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Quantum Unconscious Pre-Space: A Psychoanalytic/Neuroscientific Analysis of the Cognitive Science of Elio Conte The Hard Problem of Consciousness, New Approaches and Directions

Richard Lawrence Norman

ABSTRACT

The mathematics, physical and cognitive science of Elio Conte has uncovered essential pieces of form and structural dynamics which are isomorphic across scales, and may be observed in macro-ontologic and onto-psychologic neuroanatomical interactivity. This paper will take depth psychology alongside of neuroscience, and detail several of these parallels. A proposed relation between the pre-space and its subsequent projection as defined by Clifford algebra and the formative activities of the unconscious in perception is put forward. The derivation of logic from quantum theory and its simultaneous role as a formative basis beneath quantum theory are drawn into macro-focus with neuroanatomical symbolic analysis to be observed in the mental system as isomorphic in basic structure. A hint is provided at the possible implications of this series of analyses.

Key Words: affect, wave-function, Clifford algebra, hard problem, pre-space

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Introduction

Quantum theory details the micro-interactive sub-genesis of observable linear reality. As such, it appears all but intangible, so deeply mathematical and divorced from our observed reality in its scale. However, many of these deep insights and basic formative patterns are isomorphic across scales of representation,

allowing a unique opportunity for deductive and synthetic analyses which may yield a new approach to the situation. In this way, the mathematical formalism may become intuitively intelligible to us, and a derivation of consciousness and genesis of linear reality may be derived which spans the gulf of macro and micro scales. From this vantage, new insights into the hard problem of consciousness may be had. I wish to take the first tentative steps along this promising pathway.

Quantum processes derive, and are sometimes isomorphically evidenced in macro-reality (Tamulis *et al.*, 2015, p.2; Cai *et al.*, 2010; Pauls *et al.*, 2013; Conte 2010; Marciak-Kozłowska and Kozłowski, 2015; Conte and

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Lucas, 2015). Isomorphisms, and/or self-similar structural dynamism across scales are evident. This paper will draw those out, applied to the mathematical algebraic science of Elio Conte, using depth psychology, cognitive neuroscience, affective neuroscience and neuropsychanalysis. From there, new implications can be drawn.

Clifford algebraic expression of the encoding and projection of abstract elements from the pre-space

"...we show that a wide range of geometric forms and relationships can be described in terms of the Clifford algebra. This range is so wide that it seems reasonable to suppose that all basic geometrical forms and relationships can be put in this way, and therefore can be regarded as unfolding from an implicate order of pre-space. Because the property of chirality is included in this, the possibility is opened up for an explanation of parity non-conservation in Beta-decay as grounded in the properties of pre-space." [From: D. Bohm and B. J. Hiley (1984), p. 3, *Generalisation of the twistor to Clifford algebras as a basis for geometry*. Revista Brasileira de Fisica, Volume Especial, Os 70 anos de Mario Schonberg, pp.1-26]

Elio Conte has made great strides to accomplish these very aims set out by Bohm and Hiley (Conte, 2012; 2013; 2013a). The same concepts elucidated describing interactivity of the (sub)micro-scale quantum linear genesis, have near-isomorphic neuroanatomical and metapsychological components at the macro-scale, and indeed, represent the fundamental mathematics of the very transference from unconscious sources which gives reality its quality. First we will reference the quantum theory of perception, observation and wave function collapse as articulated by the Clifford algebra of Conte, and mathematical proof of logic as a product, and source, of quantum mechanics.

Please take careful note of these detailed mathematical proofs and essays demonstrating the encoding and projection of abstract idempotent (and nilpotent) entities from the pre-space, and, the genesis from and basis of, quantum mechanics in relation to logical grounds (Conte, 2011; 2011a; 2011b; 2013; 2013a).

It is essential for this exposition that the reader understand the above referenced material upon which the remaining discourse is

dependent. It is assumed, also, that the reader has a basic understanding of the ideas of the pre-space and nonlocality: specifically the ideas of the pre-space pertaining to the *potentials* of systemic expression as abstract idempotent elements suitable to be projected into a subspace; nonlocal quantum genesis which is based on superposition, meaning an additive (superposed) rather than a logically exclusive linear processes, nonlocality as a negation of distance, quantum interference effects, and other long familiar components of quantum theory.

Let the reader closely note Dr. Conte's definition of an abstract mathematical object and its encoding:

"... abstract objects are constituted by the properties through which we conceive or theoretically define them and therefore are connected to those properties in a way that is very different from the way ordinary objects bear their properties. I may say that mathematical objects encode these constitutive properties, though they may exemplify or even necessarily exemplify, other properties independently of their encoded properties. On the contrary, ordinary objects only exemplify their properties. As mentioned by Nodelman and Zalta, as example, ordinary triangular objects (as example, the faces of some physical pyramid, triangles) exemplify properties like having sides with a particular length, having interior angles of particular magnitudes, being made of a particular substance, and so on. By contrast, the mathematical object, such as the Euclidean triangle, does not exemplify any of these properties indeed, it exemplifies their negations. Instead it encodes only the theoretical properties implied by being triangular, such as being trilateral, having interior angles summing to 180 degrees and still more. The Euclidean triangle encodes no other properties than those implied by being triangular. Therefore, although classical logic requires that exemplification mode of predication exclude objects that are incomplete, the encoding mode of predication allows us to assert the existence of abstract objects that are incomplete with respect to the properties they encode." (Conte, 2015).

I will all too briefly summarize these important insights as follows: Through demonstration of the combined dynamical transformations of both $A(Si)$, and dihedral $N_{i,\pm 1}$ Clifford algebras, a fully quantum understanding and articulation of a particular process whereby superposed potential is transformed into linear



encoded expression is now, at last, clearly available: *the wave function collapse*. This dynamic cognitive and conscious quantum physio-ontologic micro-basis, is both the fount of, and is itself founded upon, logic. This system is self-observing, self-referential in structure. Abstract entities are thereby encoded and projected into complete linear object expression by wavefunction collapse, to create reality.

