Social Cognition or Towards a Mental Psychology/Neurology as a Dialectical Synthesis of Faculty Psychology

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The terms psychic, mental, and cognitive functions are frequently used interchangeably as equivalent terms in the daily language. Psyche is the French counterpart of the word psike (ψυχή), derived from the verb blow (psiki: ψύχει) meaning life in Greek and has gradually started to mean soul and life. Psychology and psychiatry were established as scientific disciplines that examined psyche and its disorders. This term means mind in the Anglo-American psychology. The words "mind" and "mental" were derived from "mens" in Latin. Considering the term "cognitive" equivalent to "mind" is the result of a transformation of this scientific discipline from a semi-philosophical discipline, which caused this scientific discipline to be undervalued as "chair psychology" in the origin to an empirical scientific discipline, the hypotheses of which can be experimentally tested like the other empirical scientific disciplines in the historical development of psychology. In terms of Hegel's dialectic, experimental psychology can be considered an antithesis of faculty psychology, which was the previous thesis. In this dialectic horizon, the synthesis which returned to its own origins has not completed a circular journey but elevated its point of origin (thesis) to a new status (in Hegel's language: "aufhebung"). In this article, it will be proposed that a relatively new scientific object which can be addressed by neuropsychology with the name of social cognition and cognitive neurosciences with the name of social neuroscience harbors the nuclei of such a synthesis, and the claim that clinical practices are a potential for a radical change in

behavioral neurology on one side and for combined neurology and psychiatry in the future will be argued.

In modern psychology, the tradition of dividing mental functions into three classes as cognitive, affective, and conative in a manner that can be stated to originate from Immanuel Kant (1724–1804) has been forgotten to a great extent. Although the trinity of the mind goes back to Platon and Aristo in the antiquity, it was systematized in three large critics written by Kant between 1780 and 1790. "The Critic of the Pure Reason" (1781): cognition, "The Critic of the Practical Reason" (1788): conation, and "The Critic of Judgment" (1790): affection. After Kant, his main representatives Fichte, Schelling, and Hegel and the school of philosophy called German Idealism initiated the classical enlightenment period of the philosophy of the mind with their great works related with the occurrence of the human mind in the body.

With the French Revolution, the human subject was no more subject to a master socio-politically, but transformed into a free citizen who was an equal member of the society. The word "subject" in English corresponds to the first status in the passive form (to be subjected), whereas it corresponds to the individual who is responsible of his/her acts realized with his/her own free will in the active form. As the subject of the experiences which are the counterpart of this change in the enlightenment idea, the human being becomes a scientific object in addition to the philosophical importance he/she gains. Classification of the mind by dividing it according to its functions or faculties determined the name of the first psychology school in Germany in the begin-

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ning of the 18th century when psychology was established as an autonomous science independent from philosophy: "faculty psychology." Hilgard (1) mentioned Christian Wolf (1679–1754) as the founder name in his very competent historical review, in which he reminded mental trinity for the present time. Wolf, who used the term "psychology" for the first time during the age of enlightenment, made the classification of cognitive and conative by dividing the mind into two parts as *facultas cognoscitiva* and *facultas appetitiva* long before Kant (1732 and 1734). The remaining component of the trinity (affection) was recommended by Alexander Gottlieb Baumgarten (1714–1762) (1750 and 1758). Hilgard mentioned Moses Mendelssohn (1729–1789) as the first person who combined these three components. Mendelssohn mentioned cognition, affection, and conation as the main faculties of the psyche in his "Letters on Sensation" (1755). In Hilgard's review, we see that the scotch school substituted the German faculty psychology in the 19th century. Hilgard gave wide coverage to Alexander Bain (1818–1903) among the numerous representatives of this school. The texts of Bain dated 1855 and 1859 would be accepted as the main psychology textbooks of Britain psychology in the 19th century. William James (1842–1910), who is one of the founder fathers of the American psychology, imported mental trinity to USA by transferring it from Bain: "I. FEELING which includes pleasure and grief but which does not only consist of pleasure and grief. II. Willpower which covers all our acts directed by our feelings or VOLITION. III. THOUGHT which corresponds to intellect or cognition. OUR SENSATIONS involve partially our feelings and partially our thoughts." Hilgard who made a transfer from Bain underlined the priority given to feelings by Bain with the following statement: "feeling as the main mental sign before action and thought." The parallelism of this definition with the "somatic marker hypothesis" of Damasio, which will be mentioned below and which will represent a revolutionary paradigm change in neurosciences 1.5 centuries later, cannot go unnoticed. Hilgard reported that trinity continued to be used even in texts belonging to new psychology, although faculty psychology almost disappeared under the heavy criticisms of the emerging experimental psychology in the end of the 19th century and in the beginning of 20th century. The name of the book (1897) written by E.W. Scripture, who was one of the authors of this period, was "Thinking, Feeling and Action." With the domination of experimental psychology, the psychologist was no longer a semi-philosopher academician (chair psychologist) who sat in his chair and wrote his thoughts about the mind and was transformed to a scientist who tested his well-designed assumptions using a method for which the validity had been accepted.

