

# Unity through an Event Oriented Worldview

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## **Abstract**

“Unity of Mind, Brain, and the World” can be achieved if we give up the concept of a single objective physical world and adopt an event-oriented worldview. In adopting such a view, it is necessary to recognize that our own display of the world as moving objects in space presents the result of our data processing system, not an actual independent world out there. Whatever is presented to us is a conscious experience. These experiences are only one aspect of a larger processing system, much like a television screen is only one aspect of the larger mechanism required to generate the actually seen characters. This larger self, which will be referred to as the big “I”, is to be contrasted with the appearance and feelings, including our surroundings and the appearance of our everyday body, which will be referred to as the little “i”. Such a big “I” processing system can be physically described as an action cycle. I suggest that the next major advance in our understanding of reality is to conceive reality as a set of communicating conscious beings physically described as action cycles, each evolving as a gravitationally contained universe.

The event-oriented worldview proposes a reality of universes to replace the vision of objects and fields in space. Each of these contains its own experiences evolving in its own time. Long-range communication between these conscious universes may be implemented by evoking Mach’s Principle, which suggests that inertial properties of “local material” may be altered by long-range inertial forces that penetrate the gravitationally induced electromagnetic event horizon of each. Using inertial communication, each conscious being can establish control over matter in other being’s action cycles, and in turn receive signals that interpret stimulation and evoke conscious experiences within themselves. The abovementioned “local material” provides a local body, through which electro-magnetic influences amplify interactions with its local host. This is called life. The shift to an event-oriented worldview allows a novel explanation for the origin of life and our conscious experiences. Arguments presented in this paper show some evidence that support our conjectures. To prove the veracity of the theory will require further development of an event physics. We expect elementary particles to be replaced by elementary events as the building blocks of the Universe, and quantum mechanics to be recognized as a linear approximation to the evolving event physics of cognitive systems. Only when physics encompass both the physical causes and the feeling of experiences within itself, the mind, brain and the world can be unified.

**Key Words:** Process Physics, Event Physics, Cognitive Action Theory, Process Ontology

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## **Introduction**

The basic Cognitive Action Theory (CAT) combining classic objective third person physical models and subjective first person experience into a conceptual

framework embedding conscious experience in physical processes will be summarized in section 2 below (Baer, 2013). The unity provided by this approach is based upon the recognition

that many well known physical concepts, such as electrons, are explanatory inferences which, though based upon directly observable measurements, are themselves not observable. This implies traditional physics contains mental aspects that are commonly used as tangible physical realities. By recognizing the process, which interprets observable sensations as physical realities we achieve a transcendental view point in which both our subjective experiences and their objective explanations become part of a single whole.

Such a whole provides the context for a large body of investigations, experiments, and theories. Some of these are described in the papers included in this special issue of the *Quantum Biosystems Journal*.

These papers span disciplines from physics, through neuro-chemistry, biology, and psychology that roughly correspond to a hierarchy of material aggregation encountered at various scales as well as alternative divisions of the whole encountered at each scale.

Section 3 of this work provides a short introduction of these papers and places them into the framework of a process structure that contains both physical and mental aspects of reality.

### 1 – Summary of Cognitive Action Theory

Following the tradition of James, Whitehead, Bohm, Penrose and many great scientists we have arrived at an event oriented worldview. This consists of placing the objective world into the context of a circular activity we may call the process world or event universe as shown on the right side in figure 1.

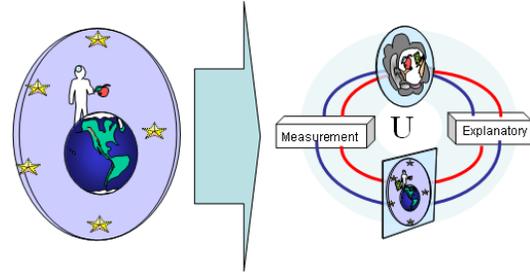


Fig. 1: Object to Event Worldview

The right side represents a stand alone self measurement-explanatory cycle implemented by two processes branches. The lower physical side shows an objectively real world while the upper round cross-section contains the answer to Nagel's question, "what it feels like to be that physical world?" The shaded area encompasses the activity volume that curves donut-like back on itself. The connecting lines represent the four fundamental forces operating in the activity. These are:

- Fgi - Gravitation and Inertia .
- Fem- Electricity and Magnetism.
- Fcm – Charge to Mass.
- Fmc – Mass to Charge.

