

Toward a Quantum Psychiatry: Hallucination, Thought Insertion and DSM

Gordon Globus

Abstract

The “splitting” that characterizes schizophrenia is difficult to explain in the classical neurophysics context of nonlinear brain dynamics where compromise—the very antithesis of splitting—is fundamental. Hallucination and thought insertion become intelligible in the framework of thermofield brain dynamics (TBD). The clinical classification found in *The diagnostic and statistical manual of mental disorders* (DSM) is of practical value but not founded on basic principles. TBD is able to generate common diagnoses in a systematic way as disorders of “self-tuning” (autotonoesis). There is a major division between disintegrated self-tuning (schizophrenia) and mistuned self-tuning (e.g. mood disorders). TBD consiliates clinical psychiatric phenomena and quantum brain theory.

Key words: DSM, quantum psychiatry, mental disorders, thermofield brain dynamics, quantum brain theory

NeuroQuantology 2010; 1: 1-12

Introduction

Hallucination and thought insertion

Bleuler (1911) had proposed the term schizophrenia—literally split-mind—for the group of disorders which was misleadingly termed by Kraepelin (1919) “dementia praecox,” implying an early dementia. (“Splitting” has accrued later meanings in the wake of Freudian ambivalence but the classical Bleulerian sense is meant here.) The splitting takes place in a number of ways but the present focus is on hallucination and thought insertion. Hallucination in particular has spawned an extensive and thoughtful literature (Spence and David, 2004; Fernyhough, 2004; Frith, 1992; Hoffman, 1986; Jones, 2008; Jones and Fernyhough, 2007; Leudar and Thomas,

2000; Stephens and Graham, 2000). Hallucination encompasses a diversity of experiences “which may involve single and/or multiple voices, who may be known and/or unknown, speaking sequentially and/or simultaneously, in the first, second, and/or third person and which may give commands, comments, insults, or encouragement.” (Jones, 2008).

A deeper phenomenology of the splitting phenomenon is Clérambault’s “automatisme mentale.” (See Hriso’s (2002) translation and discussion of Clérambault.²) Automatism implies spontaneity, autonomy (that is, independence from the executive function) and repetitiveness. This is a fully dynamical conception whereas “splitting” is statically structural in connotation. However, the latter term will be used here since it is incorporated into the familiar diagnostic term *schizo-phrenia*.

Corresponding author: Gordon Globbus

Address: Professor Emeritus of Psychiatry and Philosophy
University of California Irvine, USA

Phone: + 949 759-9515

Fax: + 949 760-3671

e-mail: : ggglobus@uci.edu

Received Nov 16, 2009. Revised March 12, 2010. Accepted March 13, 2010.

² See also Kandinsky (1881, 1885).

It is easier to intuit what is at stake if the clinical description is put in the first and second person. Suppose you have a thought and it isn't part of your own thinking—but very clearly is identifiable as a thought—then it would be natural to conclude that your thought is the product of somebody else's thinking. Someone else's thoughts have invaded your mind. The inserted thought is still a thought you have—but it wasn't you that thought it. Furthermore,

“thought insertion involves more than merely supposing that another agent has influenced, or caused, one's thinking: it involves the impression that a thought occurring in one's own stream of consciousness actually is someone else's thinking. . . It is remarkably odder than believing that another person is somehow influencing or directing our thinking.” (Stephens and Graham, 2000 p. 142).

Thus thought insertion is more peculiar than thought control, which is manipulation of thought by an external mind or device. (A well-known paranoid delusion is that of thought control by some malevolent influencing machine.) Thought insertion is someone else actually thinking in your own mind, an *alien agency*, and you have his or her thoughts in addition to your own. In the case of thought control there is believed to be a thinker outside of you that is controlling the thinking going on inside of you, whereas in thought insertion that thinker actually coinhabits your mind.

So there are two subjects thinking in the clinical phenomenon of thought insertion: one subject is the familiar self and the other subject is “alien” such that “another thinks in her” (Stephens and Graham, 2000; p.172), “somebody else is doing his thinking in the subject's head” (p.11). Put in the first person, another subject's thinking is actually going on in me and I am conscious of their thoughts as I am conscious of my own thoughts. This is the central phenomenological finding in thought insertion: *There is unity of consciousness while agency is split.*

Thought “insertion” has a somewhat misleading connotation. We “insert” a coin into the parking meter but in the clinical phenomenon presently under consideration something from the outside is not put inside.

It is already inside, but alien, not self. The etymology of “insertion” is closer to the mark. Insertion derives from the Latin *serĕre*, to join, so *in-serĕre* is to enjoin. An alien subject joins in with the subject who gets the alien subject's thoughts, like them or not. Nothing is put in from the outside like a coin ... that would be thought control, like the external coin controlling the amount of time the meter is on. Thought “insertion” might be better called “co-thought.” The agentive subject splits while the unity of consciousness is maintained.³ One consciousness, two agents ... and one of them is alien and sinister, the second comfortably familiar.

The hallucination of “voices” is another remarkable clinical phenomenon, which is conventionally given a cognitive interpretation.