Once seen in the light of depth psychology, affective and cognitive neuroscience, these hard won mathematical and theoretical constructs may be made intuitively accessible, and *allow new quantum approaches to be derived* for areas as diverse and fundamental as hallucination, neurosis, psychosis, dreaming, memory consolidation, and the “hard problem” of consciousness.

Affective Basis of Human Consciousness

As we are tracing isomorphisms and near-isomorphic relations between quantum scales and macro-affective ontological human processes and structures, it is vital that we first review the affective neuroscience, evolutionary biology and neuropsychanalytic findings, so as to ground what follows in a sure footing. Once these basics have been elucidated, and parallels between nonlocal physics and depth psychology then theoretically drawn out with neuroanatomy, we will have gained a vantage point suitable to review the mathematical results of Dr. Conte, and draw our conclusions.

Evolutionary biology and neuropsychanalysis correct the typical idea, that cortical tone is consciousness. Yes, conscious experience has a clear relation to energetic distributions which extend from the ARAS to create a cortical tone, and a waking state. However, this is a later adaptation which is demonstrably secondary, and the true root of conscious experience is far older. The REM system is older than the sleep onset system yielding SWS, and, it is older than the waking system itself (Panksepp, 1998; pp.125-143). *REM... this core system is lower, and older, than the waking system*. The highest concentration of REM initiating neurons is caudal to the ARAS. The Basic Rest Activity Cycle (BRAC) demonstrates the embedded REM cycle (Panksepp, 1998; p.129). All that implies from many directions, that REM was once primary consciousness

(Panksepp, 1998; pp.133-135).

Also, remember the fact that EMOTION, the primary element of dreams (Stickgold *et al.*, 2001; Hobson & Pace-Schott, 2002) is also demonstrably primary in maintaining consciousness: the periaqueductal grey, the locus of emotion and the primitive affective motor “self” (at its intersection with the superior colliculi) (Panksepp, 1998; p.312)—this piece of tissue, the PAG, is the smallest bit upon which consciousness is dependent (Solms, 2013; p.12). Please note this further role of the embedded REM system as it performs functional dynamics associated with an evolutionarily primary consciousness:

The FTG neurons, the giant neurons of the reticular tegmental fields which mediate rapid movement while awake, exhibit storms of spiked activity during REM (eg., PGO spikes), indicating their probable role participating in that same capacity, as orienting reflexes, associated with a primitive conscious REM (Panksepp, 1998; pp.133-135).

We see the underlying older system revealed in dreams. The Dorso Lateral Prefrontal Cortex (DLPFC), is demodulated in REM. Emotion is released. The hidden emotive definitional processes are amplified as well (hypermodulated limbic system), allowing us to watch. “This would be in keeping with the proposed role in waking of these structures in the identification of mismatches between expected and actual behavioral outcomes and would also explain the similarities seen between cholinergic and PGO activity in the amygdala during REM on the one hand and during alerting and orienting responses in awake animals on the other” (Stickgold, 2001; p.1056). The DLPFC is inactive, logic curtailed. So in REM, the brain is aminergically demodulated (low noradrenergic, serotonergic and histaminergic activity), and along with predominant acetylcholine modulation, the primary underlying system is revealed.

So, the underlying REM system, which is older than the waking system was once primary consciousness for our evolutionary ancestors, and this primary conscious source, can be revealed as ego structure and logical processes are curtailed, as in REM dreams, where the DLPFC is demodulated, or, by way of linear (ego) destructuralization revealing primary processes fostered by extensive meditative practice, or, to some extent as well, in psychedelic drug use:



“We substantiate this synthesis by showing that Freud’s descriptions of the primary process are consistent with the phenomenology and neurophysiology of rapid eye movement sleep, the early and acute psychotic state, the aura of temporal lobe epilepsy and hallucinogenic drug states. LSD given to humans immediately prior to . . . or during sleep . . . has been shown to promote REM sleep and dreaming. These studies provide converging evidence that a specific mode of cognition (primary process thinking), rests on brain states, which possess a characteristic neurophysiology.” (Carhart-Harris and Friston, 2010).

Now, let us consider the cortex in its relation to affect. Neuropsychanalysis has allowed us not inconsiderable insight here. *Libido*, is the undifferentiated affect which powers our modern waking state. Think of libido as undifferentiated systemic potential, mediated by precious few recombinations of neurochemical distribution, issuing from the ascending reticular activating system so as to create cortical tone (Kaplan-Solms & Solms, 2002; pp.264-267).

We may rightly conclude, consciousness is affective at its primary process formative level, and, affective at the level of the cortex as well. Human consciousness is entirely affect dependent.

Next we will need to closely examine the deep metapsychological structure and corresponding neuroanatomical distributions of this affective dynamic so as to place our mathematically derived insights into psychobiologic context, draw the implied quantum/unconscious parallel genesis of linear reality into focus, and gain some few preliminary results.

The system of affective assignment

We only experience our perceptions, never the fictional, factual, “thing in and of itself.” Perception is never directly able to access the things and events to which our perceptions refer. These perceptions must be identified, and, affectively interpreted, that is, given an emotional context by virtue of which they can be assessed, and appropriate behavior determined. Therefore, one could say that reality testing consists along with object identification, with the giving of proper symbolic value, proper affective value to perception and experience. These ideas converge

to a point. In the simplest terms, what does this experience “mean to you.” Think of affect as the psychological context through which a neutral perception is defined. It is the affective meaning, the context, which gives symbolic emotional *Quality* to experience. In example: One person may have a fond adoration for his pet mouse, where another may recoil in revulsion. The mouse is the same, a neutral perceptual experience, it is the affect which we assign to it which puts it in the context of our associated experience that varies. This symbolic affective function can become deranged, as we will now see.

