

Neuropsychology in Clinical Practice: New Directions for American Psychology, Psychoanalysis, and Behavioral Science

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Abstract- This paper stresses that the understanding and use of neuroscience and an awareness of brain biology is crucial to contemporary psychology, and must be incorporated into theory and practice. It shows that such a practice was present in early American psychology and in recent decades it has been renewed and expanded. It examines the central concepts uniting psychology and neuroscience.

Keywords- *Psychology; Neurology; Brain; Neuroscience; Neuropsychology; Psychoanalysis; Behavior; Mind; Emotions; Theory; Treatment; Emotions; Psychodynamics; Neural Connections; Pre-Frontal Cortex; Stress Hormones; Psychic Energy; Unconscious; Language; Memory*

I. INTRODUCTION

This paper argues that the current practice and future of psychological, psychoanalytic, and behavioral theory and clinical practice relies upon a full incorporation of the biological and neurological sciences into them. It contends that the development of such a science of mind had its origins in America around 1900 in a group of mostly Harvard-trained neurologist-psychologists led by the eminent neurologist James Jackson Putnam, along with William James, Morton Prince, G. Stanley Hall, John Dewey, Hugo Munsterberg, James Mark Baldwin, and others. It shows that this movement became truncated following Sigmund Freud's visit to America in 1909, when Putnam was convinced to adopt Freud's metapsychology. This turn away from a nascent American science of mind narrowed the development of American psychology and lead to the present situation in which psychologists need to return to this "lost" American tradition, and by going back, go forward to reunite theoretical and clinical work with recent biological and neurological brain studies of transcendent, "oceanic" experiences. In this sense, this paper has a historical aspect in addition to its theoretical and clinical emphases.

The basic theory implicit in this paper is that brain, mind, and body are interactive and inseparable; that psychic energy is renewable; that neuroses are not states of being, but the absence of dynamic activity in the prefrontal cortex; that human emotions are dynamic, ever-changing, and organized by brain biology; that in the evolution of experience new neural connections refashion past structures; and that all neural pathways are charged with emotive features and connections. Early American psychologists began to develop such a theory, and recent psychologists, neuroscientists, and brain biologists have rediscovered, refreshed, and further expanded the earlier insights.

II. A NOTE ON EARLY AMERICAN PSYCHOLOGY

Putnam, then, was crucial. Born in 1846, Putnam graduated from Harvard Medical School in 1870 and subsequently studied neurology for two years in Leipzig, Vienna, and London [1]. He worked with Theodore Meynert at the University of Vienna as Meynert painstakingly dissected and weighed human brains to deepen his grasp of the regional action of neuropathology by locating every psychological expression in the bio-neurology of the brain. Back in Boston, Putnam founded one of the first neurological clinics in the United States. In 1875 he was one of seven charter members of the American Neurological Association and eventually became its president. He also founded the Boston Society of Psychiatry and Neurology. By 1893 he became the professor of diseases of the nervous system at Harvard. In addition, he established a clinic in his house where he treated patients without regard to fee. He worked tirelessly with the poor in Boston. He promoted reform and educational movements. During the decades from 1870 to his death, Putnam published more than one hundred scientific papers on clinical and pathological neurology. His earliest special area of research involved disorders of the spinal cord and peripheral nerves, paresthesias, and neuritis. He was also keenly interested in childhood education and applied himself to the study of child development. At first severely critical of functional or psychological explanations of nervous symptoms, his views changed drastically during his career as he was influenced by the work of Jean Martin Charcot, Hippolyte Bernheim, and Pierre Janet in clinical psychology, and by forensic psychology through his experience in giving evidence in legal cases involving traumatic neuroses. "Remarks on the Psychical Treatment of Neurasthenia" preceded and anticipated some of Freud's work. In 1906, Putnam published the first reports of cases written in any English-speaking country on the treatment of hospitalized patients by psychodynamic psychology. In his paper titled "Recent Experiences in the Study and Treatment of

Hysteria at the Massachusetts General Hospital: With Remarks on Freud's Method of Treatment by 'Psycho-Analysis,'" he provisionally concluded that Freud's method might prove beneficial, but that it was "often less necessary" than Freud claimed.

