point of view, it appears that we find either randomness or determinism. The reason for this is simple. If we are capable of finding a specific reason for making a particular choice, whether that reason is based upon the options, our past experiences, or our brain structure and function, then we declare that the choice was determined. If we can find no evidence of any prior cause for our decision, then we declare that the choice was randomly determined and that no choice was actually made. We argued earlier that a choice requires the input of various facts about the objects of choice and the state of the chooser. The question is whether any decision can be based upon a completed set of facts. If so, then there would be no free choice because all facts regarding a choice would be known prior to the decision being made. We have argued that it is impossible to obtain the completed set of facts prior to a decision being made. Furthermore, we would suggest that the decision itself is the only thing that can complete the set of facts.

Thus, we are left with completely random choices being made, which is consistent with quantum mechanics. But randomness is not free will, so if free will exists, then there must be some third alternative mechanism by which decisions occur.

2.2.4 Probability

There is one more option to either randomness or determinism – and that is probability. All choices cannot be entirely random because each would have a fifty/fifty distribution among the decisions. If all decisions were determined, then we would be able to predict exactly what decision will be made for each choice. However, with any choice, there is a more likely decision so that if one took enough subjects, one could arrive at a percentage probability for any particular decision. This implies that there must be some degree of determinism that helps influence a decision in a particular direction. On the other hand, the fact that each individual decision is completely unknown suggests some component of randomness. Perhaps it is a combination of both randomness and determinism that leads to a place in which free choice resides. Incidently, it seems that the antithesis of determinism is not free will, but randomness. This is because free will seems to require some component of both determinism and randomness.

2.3 *Free Will, Randomness and Determinism: Three Aspects of the Same Reality*

It would seem that the logical conclusion of the above arguments is that free will, randomness, and determinism are really different aspects of the same thing. We will refer to this entity as free will [randomness/determinism]. Free will [randomness/determinism] is similar to the wave/particle nature of the electron, which is so beautifully described using quantum mechanics. In the wave/particle duality, the nature of the electron itself is never completely one or the other – it is both (Goswami, 1993). It is in how we observe the electron that determines whether or not it appears more like a particle or more like a wave. However, since we can create experiments that can make an electron look either like a wave or a particle, our conclusion must be that, in reality, it is both or, at least, has the properties of both.

Free will [randomness/determinism] has two properties that are analogous to the wave and particle nature of the electron. These two properties are the options and the choice. The options refer to the available objects of choice and the choice (or decision) is what determines the final, remaining option. As we have suggested above, the options imply that there are probabilities involved and that we might be able to measure these probabilities. Once the decision is made, there are no longer any probabilities.

This is like the problem of Schrödinger's cat in that as long as the box is closed, the state of the cat can only be expressed as a probability. Once the lid is opened (i.e., the decision is made), the state of the cat is consciously known. The question is: can we ever open the box prior to the choice being made?

This is where the problem lies regarding the existence of free will or determinism. Whenever we try consciously to measure or find our free will, we begin to look at the events leading up to our choice and realize that, if we are rigorous enough, we can determine precisely why we made the choice that we did. However, this does not imply that the choice was deterministic on some ultimate level, but only that we can perceive the determinism. In fact, it may even be said that it was upon being perceived by our consciousness that we necessarily made that choice because all of the

past events led us to a given place at a given time and with a given mind-set. Our consciousness might conclude that to have made a different choice was really impossible. This distinction between some objective conscious observer (even if it is our own consciousness) and the subject undergoing some subjective experience has been suggested by others (e.g., Simonov, 1993). Siminov even suggested that free will may disappear when actions are analyzed by an objective observer. The closer we look, it seems, the more our free will appears to evaporate before us. We become focused on the observation of our choices and our perceptions become trapped in the classical scientific world of strict causality.

3. THE NEUROPHYSIOLOGY OF FREE CHOICE

Part of the reason for this is that our mind is designed, in part, to function in certain specific ways. We have previously described a number of cognitive operators (d'Aquili, 1983) which form the basis for how the mind functions. We have suggested that these operators are genetically derived mechanisms by which the brain functions. Furthermore, these operators likely developed because they allowed for a more adaptive method of experiencing the world. We believe that these operators may even function in other animals, especially primates. An animal would have better survivability if its cognitive operators allowed it to perceive the world in the most adaptive way.

3.1 *The Causal and Holistic Operators*

One of the cognitive operators has been called the Causal Operator because it functions to determine cause and effect between various events in the environment. Since the mind is set up this way, we are always trying to find a cause for any given event. This may explain why we are sometimes trapped by the function of our own mind and brain to try always to find a cause. Thus, even if we cannot find a cause, we might assume that one exists since we are so compelled to find a cause. Furthermore, given the function of the Causal Operator, it is difficult to find a definition of free choice that does not, in and of itself, suggest a prior cause for that choice. There are other cognitive operators that may be of significance in this discussion. In particular, the Holistic Operator is that function of the mind and brain that allows us to break down dichotomies and attempt to unify objects and their relationships to each other. It is this operator that may allow us to arrive at some point outside of our Causal Operator to accept that the cause of a given event may be related to free choice.