The Fcm and Fmc are crossover forces, between charge and mass, related to the weak and strong forces of nuclear physics, which control the inner workings of material. I have postulated these inner forces are associated with primitive awareness and their energy fields are the correlates of primitive consciousness.

The influence sequence between charge and mass are depicted in figure 2. This shows how the external objective phase is governed by gravito-electric forces corresponding to the physical world, while the two internal cross over forces between mass and charge correspond to the direct mental observable experience.

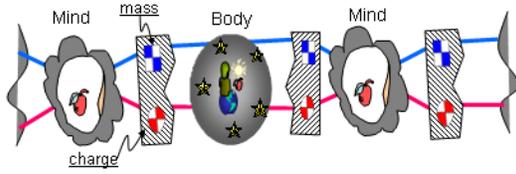


Fig.2: Charge-mass Influence Sequence

The influence can be said to propagate in the time direction so that mental and physical phases follow each other. Time is defined as the name of the state of a cycle segment. Observables are produced by measurements on the physical phase while physical entities are produced by explanations of the observable experiences. When influence sequences are closed, a continuously repeating event, consisting of mind causing body causing mind, exists forever since time for an isolated system must be measured by internal clocks and thus also repeats.

### 1.1 - The Process Universe

Event cycles replace objects as fundamental building blocks of everything and cannot be divided into physical and mental. All material feels like some experience. However the simple circular form of action is only applicable to the universe as a whole since in this case there is nothing outside itself to interact with. Only the very largest and very smallest events can be accurately described by a circle. In all other cases the closed cycle is an approximation that ignores interactions. When dividing the whole universe cycle into parts the whole equals the sum of its parts plus all the interactions. Figure 3 shows a three person universe built of three interacting cognitive cycles. Only single interaction lines are shown, although in each case two force categories are involved. The cycle names are abbreviated to I,Y, and U. U by convention means "the rest of the Universe".

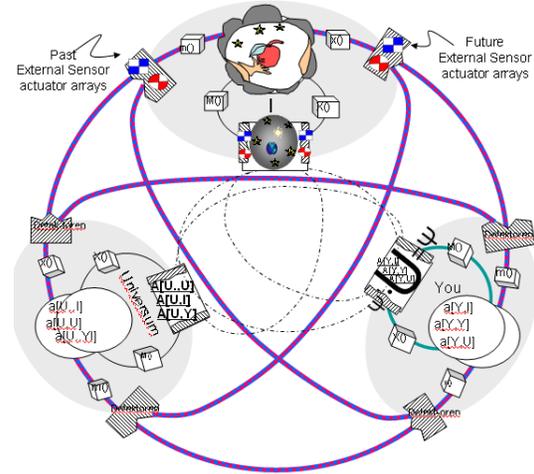


Fig. 3: Three Person Interactive Universe

The amount of activity is measured by its action so that a matrix of nine action values can be used to specify the activities happening. For this three part universe the total amount of action in the event is given by the matrix equation 1.

$$A = \begin{pmatrix} 1[I] & 1[Y] & 1[U] \end{pmatrix} \begin{pmatrix} A[I,I] & A[I,Y] & A[I,U] \\ A[Y,I] & A[Y,Y] & A[Y,U] \\ A[U,I] & A[U,Y] & A[U,U] \end{pmatrix} \begin{pmatrix} 1[I] \\ 1[Y] \\ 1[U] \end{pmatrix}$$

Eq. 1

For the general case the action in a universe of an arbitrary number of parts is given in Einstein index notation as,

$$Eq. 2 \quad A = 1[i] \cdot A[i,j] \cdot 1[j].$$

And diagonalized by a similarity transform S,

$$Eq. 3 \quad A = 1[i] \cdot S[i,l] \cdot S[l,i] \cdot A[i,j] \cdot S[j,k] \cdot S[k,j] \cdot 1[j].$$

To give the eigenvalue equation,

$$Eq. 4- \quad A = S[l] \cdot A[l,k] \cdot S[k].$$

The reader will notice the similarity to quantum mechanical equations.

