The Quantitative Unconscious: A Psychoanalytic Perturbation-Theoretic Approach to the Complexity of Neuronal Systems in the Neuroses

Richard L. Norman

Correspondence should be addressed to:
Richard L. Norman
PO Box 387
O'Brien, OR. 97534
rich@richnorman.com

Abstract: To approach the complexity of dynamic neural informational exchange across active brain anatomy as revealed by modern quantitative technology such as MEG, PET and fMRI, a framework which will define that data is required. Psychoanalysis provides that frame of reference, where the "astronomical" complexity of neuronal systems can be assessed and understood while performing their psychical functions in a known metapsychological context. As physicists simplify highly complex stellar phenomenon and their effects upon planetary motion, we can use a "perturbation-theoretic framework," and enter metapsychology as an initial prediction to define the complex dynamic system. First this idea will be placed within an historical context, and then, three primary psychical systems will be delineated through reference to current research in cognitive neuroscience, and, the Freudian picture of dynamic neurotic nosogenesis. Next, by using metapsychology in three specific perturbation-theoretic intrasystemic approaches, general experimental designs are presented, some with an unconscious stressor, which will provide the context needed to assess intrarelated informational exchange across the subsystems of the functioning brain. In time, this interdisciplinary approach may well lead to a tool which will diagnose a mental illness in moments, and reveal the type of unconscious content which is currently functioning to create illness.

KEYWORDS: [metapsychology; neuronal-systems; neurosis; repression; unconscious]

Introduction: The Quantitative Unconscious and Intrasystemic Perturbation Theory

Quantitative scanning technology, such as MEG, fMRI and PET, is a new addition to the plethora of tools used to ascertain the organization of psychical functioning. With the advent of these quantitative technologies, Freud's (1895) original vision of a somatically, neurologically grounded psychology is becoming a reality. These new additions to our situation have brought us into what for physicists is familiar territory. The near astronomical complexity of active neuronal systems which are now available to our view, have a long familiar parallel in the highly complex systems of motion and gravitational influence which are so familiar in astrophysics. These highly complex problems of planetary motion and gravitational influence have long been addressed by way of using an approximate reliable guess in substitute for a specific prediction gleaned from the super-complex data as predicted by a theory to be tested (Greene, 1999, p. 288). This theoretic approach, know as perturbation theory, finds primary expression in the classic example of determining the motion of the earth through our solar system, but has many applications in physics, including string theory (Greene, 1999, pp.289-294). I propose that we can use this perturbation-theoretic approach to interpret the complex data emerging in quantitatively defined mental functioning. Instrumental efficacy is the basis of scientific reliability and usefulness (Boyd in Hempel (Ed.), 1983, p. 84). To find our approximate substitute prediction, we have not far to look, as psychoanalysis, in its curative influence, has been instrumentally demonstrable for over one hundred years. It is through the judicious application of metapsychological acumen that the transference structure is altered, and neurosis curatively affected through psychoanalysis, so, it is metapsychology which will act as our substitute approximate prediction to define mental functioning. Indeed, there is no more suitable template than metapsychology upon which to found such a prediction based upon emergent psychical properties springing from a neuronal network, as psychoanalysis has long and rightly understood that far from being linear, psychical processes are associative, topographical and dynamic in nature (Freud, 1900, 1915), hence the psychoanalytic method of free-association which is used to access hidden associated unconscious content.

The history of neurophysiology in psychology and psychoanalysis also points in this direction. Indeed, the burgeoning discipline of neuropsychoanalysis has already advanced no small distance toward this specific avenue. One need but review the progression of the clinico-anatomical method as redefined through the work of Freud, Luria, Kaplan-Solms and Solms, to find demonstration of these ideas. Freud saw the "intrasystemic" element, and understood that mental functions are not a simple matter of isomorphism or simplistic singular anatomical localization of functioning, but are processes which exist as a function of energetic dynamism exchanged between anatomical structures: "...thoughts and psychical structures in general must never be regarded as localized *in* organic elements of the nervous system, but rather as one might say, *between* them..." [emphasis added] (Freud, 1900, p. 611). Kaplan-Solms and Solms (2002) also state the view of Luria in this regard, and specify the perturbation-theoretic element as well, in its function as a definer and simplifier of highly complex data: "In doing so, one will not have localized that faculty in any one part of the brain, but will have identified the various components *between* which, by dynamic interaction, the physiological processes representing that psychological facility are produced. . . . We believe that this method of Luria's

represents a major step forward, because it enables us to identify the neurological organization of *any* mental facility, no matter how complex, without contradicting the fundamental assumptions upon which psychoanalysis was built" (Kaplan-Solms & Solms, 2002, p. 43). So we can see that the notion of a dynamic intrasystemic definition and interpretation of mental processes, mediated, simplified and functionally defined via metapsychological means, has significant historical precedent.