Putnam developed a model that gave special emphasis to six ideas: (1) that body, brain, and mind were interactive and inseparable; (2) that human psychic energy is abundant and renewable; (3) that neurosis is the absence of being, not (as Freud reductionistically held) a state of being; (4) that the unconscious or subconscious is dynamic, expansive, ever-changing, structured in brain biology, and has positive as well as negative components rather than being, as Freud believed, a cauldron of repressions; (5) that in the context of new experience new neural connections will refashion past structures; and (6) that all neural associations are charged with emotions. More "alive" than Freud's mental model and more promising in clinical work, Putnam's synthesis was neglected and suspended until it was "lost" except to historians.

III. THE CONFLICT BETWEEN PUTNAM AND FREUD

With Freud's arrival in America in 1909 to lecture on psychoanalysis at G. Stanley Hall's Clark University, American psychology broke into two streams: Freudian psychoanalysis and varieties of American non-Freudian psychologies. Putnam tried to straddle and unite both movements through a series of arguments with Freud. After all, Freud had been trained as a neurologist and worked with Meynert, Charcot and Bernheim ten years after Putnam did. So Putnam had good reason to believe that he could bring Freud back to his biological roots, as expressed in Freud's "Project for a scientific Psychology" [2]. Initially Freud responded favorably to Putnam's ideas and even himself translated Putnam's "On the Etiology and Treatment of the Psycho-neuroses" for the *Zentralblatt*. Even later, Anna Freud translated Putnam's essay "On Some Broader Issues of the Psychoanalytic Movement," a work that strongly insisted on the necessity for integrating psychology with neuroscience and a rigorous philosophical analysis.

But the difference between them was glaringly exhibited at the Third International Psycho-Analytic Congress of 1911 at Weimar, at which Freud had personally handpicked Putnam to give the keynote address. Putnam knew that he and Freud had crucial, core differences, and he was determined to argue that any psychology would remain incomplete without an adequate conception of the biological, neurological, and theoretic relations between mind and body. He worried about being misunderstood, but he consoled himself that the members of the International Psycho-Analytic Association that he had met were "intelligent, interesting men," and that in addition, "about a dozen intelligent women ... including Mrs. Jung," were to attend. He began his speech by courteously praising Freud's insights, and asserted that he only wished to suggest a "supplement" to Freud's ideas. Then he moved on to more conflictual grounds. Putnam's paper was subsequently published as "A Plea for the Study of Philosophical Methods in the Preparation for Psychoanalytic Work," but he delivered his Weimar address in vigorous German to doctors, few of whom knew English at all at that time, whereas American scientists all knew German, French, and Latin well [3]. Putnam began with praise for Freud's energetic ideas, but turned them on their head. The principle of the conservation of energy, he argued, did not mean "that [just] as no energy is ever lost so no energy is ever gained, and that we live in a world of determinism, where the same old forces, coming no one knows from where, are shuffled to and fro, like the bits of glass in a kaleidoscope" [3, p. 252]. Putnam stressed the energetic reality of biological fact. New possibilities for energy, he argued, are ever coming into existence, for without them nothing novel would be created and human evolution would be merely adaptation, a "simple moulding of man on the world of nature, as wax is moulded on a stamp ... No one really accepts such a world as this" [3, p. 252]. Putnam asserted, even though this was indeed the world that Freud and his followers did accept. Putnam's conclusion was that analysis must affect body, brain, mind, and the neurological impulse to develop and change. So, psychology was seized by Putnam for its service to human evolution: "If evolution of mind through brain development can be deepened by a process of self-analysis, then, surely, we can do him [man] a service if we help him to make such an analysis" [3, p. 263]. Without an aim in the arena of an evolutionary ideal, Putnam was saying to anyone who listened, psychoanalysis or clinical psychology would be no more than an investigative enterprise. But it could become more--if psychologists listened to and understood Putnam's six principles.