The now diagonalized interaction matrix takes on a simple form at the expense of complicating the occupation vectors, which are identified as Schrödinger's wave function (Heisenberg 1930).

The formulation of action cycles in quantum mechanics is suggested in several references (Baer 2013, 2014).

The interaction matrix shown in Eq. 1 is intended to show that each part of the whole contains an action structure that is its adjustment to the existence of the other parts. For example  $A[I,Y]$  is the amount of change within I required to adjust itself to the interactions with You. Thus every part contains in its own structure a memory of every other part.

### 1.2 - The Interacting Big You

Expanding the structure of You in Fig. 3 allows us to expand on important architectural details of a cognitive being that are shown in Fig. 4. On the left side a single element of a sensor/actuator array interfaces with gravito-electric forces coming from the past external world. On the right side the *same* array element is shown emitting gravito-electric force signals back to the future side.

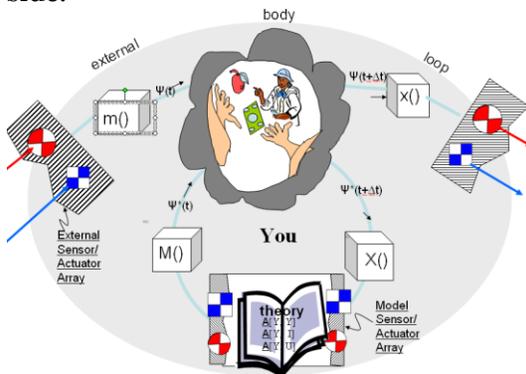


Fig. 4: The Interacting Big You

The measurement function,  $m()$ , processes influences through a neural network chain until they are mixed with an expectation signal coming from a measurement of an internal model of the external world by the function,  $M()$ .

Comparison of the two signals generates conscious awareness of the difference signals. These flow through the internal explanation function  $X()$  to update Your model of physical reality and through the external explanation function  $x()$  as command signals to I and the rest of the universe U. The action in the model consists of a prediction of what You expects the external physical reality to do in the time interval  $\Delta$  at the time  $t$ . This allows the You loop to act as a feed-forward control loop to the signals flowing through the external body loop in order to regulate its experiences. The model is heuristically shown as a book with symbols of a theory because the only way the model can be grasped in Your 1<sup>st</sup> person experience is by theoretical symbols. Theoretical symbols are implemented as operational processing elements that perform the storage and prediction operations inside the big You mechanism.

### 1.3 - The Explanation of Consciousness with Events

We are now in a position to explain consciousness within the event model. Lets assume the big You is part of the whole universe which is depicted as a stand alone activity cycle. The flow of action through Your cognitive "Now" plane produces an observable energy pattern that follows its internal evolution providing an experience sequence that corresponds to Your lifetime as measured by Your internal clock. In the absence of external interactions this lifetime of experiences repeats exactly. When isolated such a lifetime corresponds to its own universe which can be depicted as a single cycle in containing an amount of action A in a state T (Baer 2010). Lets assume the Whole universe can be approximated by a number of isolated non interacting parts. Each part will be in its own eigenstate of dynamic equilibrium and Nagel's question, "What does it feel like

*to be such a Part*”, will be answered by an experience of empty space because all internal parts will be exactly where they are needed to exactly repeat the cycle.