In “The Pain Was Greater If It Will Happen Again: The Effect of Anticipated Continuation on Retrospective Discomfort,” we find the following observation: “Across 7 laboratory studies and 1 field study, we demonstrated that people remembered an unpleasant experience as more aversive when they expected this experience to return than when they had no such expectation” (Galak & Meyvis, 2011; p.63). Note how the experience was the same, but the affect assigned to it was different, a function of a *new context* whereby a different affective value is assigned to the stimulus. Affect is the context, and so, the quality with which we endow perception and experience, and its assignment to perception is therefore a vital part of healthy balanced mental function and reality testing.

In Levens and Gotolib’s “Updating Positive and Negative Stimuli in Working Memory in Depression” we find the following statements: “Compared with controls, depressed participants were both slower to disengage from sad stimuli and faster to disengage from happy facial expressions... For example, biases against keeping positive information active or toward maintaining negative content in WM may underlie the ease with which depressed individuals develop and propagate a negative mood” (Levens & Gotolib, 2010; p. 654). It is clear that the system of assigning affect to stimulus is essential to reality testing.

The system by virtue of which this process takes place is phylogenetically old and complex. All sorts of affective aspects are undoubtedly stored in various anatomical neural locations and retrieved from these many various areas to create the final effect of “affect.” We must watch the system work in a known metapsychological context to identify its various



parts and their interrelations. But, as we study sleep, it seems that with some psychology we may see the system of affective assignment in isolation, and gain some insight into the process. For this reason, I will now draw out the proper Freudian picture of the metapsychology of dreaming so it may be related to the current cognitive neuroscience.

I have found that even the very best scholarly papers often misrepresent Freudian theory by way of drastic oversimplification in order to contrast the theory being advanced against the older established theory. Please read the following from an otherwise superb piece of scholarship. In "The Cognitive Neuroscience of Sleep: Neuronal Systems, Consciousness and Learning," we find the following statement: "Freud believed that dream content was determined by a daytime experience that triggered the emergence of related memories" (Hobson & Pace-Schott, 2002; p.686). This is an oversimplification. Freud did not state that dreams were primarily dependent on episodic memory as this statement may be seen to imply, but instead, had found many dream sources and relations to day world experience (Freud, 1900; p.551). The partial statement of the highly complex and nuanced Freudian theory is so brief as to be utterly misleading. Later in "The Cognitive Neuroscience of Sleep: Neuronal Systems, Consciousness and Learning," on the same page, we find this statement which fits perfectly with the nuanced Freudian theory: "Instead, discrete and incomplete fragments of narrative memory are assembled to create the new synthetic scenarios of dreams" (Hobson & Pace-Schott, 2002, p. 686). It seems that in an attempt to define the new, the old has been distorted. For this reason, I will begin with a recap of some familiar psychology which we will need to keep clearly in mind in order to construct our new analysis of affect.

Please note that we have already drawn a clear and intuitive connection between the assignment of affect and symbolism. Note also that our understanding extends this chain of ideas to include the notion of context. They are all but, if not truly, identical ideas, or aspects of each other. In psychoanalytic theory, dream and symbolic construction are accomplished by certain complex and specific means. A piece of day-world residue, a trivial dissociated fragment, a memory trace is chosen as a building block for dream construction because it is neutral, free of

affect and meaning, and so becomes ripe for representation in a dream, ready as a canvas to accept the many meanings via transference which will be assigned to it in condensation and "over determination" (Freud, 1900, p. 279, 283-284, 563-564). The less saturated with meaning, and, the closer to being a nexus for many other ideas, the better. Language, as it is itself a symbol with many meanings and puns, acts as a nexus to which many underlying determinants can attach in condensation and over determination (Freud, 1900; pp. 340-341). The memory trace, and there are of course many which will be assembled to form the finished dream, is then invested with meaning from many sources. A process of disguise and distortion is used to accomplish this which includes: reversal, condensation of many events into one (Freud, 1900; p.595), over determination of a dream through thematic repetition (Freud, 1900; pp.283-284) and/or determination of a single symbol by connecting many various trains of thought to give it energetic value sufficient to gain representation (Freud, 1900; p. 330), displacement from one object to another (Freud, 1900; pp.307-308), and a host of other means which symbolically represent and compound affect to achieve representation and conceal the true source of the affect delegated. These means of affective encoding found in REM dreaming function to avoid censorship via compromise formation which functions to create *distortions* (Freud, 1900, pp. 143-144, 506-508, 595-598). It is by condensed symbolic construction and distortion that the affective sources of the symbol are attached, and also, hidden (Freud, 1900, pp. 506-508). The symbols thusly endowed are then woven into a story, a narrative, and are thereby given further episodic context, although be it a false one, in a process known as "secondary revision" (Freud, 1900; p.488). The distortions are guided in no small part by the process of compromise formation, where the contents are distorted, censored, so as to produce a manifest dream, the meaning of which, the ego will not recognize (Freud, 1900, pp. 143-144, 506-508, 595-598). The process is called dream work (Freud, 1900; p. 277). So we have the process of symbolic construction and dream representation, a process whereby memory traces with little or no affect become suitable to be endowed with affect and woven into a distorted narrative, through many specific means. Highly complex! However, I have tipped my hand as this



process can be reduced to a simple but broad quantifiable principle. To discover this quantitative reduction the neuroscience must be analyzed alongside the aforementioned metapsychology of symbolism and dreaming.