An approach must be established to the complex matter of anatomical and ontological mental functioning which looks to untangle the apparent complexity by focusing on the informational flow inherent in certain modes of processing and function. Brain activity, if observed at close range, that is, as a series of single circuits, leads to a picture so complex, as to all but defy understanding. Observe the role of the amygdala in the emotion of anxiety as referenced in: "Amygdala circuitry mediating reversible and bidirectional control of anxiety" (Deisseroth et al., 2011). Please note how complex this emotion is in regard to its dynamic neural location and source:

> "Neural circuitry arranged in this way provides many opportunities for modulation of expression of anxiety phenotypes; for example, this microcircuit is well-positioned to be influenced by top-down cortical control from regions important for processing fear and anxiety, including the prelimbic, infralimbic, anterior cingulate and insular cortices that provide robust innervation to the BLA and CeL. These data are consistent with reports implicating CeA involvement in anxiety 9,11,12, but it is important to note that our findings do not exclude downstream or parallel circuits including the BNST28, the insular and prefrontal cortices 29, and the septal–hippocampal circuit 30; . . . these findings demonstrate that anxiety is continuously regulated by balanced antagonistic pathways within the amygdala, and illustrate the importance of resolving specific projections in the study of neural circuit function relevant to psychiatric disease" (Deisseroth et al., 2011, p. 362).

So if we are to disentangle the complexity we must first back off the lens, and then determine the larger intrasystemic target which the metapsychology infers and functionally defines, that will later, once a suitable sample population has been assessed, yield a baseline value for that particular type of intrasystemic functioning. In this way, the now neurologically identified embedded metapsychological system's function is clear, and the quantitative dynamism of the informational flow can be interpreted. The problem with the innovative and brilliant optogenetic approach used above, is that the mass of complex information is not understood in context, and so, becomes a complexity rather than the manifestation of a predictable system. The signature of the embedded system, a relative relation of energetic activity which indicates its mode of processing, its purpose, will be discernible if we go from large to small, from psychology to neurology. First we identify and stress the system we know is there through our understanding of metapsychology, and watch how it reacts. *Then the complex information is seen as manifesting the architecture of a known underlying intrarelated conjunct subsystem, and the information becomes intelligible, now cast in the role of a particular psychological dynamic system.* To clarify this notion and demonstrate how it will lead to a tool for rapid diagnosis of mental illness and typological identification of unconscious content, I will first identify the three primary psychical systems implied by Freudian metapsychology, and provide an analysis connecting them to current cognitive neuroscience, after which, I will outline some particular

examples to bring the theory into focus.

Meta theory: The systems of affective assignment, overall repressive function and unconscious ideation

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 intrarelations. But, as we study sleep, it seems that with some psychology we may see the system of affective assignment in isolation, and gain some not inconsiderable 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 "overdetermination" (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 overdetermination (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), overdetermination of a dream through thematic repetition (Freud, 1900, pp. 283-284) and/or overdetermination 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 (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 (75–77), and (iii) the decreased outflow of information from hippocampus to neocortex (53). 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 (95) and minimal incorporation of episodic memories (96, 97)" (Stickgold, R., Hobson, J., Fosse, R., Fosse M. 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 aminergical 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 mnemic 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 (75, 76, 106, 107) and the hippocampal formation producing only minimal cortical output in REM (53), 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 (76, 108, 109). This adds to the deactivation of DLPFC, normally associated with higher cognitive functions (110), 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 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).

So 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. Now I will outline the next of the three psychical systems implied by the metapsychology.

The system of overall repressive function: A term generally ascribed to Johann Herbart (as cited in Erdelyi, 2006), and later taken on by Freud (1915) 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), has proven itself an instrumentally demonstrable proposition at once obvious and empirically elusive (Michael & Benjamin, 2006). Current research into the topic has approached this metapsychological cornerstone from various ancillary perspectives, ranging from the Pavlovian mathematical modeling and experimental determination of the neuropharmacology associated with SSRI therapy and the suppression of aversive predictions (Crockett et al., 2012; Dayan & Huys, 2008; Huys, et al., 2012), to the resource-depletion framework of task aligned/misaligned cognitive functioning (Storbeck, 2011), or the optogenetic activation of individual brain circuits and structures such as the amygdala, which mediates anxiety, and is sure to have a role in repression (Deisseroth et al., 2011, p. 362; Freud, 1926; Norman, 2010, 2011). Indeed, there are a great many particular neural structures, including the orbitofrontal and inferior regions of the PFC and