“... the striking or puzzling fact about voices is that, although the hallucinator is talking to himself, he believes that someone else is doing the talking and that he is only listening. That is, the subject misattributes the relevant speech or mislocates its source. The central problem, then, is to account for why the subject comes to mistake experience of his own inner speech for experience of someone else's speech.” (Stephens and Graham 2000, p. 60)

The psychotic person may hear a voice like any other but there is no one about who is saying the words. The experience of actually hearing voices may be unimpeachable. The person may (mis)attribute the source to the television or some malevolent broadcasting apparatus outside the room, but the voices are consciously heard. Often the voice – or more commonly, a small set of voices, each a persona – is making punitive judgments and commanding the person, though one persona may be supportive. Sometimes the voices are engaged in commentary, “Now he is doing this. Now he is doing that.” The

³ Some models try to explain hallucination as a “disconnection” phenomenon, in which auditory cortex is not connected with speech production areas, so the schizophrenic patient is unaware that the voice is self-generated. (See the discussion in Allen et al (2008).) But the unity of consciousness is maintained despite the disconnection, and as will be seen below, this is inconsistent with neural network theory which would have consciousness divided in the case of disconnection.

voices are not in the patient's own voice and may even have a different accent.⁴

The term "voices" is somewhat misleading. Voices can be incorrigibly perceptible but commonly they lack perceptual quality altogether. The patient may find it hard to make out what they are saying or there may be just a background whispering that is indistinct. The perceptible property of voices is highly variable in hallucination, a key point that is easily overlooked. To diverge from the near universal opinion that distinguishes hallucination and thought insertion, it is asserted here that they lie on one dimension which is the degree of perceptualization. At the extreme of no perceptual quality lies thought insertion, at the other extreme lies voices that are as perceptual as any other perception. As inserted thoughts begin to take on a perceptual quality they become "voices in the head," with more perceptual quality there are whisperings, finally full-fledged hallucinations. *Automatism mentale* is perceptually dimensional. In its manifestation as thought insertion the perceptual dimension goes to zero.

The nonlinear dynamical brain fails to explain thought insertion

The brain is conventionally considered to be a nonlinear dynamical system founded in classical neurophysics (Stein and Ludik, 1998). (See especially the discussion by Mender in this issue of *NeuroQuantology*). As such its states are represented by a trajectory in a state space. Because the brain has an hierarchical arrangement of subsystems richly interconnected by reentrant signalling at every level and with connections across levels too, its functional N-dimensional state space is unimaginably complicated. At any time the "global workspace" (Baars, 1988; 1997) in which

subsystems variably participate is in one conscious state or another. The nonlinear dynamical brain's state space topography has attractors and repellers, and the actual state moves away from repellers and toward attractors under an energy minimization principle ("least action") operating within a certain global context. Each attractor state is ultimately a maximized consensus state of participating subsystems within some unified context that plays the agentive role. That is, the agent acts as a top-level constraint on the evolution of the brain's neural networks, an evolution in which constraint satisfaction is maximized.

"Thus the self-system is more than just another knowledge representation – it is knowledge that provides a framework for all conscious experience. Self, in this sense, is a perspective, a point of view, an overarching context for the flow of conscious events. It has perceptual-motor, evaluative, conceptual, motivation and social aspects." (Baars, 1988; p.327)

Change the context by the agent's intentional shift and the state space topography changes too, which gives the attractor landscape a thoroughly dynamical organization (Globus, 1992). The agent's intention sculpts the landscape moment to moment, or to borrow Hameroff's (2006) apt phrasing, intention is "orchestrative." Functionally conceived, intention is a *self-tuning* confluent with the constraints of other-tuning (that is, sensory input) and the static tuning provided by memory traces. *Self-tuning orchestrates the dynamical organization of state space topography*, which also operates under constraints from memory and sensory input.

Despite all its facility the nonlinear dynamical model of brain functioning is unable to handle thought insertion for the basic reason that in this model the whole has ontological primacy and does not accommodate splitting. In the global workspace formulation two contexts must *compromise*. The attractors of nonlinear brain dynamics could only model splitting by sequential alternatives, for consensus is the essence of attractors. Least action comes to one harmonious result that maximizes multiple constraint satisfaction. The dynamical system does not settle into two different attractors at the same time. The minimization or "goodness" principle does

⁴ There is wide disagreement in conventional theories of hallucination. Arguably the leading interpretation (Frith, 1992) is that hallucination is a misattribution phenomenon. Normally our acts are coupled with signals that prepare the receptors and effectors for a world and our behaviors in it, and it is these signals that are associated with "mineness." The idea is that something goes wrong with this mechanism in schizophrenia so we do not recognize behavior and thinking as our own and experience it as "alien." But why if the voice is ours but not recognized as such—that is, split off, an *automatism mentale*—is it completely unlike our own voice but unique? The misattribution theory does not explain this central feature of hallucination.

not tolerate agentic disjunction but achieves a consensus. But in thought insertion some alien subject with its own intentional context has invaded the mind which thereby becomes schizo-phrenic. Unlike the compromise formations of conversion hysteria, schizophrenia is disjunctive. So to comprehend the splitting of agency in schizophrenia some other model of brain functioning is required. Perhaps quantum degrees of freedom will do the job.

Thermofield brain dynamics (TBD)

Thinking together psychiatry and neuroquantology is a first time meeting in different languages, which the present symposium tries to encourage. (See also Monsoor and Lindesay, 2009.) If the level of neuroquantological discourse is too fundamental, communication with the clinical field becomes difficult and the hermeneutic endeavor frustrated. A highly schematic take on the quantum brain is more likely to succeed. The form of neuroquantological theory adopted here is thermofield brain dynamics (TBD), which has been extensively elaborated (see below). The present claim is only that neuroquantology spoken with a certain accent can be thought gracefully with clinical psychiatry, and if so, quantum psychiatry opens up for wider and more intensive discussion. Thus this article is “toward” a quantum psychiatry.