In his paper, "*Sleep, Learning, and Dreams: Off-line Memory Reprocessing*," Dr. Stickgold (2001) and an esteemed collection of intellectual confederates bring us the clearest somato-neurologic picture of this metapsychological proposition to date. A clear neurological definition of the trivial unsaturated pieces of memory (memory traces) and symbolic processes of Freudian theory are seen to emerge in the context of memory consolidation, even if in a schematic and reduced fashion. In certain states of psychopathology such as schizophrenia, we can observe the pathogenic assignment of affect to experience as affective assignment operates unrestrained by the higher mental functions, such as input from the dorsolateral prefrontal cortex, just as we can observe in REM dreaming, which is understood psychologically as the general prototype of psychopathology (Hobson, 2001; Hobson & Pace-Schott 2002; Pace-Schott, 2003). In REM dreaming this unrestrained affective processing is isolated and expressed in harmless hallucination. The isolation of the affective system is achieved through a series of changes in neural modulation which Dr. Stickgold enumerates as:

"More generally, the cognitive changes seen during REM may be the combined result of three physiological characteristics of REM: (i) the shift in neuromodulatory balance from aminergic to cholinergic, (ii) the decreased activity in DLPFC and increased activity in both the anterior cingulate cortex and amygdala, and (iii) the decreased outflow of information from hippocampus to neocortex. Taken together, these findings suggest that the brain in REM is tuned more for the processing of associative memories than for the simple consolidation of recent memory traces and may explain, in part, various features of REM dreams, including their bizarre, hyperassociative quality and minimal incorporation of episodic memories." (Stickgold *et al.*, 2001; p. 1055).

In Dr. Hobson's paper we find the statement nicely summed in these few words:

"There is also a progressive decrease in output from the noradrenergic, serotonergic and histaminergic neurons, all of which shut off in REM, leaving the selectively activated forebrain aminergically unmodulated" (Hobson & Pace-

Schott, 2002; p. 691).

In this instance of systemic aminergic demodulation the intrarelated symbolic subsystem by virtue of which we give affective value to experience is observable as it encodes affect into a dream for consolidation into the mnemonic system, and other various functions I will touch on later:

"This suggests that the brain sources for dream elements are not hippocampally mediated episodic memories, but cortical traces of discrete components of the episodic memories, which then presumably are combined with associated semantic memories. With dorsolateral prefrontal cortex deactivated in both REM and NREM and the hippocampal formation producing only minimal cortical output in REM, actual episodic memories may be inaccessible and hence irrelevant to the dream construction process... In REM, the central nucleus of the amygdala plays a crucial role in the activation of medial prefrontal cortical structures associated with the highest order regulation of emotions. This adds to the deactivation of DLPFC, normally associated with higher cognitive functions, in REM. Thus, the brain appears to be biased toward emotional processing in this state... We hypothesize that these features reflect an attempt, on the part of the brain, to identify and evaluate novel cortical associations in the light of emotions mediated by limbic structures activated during REM. This would be in keeping with the proposed role in waking of these structures in the identification of mismatches between expected and actual behavioral outcomes" (Stickgold *et al.*, 2001; p.1056).

So we finally have a clear beginning in our search for an analysis to discover the neuroscience behind the metapsychology. A memory trace suitable for dream construction is now well defined as nonhippocampally mediated, and so, cut off from episodic memory just as one would expect metapsychologically, as the memory trace must be free of context and preexisting symbolic and affective value to be able to receive affective, limbic value and emotional definition, and act as a neutral substrate, an unsaturated nodal point with which to provide a new symbolic/episodic context. The source of the affect assigned to these free memory traces which are bereft of saturated context and existing emotive value is found through the mediation of limbic structures. Also, the purpose of these structures in providing affective definition to perception and the

influence of this process on reality testing is not neglected either, as I will point out again, we read:

“We hypothesize that these features reflect an attempt, on the part of the brain, to identify and evaluate novel cortical associations in the light of emotions mediated by limbic structures activated during REM. This would be in keeping with the proposed role in waking of these structures in the identification of mismatches between expected and actual behavioral outcomes” (Stickgold *et al.*, 2001; p.1056).

I can now plainly state the quantitative conceptual reduction to which I have alluded: The symbolic processes by virtue of which we give quality to REM dreams, experience and perception, can be reduced to a quantifiable operation: “the assignment of affect to.” Symbolism is a transference from concealed limbic sources, from unconscious sources by virtue of which emotion is mediated and affective quality assigned to perception. Symbolism is a function of the system of affective assignment.

Next, I wish to demonstrate logic emerging in self-recursive dynamism, and show the reader that we need but add missing episodic context to our REM memory trace, and bind/encode the result to a linear object, to begin to see our way into the answer. Toward this result, I will first reduce these processes to a schematic simplified structure. A clear relation between unconscious primary process dynamics, the pre-space and nonlocal formative processes and encoding will first be established, so we may understand what has been gained.

Unconscious as nonlocal; a TOY theory-sub-affective logical determination; Logic self-configured from affect

I wish to thank the reader for traversing these many vital roads on route to our new thinking. A few more pieces, and we will arrive at an unexpected place. Please recall that the system we are exposing to view, is self-observing, self-determined, self-referential (Conte, 2015; p. 139; Norman, 2014). This is a necessary truth at all levels. Phenomenologically this MUST be the case, as we are only at access to our perceptions, and furthermore, a valuable conclusion as to our place in this physical universe can be derived from this fact as well: we, as human observers are mere parts of this self-observing system, and although we have a role and influence physical

expression as you will soon see, we as observers, are not its sole causal fount. This is vital, as it makes clear the answer to troubling questions of egocentric solipsism, and we may be sure, that an electron or any other object DOES exist even if we are not ourselves looking at it. We are not as a “God.” We are simply a small part, not the only causal fount of observation and wavefunction collapse. The system itself, is self-recursive, self-observing. Iconoclastic thinkers have derived this self-recursive dynamic, and inferred a different implication (Langan, 2002).