others, that promise to hold some individual part in the cooperative anatomical conglomeration which must work smoothly together so as to achieve the delicate and appropriate result of proper repressive functioning, which is so crucial to maintaining mental stability and balance (Norman, 2011; Ovaysikia et al., 2011, p. 2.; Shimamura, Marian & Haskins, 2012, p.1). If we are to understand the purpose of the complex and dynamic patterns of information as expressed over active brain anatomy, these patterns must be analyzed in terms of the instrumentally demonstrable metapsychology which they represent, and so, allow us to discover their purpose, and unearth the relative simplicity, the "intention" of those informational patterns of activity as they are made manifest in their operation, now clearly serving to contain the familiar quantitative and qualitative conflicts endemic to mental functioning.

Although modern research demonstrates the amygdala, the lateral PFC, medial PFC (including anterior cingulate gyrus), and lateral orbitofrontal cortex (OFC) are all involved in the repression and control of emotion and behavior, the exact way these structures interact to form the delicate result is still unknown (Deisseroth et al., 2011, p. 362; Feinstein, 2011; Ovaysikia et al., 2011; Shimamura, Marian & Haskins, 2012). The intrasystemic approach will go one step further and make the particular role of each neural anatomical structure clear, as the intrarelated patterns of informational exchange and activity are defined within the context of a known metapsychological system.

The intrasystemic experimental framework substitutes metapsychology for complex and specific theoretical predictions, and unearths the entire intrarelated collective subsystem as it functions, making sense of the complexity that emerges, as informational flow is assessed in terms of the instrumentally demonstrable theory. The key is a stressor that is added to the experiment, a stressor that is aimed directly at unconscious processes. All of psychoanalysis works through its relation with repression, and it is in changing the transference structure and bringing pathogenic unconscious affective sources to conscious recognition that the work of psychoanalysis is accomplished. “All repressions must be undone” states the ideal goal of psychoanalytic practice (Freud, 1904, p. 253). The validity of the metapsychology is long proven, so one need not predict, only stress the known metapsychological system and watch, and establish the particulars of its functioning as an observed fact. In this way the *purpose* of the processing we observe is known before its particulars, and so those effects, the information flow and pathways are better understood, as the intention and purpose of the system are known before the potentially complex experimental data, and can thusly explain it in a known and certain context. As the sample size grows, *a baseline of normal functioning for those systems will emerge as well as variations associated with different types of maladjustment and illness*. Repression has various and specific relations to different types of illness (Freud, 1905*d*, 1915 pp. 180-185; Jung, 1972). Current imaging research and other empirical study in the field of neuropsychopharmacology and computer modeling, once interpreted psychoanalytically, reveals just the sort of distinct and various repressive relations and types we would expect, each corresponding to a different sort of pathology: the proliferation of unrepressed negative prediction and ideation treatable with SSRI drugs in the case of depression, and the repressive mechanism of hysterical innervation in the case of conversion hysteria (Crockett et al., 2012; Dayan & Huys, 2008; Feinstein, 2011; Huys, et al., 2012). One can conclude that by detailing the particular emergent patterns of activity associated with repressive function specific to each pathological condition, a relative signature of intrasystemic energetic activity across brain anatomy associated with normal and abnormal conditions will emerge. The health and or imbalance of the patient will be definable as specific clusters of relative energetic relations, a

particular constellation of associated relative energetic traits specific to each sort of illness will be established, and a diagnostic tool for the general categorization of mental illness, health and functioning will result. Next, I will outline the third fundamental psychical system implied by the Freudian theory of neurotic nosogenesis and the topographical structure of transference and symptomatic dynamism, before bringing these ideas together with the unconscious stressor in a more specific picture of the entire neuropsychological framework.

The system of unconscious ideation: After having worked extensively with the method of Native Psychoanalysis (Norman, 2011), a technique which allows access to unconscious content, this author is entirely certain after having examined and analyzed thousands of examples, as to the nature of said content, which is entirely and invariably specific. This author has reached a very different conclusion as to the nature of unconscious content than the intersubjective notion that unconscious ideations and content are "an ineffable substrate" or "unnamable dread" as is common in today's psychoanalysis based on the model of the intersubjective processes and the work of Bion (Brown, 2011, p. 73, 134). That is a wish, the wish to look away from the unpleasant specific fact. Unconscious content is specific. Because unconscious content is specific, if it can be accessed, it is necessarily quantifiable. The "quantitative unconscious" is a notion, a nexus around which cognitive neuroscience and depth psychology are both determined.