TBD has its origins in the late sixties in proposals by Umezawa and coworkers (Ricciardi and Umezawa, 1967; Stuart *et al.*, 1978; 1979). The application to brain called quantum brain dynamics (QBD) was worked out by Jibu and Yasue (1995; 2004). (See Jibu, Yasue and Pribram (1993) for a formulation with more extensive mathematical development and also Ohsaku (2008)). Vitiello (1995; 2001; 2003; 2004) proposed the dissipative formulation of QBD that is TBD. Empirical foundations have been supplied by Freeman and Vitiello (2006; 2008; 2009) and ontological issues considered by Globus (2003; 2004; 2005; 2009b, in press).

The TBD formulation reduced to its bare skeleton is just Feynman’s “QED” (quantum electrodynamics) applied to dissipative systems. Quantum brain

dynamics is the QED of the brain’s water dipole field inside the microtubules *and* the nanolevel filamentous web of protein strands that percolates through brain tissue (Jibu and Yasue, 2004). The water-filled microtubules are the terminus of this filamentous web that pervades neuronal and neuroglial tissue. Essentially nondegrading dipolar solitons whizzing through the nanolevel web integrate regional dipole fields into a coherent whole. Such a quantum electro-dynamical system has a domain structure of macroscopic condensates in the bioplasma with a minimum size⁵ of 50 microns and with domains capable of coalescing over much wider regions. What is to be tried here is thinking a sketch of TBD together with clinical psychiatry.

TBD (like QBD before it) exploits the idea of symmetry-breaking in the water dipole field. The vacuum ground state in this case of the water dipole field has a unique property which allows differentiation of the dynamical symmetry. The dynamical symmetry is a kind of plenum in which uncorrelated water molecule dipoles point every which-way. Rotate each dipole by the same degree and the overall dynamics does not change. The exception is the vacuum ground state, which in the case of water dipoles is of the symmetry-breaking type. Here the dipoles are correlated, all pointing in the same direction. Now rotation of each dipole to the same degree results in a different state. *The indifference of symmetry becomes difference.* The quantum brain is able to reap a harvest from the plenum of symmetry. Umezawa’s (1995) group exploited this conception of symmetry-breaking to explain the traces that comprise memory.

The central idea of this theory of memory is that as a generalized consequence of Noether’s theorem on symmetry conservation, the symmetry lost from the plenum of indifference in virtue of symmetry-breaking is preserved (traced) in the form of condensates of coherent Nambu-Goldstone (N-G) bosons called “symmetrons.” (Nambu won the 2008 Nobel Prize for his work in this general area.) That

⁵ I have argued elsewhere (Globus, 2009a) that the minimum size of the domain structure “halts the descent into panpsychism.” For discussions of contemporary panpsychism see Skrbina (2009) .

is, the symmetry broken is retained by the symmetrons (under Noether's theorem). Symmetrons are N-G bosons which have preserved the symmetry lost under the goading "hard rain" of sensory stimuli⁶ that have dissipated their energy and fallen into the ground state. Different sensory orders break the symmetry in different ways while leaving their characteristic trace in symmetron condensates. Symmetron condensates of the ground state are near-zero in energy and easily excited out of the vacuum when the original sensory signals are replicated and match the traces. Memories become conscious in being excited out of the ground state—this was the Umezawa group's original interpretation. (Remarkably in this case, memory trace precedes *Existenz*. See Globus (2009b).)

The bioplasma sustained by the dissipative autopoietic brain comes under fine control. This is the brain's forte. It generates its own background signals to the vacuum state which bias it for matching signals of extrinsic origin. These self-tuning signals might be called "intentional." The brain is "self-tuning" of the ground state ("autotonoetic" (Globus, 2009b)). Self-tuning signals in effect softly prime the ground for the hard rapidly changing encounter with sensory and endosomatic input. Self-tuning is functionally contextualizing. The highest level of self-tuning is the agent, Baars' (1988) "self-system." Self-tuning from all levels functionally *attunes* memory for the convolution with sensory input. Consciousness (or existence) is the best match of self-tuned memory⁷ with sensory input under "least action" (Jibu *et al.*, 1993).

A remarkable feature of such a system emphasized by Jibu and Yasue (1995, 2004) is that symmetrons ideally provide an *infinite memory* which uses as resource an infinity of unitarily inequivalent theta-vacua. In the passing of each moment, a new trace is enfolded to a new theta-vacuum together with all the previous traces. This ideal total memory trace is eroded over time by quantum tunneling (Jibu and Yasue's theory

well accounts for both remembering and forgetting within QBD). However, following Umezawa they equate consciousness to memory recall and this seems unduly restricted for so rich a happening.

Vitiello (1995; 2001; 2004) greatly enriched quantum brain dynamics by emphasizing the dissipative nature of the living brain, with its ability to hold out for a time against the second law of thermodynamics and decrease in entropy. The dissipative system exchanges energy with its heat bath environment (in principle the rest of the universe), while the total energy of both system and heat bath remains constant under the first law of thermodynamics.