But no one at Weimar did listen. The truth was that the audience there was ill-equipped to hear Putnam's point. The opening of Putnam's address was greeted by expectant applause. Then, as George Prochnik, Putnam's historian, writes, this "gave way to a hush, to a frozen quiet--and then, more slowly still, to the stirrings of restlessness, the tugging of beards, a peppering of coughs, the shifting of rear ends" [4, p. 185]. The conferees, he says, were "stumped" [4, p. 185]. Putnam thought he knew what had gone wrong. The Europeans, he concluded, were simply trained too narrowly. "Well, the paper is read and done for," he wrote to his wife Marian, "and when one thinks that, of course most of the folks (including Freud) have no head for philosophy" [4, p. 185]. Most of the European therapists at Weimar were ill-trained scientifically and psychologically, and ill-equipped to distinguish between a metaphysical theory and a disease; or to understand the difference between a pathology lab test and a scientific analysis. As the great American neuroscientist Eric R. Kandel has written, "the lack of a scientific culture led to the insularity and anti-intellectualism which characterized psychoanalysis in the last 50 years..." [6, p. 55]. On his own, and on American grounds, Putnam had worked out a theory and model of the unity of mind-and-brain in his subsequent book *Human Motives*, a volume whose psychological argument is still waiting for adequate assessment. Putnam held to the unity of the mind-brain-body continuum and continued to understand biology, neurology, psychiatry, psychology and scientific analysis together while Freud's abandonment of biology narrowed the psychological field he created. In essence, he abandoned a neuroscience model for a mentalistic one, based flimsily only upon verbal reports of subjective experience.

Psychoanalysis soon began to devalue experimental inquiry and to decline intellectually. At the same time, ironically, its influence on psychology increased.

IV. NEW DIRECTIONS FOR PSYCHOLOGY

So, Putnam fell into oblivion, and the promising beginnings of his biological psychology were suspended--until the last two decades. Today, neurobiology and cell biology have moved far ahead of Freud's--but not Putnam's--model of mind. The present time in America is ripe for a reconsideration and reconstruction of psychology as an instrument for the evolution of consciousness through empirical analytic research, empirical theory, and clinical practice. Eric R. Kandel is exemplary of a large group of bio-neurological scientists who brought new life and new dimensions to psychology, and point to further, future developments. Kandel, the only American psychiatrist to win the Nobel Prize in medicine, followed a career path that today psychodynamics must retrace. Intending to become a psychoanalyst, he completed a residency in psychiatry, but turned, instead, to neuroscientific research, brain change, and learning--central concerns of psychology--through investigations in molecular biology. Focusing on the sea slug, *aplysia californica*, he established that learning takes place not by altering neurons but by building new synaptic connections between them. Remodeling occurs through new experience because gene expression constantly produces new structural changes in the brain and brings about dramatic anatomic rearrangements in the nervous system. In short, we are the experiences of our brains. The idea was not entirely new. As early as 1846, Carl Gustav Carus [6] sought to approach consciousness through the non-conscious. Through biological investigations Kandel managed to establish what Carus could only suggest. We can now scientifically assert, as Antonio Damasio [8] also does, that "the brain knows more than the conscious mind reveals" [8, p. 42]. Genes, Kandel [8] observed, are not simply the determinants of behavior--they are also servants of the environment [9, p. 39-40]. Kandel has boldly predicted that the "biology of the mind will be the central pursuit of modern scholarship in the twenty-first century, much as the biology of the gene was the central pursuit of the last half of the twentieth century" [9, p. xxii]. Brain biology exhibits the centrality and power of both memory and desire in patients, and psychologists will need to attend to these in a serious way.

Obviously, the biological discoveries elaborated and refined over forty years by Kandel and many co-workers have profound implications for psychology. From a neurobiological perspective, humans are understood not as pre-programmed, mechanistic beings, hopelessly determined, nor as endlessly conflicted entities, but as ever-changing networks that constantly alter with experience. Such research vigorously asserts that therapy is itself an experience that can profoundly change brain chemistry and the mental-emotional functioning of mind, and it is likely to be more effective than drug therapy. As the psychoanalyst Glen Gabbard [10] observes that drugs are not going to change someone's tendency to, say, demonize others or fail to listen. That, he argues, requires therapy. [10]. Psychopharmacology has now been almost entirely replaced by many forms of therapy in nearly all psychiatric residencies and in the fee schedules of insurance companies, but in the future, we are likely to see psychotropic medications used not as a primary modality but as adjuncts to dynamic psychotherapy. We need a psychologist of the mind to add a biologist of the brain to his or her repertoire. Evidence already exists that this is possible and desirable. Recent studies have shown that for obsessive-compulsive and depressive patients therapy produces measurable reductions of activity in the right caudate nucleus of the brain by normalizing serotonin levels and causing metabolic changes in the brain's thinking areas. For patients who are seriously deprived in early childhood, new learning and new memory in a clinical treatment can alter the pre-existing neural pathways and lead to gene expression in new patterns of behavior. We now also know that anger or fear are not the consequences of an "aggressive instinct," but, for instance, start in the prefrontal cortex and are triggered deep in the brain by release of the stress hormone cortisol. We can now understand how feelings of sympathy, sadness, and loss are active in the ventromedial prefrontal region. We can understand that emotions of attachment and pleasure are related to chemical molecules that are released into the bloodstream by the hypothalamus directly or by way of the pituitary gland.