There is an axiom in psychoanalysis which rightly states the relationship between unconscious fantasy, perversion, and neurotic symptomatology. Neurotic symptoms are *in the main*, accompanied by unconscious fantasy, which acts from the unconscious to affect conscious behavior and create symptoms. These "replacement gratification" fantasies are the active and unseen contributors to neurosis. This author has found many thousands of examples of this axiom: *"Neuroses are, so to say, the negative of perversions"* (Freud, 1905*d*, p. 165). To put it plainly, a perversion is the unseen unconscious positive, the active agent spinning away in the unconscious, creating neurotic symptoms via transference. These fantasies which are associated with neurotic (Freud, 1905*d*) and often psychotic (Freud, 1911) illness, are typologically distinct in their energetic and qualitative presentation. Although this author has found some limited number of other unconscious ideations of a universally painful character which also create symptoms from under repression, they are few by comparison to the wealth of perverse ideational elements (Norman, 2011, pp. 88-94). Each unconscious is sure to possess all of the various types, but one or two types will typically be represented in far greater predominance in any one unconscious (Freud, 1905*d*; Norman, 2011, p. 79). As these fantasies are specific, active, and unconscious (in the case of the neurotic), one can infer something of the processes which create them, and formulate a method to answer the question of their location, type, and the way in which they are repressed and kept unconscious. If they are not unconscious and a perverse personality structure is indicated, the lack of repression and its attendant moral development will also be available to see, and appropriate treatment recommended as is suitable in each case.

Unconscious fantasy is kept unconscious via anxiety (Freud, 1926; Norman, 2011, p. 89, 157; Brenner in Rickman (Ed.), 1957, p.239; Meissner in Wolman (Ed.), 1996, p. 44). Although the fantasy is active it remains unseen (Freud & Breuer, 1893-1895, p. 221; Freud, 1905*d*). I believe Hobson has found a key piece of the puzzle when he indicated the fictive dream space in which our dreams, which are but symbolic fantasies, are played out. The inferior parietal lobe Brodmann area number 40, is that fictive imaginary space which also serves a similar function in waking (Hobson & Pace-Schott, 2002, p. 687). Although the intrasystemic method offers an

experimental framework which is not prediction dependent, one can begin to focus one's attention here. It seems that either the inferior parietal lobe Brodmann area number 40 is receiving the input, and the function of repression is found in isolating conscious attention from the active display, as one would look away from a movie playing in a theatre, or, the "theatre" is dark, the inferior parietal lobe Brodmann area 40 has not been engaged, and the facility of repression is active in keeping the information signal containing the fantasy cut off from the inferior parietal lobe Brodmann area 40, and the fictive dream/fantasy space into which the fantasy must be projected to become conscious is isolated from the signal carrying the fantasy. If the exact mechanism of repressive function is one or the other, or something entirely different, *matters not*. The intrasystemic experimental framework will itself reveal the correct particulars, as the known metapsychological system is stressed and reveals itself in active operation, performing known tasks and clearly defined operations and processing which define the emerging data streams and their purpose in the context of known metatheory.

So, this last piece of the puzzle completes the rough picture I drew out describing the intrasystemic approach. Once a baseline for overall repressive function, and to a lesser extent, affective assignment, has been established, a *general* diagnostic tool can be constructed whereby a mental illness can be categorized by virtue of examining the pathologically associated intrasystemic signatures of relative energetic activity across active brain anatomy. Then, we add the ability to isolate and interpret the energetic intrasystemic signature of relative neural activity which corresponds to the unconscious replacement gratification fantasy in its various forms. This will yield a very *specific and precise* picture of mental functioning and diagnosis. The result will be a scan which will provide a detailed description of the relation of the subject's unconscious and conscious mind, allowing precise diagnosis of the general type of illness, and the typological identification of psychopathological unconscious content. Each type of unconscious ideation will be specific in its energetic presentation, and, specific as to its signature of distribution across active brain anatomy. Although the precise hidden thoughts in any one person are beyond this method to discover, the *type* of ideation should be clear to see. The combination of energetic characteristics and their distribution over active brain function will be unique and specific in their association, and hence, a typological identification of unconscious thought and ideation should be discernable. In example: Sadistic ideation will be the most energetic, masochistic content next, more overtly sexual content will be quantitatively less energetic still, and will also be unique in its anatomical distribution of energetic characteristics, and so on. Each type of content will be energetically distinct in its quantitative presentation, and, be specific as to the areas of the brain it will use to mediate and affect the fantasy, and so, each will present a different, distinct signature of relative activity, across the structure of the actively functioning anatomy of the brain. Now I will flesh out this theory, and provide a rough experimental picture to demonstrate the general approach, and clarify the specific role of metapsychology in defining the quantitative unconscious through perturbation theory, and make clear the meaning of metapsychological mediation and definition of mental processes via the unconscious stressor.