However, the first half of the 20th century would be the age of behaviorism, which would reduce psychology to a stimulus-reaction psychology by abolishing not only the faculties but also the mind totally or transforming it into a black box outside of scientific observation. At the end, the behaviorism of Watson and Skinner has started to be reduced from its peak from the sec-

ond half of the previous century with a new psychology: cognitive psychology. On the way leading to this new psychology, one should mention the hard critics of Donald Broadbent and Noam Chomsky against the Behaviorist School during the period between the post-2nd World War and 1960s (2,3). This approximately 15-year period corresponds to a "cognitive revolution." The term "cognitive psychology" was used by Ulrich Neisser for the first time in the book named "Cognitive Psychology" published in 1967 (4). Cognitive psychology put the mind in focus again and defined it with an analogy of an information processing model of the computer. Here, it will be appropriate to mention the names of Allen Newell and Herbert Simon who developed the concept of "artificial intelligence" (5). According to this definition, different cognitive areas, including attention, memory, and language, are modules that process information and the computational strategies of which can be defined by probabilistic mathematics. Cognitive psychology started to use the name of "cognitive sciences" starting from the 1990s because of the integration of the mental studies that were addresses by artificial intelligence, linguistics, anthropology, and philosophy and the inclusion of computational modeling and imaging of functional magnetic resonance imaging (fMRI) of mental functions of the healthy individual in addition to the classical psychological experimental method.

A parallel development is observed in the discipline of neuropsychology. The modules of cognitive psychology were perceived as specific neural system of neuropsychology, the damage of which caused cognitive disorders by the substitution of the view of neuro-cognitive networks of a large dimension instead of localization neurology, which advocates that mental functions are localized in engaged cerebral centers as the main paradigm explaining the brain-behavior relations. In the establishment of modern clinical neuropsychology, mentioning Harold Goodglass and Edith Kaplan, who were the leader names of the Boston school in the 1960s. Their tracing student Sandra Weintraub and Arthur Benton, who was the founder of the Iowa School. They will surely be not enough to consume all the names that should be mentioned.

Clinical practices of neuropsychology would lead to articulation of a new sub-discipline to neurology: behavioral neurology. The classical founder of behavioral neurology, which can be summarized as a perception of the change of human behavior caused by brain damage in the scope of its relation with brain geography, was Paul Broca who stated "we speak with our left hemisphere" as a result of the observation of M. Tantan, whose speech ability was limited to the word "tan" because of a left hemisphere damage. The modern founder is surely Norman Geschwind who used the term for the first time 100 years after Broca and initiated behavioral neurology as an academic discipline primarily in Boston University, Boston VA Hospital in USA, Boston and secondarily in Harvard University, Beth Israel Hospital. Second generation behavioral neurologists (Frank Benson, Eliot Ross, Kenneth Heilman, Antonio Damasio,