Dissipative thermofield dynamics allows the ground state to have dual modes. System and heat bath are modes which share the ground state. These dual modes are labeled non-tilde (non~) and tilde (~). The relationship between ~ and non~ modes is "intrinsic" (which means that the dual modes do not exist outside their relationship). The ground state is always "between-two." This conception greatly enriches ontology (Globus, 2003; 2005; 2009b), offering a new conception of duality which departs from philosophical tradition. The duality of dissipative neuroquantology is not that of Cartesian substances or Spinozan aspects nor does it require introduction of Sperry's (1969) ontological emergents. The duality is that of dual modes that might match, and when they do match, when they "belong-together" as complex conjugates, the imaginary dualities become a real unity. *The unity of phenomenal consciousness is between-two.*

Vitiello thus locates consciousness very differently from Jibu and Yasue, who had followed Umezawa in identifying consciousness with excitation of N-G bosons out of the vacuum state. Vitiello locates consciousness *to* the vacuum state: *consciousness is between-two.*⁸ Vitiello assigns the non~ system mode to the brain and the tilded mode to the brain's

⁶ The etymology of "stimulus" has to do with goading or pricking.

⁷ In the formulation by Globus (2009b) the traces participating in the match are "re-traces," that is, traces of recognitions of sensory order rather than traces of sensory order.

⁸ At this juncture Globus (2003; 2009b) departs from Vitiello, finding existence (*Existenz*) rather than consciousness between-two. That is, world-thrownness is between-two. However, this turns out to be a highly counter-intuitive formulation, which would be distracting in the present context.

surrounding environment.⁹ Consciousness is their match. Consciousness is between-two, between system and its environment, indeed consciousness is their belonging-together. Vitiello's transformation of quantum brain dynamics into dual mode quantum thermofield brain dynamics is an ontological innovation that opens a new home for consciousness: between-two. It also lights a way to conceive the splitting of alien agency from self agency as found in the thought insertion and voices of schizophrenia.

The Vitiello model might be schematized as three wave functions interfering in the vacuum state. There is an interpenetration of stimuli (both external and endosomatic), hierarchically organized self-tuning whose topmost level is agency, and memories. Conscious states form in their belonging-together in the ground state. Now if self-tuning were split, fragmented, dis-integrated, then the state of the between-two would be disintegrative too. It would be as if two discrepant images were *simultaneously* explicated from a hologram to which they had previously been *serially* enfolded.

TBD offers a new way of understanding schizophrenic splitting: as integration failure of the self-tuning function. Whatever belongs-together in the between-two is conscious, even when disparate attunements are each matched. In principle the agent might split many times over but consciousness still would remain unified, which is sharply distinguished from the usual nonlinear dynamics that obligatorily compromises and is antithetical to any splitting. A variety of factors—genetic, developmental, experiential—might contribute to the decoherent splitting of attunement in which the conscious state nonetheless remains unified.

Schizophrenia is thus a group of disorders in which self-tuning dis-integrates while the unity of consciousness is maintained. In contrast, when the corpus callosum is severed (as a neurosurgical treatment for intractable epilepsy) resulting in a "split brain," the unity of consciousness is broken and there are two consciousnesses.

⁹ To avoid confusion it should be noted that Globus (2003; 2009b) reverses Vitiello's tilde and non-tilde notation for reasons explained there.

Automatism mentale, inexplicable under classical nonlinear dynamical conceptions, becomes comprehensible within the framework of thermofield brain dynamics.

The Diagnostic and Statistical Manual of Mental Disorders (DSM)

DSM is a heterogeneous clinical classification that works out practically. The original DSM-I dates to 1952 and the current DSM-IV has been in use with minor revisions since 1994. DSM-V is still years from finalization and has been in the works since 1999, while subject to ongoing controversy. The classificatory scheme of DSM-IV is influenced by a variety of factors: clinical tradition, scientific findings, subcommittee dynamics of the task forces constituted by the American Psychiatric Association, patient advocacy groups, and commercial interests of "big pharma," in addition to the attempt to cut clinical nature at her joints. Since 1980 (DSM-III) the various psychiatric disorders have been defined in terms of clusters of symptoms that covary, i.e. "syndromes." DSM-V promises the addition of dimensional variables to enrich the classification scheme. DSM's goal of a scientifically sound, consistent and comprehensive classification scheme based in aetiology is certainly laudable but nowhere in sight.

It is beyond the present scope to consider DSM in its motley entirety. If major categories of DSM might be systematized in neuroquantological terms, then this would help float quantum psychiatry. It should be emphasized that the actual DSM classification is only slightly modified in the following discussion. The goal instead is to found the clinical logic of DSM in the neuroquantologic principles of TBD.

Psychiatric disorders as self-tuning disorders

In TBD there is superposition derived under three influences: sensory input, memory trace and self-tuning. Psychiatric disorders are mainly disorders of self-tuning but input and memory factors variously enter in, as will be described. The present proposal is that DSM be divided into two major categories, which is in accordance with venerable clinical traditions in continental

psychiatry. The first category is *disorders of disintegrated self-tuning*, which is the Bleulerian group of schizo-phrenias already discussed. The second category consists in disorders that are malattunements, which are most easily grasped through considering the psychopathology of moods, where global operations are prominent, but all functional psychiatric disorders other than schizophrenia are at heart distunings.