The quantitative unconscious: perturbation-theoretic intrasystemic experimental design and the unconscious stressor

In this section I will briefly draw together these many theoretical threads into a specific picture which will make the ideas of intrasystemic perturbation theory, the specificity of unconscious

content, and the experimental role of the unconscious stressor tangible as applied to the three psychical systems. As one applies this approach to interpret the three psychical systems, three distinct relations to the unconscious stressor are derived. The first of these three ***rough experimental outlines*** below, uses only an intrasystemic stressor, the next, an unconscious stressor spanning the breadth of unconscious ideation, and the last makes use of our specific psychoanalytic knowledge of unconscious content. So what is meant by these great many theoretical notions? A few specific examples will serve to clarify the matter.

An application of intrasystemic perturbation theory to the system of affective assignment: Although much work in cognitive neuroscience has been accomplished regarding the affective value assigned to facial expression (Adolphs & Tranel, 2004; Blair et al., 1999; Killgore & Yurgelun-Todd, 2004) and a test like the 1NT which clearly demarcates affective assignment exists, the 1NT does not separate the variables of repression and affective assignment, and, affective assignment is not limited to the assignment of affective value to social groups or faces alone, but endows all of human experience with symbolic and qualitative valence. Think of the previous discussion about affective, contextual and symbolic assignment to our neutral perceptual experience: e.g., One person may look upon a barren desert landscape and see beauty, another may see a desolate expanse most ugly and uninviting. For this reason the following test should be constructed: One has the subject look at a series of faces and scenes, each with a distinct affective element, or no such element: i.e., some faces are negative, some positive, some neutral, just as the scenes of cityscapes and nature, etc. As each person has individual prejudice and different affective definitions for *all* stimulus, this first test is a baseline marker for that subject. (The addition of a personality inventory and/or test for neuroticism at this point will provide a basic snapshot of personality type and its correlation to affective assignment, and further clarify the results). The subject must be well rested, and will respond to each stimulus and categorize the affect they have assigned to that stimulus by indicating an affective category along a continuum: Loving, Friendly, Kind, Neutral, Hostile, Hateful, etc. Each response is timed and recorded.

Next the subject has some single specific aspect altered which we suspect correlates with affective assignment, like *deprivation of REM*, since REM, as we have theorized, is the model of affective assignment and symbolic function, and therefore, may well be involved in properly rebalancing the system of affective assignment each night as a metapsychological function of the expression of a repressed wish (Freud, 1900), and analogously in the language of cognitive neuroscience, through the encoding of the affective component of experience into a REM dream indicative of neural processing (plasticity), and consolidation into the overall mnemic system, a process which also involves NREM/slow-wave-sleep (Stickgold, et al., 2001; Hobson & Pace-Schott, 2002).

Then once the associated metapsychologically defined variable, such as REM deprivation, has been changed, the test is repeated. Now, if the hypothesis correct, we will have demonstrated a correlation to be present, as affective assignment will be altered for the worse: the responses will take longer and demonstrate inefficiency and other possibly pathological alterations from baseline. Affective assignment has now been isolated from repression, and a correlation of specific and causal relation has been established. Next, as the intrasystemic stressor (REM

deprivation) has been causally linked to affective assignment, the entire test is repeated in an MEG, fMRI or PET, and the information gathered in the two images compared, one at baseline, one stressed. The system is thereby defined, and understood in context. One can observe the limbic activity and any other mediating affective structures, the particulars of which need not be predicted, but are rightly understood to be observed in operation, as the function they serve is known before the data that function defines is collected: *Here we are observing a distortion in the transference which provides affective definition to reality and perception.*

An application of intrasystemic perturbation theory to the system of overall repressive function: In his 1915 paper on repression Freud wrote that, "*the essence of repression lies simply in turning something away, and keeping it at a distance, from the conscious*" [his italics] (Freud, 1915, p. 147). As the Stroop task works to achieve its effect through the separation and suppression of some ideational elements, and the conscious selection and representation of other intermixed pieces of information, it can be recognized as a well established test rightly aimed at the repressive facility. We again establish a baseline, and administer a Stroop test suitable for use in a scanner with no stressor. The responses are timed. Then we repeat the test after altering a variable we suspect is correlated with repression, such as wholescale sleep interruption. (Hallucination and every indication of repressive failure are brought about by wholescale sleep loss). In this way, a correlation, although be it an obvious one, has been established, as the test times will be slower, indicating a loss of repressive efficiency. Then the test is repeated in a scanner. The images generated, once compared, will yield a basic picture of the active repressive system mediated by a single mode of stress.