If there is an interaction the You will transfer an action flow to or from the rest of the universe, called U. When projected on the Now plane this flow transfer looks like an energy transfer since energy is the rate of action flowing through the Now. Depending upon whether the energy was gained or lost You now has more or less action in Your cycle. This means it experiences a different lifetime of happenings. The difference can be described as a perturbation in its previously empty space experience which will show up as content. Using the notation shown in figure 3 this observable content is labeled as observable  $a[Y,U]$  and its explanation as  $A[Y,U]$ . The  $a[Y,U]$  is a mathematical matrix notation that will usually be replaced by the name of an object such as the apple seen by You. For example an apple icon is shown in I’s Mind in figure 3. If no further interaction happens You’s cycle will eventually repeat along with the formation of an observable experience imbedded in the feeling of empty space which serves as a memory of the interaction.

Thus You, I, and the Universe will each experience objects in empty space. However both quantum and event theory do not consider these objects to be anything but our private display resulting from our interpretations of interactions. In quantum theory the proposed explanation for such appearances are small perturbations in space identified as deBroglie waves that satisfy Schroedinger’s wave equation. In the event oriented worldview these objects are created as internal accommodations to the influences from the rest of the universe and apply at all scales. We no longer need to restrict the applicability of the theory to the atomic and nuclear

domain, but realize that each of us generates the world of experience around us as our individual explanation of the stimulation received.

## **2 – The Multi-verse as Cognitive Beings**

In this section we will show how a system of isolated action cycles can form a Multi-verse reality of cognitive beings that exist outside of each others event horizon but can still communicate through long range inertial forces. The concept of a Multi-verse has been introduced to physics in response to the spontaneous creation of the Universe at the moment of the Big Bang (Kaku 2004). It is argued that if our Universe was created through such a spontaneous event then there is nothing to prevent other universes to be created as well. If such additional universes exist two immediate questions arise. Is there any way to communicate with them or are they forever outside our outside measurement capabilities? Second if they exist would they be conscious in at least some primitive level from which human consciousness could be derived given sufficient size and complexity?

The affirmative answer to the second question has already been discussed by introducing the shift from object to an event oriented worldview shown in figure 1. If an isolated system is describable as a cycle of activity, which contains a plane of awareness in sequence with the physical memories that store and generate that awareness then isolated systems no matter how large or small will eventually repeat and contain primitive consciousness. That the Universe is conscious has been proposed by Kafatos (1990) among others. However most authors still conceive of a single, out there, universe whether a classic objective or a quantum variety is envisioned. In our model each cycle is internally conscious and contains all the experiences usually attributed to the outside world.

We acknowledge that it is impossible to directly experience what is not inside our own activity and hence what feels like the world around our perceived bodies is internal to the big You and I. Figure 4 shows the event architecture of a cognitive being as an inner activity loop connected to an external body activity as drawn as a detail expansion of the You also shown in the three part interacting Universe of figure 3. Each of these parts is on an equal footing and is conscious of its own experiences. Each part also combines the internal forces of consciousness derived from the outside connection with those of the inside loop. For You and the Universe these two data streams are shown as two superimposed circles. For I these two streams are shown as a monocular visual field superimposed on a thought bubble which displays the output of ones imagination from the inside activity.

If we now separate the outside and inside activity streams by recombining the I and You body loops with the rest of the Universe we achieve, in figure 5, an architecture in which each part is a stand alone conscious being with the only inter-connection shown by the dot-dashed lines between the physical material phases of each loop.

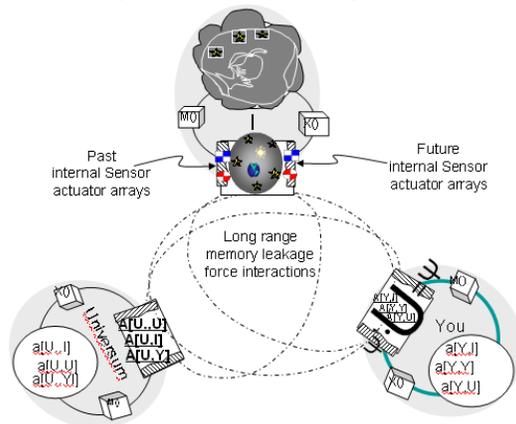


Fig. 5: Three Isolated Action Cycles

These dotted lines would be considered leakage interactions that might escape from the otherwise

shielded memory of a cognitive being and would be associated with extra sensory perception since they by pass the normal body sensors. As suggested by the architecture of fig. 5 the three cognitive beings are now separated from each other and do not interact with normal electromagnetic forces through which all information is transmitted to the brain under normal circumstances.