Commenting on an article by Kandel [9], the psychoanalyst Arnold Cooper [11] persuasively predicted that by collaborating together, psychoanalysts, psychologists, behaviorists, and neuroscientists will provide "a richer, more nuanced understanding of such human qualities as emotional responsiveness, unconscious mental processing, chronic resentment, self-damaging behavior, self-pity, persistent avoidance of loving and gratifying relationships, and resistance to change" [11, p. 60]. Chemical and behavioral psychologists must learn from neuroscience how to measure change in a more rigorous, empirical manner than the untestable tradition of subjective assessments made through the therapist's character. For instance, neuroimaging by use of Functional Magnetic Resonance Imaging (F.M.R.I.) is already allowing measurements of language, emotion, non-conscious activity, and even the experience of "romantic love." Psychology has already arrived at the ability of medical technology to allow researchers and therapists to measure treatment progress (or lack of it) by brain scans. It is foreseeable that during treatment an analyst may be able to monitor the varied activities in the brain in relation to real time interpretation and interchange.

The price that psychologists will have to pay for the extraordinary clinical advances that testing and measuring will bring to heuristic and ameliorative clinical outcomes does not reside especially in the necessity of learning a biological field. This will be an easy task compared to the more stringent necessity of acknowledging that many of the ideas cherished by traditional therapy are simply wrong. Neurobiology recognizes unconscious or non-conscious states in their neural basis, while nearly the whole of the idea of a messy, unstructured, conflictual, repressed, libidinous unconscious is unsustainable. Infantile amnesia

we now know to be the result of a lack of adequate memory pathways in a young child. The biological basis of theories of attachment and separation anxiety helps to clarify both diagnosis and treatment choices much better than traditional theories of attachment. In neuropsychological terms, transference takes a richer, fuller, more dramatic meaning as old pathways are revisited and modified in the new therapeutic dyad. Donald Klein [12] has commented strikingly on some other misleading core claims of traditional psychodynamic theories and practices:

Freud's explanatory insights about anxiety were frequently misleading. For instance: that behind every phobic fear lay a repressed wish; that attachment to the mother was "anaclitic," derived from need satisfaction; that the infant's stranger anxiety and separation anxiety were both due to anticipation of a rising flood of ungratified libidinal drives; that school phobia was due to the child's unconscious hostility to the mother; that dyspnea is due to the lasting effects of birth trauma; that the panic attack is due to undischarged libido caused by coitus interruptus; that castration anxiety is central to masculine development and superego formation; that social anxiety is due to repressed exhibitionist desires, and so on. Such claims were based on the flawed but fundamental analytic procedure of "interpretation" [12, p. 111].

By contrast, neuroscience contributes to clinical psychologies by redefining brain functioning. Its core principles are: that all mental processes are neural; that genes and protein products determine neural connections; that experience alters gene expression; that learning reconstructs neural pathways; and that, finally, psychodynamic therapy can alter gene connection.

The picture I have drawn may seem to suggest that psychotherapy will become the stepchild of brain biology. On the contrary, for all its limitation or misleading chemical features, dynamic and behavioral therapies have produced the richest vision of mind that exists. Kandel's research [13] took him away from training in psychotherapy, but he never abandoned his regard for it and has asserted that psychoanalysis "still represents the most coherent and intellectual view of mind" [13, p. 78]. Its basic strengths remain in its vision of mind and the complexity of the issues that will need to be brought to the attention of and be addressed by the neurobiologist. By its nature, neuroscience is concerned with specific biological research issues, while psychotherapeutic thinking has always striven to grapple with general concerns involving mankind and mind. To keep from reducing humanity to biology, a human science of psychology is needed. The concept of the role of society in the life of the mind in the individual or in groups is necessary to lead biology into a study of productive areas that biologists alone would not choose. As psychology absorbs neuroscience, neuroscientists must in like manner be attentive to a broad, new, psychological vision of mind, with its larger grasp of the complexity of individual and other minds.