Next the subject is rested, and an unconscious stressor using images spanning the full breadth of polymorphously perverse unconscious ideation is administered, and the test repeated in the scanner. As the ego dystonic images from the stressor take effect, the fantasies (or memories) that correspond to them in the unconscious are encouraged, and made active, just as a dream wish *may* be triggered by day world experience (Freud, 1900, p. 551). This stressed result is compared to baseline to establish the isolated effect of the unconscious stressor on repressive function, in terms of test times and scan images. This will yield a clear picture of a particular transference distortion. We have encouraged whatever *native pathogenic constituents* are present in predominance in the subject's unconscious, and stressed the repressive system as in a neurosis. In neurosis the subject refuses to admit an unconscious ideation into consciousness (Freud, 1905*d*; 1924, p. 150-151). He represses it, as our experimental subject is required to do, as he must allocate his attention outward to complete the Stroop task.

Next, the two stressors, sleep deprivation and the unconscious stressor are combined, to yield a third conjunct level of systemic stress, allowing directed insight into the *various energetic and anatomical dynamics* of the system. With the addition of a targeted metapsychological stressor aimed directly at the sort of unconscious content that is so often pathogenic, one knows psychoanalytically what the system is doing, and can look at the complex information gathered in the context of a known metapsychological function, and hence, discover the relative simplicity of intentional informational exchange—which is now revealed and understood in a functional context of known operation. Now it is clear what familiar repressive distortion we are looking

at: *the repression of a perversion or perversions as they affect the transference*, and so, the complex quantitative information collected is understood as to its purpose and function, even before it is gathered.

An application of intrasystemic perturbation theory to the system of unconscious ideation: Lastly, the picture of the quantitative unconscious must be completed in specific, to discover the typological distillation of unconscious replacement gratification fantasy, and secure a detailed picture of dynamic neurotic and psychotic nosogenesis. To gain access to the thoughts of the hidden unconscious mind and create a specific diagnostic tool of great precision and scope, one more step must be added. Each subject will have a different balance of unconscious content, and have various fixations and levels of energetic activity particular to their unconscious (Freud, 1905*d*, 1915 pp. 180-185; Jung, 1972; Norman, 2011, pp. 72-73, 79-80). One overcomes this difficulty by exposing the subject in an MEG, fMRI or PET to one unconscious element at a time, *one perversion at a time*. The imagery will reveal the particular areas of the limbic system and other neural anatomy which will become active, and correspond to the "neuro-affective" structures across which that aspect of perverse ideation is mediated. As the ego dystonic images from the stressor take effect, the fantasies (or memories) that correspond to them in the unconscious are encouraged, and made active, just as a dream wish *may* be triggered by day world experience (Freud, 1900, p. 551). We first apply the unconscious stimulus, and then, allow the initial impression from the stressor to fade, and once its direct impact has waned, we observe the result, as it has *encouraged the unconscious ideations to which it is related* toward emergence into consciousness. We then compare the former unstressed scan image to the latter, and deduce the intrasystemic signature of energetic activity which corresponds to each particular type of unconscious content. Again, the information is defined even before it is collected: *Here we are observing and identifying the intrasystemic signature of the particular and various types of pathogenic unconscious content which will affect the transference.*

As we have established: Subjects with a preponderance of a particular type of unconscious content, will demonstrate increased responsiveness to that particular type of content.

Once subjects have been identified with various particular types of predominant unconscious content, these subjects are tested as outlined above for the "overall system of repressive function," with the specific unconscious stressor associated with that subject's unconscious inventory, substituted for the general unconscious stressor spanning the breadth of polymorphously perverse unconscious ideation. The interpretation of the complex quantitative result is again available to define the data before its collection: *Here we observe the intrasystemic signature of a particular typologically identified piece of pathogenic unconscious content as it affects the transference from under repression.* The effects on task performance, and hence, repression can be observed first hand with full knowledge of the type of unconscious content and mechanism of distortion, which due to our test's construction, closely resembles a neurosis. This artificial neurotic simulation is created like the real thing: a piece of unconscious ideation is encouraged from under repression to affect the transference.

Lastly, we have but to apply our specific unconscious stressor *in substitute for the intrasystemic stressor*, and compare the result to a baseline for these same subjects, this time, *using our test for affective assignment*. We record the variations in test times and scans, to observe the actual

affective transference distortion first hand, and identify the intrasystemic signatures of *each type of content* as it affects the transference while actively assigning affective quality and definition to all of reality. *Here we observe the fundamental affective transference, on a physiologic and quantitative level, as it is altered and distorted in relation to each specific type of pathogenic unconscious content.*

Further experimentation will then serve to advance our knowledge of these systems in ever greater detail, moving beyond the explanatory power of the initial metapsychological perturbation prediction, to an ever greater and more accurate understanding of our psychical dynamic.