3.2 *The Moment of Choice*

There is yet a more important aspect of how our mind works that relates to the question of free will. What actually occurs in reality must be happening in the present moment by definition. On one level, all of our brain functioning, the operators, and cognition occur simultaneously with reality. When a decision comes before our mind, we act by making a choice in the present reality. However, the moment that we remove ourselves from the present reality and act as the conscious observer, we enter

into Schrödinger's Paradox. This is because consciousness functions in the present reality to let us see what happened the moment before. However, consciousness can never be aware of the present reality since it necessarily requires some finite time to bring reality to awareness. The function of becoming aware occurs in the present reality, but the awareness can only be of a past moment. It is when we use our awareness, our consciousness, that we have effectively removed the lid of the box and determined that our decision was already made even before we had the chance to make it. However, present reality occurs with the lid still closed because consciousness cannot be aware of the present reality, but must wait for it to occur. Therefore, as long as we remain in the present reality, we exist in the realm of possibility, and will have the opportunity to make decisions based on our own volition.

In other words, in the present reality, we cannot speak of choices as being deterministic because of the previously described uncertainty. In the present reality, choices have the same uncertainty as that of Schrödinger's Cat. If we act as the conscious observer, then we exist in the realm of perceived determinacy and will lose our apparent ability to make free choices. Thus, the harder we look with our consciousness, the less we find free will and the less we look, the harder it is to find determinism.

Another argument that may be posited against the quantum nature of free will [randomness/determinism] is that quantum mechanics refers only to very small objects such as electrons. The argument continues that the human brain does not rely on the random motion of individual electrons in order to make choices. The brain relies on structures such as neurotransmitters and neurons in addition to the even larger structures of the various nuclei and lobes of the brain. We would agree that the brain does not necessarily function on the quantum level. But the question is: where do free will and choice originate? We have argued that the mind makes decisions, but also becomes conscious of them. In order for the mind to do all of this, the mind must be both itself and aware of itself at the same time. As such, one might make the argument that with respect to the mind, it is impossible to exist and to be consciously aware of that same existence at the same time since doing one would necessarily alter the other as stated in Heisenberg's Uncertainty Principle. The moment the mind becomes consciously aware of what it is, it has changed. The moment it changes, it is no longer aware of what it is. That the mind must contend with the Uncertainty Principle suggests that it has characteristics similar to those in quantum mechanics whether or not the mind relies directly on quantum objects such as electrons.

4. THE PROOF FOR THE EXISTENCE OF FREE WILL

The problem still remaining is the proof for the existence of free will. Unfortunately, this becomes extremely problematic since a proof requires consciousness in order to validate it. And we have already indicated that part of the problem with finding free will is that consciousness seems to make it impossible to find. We might be able to infer free will by indirect evidence, but even this will eventually require a conscious observer in order to interpret that evidence. We are therefore left with constructing

some kind of proof that has no need for conscious validation. For this we can think of only two possible manners of attempting to obtain at least some suggestive evidence for the existence of free will. However, neither of these 'proofs' will appear to be empirical in nature. But this is because, as we will see, the topic itself does not lend itself to empiricism.

4.1 *Unitary States of Consciousness*

The first evidence for free will is via philosophical or religious endeavors which lead to 'phases of consciousness' that lie outside of normal consciousness. Particularly, we can consider philosophies that involve the use of meditation in order to try to access some deeper level of reality. In meditation, the practitioner will attempt to enter into a state in which there are no ego-self and no consciousness in the descriptive sense. As mentioned in our introduction we have previously described this state as Absolute Unitary Being (henceforth AUB). We have also described the neurophysiological basis for these states and have shown that certain parts of the brain are responsible for generating these mystical experiences. We will consider this later in our discussion of neuroepistemology. It is interesting that in these meditative states, the subjects come to understand a profound sense of free will. In fact, they often describe that while the individual ego may not truly have free will, there is a universal free will that seems both absolute and contentless (Goswami, 1993).

One might argue that the existence of a universal free will does not address the issue of individual choice. However, it is difficult to interpret the free will experienced in the state of AUB since this is a state in which there is no ego, no differentiation between self and other. Thus, while persons in AUB may experience free will, they cannot relate it to their own ego since the ego does not exist in this state. They can only describe their experience as pertaining to the universe as a whole. The free will that is experienced may pertain to individuals as well as the universe, but if experienced in the state of AUB, it can only be described as being universal. Unfortunately, this does not prove the existence of free will, either on a universal or individual level, but it does satisfy the criteria of being a state that exists outside of normal consciousness. That this state yields the notion of free will suggests, but does not confirm, that there is free will.