V. THE RECOVERABLE TRADITION OF AMERICAN NEUROPSYCHOLOGY

With notable early exceptions, such as Oskar Pfister and Carl Jung, European psychoanalysts tended to take a skeptical view of human possibility, human strivings, man's hope, and man's spirit. Even today, in most psychiatric and psychological training programs students learn a great deal about psychopathology with little instruction in normality. That being the case, philosophy has never made its way into training or clinical practice. By contrast, American neuropsychiatry and philosophy tended to envision clinical therapeutic work as one source of positive ethical and social evolution for mankind. The historian Nathan Hale [14] has said flatly that the Americans had "a highly optimistic outlook, more sanguine than Freud's at his most hopeful" [14, p. 115]. Putnam, James, Morton Prince, Dewey, and others saw man in a wider and more unified way than the Europeans, who tended to see only the dark side of human nature, while the Americans understood psychotherapy as having an ethical function, giving people some ease from neurotic conflict and so releasing them to strive toward biological brain change. The French psychologist Julia Kristeva [15] recently noted that Freud used the word freedom rarely [15] and paid little attention to it. But, she argues, the capacity of human beings to create meaning ensures the fundamental mental existence and experience of freedom. American thinkers arrived at this position a hundred years ago and it seems to be viable and available once more. Unremitting psychopathology and "common unhappiness" are not the unavoidable destiny of people. Putnam wrote to William James that he could envision "a truly personalistic [mental] universe with love and hope in it from the start" [5, p. 48] as several versions of emotive psychologies are now contending. Both James and Putnam understood that psychology must be taken seriously, but they envisioned an unconscious also containing benevolent and benign moral strivings. Both insisted that conflict did not account for all of human relations. Both refused to reduce love to sexuality. With their colleague Morton Prince they resisted Freud's dualism and insisted on the interactive oneness of mind and body. These convictions allowed Putnam to lecture Freud on his reductionism more rigorously than any of Freud's co-workers could. Like the neuroscientists of the present day, Putnam [5] argued that the "real thing to study, if one would be truly fundamental, is the mind, in all its aspects, and this cannot be done fully if we confine ourselves to pure psychology as usually studied" [5, p. 95]. Far more than the Europeans, the Americans, as Hale says, "had an intense concern for scientific method: as early as 1903, Edward Thorndike said the [psychotherapeutic] goal was 'quantitative precision,' 'direct observation,' 'experiment,' and the careful use of statistics," being convinced that "psychological data were as valid objects of attention as tissue" [14, p. 115]. The earlier Americans' idealistic beliefs in the positive forward-going aspects of therapy are not "mere philosophy," but have turned out to confirm an important aspect of brain biology. The neuroscientist Richard J. Davidson [16] has given the following example, that adults:

Who regulated their emotions well [i.e. positively] showed a distinctly different pattern of brain activity than those who didn't. These people apparently used their prefrontal cortex, the part of the brain that exerts "executive control" over certain brain functions, to tamp down activity in the amygdala, [the part of the brain] that processes [negative] emotional content,

especially fear and anxiety. In people who are poor regulators of emotion, activity in the amygdala is higher, and daily measures of the stress hormone cortisol follow a pattern associated with poor health outcomes. Those people who are good at regulating negative emotion [by using] cognitive strategies to reappraise a stimulus show reductions in activation in the amygdala [16, p. 74].

The earlier American psychologists were right all along, in ways they could not verify due to the immaturity of the science of brain biology in their time. But they practiced clinical psychology that provided not merely insight into the origins of neuroses, but a curative outcome in personal healing and enhanced social participation.

VI. THE EMOTIVE BRAIN

This section focuses upon recent studies that provide a biological, neuroscientific basis for the operations of emotions regulated by the brain and expressed in the mind and body. This insight originated with the early American psychologists. William James died on August 26, 1910. Putnam was the inevitable choice to write James's obituary, which appeared in the December, 1910 issue of the *Atlantic Monthly*. He especially praised James's "truly radical empiricism" which "enabled him to maintain his stout adherence to scientific accuracy and to assert the necessity for taking experience as the court of last resort, yet at the same time to recognize the existence of influences that transcend the evidence of the senses" [17, p. 846]. This, Putnam said "kept him in touch at once with science and ... [also] made it possible for him to believe in spiritual freedom" [17, p. 846]. Brain studies have helped us to regain some of James's and Putnam's comprehensive views of freedom in the brain.