Positive symptoms of schizophrenia: Schizophrenic symptomatology is traditionally divided into positive and negative symptoms. The positive symptoms of hallucination and thought insertion have already been discussed in some detail. Another positive symptom will now be considered more briefly: *formal thought disorder*. There is a loosening of associations—a kind of idiosyncratic branching off of ideas—and a breakdown in discourse planning (Hoffman, 1986) that is highly characteristic of schizophrenia. (The Appendix well illustrates formal thought disorder.) An extreme version of this phenomenon is called “word salad” since different words are mixed together incomprehensibly. Formal thought disorder reveals that splitting as disintegration of self-tuning is not only in the state of consciousness at the moment—my thoughts vs. alien thoughts—but is a temporal phenomenon as well, in that thoughts keep splitting off in new directions.

Negative symptoms of schizophrenia: These symptoms are commonly associated with the positive symptoms of schizophrenia, especially as the disorder becomes chronic, but appear to be of a different type. Negative symptoms encompass a flat or “blunted” emotional life, a lack of motivation, loss of pleasurable experience (anhedonia), poverty of speech, disinterest in social relationships ... a general nulling of the person in all respects. The negative symptoms of schizophrenia can be conceived in terms of a decreased amplitude of self-tuning. So in the neuroquantologic model of schizophrenia self-tuning is both split and detuned.

Depressive and Bipolar Disorders: Depression is not a set of symptoms (sadness, poor self-esteem, low energy, lack of motivation, disengagement from

previously enjoyed activities, etc.) though DSM likes to count them off and DSM-V will likely dimensionalize them. Depression is a mode of existence (Binswanger, 1963; Havens, 1976). In depression we “see the world through a glass darkly” and all our actions reflect a person being more or less “down.” In the case of bipolar mood disorder the global operation of mood can be most striking, when the depressed mood may rapidly shift to exuberant mania. Now the global operator on existence makes the spirit soar, the energy excessive, the self-esteem inflated, every involvement urgent. In the manic phase the patient is the life of the all night party and in the depressed phase checked out of social life and can’t get out of bed in the morning. The patient is pathologically attuned—distuned—in unipolar and bipolar mood disorders, *situated* within one or another emotional horizon that affects everything. Mood disorders can be conceptualized as malattunements founded in genetic, developmental and learned factors. The affective component of self-tuning dominates the between-two in mood disorders.

Anxiety Disorders: Although anxiety disorders are not considered by DSM to be disorders of mood but are given their own category, anxiety is a mood-like global operator on existence too. The panic attack is most commonly not a discrete event “out of the blue” in an otherwise mellow life. These brittle patients are in general worried, apprehensive, over-concerned that things are not just right and will spiral out of control, obsessively concerned about details. Just as the classic bipolar patients have periods of “euthymia” when their mood is neither up nor down, anxiety patients have periods of some calm when life proceeds in a relatively unruffled fashion. The anxious mood disorder does not typically have the striking periodicity that may be seen in classic bipolar patients but in some bipolar patients the “up” mood is more characterized by anxiety than elation and so anxiety too can be periodic. Thus mood disorders can be bipolar, unipolar depressed, unipolar anxious, or most commonly unipolar

depressed and anxious.¹⁰ All of these cases can be conceived as affective mistunings based on genetic, epigenetic and learned factors which function as global operators constraining what might belong-together in the between-two.

Posttraumatic Stress Disorder (PTSD) is a special form of anxiety disorder in which some unexpected and overwhelming traumatic experience that threatens life or bodily integrity (or is witnessed in relation to someone else) precipitates the disorder, such as an automobile accident. Already anxiety-prone individuals are predisposed to develop this disorder after traumatic experiences. Here the memory contribution to the between-two dominates. As the patient with PTSD approaches the location where the accident took place, anxiety automatically mounts, as memory traces of the trauma are revived. But the location of the traumatic experience is in general avoidable and so the memory contribution is not what keeps PTSD going. Anticipatory worried self-tuning in general is a consequence of the traumatic event in particular and this lies at the heart of PTSD. Posttraumatic stress disorder is an event precipitated disorder of mood.

Obsessive-Compulsive Disorder (OCD): OCD is also a form of Anxiety Disorder. Obsessions are intrusive and inappropriate recurring thoughts, images or impulses (e.g. the thought of murdering a parent or a pornographic image). Compulsions are recurring actions such as checking a lock over and over or repeatedly washing one's hands. These are repetitive self-tunings which have a certain duration; they are "runs" or "trains" such as counting rituals. Here the self-tuning is a repetitive sequence of actions, a kind of limit cycle. A mild and common form of this is mid-sleep insomnia, where someone who feels burdened by unfinished business from the day half-awakens in the middle of the night and keeps turning over the same limited circle of thought, getting nowhere with it but unable to stop the round and round and round thinking. OCD phenomena are repetitive trains of self-tuning actions.

Adjustment Disorders: These are not entirely self-tuning disorders but provide a good perspective on self-tuning pathology. Their essential feature is "the development of clinically significant emotional or behavioral symptoms in response to an identifiable psychosocial stressor or stressors" (DSM 623). Stressors are environmental events that will initiate a psychiatric disorder only in some individuals who are already vulnerable in virtue of self-tuning tendencies. (The traumatic event that precipitates PTSD is an environmental stressor but it is an overwhelming unexpected sensory flooding whereas the stressors for adjustment disorders are situational.) Whereas in Bipolar Disorder major swings in mood may be quite orthogonal to what is going on in the environment now and memories of what has happened previously, Adjustment Disorders emphasize the input factor in convolution with self-tuning and memory factors.

Attention Deficit Disorder (ADD): Attentional problems derive from a different parameter of self-tuning than those already discussed. The difficulty in sustaining attention arises from self-tuning instability. ADD is commonly associated with hyperactivity in childhood and a certain fidgety restlessness in adulthood. This suggests a constitutional hyperarousal that tends to destabilize the self-tuning process so that the patient with attention deficit problems is easily distracted and has difficulties with task completion.