4.2 *The Feeling of Freedom*

Another body of evidence is perhaps more understandable and speaks to the idea of individual free will, but at the same time raises other ontological problems. Virtually all human beings have a strong sense of their own free will (i.e., we believe that it is our self that is making choices and decisions). In other words, we feel free (Davis, 1971, p. 23). In fact, it is this deep sense of free will that has raised the entire problem of free will and determinism in the first place. After all, if we had no sense of free will, then we would have no reason to suggest that it exists. This sense of free will is perhaps not considerably different from the meditator's understanding of free will since both appear to be only a subjective sense. Of course, this is not the kind of proof that most scientists or philosophers would feel comfortable defending and some

might suggest that the sense of free will is irrelevant to the question of whether or not we really have it (Russell, 1981, p. 149). However, we would counter with the statement that reality itself is only proven by a strong sense of that reality. This sense of immediate compelling and certain presence has been termed by the stoic philosophers the *phantasia catalyptica* or by certain contemporary German philosophers as *Anwesenheit.*

There is no manner of truly proving the existence of what we call our everyday 'baseline' reality without somehow getting outside of that baseline reality. On the other hand, few scientists and philosophers would consider that our baseline reality, the world we see all around us, does not exist even though this is based solely on their subjective sense of that reality. We would argue that the sense of free will is just as compelling as the sense of reality. This leads us to the question of neuroepistemology.

5. NEUROEPISTEMOLOGY

We would like to consider briefly some epistemological questions which are raised by this synthesis of free will in relation to the mind. We have indicated that part of the proof for the existence of free will is the sense that we have of our own free will. However, as soon as we begin to consider the validity of this sense, we must expand the argument to consider how we come to know what is real at all. We have described in previous papers a neurophysiological model of unitary states (d'Aquili and Newberg, 1993a, 1993b). These unitary states derive from various causes including meditation, ceremonial ritual, or spontaneous mystical experiences. Major examples of such unitary states are vivid mystical visions, sensorially constellated archetypes, a vivid sense of the unity of being (cosmic consciousness), and a state we have called Absolute Unitary Being. These states are perceived by the experiencer as being more real, or 'hyper real', compared to baseline reality. The problem arises in determining which reality is more real. Although it seems true that hyper lucid unitary states have their basis in neuroanatomy, neurophysiology, and the flux of neurohumoral transmitters, it is equally true that baseline reality (lucid consciousness), which both the average person and the average scientist construe to be really real, nevertheless is based on exactly the same parameters. Simply put, one can never get at what is 'really out there' without its being processed, one way or another, through the human brain.

To examine briefly this issue of what is really real (and hence what is ultimate reality), let us for the moment contrast the most extreme hyper lucid unitary state, that of AUB, with our everyday baseline reality. In such an exercise there is absolutely no question that AUB wins out as being 'more real'. People who have experienced AUB, and this includes some very learned and previously materialistic scientists, regard it as being more fundamentally real than baseline reality. Even the memory of AUB is perceived to be more fundamentally real than baseline reality. A number of years ago we interviewed several people who had this experience. There is no doubt that it, and even the memory of it, carried the sense of greater fundamental reality

than that generated in their day-to-day living. If we use the criterion, therefore, of the sense of certainty of the objective reality of that state, AUB wins hands down. The same is true of all hyper lucid unitary states (but not necessarily of non-hyper lucid unitary states).

It further seems that the determination of what is really real is ultimately reducible to the single characteristic of the compelling sense that a person has of any given reality. The same may be true of free will. Thus, we would maintain that there is no way to determine whether the various unitary states or baseline reality is more 'real', i.e., which represents more fundamental ontological reality without first making gratuitous and unsubstantiated assumptions. We are reduced to saying that each reality is real in its own way and for its own adaptive ends. This may not be epistemologically satisfying, but up to now any alternative has escaped us. We suspect that this is because of an inherent indeterminacy in brain functioning, perhaps related to the Uncertainty Principle discussed above. In the end, our problem is that as we search for free will, we have difficulty in finding it because we are constrained by the functional processes in our brain and in our consciousness. This constraint necessarily affects our search and biases the results of this search. Thus, we are left with nothing more and nothing less than a sense of that free will which is no less compelling than our sense of reality.

6. CONCLUSION

The purpose of this paper was to consider a new synthesis of free will and determinism in a way that would allow for both to occur in a manner analogous to quantum mechanics. In this synthesis, randomness and determinism are regarded as different manifestations of the same thing – free will, just as the particle and wave are characteristics of the electron. This analogy also utilizes the concept of the Heisenberg Uncertainty Principle such that there seems to be a related form of uncertainty with regard to the functioning of our mind in making decisions. Finally, the function of the brain in its fundamental perception of reality, specifically the significance of the sense of the objective existence of that reality, is invoked to explain the significance of our sense of free will. Thus, we are left to no further reduction than the strong sense that we have of any given reality, whether that reality has randomness, determinism, free will, or all three.

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