In the twenty-first century, studies of brain activity have uncovered the sources of biological influences that transcend the evidence of the senses in the brain itself. During the last decade several neuroscientists have designed experiments to identify the areas of the brain that are active during conscious emotional feelings. This growing area is variously named "neurotheology" or "spiritual neuroscience." Neurologist Putnam would have approved. He believed that something equivalent to an emotional feeling of spirituality resides in man's brain. At the University of Montreal, Mario Beauregard [18] used f.M.R.I technology to examine the brain activity of fifteen Carmelite nuns during times of contemplation, prayer, meditation, or spontaneous verbal utterances. Beauregard started with the proposition that "It is as important to study the neural basis of experience as it is to investigate the neural basis of emotion, memory, or language" [qtd. in 22, p. 38].

Beauregard examined the brains of the nuns under three different states, two of them "controls" (resting, and recollecting an intense social encounter), while the third involved thoughts about a vivid past experience with God. The f.M.R.I. recorded cross sections of the brain every three seconds, capturing the whole brain's activities every two minutes, as each nun revolved among these states. Six regions of the brain were activated only during the nun's recollections of feelings of communion with God--the caudate nucleus, the insula, the parietal lobe, the medial orbitofrontal cortex, the medial prefrontal cortex, and the middle of the temporal lobe. Beauregard's conclusion seems justified: 'spirituality' is a complex experience distributed throughout the brain by neural networks, connecting several areas [18]. In a later experiment Beauregard used a faster measuring technique, quantitative electroencephalography (EEG), to scan the fluctuating voltage from the summed responses of millions of neurons in real time. Again, as the nuns shifted from thoughts of a social experience to thoughts of God, Beauregard's team found that during the spiritual phase, the most prevalent brain waves were long, slow, alpha waves associated with deep relaxation, as well as lower-frequency waves in the prefrontal and parietal cortices and the temporal lobe, associated with meditation and trance [18, p. 187-189].

Other researchers, such as Michael Persinger [19] have also found that activity in the temporal lobe was associated with emotions of bliss or happiness. Michael Davidson [16] tentatively located activation in the left prefrontal cortex during meditation states of Buddhist subjects. Newberg and d'Aquili [20] saw increased activity in the prefrontal lobes in Franciscan nuns during their prayers. Other research by Newberg [20] investigated whether meditation can relieve stress and sadness in certain brain regions in cancer patients; and whether meditation can preserve or expand cognitive capacities. His results were tentatively affirmative. Sara Lazar [21] and her colleagues at Harvard suggested that the repeated experience of meditation might even delay aging. In her subjects who frequently meditated, the prefrontal cortex and the right anterior insula showed an increase in thickness. The normal process of aging has the opposite effect.

As yet there is no more than a general consensus on the exact locations of brain activation during transcendental thought: it is likely that several regions are neurally connected in a pervasive brain experience. But, as David Biello [22] writes, because "of the positive effect of such experiences on those who have them, some researchers speculate that the ability to induce them artificially (or habitually) could transform people's lives by making them happier, healthier, and better able to concentrate" [22, p. 39].

Certainly, the beneficent effects of experiences of emotional ideals do not "prove" or "disprove" the existence of God. Beauregard's nuns concluded that their brain scans identified regions where they felt "God" interacted with them [18]. Finding a cerebral source for spiritual experience identified for them the way that God reaches out to humankind. Science, they said, had given them yet one more reason for faith. An atheist could as justifiably conclude that "religious experience" is no more than a certain sort of neural activity. Damasio [23] is likely to have had it right when he argued that emotions, religious beliefs, or ethical principles are not "cheapened" by acknowledgement of the participation of "simple circuitry in the brain core" [23, p. xix] The edifice of ethics does not collapse, morality is not threatened, and in a normal individual the will remains the will.