I will now, distill affective assignment into a TOY theory, and demonstrate the logical basis beneath affect, providing affective example of the mathematically derived truth that logic may well underlie quantum theory, and be product also, of quantum processes. For that to be meaningful, the foundational isomorphic/self-similar relation between the unconscious primary process, and the nonlocal genesis of reality in the pre-space (Conte, 2013a), must first be articulated:

The ideas of nonlocality, superposition and entangled phenomenon are the basis of quantum theory. This quantum basis is the potential from which linear reality springs. There is no distance or time in the usual sense, communication may be instantaneous between objects, and all things are expressed additively, instead of oppositionally, one might say in terms of “and,” rather than “or,” as a function of superposed compounding of wavefunction. The unconscious is self-similar if not isomorphic to the nonlocal pre-space. From the unconscious, we “project” *by way of transference* (Norman, 2013a, p. 9) to give reality its quality, in both pathological and healthy cases. I assert: *The unconscious is our perceptual ontological quantum genesis: the “primary process.” The projection into a subspace to create reality, is the micro-quantum level of the transference itself. Wavefunction collapse leading to perception, is itself: the transference.* Here is the definition of primary process unconscious mentation:

“The cathetic intensities [in the Ucs.] are much more mobile. By the process of displacement one idea may surrender to another its whole quota of cathexis; by the process of condensation it may appropriate the whole cathexis of several other ideas. I have proposed to regard these two processes as distinguishing marks of the so-called primary psychological process.” ... “exemption from mutual contradiction, primary process (mobility of



cathexes), timelessness, and replacement of external by psychological reality" (Freud, 1915e, p. 186-187).

I hope the reader can clearly see the relation, the lack of contradiction (primary process thinking creates compounded symbols, compromise formations symbols (Freud 1900), additions, *superpositions/entanglements*, never either/or contradictions), linear distance is not available as all is in proximate associative contact, and so may transfer instantly masses of cathexis, the lack of linear time, and in the case of dreams and psychotic symptoms, the hidden associative nonlinear encoding process itself becomes manifest, and replaces the external reality it is meant to define.

Bion also understood the importance of dreaming as it relates to health and experience, and that we are all, if we are healthy, dreaming all the time (Bion, 1992; p.52; Brown, 2011; p.164). To illustrate this idea, that dream formation, symptom formation and our proper definition of reality all gain structure and quality by identical primary "associo-cognitive" processes (Norman, 2013b) and, assess the role of the neocortical/hippocampal mnemonic store in mediating the affect assigned from subcortical sources to this definitional transference, so as to affect "mental solids" represented in the cortex (Solms, 2013), we need but indulge in a simple thought experiment. The reduced TOY theory will allow us to see through the complexity, and examine the abstract associative affective encoding of a symbol in divergent cases, and also, demonstrate the surprising conclusion derived mathematically by Conte, that logic underlies quantum processes. [It should be noted, that such a simplification is bound to omit much, and indeed, the affective contributions of unconscious fantasy are not included here. I propose that these contributions and others can be quantitatively assessed so as to place a solid quantitative basis under neurosis and psychosis in a real unconscious context (Norman, 2013). The idea of unconscious fantasy is also addressed here: (Norman, 2013a; 2013b; 2013d)].

Two subjects are asked to participate in a study on consciousness and reality. One is healthy, and has had a loving home life. The other is neurotic, and has had a disturbed upbringing. Both are shown the same photo of a yellow butterfly. The two hypothetical associative chains are listed below:

Healthy subject A: Stimulus... butterfly. Associations: Butterfly-yellow-sun dress-mother-warmth-love-perfume-smile-sun

Neurotic subject B: Stimulus... butterfly. Associations: Butterfly-yellow-sun-son--mother-empty-cut-kill-sad

So, in free-association we can see a schematic reduced view of the entire process. Just as in our preliminary description of affective assignment we observe the process may become deranged, or function properly. The neurotic, as we can clearly see, has a different encoded, affective, abstract definition associated with the linear, complete symbol. It appears that the neurotic has improper abstract encoding bound into the collapsed object definition. We may deduce, in the case of unconscious primary process affective assignment, each and every entangled encoded mnemonic contributor which creates unified object quality, *is, or, is not*, an appropriate definitional piece of the unconscious transference. *A binary logical proposition at this scale.* Logical form is the basis of primary process/unconscious/quantum affective representation. Here, at the level of quantum metapsychological affective ontology, we see the same surprising dynamic, derived by the mathematical science of Elio Conte.

Soon, we will be in a position to draw our conclusions. The self-recursive dynamic is, as I have said, necessary at all scales, spanning physics and ontogeny. One more piece must therefore be laid into place. I will draw this last macro-psychological parallel from classic depth psychology demonstrating in intuitive simplicity, the derivation of logic, as an affective self-referential function developing directly out of the system's self-observing emergence in experience:

We can see, in the development of the infant, the self-configuration, the self-processing and initial creation of binary logical forms in response to the mental system itself being immersed in experience (Freud, 1900, p. 565-566; 1911; pp. 218-219; 1920). The infant has experienced a satisfaction, it has fed. Now it is hungry again. It has a mnemonic impression of feeding, and seeks by way of perceptual "regression," to reproduce the image in hallucination. This situation proves unsatisfying to the infant, who then seeks to remedy the situation in reality, and holds the image of feeding and its attendant hallucination away from its mind so as to find a new relationship with the



world, and seek not just the revival of a memory of satisfaction, but to achieve that satisfaction *in reality*. *The reality principle* (Freud, 1911; p. 219) is thusly founded. Here, we can see logic, the ability to distinguish between the real and the unreal, logic itself is created from the somatic and mental system's self-referential emersion in experience, and by way of systemic feedback, the unreal, the hallucinatory, is deemed unworthy of belief, as the pain and discomfort of the unsatisfied hunger drive are not met by the unreal, the real obtains a clear priority and precedence, and its identity is soon rightly distinguished from that of the hallucinatory and unreal. So developmentally, we may conclude that *logic is self-configured from within the psycho-somatic system itself as a function of memory, interacting with experience, mediated through feedback with the self-observed internal neural mechanisms of pleasure and pain*. Memory provides a vital self-recursive element, a self-consciousness of past states (Conte, 2015; p. 139). The result is a very particular and specific mental process of prioritization and rejection where a piece of *wishful experiential content originating internally*, a wishful hallucination, is held away from consciousness, the regression left incomplete, maintained at the stage of a mnemonic image rather than a hallucination (Freud, 1900; p.566), and another: *reality*, is thereby given precedence in consciousness. This holding away of an abstract/incomplete ideation from the conscious is a fundamental psychical dynamic which has many implications we will soon articulate. This automatic restriction of conscious ideational content is called *repression*, and it is the cornerstone of mental functioning and balance. Here, we see the very first fundamental *core* of repressive function which will approach its fruition with the creation of the super-ego in later development. Freud (1915) used the term repression to denote a defensive function responsible for creating much of the unconscious, repression: *"turning something away, and keeping it at a distance, from the conscious"* [his italics] (Freud, 1915; p.147).

Condensation and a first fundamental alteration: wavefunction, affect, and the knowledge factor

It will now be useful to condense the many pieces of information we have assembled, and take a

first tentative step toward a valuable alteration in our thinking. We have articulated the definition of an abstract mathematical object suitable for projection into a subspace from the pre-space. We have demonstrated a close relation between unconscious functioning described by the (psychoanalytic) primary process in its formative role in the transference, and the nonlocal aspects of physics embodied in the pre-space. The entirely affective basis of consciousness has been briefly articulated, structured as neuro-evolutionarily primary REM mediating abstract associative affective distribution in symbolic definitional encoding, forming a malleable comparative basis for reality testing, alongside affectively sourced cortical functioning and waking tone extending from the ARAS, to allow for object representation (of "mental solids").² We have established the deep connectivity between wavefunction collapse, and the transference. We have provided intuitive examples of mathematically derived principles. These are based in neuroscience and well established metapsychological theory. Logic has been shown to emerge as a product of self-configuration and self-observing systemic dynamism to begin the establishment of the repressed unconscious (analogous to the pre-space), and, logical form has been shown by way of psycho-anatomical dynamism reduced to a TOY theory, to be again, at the formative basis of said unconscious quantum dynamics. This makes good sense of the idea, that our affective ontological world, and that of physics alike, may well be properly represented at the lowest quantum genesis, through the fundamental contributions of the logical statements and semantic relations represented in the idempotent (and mathematically transformed nilpotent) abstract elements of Clifford algebra as projected into a subspace.

Let us follow Solms (2013) and tighten the implication one notch more:

"...our conscious thinking (and perceiving which thinking represents) is *constantly accompanied by affect*. This constant "presence"

² This self-comparative, internally self-referential symbolic encoded definitional structuralization is a clearly quantum-like process basis for mental functioning, where *probability* is a basic built-in fundamental aspect deriving reality, logic, and knowledge. The symbol is encoded, its *probable validity*, the *expected* behavioral outcome is then compared to the phenomenologically self-contained perceived actual outcome, and its valence, adjusted. The symbolic processes from which reality is derived are therefore quantum in operational dynamism.



of feeling is the background *subject* of all cognition, without which consciousness of perception and cognition *could not exist*. The primary subject of consciousness is literally invisible, so we first have to translate it into perceptual-verbal imagery before we can “declare” its existence” (Solms, 2013, p. 16).

This binding of affect to perception is in close parallel to our understanding of wavefunction collapse which yields a picture of reality, which is, or is not, there (Conte and Lucas, 2015; Conte, 2015a). Here the existential and knowledge factors converge.

We can now see (logically mediated) affect at the basis of consciousness, and, observe affective transformations and structured symbolic compoundings to be the basis of abstract object encoding, which once bound into an object by way of the transference, create reality. Conte has noted with great regularity (Conte, and Lucas, 2015; Conte, 2015a), that wavefunction is the basis of the knowledge factor, and of course, physical expression as well. Wavefunction collapse is, as we have demonstrated, akin to the abstract symbolic encoding (transference) of internal perceptual data which creates from unseen unconscious sources perceptual representation--reality. Please recall the great many experiments which assess and/or demonstrate focused affect creating variance in probability outcome and physical form (Radin 2013; Tressoldi *et al.*, 2014; Radin *et al.*, 2010; Radin and Nelson, 1989; Jahn *et al.*, 1997; Bösch, Steinkamp and Boller, 2006; Radin *et al.*, 2012). Affect, is the demonstrated basis of human ontological consciousness and reality creation, and acting just as within the ontogenetic transference, once projected outward into this physical subspace, it demonstrably affects physical outcomes... *just as the wavefunction*. I wish to offer a tentative, yet plausible adjustment to our thinking on this basis: “*Wavefunction is Affect*”

This insight will lead to many new potentially valuable directions of enquiry and result. In retrospective historical assessment, it is pleasing to note, how Bohr's initial model and Heisenberg's famous seminal insights which together infer a direct link between quantum mechanics and consciousness, leaving reality as a function of an endemic consciousness, fit beautifully with our assertions. Wavefunction, affect, create consciousness, which must precede and also mediate, the subsequent collapse, which

creates reality. Now we may assess the physics and psychology in a new light.