Personality Disorders: These are given their own axis (Axis II) in DSM for a reason that is symptomatic of the thoroughly ad hoc character of the DSM classification scheme. The reason for the distinction (DSM-IV, p.26) is merely that "consideration will be given to the possible presence of Personality Disorders ... that might otherwise be overlooked when attention is direct to the usually more florid Axis I disorders." The separation of Axis II "should not be taken to imply that their pathogenesis ... is fundamentally different from that for the disorders coded on Axis I" (p.26). The definition of Personality Disorder is readily interpreted as deviant self-tuning.

A Personality Disorder is an enduring pattern of inner experience and behavior that deviates markedly from the

¹⁰ The notoriously difficult-to-treat borderline personality disorder is pan-emotionally dystuned (angry, anxious, depressed, aroused, etc.), tending to ride off emotionally in all directions at once.

expectations of the individual's culture, is pervasive and inflexible, has an onset in adolescence or early adulthood, is stable over time, and leads to distress or impairment. (DSM IV, p. 629)

A number of distinctive patterns of deviant self-tuning are listed: paranoid, schizoid, schizotypal, antisocial, borderline, histrionic, narcissistic, avoidant, dependent, obsessive compulsive and "not otherwise specified." For example, Paranoid Personality Disorder is marked by pervasive distrustful and suspicious self-tuning, whereas Schizoid Personality Disorder is distuned so as to be detached from social relationships and restricted in the range of expression of emotions in interpersonal settings. The different patterns of personality disorder are simply different persisting general context-driven malattunements of the between-two and accordingly the states of conscious experience and behaviors that flow within it.

Multiple Personality Disorder: This disorder, which DSM catalogs under Dissociative Disorders, has been (over)dramatically illustrated in the book and film *The three faces of Eve* (Thigpen and Cleckley, 1957). Eve has three distinctive personalities, each with her own memories and each unaware of the others. Eve "switches" between the different personalities which have their own consciousness when the global attunement massively shifts. In splitting there is the person's usual attunement and an alien attunement at the same time, whereas in multiple personality the distinctive attunements are consecutive. This is a global shift rather than the split which is pathognomonic for schizophrenia. The distinct multiple personalities are somewhat unstable distinct global operators that constrain the between-two at different times.

Discussion

There is at present no discernable momentum within psychiatry for a shift to a neuroquantological paradigm. The clinical science of psychiatry continues its strong advance within a tacit classical neurophysical framework. However the decade-long unfinished effort to improve the clinical classification scheme used by psychiatrists

and the ongoing lively controversy over it¹¹ are symptoms that attract deconstructive attention and promote exploration of new ways of thinking. The present discussion and the companion article by Mender move in a new direction. But the heavy weight of the paradigm of successful clinical science in its "normal" phase (Kuhn, 1976) is thoughtlessly classical and metaphysical, and this is hard to shake off. As reconnaissance for change, a continental "leap" (Heidegger, 1999) might be tried and study undertaken of where one lands. The immediate vicinity turns out existential.

We might think of three wave functions interfering, interpenetrating, convolving. There are three participants in an interaction governed by a Hamiltonian least action optimizing principle (Jibu *et al.*, 1993). One participant represents the environment, a second participant represents memory and a third represents self-tuning intention. There is what is given, what had been given, and the self-tuning action that greets them. Existence lies between all three, in their fit, the belonging-together of environment, memory and self-tuning action. The highest level of self-tuning action is the executive function which is usually conceived either as an emergent virtual governor (Sperry, 1969) or as an interconnecting system or "global workspace" (Baars, 1988). In the present context, contrastingly, self-tuning intentional action becomes participant in an evolving convolution.¹² In schizophrenia a part of self-tuning splits off, becoming autonomous, "alien," which accounts for hallucination and thought insertion.

The unique state of interpenetrating participants (environment, memory, self-tuning) is a belonging-together. What provides the novel advantage in the thermofield formulation is that dual modes are involved. The belonging-together is real when the belonging-together is the match of complex conjugates. For Vitiello (2001; 2004) the match between dual modes is

¹¹ The controversy is well illustrated in *Psychiatric News*, Newspaper of the American Psychiatric Association, v.44, #16, 08 21 09 and becomes vituperative in *Psychiatric Times* v. XXVI, No.8, August 2009.

¹² This is compatible with the "process philosophy" of Whitehead (1929), in which change is ontologically fundamental. See Globus (2009).

consciousness and for Globus (2003; 2009b) the match between two is “existence” (understood as “world-thrownness” along Heideggerian lines).¹³ Consciousness or existence is literally a “creature” (Whitehead, 1929), a creation of the between-two.

The distortions of psychopathology variously arise out of abnormal inputs, abnormal memories and above all abnormal self-tuning, as illustrated above. Thinking along these general lines the classification of the DSM has been made intelligible with only minor modifications of its traditional form. In the hermeneutic the psychiatric contribution brings benefits to neuroquantology, too, pointing to the joints where brain nature articulates. The exaggerated and split self-tunings in psychopathology make vivid the fundamental self-tuning process.¹⁴ After all, self-tuning is perfectly transparent and so unnoticed. When self-tuning breaks or distorts, then we might see it for what it is.¹⁵ Thus both psychiatry and neuroquantology are advanced in their conciliation.