In conclusion: The most inclusive proposed psychical system, the system of overall repressive function, has long been known in its various levels of functioning to be associated with the different types of neurosis, psychosis and perverse personality formations (Freud, 1905*d*, 1911, 1915 pp. 180-185; Jung, 1972). Once the overall repressive intrasystemic neural signature associated with each illness has been established, this initial line of experimental approach will lead directly to a general typological diagnostic tool for mental illness. After a good night's sleep, a scan should clearly reveal the general relation of conscious and unconscious content as a function of repression. Once the general type of illness has been thusly identified, the repressive system itself in its level of development will make the choice of available treatment options clear, drugs in one case, psychoanalysis in another where repressive development and its attendant moral component are in evidence. The *initial* phase of repressive experimentation will yield a general diagnostic tool which will determine the type of illness and the appropriate treatment via a scan, following a good night's rest.

Once *all three* systems are understood, and the intrasystemic signatures associated with each condition identified, the clear typological identification of specific unconscious content and ideation will complete the picture. A noninvasive scan may reveal in minutes what formerly took years of psychoanalysis to discover, and hence, the technology thusly applied should reliably diagnose a particular mental illness, and also, provide typological identification of the pathogenic unconscious content itself, and its relation to consciousness. The typological identification of unconscious content in the context of observed repressive function and affective balance, may greatly reduce the time required for successful psychoanalytic treatment, by informing the physician of vital factors that were once hidden to observation. This line of research could change the entire way psychology is practiced, insuring proper and objective diagnosis, rapid identification of pathogenic unconscious content, and specific recommendations regarding efficacious and appropriate treatment in each case. The Quantitative Unconscious, once functionally defined through a Perturbation-Theoretic Intrasystemic Approach to mental functioning, may serve as a vital descriptive nexus, a central unified theoretical framework, within which, psychical functioning in its relation to the super complex physiology of dynamic neuronal systems, and ontology, might both be described, and functionally understood, without conflict.

References:

Adolphs, R., & Tranel, D. (2004). Impaired judgments of sadness but not happiness following bilateral amygdala damage. *Journal of Cognitive Neuroscience, 16,* 453-462.

Blair, R. J. R., Morris, J. S., Firth, C. D., Perrett, D. I., & Dolan, R. J. (1999). Dissociable neural responses to facial expressions of sadness and anger. *Brain, 122,* 883-893.

Brown, L. (2011). *Intersubjective processes and the unconscious.* London: Routledge.

Crockett, M.J., Clark, L., Apergis-Schoute, A. M., Morein-Zamir, S., Robbins. T. W. (2012). Serotonin modulates the effects of pavlovian aversive predictions on response vigor. *Neuropsychopharmacology,* advance online publication, doi:10.1038/npp.2012.75

Dayan, P., Huys, Q.J.M. (2008). Serotonin, inhibition, and negative mood. *PLoS Comput Biol, 4*(2): e4. doi:10.1371/journal.pcbi.0040004

Deisseroth, K., Tye, K. M., Prakash, R., Kim, S. Y., Fenno, L. E., Grosenick, L., et al. (2011). Amygdala circuitry mediating reversible and bidirectional control of anxiety. *Nature, 471,* 358 – 362. doi:10.1038/nature09820

Erdelyi, M.H. (2006). The unified theory of repression. *Behavioral and Brain Sciences, 29*(5), 499–551

Feinstein, A. (2011). Conversion disorder: Advances in our understanding. *Canadian Medical Association Journal,* (183) 8, 915-920.

doi:10.1503/cmaj.110490

Freud, S. (1886-1899). *The standard edition of the complete psychological works of Sigmund Freud volume one: Pre-psychoanalytic publications and unpublished drafts.* London: Hogarth Press.

Freud, S. (1893-1895). *The standard edition of the complete psychological works of Sigmund Freud volume two: Studies on hysteria by Joseph Breuer and Sigmund Freud*. London: Hogarth Press.

Freud, S. (1900). *The standard edition of the complete psychological works of Sigmund Freud volumes four and five: The Interpretation of Dreams*. London: Hogarth Press.

Freud, S. (1901 - 1905). *The standard edition of the complete psychological works of Sigmund Freud volume seven: A case of hysteria, Three essays on sexuality and other works*. London: Hogarth Press.