Clifford algebraic theory in example; implications for psychology: neurosis, psychosis, dreaming, memory consolidation and hallucination

I will admit that the idea of wavefunction collapse has never seemed convincing: a hollow, mechanistic, two-dimensional proposition which abandons the depth of superposed pre-reality in its subsequent linear definition. However, this is not in any way the case. I have shown, in agreement with Elio Conte's mathematical assertions, that the collapse is in fact an encoding of incomplete abstract idempotent mathematical elements bound into *proper* linear object representation. Think of our early example and definition of an abstract mathematical object. Imagine perception of a triangular table. Let us isolate the encoding of but one of the many associated abstract mathematical constituents encoded therein: the abstract mathematical object of the Euclidean triangle. To reiterate Dr. Conte: “The Euclidean triangle encodes no other properties than those implied by being triangular. Therefore, although classical logic requires that exemplification mode of predication exclude objects that are incomplete, the encoding mode of predication allows us to assert the existence of abstract objects that are incomplete with respect to the properties they encode.” So after collapse, the table has bound into its object representation, encoded into the resultant object, the abstract idea of being triangular, *an incomplete abstract element* encoded into the final properly defined object representation. We can now imagine many such abstract determinants each bound into the object representation as definitional affective associative symbolic underpinnings, as in our TOY theory, which in their composite, give *Quality* to experience, and are the very subject of perceptual qualitative reality and valence. This process, as we have demonstrated can function properly, or, improperly. We can now formulate general definitions of familiar states of mental aberrance, and basic functioning, in terms of affective wavefunction collapse as an encoding process. Quantum definitions of mental states can be derived.

The transference neuroses, as we know, comprise a struggle to maintain *repression*



against unserviceable unconscious content (an id/super-ego conflict); while psychoses constitute *a replacing of external reality with what should be repressed unconscious material* (delusions/hallucinations, etc.) (Freud, 1924; pp.150-151).

The transference neuroses

OCD, conversion hysteria, anxiety hysteria: (Freud, 1915; pp. 180-185). Please note the importance of these correct terms in light of modern psychological practice (Norman, 2013c; Feinstein, 2011). Please recall our TOY theory. In this example, feelings about the mother constitute improper and unserviceable associated abstract elements bound via wavefunction collapse into object representation of the butterfly in our hypothetical neurotic subject. We may reduce the neurotic dynamic in light of our new insights to: The transference neuroses correspond to improper encoding of projected abstract mathematical elements, as they conflict with regulatory psychical agencies (super-ego)—or—transference neuroses are a function of improper wavefunction collapse due to abstract mnemonic associative encoding malformations (as interactive with individual regulatory ontology).

Hallucinatory psychoses

The hallucinatory psychoses parallel a dream state (Freud, 1924; p. 151; Hobson, 2002; p. 688). We can neatly reduce the active principle in this observation: Hallucinatory psychoses demonstrate *incomplete wavefunction collapse* resulting in the direct perception of unbound incomplete abstract elements. A hallucination is exactly that—*An incomplete, affective, abstract object*. Here, wavefunction collapse is incomplete: directly perceived affective encoding, left unbound. Clearly, linear reality is abandoned, if wavefunction collapse is incomplete.

Dreaming and memory consolidation

REM promotes procedural learning (Hobson & Pace-Schott, 2002; p. 690) and lacks episodic content (Stickgold *et al.*, 2001; pp.1055-1056). REM dreams however, often appear as nonsense. How can procedural learning be properly consolidated, while episodic content is absent?

Here, our theory is quite helpful, and may allow us to draw possible inferences: We know, the objects to which these abstract pieces of hallucinatory encoding are bound, are simply omitted. The encoding which defines objects and procedures is thereby consolidated directly. An efficient return to primary REM consciousness to aid processing. So, dreams function by way of the primary process, and the superposed wavefunctions (entangled memory) associated with objects and procedures (quantum interference patterns) are manipulated and consolidated in REM dreaming, sans bound object representation. Hence, the “random” activity of dreaming is not in any way random, but only appears so, as the actual objects and procedures are omitted, and replaced, as in psychosis, with the abstract definitional associative underpinnings that provide actual qualitative and substantive definition to reality. Dreaming and memory consolidation therefore, are examples of pre-collapse projective abstract definitional encoding processes made manifest, and consolidated directly into memory.

Now we may examine several pieces of Dr. Conte's seemingly intangible quantum theory, easily understand their importance, and tie together our insights, so as to form a new approach to the hard problem of consciousness.

Concept analysis, bio-molecular homochirality as conscious isomeric selection via weak interaction, and the hard problem of consciousness

I will now bring forward several pieces of Dr. Conte's theories in light of our previous insights, draw out our final conclusions and suggested new directions for addressing the hard problem of consciousness. It is a primary objective of this paper to make the seemingly intangible and deeply mathematical insights of Elio Conte more available to the reader by way of isomorphic parallel across scales, in the context of affective psychology, and neuroscience. In so much as this has been successful, the following statements will now be clearly accessible to the reader:

1. Keeping in mind our exposition has deduced the primary role of wavefunction/affect in establishing consciousness, distributed at the lowest genesis by logical statements, the following becomes easily accessible to us: “...quantum mechanics contains some basic

features evidencing that its origin is also in the logic and in the cognition. It contains *ab initio* indication of our primary cognitive elements . . . In particular, the wave function of quantum mechanics, that is the pillar of the theory, must be considered as a factor of knowledge that engages our cognitive performance” (Conte, 2014).