Appendix

The following vivid internet post is a response to the question, “What is thought insertion?” What is actually described, however, appears to be thought control. The post also well illustrates hallucination, paranoid delusion and thought disorder.

“I can explain thought insertion as I experience it I get it everyday all day long. It is NOT the same as voices but rather believing someone else is inserting thoughts into your head. They can act as voices, commanding you to do things, putting you down, and even telling you things that sound delusional to outsiders. That is how I developed my beliefs in the first place, the government and aliens are putting thoughts into my head. The government is currently telling me to make slits on my back so the jet

packs can pop out because they were being built from within from the nanobots. That means when it works, I can fly! I used to fly real airplanes and that was fun, so imagine me flying by myself! They also tell me that there is a super powerful bomb in my neck and sometimes they tell me to go catatonic or else the bomb will explode. Voices are an auditory hallucination where as thought insertion is classified as a delusion or a first rank symptom of schizophrenia. I sometimes hear voices as well though, but my thought insertion is much more often. The thought insertion is telling me that I will become a robot and have technology 200 years from now (the gov is 200 years from now in tech and the aliens are 1,000 years from now) and the only things that could kill me are the bomb in my neck, the laser satellites and the nanobots. Otherwise I am impervious to harm, bullets can't stop me, I can't get hurt but I don't know when the "transformation" will be complete- it can take weeks or even months. I feel it slowly. The gov when I'm still human threatens to kill me and once I actually heard them say it audibly. If I cut out the bomb, I can save the world from world war 3! I always have to say, I love the gov! They have a whole spy team assigned to me. Yesterday or the day before they were circling my house with helicopters but no one in the house heard them. I've even heard them with jets with full afterburners on fly over my house and once again, no one else heard them. Sometimes I see the gov in my house and other times I feel their presence because they are cloaked. They can go through walls.”
(*Firebird*)¹⁶

¹³ Globus (in press-b) argues that since the between-two is real in the match of complex conjugates, then the match should not be identified with a consciousness that is anything but real (which is just why the consciousness/brain problem is so problematic). The real numbers that characterize the between-two are instead consistent with world-thrownness rather than consciousness.

¹⁴ Clinical syndromes in neurology are another great potential contributor, an area that Metzinger (2000) has beautifully mined in a classical framework.

¹⁵ Cf. Heidegger's (1927) discussion of a tool breaking in the workshop so that one suddenly sees it as a tool rather than just using it.