Freud, S. (1911-1913). *The standard edition of the complete psychological works of Sigmund Freud volume twelve: Case history of Schreber, Papers on technique, and other works.* London: Hogarth Press.

Freud, S. (1914-1916). *The standard edition of the complete psychological works of Sigmund Freud volume fourteen: On the history of the psycho-analytic movement, Papers on metapsychology, and other works.* London: Hogarth Press.

Freud, S. (1923-1925). *The standard edition of the complete psychological works of Sigmund Freud volume nineteen: The ego and the id, and other works.* London: Hogarth Press.

Freud, S. (1925-1926). *The standard edition of the complete psychological works of Sigmund Freud volume twenty: An autobiographical study, Inhibitions symptoms and anxiety, Lay analysis, and other works.* London: Hogarth Press.

Galak, J., Meyvis, T. (2011). The pain was greater if it will happen again: The effect of anticipated continuation on retrospective discomfort. *Journal of Experimental Psychology: General,* Vol. 140, No. 1, 63–75 0096-3445/11/. doi: 10.1037/a0021447

Greene, B. (1999). *The elegant universe.* N.Y.: W.W. Norton and Co. Ltd.

Hempel, C. G. (Ed.) (1983). *Methodology, epistemology, and philosophy of science.* Dordrecht, Holland: D. Reidel Publishing Co.

Hobson, J. A. (2001). *The dream drugstore.* Cambridge, Massachusetts: MIT Press.

Hobson, J. A., & Pace-Schott, E. F. (2002). The cognitive neuroscience of sleep: Neuronal systems, consciousness and learning. *Nature Reviews Neuroscience,* (3). doi:10.1038/nrn915

Huys, Q.J.M., Eshel, N., O'Nions, E., Sheridan L., Dayan P., Roiser, J. P. (2012). Bonsai trees in your head: How the pavlovian system sculpts goal-directed choices by pruning decision trees. *PLoS Comput Biol,* 8(3): e1002410. doi:10.1371/journal.pcbi.1002410

Jung, C. G. (1972). *The psychogenesis of mental disease*. Princeton New Jersey: Princeton University Press.

Kaplan-Solms, K., & Solms, M. (2002).
Clinical studies in neuropsychoanalysis: Introduction to a depth neuropsychology.
London: International Karnac Press.

Killgore, W. D. S., & Yurgelun-Todd, D. A. (2004).
Activation of the amygdala and anterior cingulate during non-conscious processing of sad versus happy faces. *Neuroimage, 21,* 1215-1223.

Levens, S., Gotlib, I. (2010).
Updating positive and negative stimuli in working memory in depression.
Journal of Experimental Psychology: *General,*
139(4), 654–664 0096-3445/10/. doi: 10.1037/a0020283

Michael, C. A., & Benjamin, J. L. (2006).
Encouraging the nascent cognitive neuroscience of repression.
Behavioral and Brain Sciences, 29(5), 511-511.

Norman, R. (2010). *Mind map: Psychological topography*
and an approach to a new creative psychology,
or, the secret of happiness. O'Brien, OR.: Standing Dead Publications.

Norman, R. (2011). *The tangible self.* O'Brien, OR.: Standing Dead Publications.

Ovaysikia, S., Tahir, K., Chan, J., & DeSouza, J. (2011).
Word wins over face: Emotional Stroop effect activates the frontal cortical network.
Frontiers in Human Neuroscience, www.frontiersin.org.
Vol. 4, Article 234. doi: 10.3389/fnhum.2010.00234

Pace-Schott, E. F. (2003). *Sleep and dreaming: Scientific*
advances and reconsiderations.
Cambridge, UK.: Cambridge University Press.

Rickman J, (Ed.) (1957). *A general selection from the works of Sigmund Freud.*
New York, NY.: Doubleday.

Shimamura, A., Marian, D., & Haskins, A. (2012).
Neural correlates of emotional regulation while viewing films.
Brain Imaging and Behavior, Original research published online by
Springer Science+Business Media. doi: 10.1007/s11682-012-9195-y

Stickgold, R., Hobson, J., Fosse, R., Fosse M. (2001).
Sleep, learning, and dreams: Off-line memory reprocessing.
Science, 294, 1052 – 1057. doi: 10.1126/science.1063530

Storbeck, J. (2011). Performance costs when emotion tunes inappropriate cognitive abilities: Implications for mental resources and behavior. *Journal of Experimental Psychology*: *General*, Advance online publication (2011, Nov. 14). doi: 10.1037/a0026322

Wolman, B. (Ed.) (1996). *The encyclopedia of psychiatry, psychology and psychoanalysis.* New York, NY.: Henry Holt and Company.