2. Keeping in mind the above points regarding logical basis and quantum process derivation [see original article for embedded citations]: “It is well known that J. von Neumann constructed a matrix logic on the basis of quantum mechanics. We inverted the demonstration, we showed that quantum mechanics may be constructed from logic. This feature may represent a turning point” (Conte, 2013).

3. From the above cited source, this also becomes intelligible to intuitive comprehension:

“Since, as previously said, idempotent elements are representative of logical statements and thus of cognition and semantics, we conclude that in the basic foundation of our quantized basic reality *ab initio* there are elements of existence defined, not in terms of some hazy metaphysical concept of existence, but in the sense that existence, related to the cognitive act, is represented by abstract entities of the Clifford algebra, and it contains only two possibilities: existence or non-existence. A pure dichotomic cognitive variable structured *ab initio* in the inner architecture of our reality. There is *ab initio* in quantum reality a variable, we could call it “the factor of knowledge and existence” that travels with more traditional physical variables that identify matter per se and that we are accustomed to use in the traditional approach to reality that we formulate in classical physics. There are stages of our reality in which we no more may separate matter per se from the cognition and the principle of existence that we have to attribute to it.”

4. Keeping in mind our promising quantum applications toward defining mental aberrance, this is sensible to us: “Quantum mechanics not only gives a net identification of such basic feature of our reality but gives us also the possibility to quantify soon after with great care such basic features. This is of great importance not only when responding to the question to attempt to characterize our reality but also when passing as example at the level of the applications as in particular in diagnostic and therapeutic clinical fields” (Conte, 2015).

5. From the above referenced source, keeping in mind both our analysis of the symbolic affective system as inherently probabilistic, *and*, the internal affective structure of abstract affective symbolic elements, we may now comprehend the following without difficulty: “What is the rule in these cases? It is that one of the probability. Such alternatives are given in this quantum reality from probabilities. True and false may coexist at the same time with 0.5 of probability but may be also that true is with probability 0.7 and false with probability 0.3 or the vice versa. The same reasoning hold for what it happens or what exists.”

We do hope that these seemingly intangible mathematically derived concepts, are now accessible to the reader on an intuitive level.

At this point let us review all too briefly the many contributions to the topic of homo-chirality and the weak interaction as it relates to particular enantiomorphic selectivity of racemic isomers, many of which are referred to in this recent work (Conte, 2012). As we review this work and references detailing experimentally and mathematically the process which has created the specific conditions necessary for life itself to emerge, one is forced, having considered the demonstrated *ab initio* cognitive basis, to a startling and inescapable conclusion: in homo-chiral bio-molecular isomeric process selectivity, we are perceiving an act of quantum cognition. We must conclude no less than that.

The hard problem of consciousness

From the extremely important essay: *On the possibility that we think in a quantum probabilistic manner*:

“There are stages of our reality in which it results impossible to unconditionally defining the truth. Logic, language and thus cognition enter with a so fundamental role in quantum mechanics because there are levels of our reality in which the fundamental features of cognition and thus of logic and language, and thus the conceptual entities, acquire the same importance as the features of what is being described. At this level of reality, we no more may separate the features of matter per se from the features of the cognition, of the logic and of the language that we use to describe it. Conceptual entities no more are separated from the object of cognitive performance” (Conte, 2010).



In the above referenced work, a probability field, synaptic electron tunneling, and entangled effects are introduced to account for the ontological and interactive dynamic. Along with our previous exposition, we offer the following possible directions for future research into proving or disproving these exciting new concepts:

1. Prediction: As affect is ascribed the ontogenetic and physical ontological role of wavefunction, subjects who use mental effort to alter the interference pattern of a double slit experiment (Radin *et al.*, 2013), should when placed in an fMRI or other device, demonstrate heightened limbic activity during the process, and substantial neocortical to hippocampal informational exchange. Brodmann area 40 is predicted to demonstrate dynamic activity. Think of REM dreaming as an embedded model.

2. Prediction: As affect is proposed to be equivalent to wavefunction, subjects who are good at using their focused affect to influence physical outcomes such as double slit perturbation, or random event organization, should demonstrate less ability during trials measured by fMRI or other suitable means, when limbic activity is demonstrated as relatively reduced as recorded over a large number of measurements. Less ideally, relatively impaired ability is also predicted if given Haloperidol, or another agent which reduces limbic and other affective expression, [Haloperidol blockades dopamine receptors in the limbic system and mesocortex] (Goodman & Gilman, 1985).

3. Prediction: As subjects who visually hallucinate are proposed to be seeing the unbound quantum interference patterns associated with incomplete abstract elements,

their thinking should demonstrate a preponderance of measurable quantum interference effects in ordinary object identification and qualitative attribution, compared to normal subjects.

Conclusion

The complex mathematics of Clifford algebra in an affective psychological context may well have found for us, an approach to the hard problem of consciousness: *Wavefunction is affect, which creates physical and ontogenetic consciousness, and, physical and ontogenetic consciousness, is sourced at the unconscious level of the pre-space and necessarily precedes wavefunction collapse, which is the transference creating linear reality.*

Affective/wavefunction then, is in its dynamism, responsible for consciousness, the qualitative aspects thereof, as well as the knowledge and existential factors.

I have now suggested by way of neuroscience, depth psychology and Elio Conte's extensive Clifford algebraic mathematical proofs, that affect, this causal basis of consciousness is akin to wavefunction: the basis of both ontology and quantum physics. Consciousness is a fundamental potential logical/affective agent represented by the elements of Clifford algebra, which precedes mental operations and dynamic physical processes embodied in wavefunction collapse. Wavefunction, and its dynamism in superposition and collapse, *is* an expression of dynamic ontological consciousness/cognition, *the transference*, and also guides physical linear and particulate expression. Consciousness, is quantum, sourced in the unconscious pre-space, and is endemic, to all things.

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