It is now necessary to present a bit of physics in order to explain the reason why these individual cycles cannot “see” each other and show the nature of the inertial forces through which the long range communication is accomplished.

**2.1 – Mach’s Principle and Long Range Inertial Forces**

The first issue to address is why these semi-isolated activities cannot “see” each other then communicating with electromagnetic waves? The first thing to remember is that each first person believes he/she is living inside a space of his perception. This is cross-section of the action cycle in order to send a signal outside this space the photon needs to climb out of a gravitational hole losing energy as it goes. The potential energy loss for a photon of energy “h·v” in the center of a mass density “ρ” is

$$\text{Eq. 5 } \Delta E = - (h \cdot v / c^2) \cdot G \cdot \rho \cdot r^2 \cdot 4 \cdot \pi / 3$$

As the photon travels outward the distance (r) from the center increases and the photon loses energy. Thus when

$$\text{Eq. 6 } r = (3 \cdot c^2 / G \cdot \rho \cdot 4 \cdot \pi)^{1/2},$$

the photon has lost all its energy and no observer beyond that range can see it. This is called the event horizon and each activity cycle acts like its cognitive entity is inside a black hole from which no electromagnetic energy escapes.

The next question is then what is this long-range memory leakage force

we show in figure 5 that connects the isolated activities. The answer is given by Mach's principle which states the origin of inertia is do to a gravitational interaction between a local particle and the rest of the distant masses in the universe. An analysis by Sciama (1953) provides a general relativistically compatible equation for a gravitational force field "Fg" that is analogous to the electric field in that it contains a vector potential "Ag" of the form,

$$\text{Eq. 7 } F_g = -\nabla\phi - (1/c)\partial A_g/\partial t \\ = -\nabla\phi - (\phi/c^2)\partial v/\partial t$$

Where :  $\phi$  = the gravitational  
 $c$  = the speed of light const.  
 $v$  = the velocity of a test mass  
 $A_g$ =the sum over all mass currents  
 $(1/c) \int (\rho \cdot \mathbf{v}/r) dV$   
 $V$  = volume of the Universe  
 $\rho$  = the Universe mass density  
 $\mathbf{v}$  = the velocity vector of the density  
 $r$  = the distance to the test mass

The first term of equation 7 is the standard Newtonian gravitational force. The second terms is an inertial reaction force proportional to the acceleration of the test particle under the condition that  $1 = \phi/c^2$  and that the vector potential due to the distant masses in the Universe can be integrated as a rigid body in the rest frame of the moving test mass. The gravitational potential divided by the speed of light constant will be equal to one if the universe is flat. That this should be the case was measured by the Wilkinson Microwave Anisotropy Probe (WMAP) about a decade ago and conveniently allows us to draw a reality (not to scale) on a flat space of the page of figure 5. For the rational a approximations used to achieve these results the reader is referred to Woodward (2013).

The important consequence of Sciama analysis of the inertial force is that though Newton's gravitational force fall off as  $1/r^2$  the inertial force falls off as  $1/r$ . Quoting Sciama, "The

contribution of matter to local inertia falls off only inversely as the distance, since  $\partial A_g/\partial t$  is proportional to the scalar potential (cf. the radiation field of an accelerating charge" (Heitler 1944).

What this means as Sciama pointed out is that Newtonian gravitational forces are due to local masses (sun, earth, moons, even Milky Way) however inertial forces dominate over very large distances that can range beyond the event horizon for any material cluster. These long-range inertial forces can therefore implement communication signals between the Multi-verses that may exist beyond the limits of our electro-magnetic radiation detectors at any frequency. Fig. 6 shows a schematic drawing of the range of the gravitational and inertial energy curves.