What changes is our view of how biology has illuminated the origin of certain impulses toward spirit, ethics, and freedom. Damasio [24] has arrived at this conclusion by means of Spinoza, philosophy, and neuroscience. He argues that when you are loving to others there is a good chance of achieving inner peace and happiness. Thus, a person's actions should not be aimed at pleasing God, but rather at acting in conformity with the nature of God. When you do so, some kind of happiness results and some kind of salvation is achieved. Spinoza's salvation--salus--is about repeated occasions of a kind of happiness that cumulatively make for a healthy mental condition [24]. Today's Spinozas are psychologists and neuroscientists--but the conclusion is the same: the wisdom of idealism accepts that the negative exists, but "wise people," as Michael Davidson [16] concluded, "have somehow learned not to get bogged down in it" [16, p. 74]. One is led to suspect that Freud's often-repeated assertion that he could not experience a positive "oceanic sense" reflected his own personal blockages of some kinds of potential neural activity more than it described the strivings of most of mankind.

Today psychologists, equipped with neuroscience and brain biology, are ready for a new kind of clinical practice informed by Kierkegaard's [25] powerful distinction between guilt, tragedy, and the comic. He observed that "the tragic is suffering contradictions, [while] the comic is painless contradiction," because "the comic has a way out, [while] the tragic sees the contradictions and despairs over the way out" [25, p. 233]. The comic, he says, "touches the secret of existence in the pain, but then [it] goes back home again" [25, p. 233]. That is, the comic vision grasps at freedom; it sees tragedy, but overcomes it through ultimate reliance on self, mankind, or divinity. After guilty and tragic man, we are beginning to be ready to achieve a vision of cosmic comic man. The now outmoded cliché that irredeemable tension exists between biological and the emotional loses the value of both. Biology and emotionality both occur in the same brain. Both are indices of an organizing scheme behind an ordered, purposeful, and well-tempered life.

VII. CLINICAL APPLICATIONS

The investigations of the contributions to clinical practice made by neuroscience have increased very markedly in the last decade. These studies often recommend that a psychological treatment begin with a set or subset of tests conducted by a neuropsychologist, including neuroimaging CT scans, magnetic resonance imaging, resonance imaging, or transcranial magnetic stimulation, or positron emission tomography. The purpose of such crucial tests is to pinpoint any existing structural brain injuries or unusual features in order to identify abnormalities in specific sites in the brain. Following the development of specific functional concerns, an interview with the patient, and sometimes the family, is conducted to assess the patient's psychological capacity for self-understanding and introspection, his or her cognitive ability, and behavioral skill or impairment of these. The impressive capacity of the patient to use language in self-representations, the patient's ability to give expression to emotions, the capacity to learn and remember, the ability to plan, to make decisions, and to act upon them also provide important psychological-neurological signals for the treatment plan. Periodic, serial testing may occur during the clinical treatment should the unfolding work suggest the need for these. In short, neuropsychology plays a very important part in diagnosis, treatment planning and assessment of progress, and can form the basis for the beginning of a sound, solid therapeutic alliance between patients and therapists as the goals of the treatment are attained [26].

In the last few years articles and books have appeared that focus on the clinical setting and psychotherapy in relation to neuroscientific findings. These include Cappas [27], "What psychotherapists can begin to learn from neuroscience," which proposes seven principles for the effective and ameliorative conduct of a brain-related psychotherapy. Other important work, Patient Basic Approaches to Cognitive Neuroscience [28], focuses on brain plasticity. Grawe [29] argues that therapists should focus on the goal of changing brain functioning by connecting basic brain circuits with psychotherapeutic needs and aims. These authors and recent publications stress the sharpening of psychological progress by strengthening empirically supportive psychological interventions [30].

Clinical evidence of the crucial interconnectedness of brain-based understanding and clinical psychology is beyond the scope of this paper, but will be the subject of a forthcoming paper involving several case studies.

VIII. CONCLUSION

This paper has included: (1) commentary on the important early research by American writers (2) a commentary on the reductionism in theory and practice of the psychoanalytic model (3) a focus upon more recent breakthroughs in neuroscience and psychology (4) an examination of emotions in the brain; and (5) an outline of recent and forthcoming work concerning the further advances in clinical and behavioral psychology. In conclusion, this paper proposes that today's psychology is an unfinished project that can be deepened as it goes hand-in-hand with bio-neurology.

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