¹⁶ <http://www.schizophrenia.com:8080/jiveforums/thread.jspa?messageID=75414>

References

- Allen P, Aleman A, McGuire P. Inner speech models of auditory verbal hallucinations: evidence from behavioural and neuroimaging studies. *International Review of Psychiatry* 2007;19:409-417.
- American Psychiatric Association Diagnostic and statistical manual of mental disorders, fourth edition. Washington: American Psychiatric Association, 1994.
- Baars B. A cognitive theory of consciousness. Cambridge: Cambridge University Press, 1988.
- Baars B. In the theater of consciousness. Oxford: Oxford University Press, 1997.
- Binswanger, L. Being in the world: Selected papers of Ludwig Binswanger Trans. J. Needleman New York: Basic Books, 1963.
- Bleuler E. Dementia praecox or the group of schizophrenias. Trans. J. Zinkin New York: International Universities Press, 1950.
- Fernyhough C. Alien voices and inner dialogue: Towards a developmental account of auditory hallucinations. *New ideas in psychology* 2004; 22:49-68.
- Freeman W. How brains make up their minds. New York: Columbia University Press, 2000.
- Freeman W. Intentionality. *Scholarpedia* 2007;2:1337.
- Freeman W, Vitiello G. Nonlinear brain dynamics as macroscopic manifestation of underlying many-body field dynamics. *Physics of Life Rev* 2006; 3:93-118.
- Freeman W, Vitiello G. Dissipation and spontaneous symmetry breaking in brain dynamics. *J of Physics A: Mathematical and Theoretical* 2008;41: 304042.
- Freeman W, Vitiello G. Dissipative neurodynamics in perception form vortices that are stabilized by vortices. *J of physics conference series* 2009; 174: 012011 (<http://escholarship.org/uc/item/9f50p188>).
- Freud S. The interpretation of dreams. Standard Edition v. 4-5. Trans. S. J. Strachey London: Hogarth.1900.
- Frith CD. The cognitive neuropsychology of schizophrenia. New Jersey: Lawrence Erlbaum Associates, 1992.
- Globus G. Toward a noncomputational cognitive neuroscience. *J of Cog Neurosci* 1992; 4:319-330.
- Globus G. Quantum Closures and Disclosures: Thinking together Postphenomenology and Quantum Brain Dynamics. Amsterdam: John Benjamins, 2003.
- Globus G. Dual mode ontology and its application to the Riemann hypothesis. In *Brain and being*. Globus, G., Pribram, K., Vitello, G. eds. Amsterdam: John Benjamins, 2004.
- Globus G. The being/brain problem. *NeuroQuantology* 2005; 3:256-263.
- Globus G. Halting the descent into panpsychism: A quantum thermofield theoretical perspective. In D. Skrbina, ed. *Mind that abides: Panpsychism in the new millenium*. Amsterdam: John Benjamins, 2009a.
- Globus G. The transparent becoming of world: A crossing between process thought and quantum neurophilosophy. Amsterdam: John Benjamins, 2009b.
- Globus G. Dissipative thermofield logic of the Tao symbol. *J of consciousness Stud*, In press.
- Hameroff S. Consciousness, neurobiology and quantum mechanics: The case for a connection. In: *The emerging physics of consciousness*. J. Tuszynski, ed. Berlin: Springer-Verlag, 2006.
- Havens L. Approaches to the mind. New York: Aronson, 1976.
- Heidegger M. Being and time. J. Macquarrie and E. Robinson, trans. New York: Harper & Row, 1962 (1927).
- Heidegger M. Contributions to philosophy (From enowning). P. Emad, K. Maly, trans. Indianapolis: Indiana University Press, 1999.
- Hriso P. Mental automatisms. A conceptual journey into psychosis. Commentaries and translation of the work of Gaëtan Gatian de Clérambault. Hermes Whispers Press, 2002.
- Jibu M, Yasue K. A physical picture of Umezawa's quantum brain dynamics. In *Cybernetics and system research* Trappl, R. Ed. Singapore: World Scientific, 1992.
- Jibu M, Yasue K. Intracellular quantum quantum signal transfer in Umezawa's quantum brain dynamics. *Cybernetics and systems* 1993;24: 1-7.
- Jibu M, Hagan S, Hameroff S, Pribram K, Yasue K. Quantum optical coherence in cytoskeletal microtubules: Implications for brain function. *BioSystems* 1994; 32: 195-209.
- Jibu M, Yasue K. Quantum brain dynamics and consciousness. Amsterdam: John Benjamins, 1995.
- Jibu M, Yasue K. Quantum brain dynamics and quantum field theory. In *Brain and being*. Globus, G., Pribram, K., Vitello, G. eds. Amsterdam: John Benjamins, 2004.
- Jibu M, Yasue K and Pribram K. Appendix to Brain and perception. Pribram, K. Hillsdale, N.J.: Lawrence Erlbaum, 1993.
- Jones SE, Fernyhough C. Neural correlates of inner speech and auditory verbal hallucinations: A critical review and theoretical integration. *Clin Psychol Rev* 2007; 26:140-154.
- Jones S. Do we need multiple models of auditory verbal hallucinations? Examining the phenomenological fit of cognitive and neurological models. *Schizophrenia Bulletin* 2008; doi:10.1093/schbul/sbn129.
- Kandinsky V. Zur lehre von den hallucinationen. *Archiv Psychiatrie Nervenkrankheiten* 1881;11:453-64.
- Kandinsky V. Kritische and klinische betrachtungen im gebiete der Sinnestäuschungen Berlin: Verlag von Friedländer and Sohn, 1885.
- Kuhn T. The structure of scientific revolution. Chicago: University of Chicago Press, 1976.
- Kraepelin E. Dementia praecox and paraphrenia. Trans. R. Mary Barclay, Ed. G. Robinson Malibar Fl: Robert E. Krieger Publ., 1971 (1919).
- Monsoor A., Lindesay, J. Quantum physics: Relevance to psychiatry. *NeuroQuantology* 2009; 7:314-317.
- Metzinger T. Being no one. The self-model theory of subjectivity. Cambridge: MIT Press, 2003.
- Ohsaku T. The model of the theory of the quantum brain dynamics can be cast on the Heisenberg spin Hamiltonian. *NeuroQuantology* 2008;6:289-290.

- Ricciardi LM, Umezawa H. Brain and physics of many-body problems. *Kybernetik* 1967; 4:44-48.
- Stephens G, Graham G. When self-consciousness breaks. Cambridge: MIT Press, 2000.
- Spence S, David A. (eds.) *Voices in the brain: The cognitive neuropsychiatry of auditory verbal hallucinations*. *Cognitive Neuropsychiat* 2004;9:1-151.
- Sperry R. A modified concept of consciousness. *Psychol. Rev.* 1969;76:532-536.
- Stein D, Ludik J. (eds.) *Neural networks and psychopathology: Connectionist models in practice and research*. Cambridge: Cambridge University Press, 1998.
- Stuart CIJM, Takahashi Y & Umezawa H. On the stability and nonlocal properties of memory. *J of Theoret Biol* 1978; 71:605-618.
- Stuart CIJM, Takahashi Y & Umezawa H. Mixed-system brain dynamics: Neural memory as a macroscopic ordered state. *Foundations of Physics* 1979; 9:301-307.
- Thigpen CH, Cleckley HM. *The three faces of Eve*. London: Secker & Warburg, 1957.
- Umezawa H. *Advanced Field Theory: Micro, Macro, and Thermal Physics*, New York: American Institute of Physics, 1993.
- Umezawa H. Development in concepts in quantum field theory in half century. *Mathematica Japonica* 1995;41:109-124.
- Vitiello G. Dissipation and memory capacity in the quantum brain model. *Int J of Modern Physics B* 1995;9:973-989.
- Vitiello G. *My Double Unveiled*. Amsterdam: John Benjamins, 2001.
- Vitiello G. Quantum dissipation and information: A route to consciousness modeling. *NeuroQuantology* 2003;1:266-279.
- Vitiello G. The dissipative brain. In: G. Globus, K. Pribram & G. Vitiello, eds. *Brain and being. At the boundary between science, philosophy, language and arts*. Amsterdam: John Benjamins, 2004.
- Whitehead A.N. *Process and reality. An essay in cosmology*. (Critical edition, D.R. Griffin and D.W. Sherbourne, eds.) New York: MacMillan, 1929.