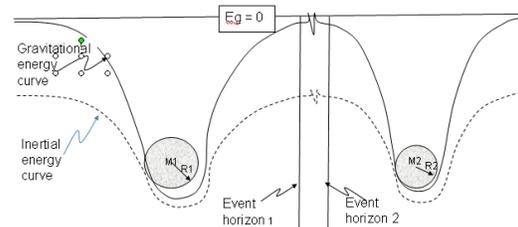


Fig. 6: Gravity vs Inertial Energy Curves

The event horizon for each Multi-verse is determined by the depth of the gravitational energy well, which prevents light from escaping. The black line shows this energy curve is much steeper than the dotted inertial energy curve hence electromagnetic radiation would loose its energy much faster than inertial radiation.

Returning to figure 5 we have now identified a physical inertial force that implements long range interaction between Universes that lie beyond visual range and beyond the range of normal sensors with which the human is biologically endowed or has been able to build in the form of externalized sensor extensions. The dash dot lines connecting the material phases of widely separated cognitive action cycles

represent very long range inertial force interactions that may be able to implement extra sensory communication between action cycles located beyond electromagnetically defined event horizons.

## 2.2 – Speculative Interaction Involving Long Range Inertial Forces

Having established the possibility of long-range inertial communication between worlds outside each others event horizon we are now in a position to speculate how such interaction can produce the effects of living conscious bodies inside each of our perceptive spheres. The first step is to convince oneself that the universe which in classic physics is taken to be an external independent world surrounding your body is actually happening inside your larger self. As Steve Lehar (2003) puts it what appears to be the edge of the universe is actually your skull.

The second step is to remember that the terms in the interaction matrix defined in equation 1 contains off diagonal elements, which represent the amount of action in one part due to influences from another. For example  $A[U,Y]$  refers to the memory made in the rest of the Universe due to the presence of You. By memory we are not only talking about the conventional physical symbol in an objective worldview, but the action in the entire refresh cycle that holds the accommodation U makes to You.

If we start with totally isolated individuals who have never interacted, or reached a processing stage in which all memories have been eliminated, then interaction matrix has no diagonal terms and each universe is completely self contained. This state of affairs might be identified as a kind of reset-beginning. In this dynamic state each universe evolves through a lifetime of phases in its own eigenstate throughout which all forces are internally balanced. An

extended d’Alambert principle that defines such a balance condition is discussed in Baer (2014).

Next assume that an inertial interaction is initiated. The inertial mass of some pattern of material inside both U and You is modified and a force imbalance occurs in both systems. Interaction waves occur between the two systems as suggested by the Transactional Interpretation of Quantum Mechanics (Cramer 1988). We are taking advantage of the analogy between distant universes and atoms in the sense that neither is visible from the outside except through changes in internal structures that resonate with changes in the internal structures of some receiving entities.

At this point the behavior of material is no longer completely explained by the internal forces in either U or You. This is the hallmark of life. Whether through unexplained spontaneous transitions in atoms and nuclei, or the accumulation of negative entropy, life violates physics of an isolated universe. We are suggesting that a cycle of activity that incorporates conscious experiences interacts with another cycle of activity resulting in a modification of its own conscious experience and at the same time producing a physical modification in its interaction partner.

Once a communication channel is available between You and U (the rest of the Universe) that produces an accommodation  $A[U,Y]$ , which modifies the behavior of material from which U is constructed, a kind of beachhead is established. The behavior of material in U is now modified and to a some extent controlled from the conscious structure You. At the same time You is informed of stimulation impinging on this beachhead from other parts of U.

One can assume that such a beachhead can be a random occurrence which quickly falls apart producing a unexplained noise. It is also possible

that control established through this beachhead will grow to dominate larger amounts of the material available in U. The theories proposed by in the article by Grandy (2015) suggest that the DNA molecule may play the role of such a beachhead and as it grows a full body develops enlarging the connection between material in the rest of the universe and the conscious experience in the big You.

The immediate implication of the architecture presented is that a permanent conscious activity exists outside of the material defining the Universe that is connected to a body of material inside the Universe. In colloquial language such a permanent activity, which we have designated as the big You, is called your soul. As long as the connection is maintained the body appears to be alive and experiences feelings we attribute to consciousness.

When the connection is broken the extra-universal influences disappear and the body behaves strictly in according to the physical laws defining the Universe. Such a body is dead.

The possibility that life and death can be associated with the establishment and destruction of a communication channel to a more permanent activity outside the Universe is given credence by the discussion presented in James Lakes article in this special issue (Lake 2015). Lake argues that well documented out-of-body and near-death-experiences represent a psychic overhead without apparent utility and should have been eliminated according to the rules of Darwin's Natural selection. If however these experiences are associated with the establishment and dismantling of a connection between what is colloquially called your body and soul then out-of-body and near-death-experiences are vital phases of the life and death process.

The discussions cited in these related articles do not prove activity cycles exist outside our event horizon

but merely suggest that if such an extra-universal architecture is valid then certain difficult problems, including the origin of life and appearance of otherwise useless psychic phenomena would be given a rational physical explanation.

The next steps along this line of reasoning would include the development of experimental tests that would verify the existence of extra-universal material and inertial based gravity interactions. The works by Woodward (2004) suggests a design for an instrument based upon inertial force detection. While a planned work by this author will discuss the implications and possible measurement of spectral line broadening that would result if the inertial mass of elementary particles is modified through inertial radiation.

## Conclusion

The theory presented in this paper represents a comprehensive shift from the objective independent worldview to an event oriented worldview that has been forced upon us by the need to explain the consciousness phenomena and integrate the spiritual and material experiences into a comprehensive scientific theory. A bullet outline of the major steps required to make this jump is summarized bellow.

We are a bigger mechanism than our body. That bigger mechanism includes the generation of our conscious experiences from memories visualizable as a kind of refresh cycle. The space in front of our noses is not an independent universe out there but happens inside our bigger selves. We cannot experience anything at a distance. The simplest structure for such a bigger self is a cognitive action cycle, which explains sensations in terms of a memory containing a model of physical reality and measuring this model to regenerate expectations of sensations.

When isolated such a cycle acts like a universe built of action and executes a

phase sequence of activities associated with the state of the entire event. When Isolated You, I, and the rest of the Universe activities exist outside of each other in a Multi-verse configuration. Each of these Multi-verses is identified with cognitive beings rather than simply inanimate systems. They communicate through inertial gravity signals. The Newtonian gravity forces contain photons to within our event horizon so we can only see out to the 3 deg black body radiation limit but a flat space extends indefinitely. The gravitational forces decrease as  $1/r^2$  but the inertial forces decrease as  $1/r$ . Hence inertial forces have a range much larger than gravity. Therefore isolated activity cycles spread out beyond each others event horizon cannot see each other but can communicate through long-range inertial forces.

An interaction between an isolated You and an isolated Universe leaves an accommodation in both. That means a small part of the Universe contains a bit of material which is NOT only subject to the forces in the Universe but is also effected by extra-universal influences from You. Life as defined by the material who's behavior is NOT fully explained by the Universes physical laws. Some interactions may grow and increase the material borrowed from the Universe. That material is partially controlled by Your Cognitive Action Cycle existing outside the Universe through inertial forces.

This beachhead of life ie. the latent modification in the Universe due to interactions with the big You grows to become a field of DNA molecules which are organized into ones Physical body (Grandy, 2015). When the communication between the Universes accommodation of Your signals is broken the physical body is no longer under Your control and it returns to act

like any other inanimate structure i.e. it dies. From dust to dust.

Before it disconnects completely there are communication disturbances and repair efforts experienced as out-of-body and near-death-experiences that have no purpose or survival value in the Darwinian evolutionary sense. Why do we have such overhead? (Lake, 2015) Rather than directly control every aspect of Your body in the Universe, You builds a local processing structures which automate local responses limiting the relay back to Your Cognitive Action Cycle. Some of these structures implement pre and post processing and others duplicate the cognitive action cycle architecture in material found in the Universe (Mitterauer, 2015).

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