Marsel Mesulam), who were students of Geschwind, pioneered in spreading this discipline in USA and worldwide. Behavioral neurology was now established as a sub-discipline of neurology, which addressed cognitive disorders caused mostly by acquired brain damage and sometimes by developmental brain damage. The first edition of the textbook of Mesulam, who made great contributions to the theoretical education of early behavioral neurologists in the world and in our country, "The Principles of Behavior Neurology" was published in 1985 (6). Behavioral neurology students would call this book, which they would be glued to, as "Mesulam". In fact, the first clinical neuropsychology laboratory of Turkey was established in the Istanbul Medical Faculty, Department of Neurology by Öget Oktem- Tanör in 1983. Approximately ten years later, individual studies of this author in the same clinic were evolved into the establishment of the first behavioral neurology unit of Turkey with the participation of Murat Emre to the academic staff. At this time, Oğuz Tanrıdağ started his studies on aphasia in Ankara GATA, Department of Neurology from the late 1980s.

Cognition is derived from the word "cognito," which means information and learning, and is the form of the Greek word "gnosis," which means knowing and recognizing, translated from Latin. In Turkish, the words "bilgi" and "bilgiçlik" are used.

Cognition traditionally corresponds to a series of "cold" mental functions in neuropsychology. These functions include attention, memory (episodic, semantic, implicit), language, visual-spatial functions, and executive functions. The practice of clinical neuropsychology is to test these functions by specifically developed neuropsychological instruments.

The marriage of cognitive sciences and neurosciences, which were not so close to each other, initially generated a new discipline: cognitive neuroscience. Cognitive neuroscience was baptized by George Miller and Michael Gazzaniga in the beginning of the 1980s in USA as a main component of neuroscience involving all sciences (cognitive psychology, neuropsychology, behavioral neurology, cognitive neuroimaging, cognitive electrophysiology, computational neuroscience, and gradually any discipline with a prefix of neuro with the analogy of neural networks, including neuro-philosophy, neuro-economy, neuro-architecture) addressing the mind directly or indirectly. The first textbook which carried this name was published in 1995 with the editorship of Michael Gazzaniga, and four editions have been published to date (7,8,9,10). Considering that a new edition has been published every 4–5 years, the lack of the 5th edition in the last month of 2014 can be considered as a disappointment.

The second edition of Marsel Mesulam's book was published in 2000 after 15 years (11). The name was changed slightly in the second edition, which was translated to Turkish with the editorship of this author (12): "The Main Principles of Behavioral and Cognitive Neurology." Mesulam explained the reason of this change in the foreword of the book with the inclusion of the use of fMRI in the practice of behavioral neurology research, motivation for working with cognitive scientists in partnership

with this new method and thus elimination of the necessity of the classical "lesion method," which continued with autopsy in the antiquity of behavioral neurology and with computed tomography (CT) in the modern times of behavioral neurology to be the only method. The new behavioral neurologist does not have the obligation to work only with patients with cognitive disorders and can test cognitive hypotheses in healthy individuals with this new method. New generation behavioral neurologists would start to call themselves "cognitive neurologists" with a gradually increasing rate.

Although there is a severe limitation of behaviorism, removing the mind from the focus of psychology seems to be eliminated by cognitive psychology; this sophistication on the "cold" mental functions led to a neglect of biological sciences, which have evolved completely independently, and tried to maintain this independence with an epistemological accuracy by the "warm" mental functions, including affection and conation, except for psychoanalysis, which totally eliminates the brain from its conceptual system.

Affection is derived from the Latin word "affectio." In Turkish, it is called "duyguduyum." In English, "to be affected" means to be influenced by a stimulus. A stimulus, which has the capacity of affecting (having affective heaviness), causes a feeling with a positive or negative valence (pleasure, grief, joy, sorrow, anger, etc.), and this feeling generated is stated as an emotion which corresponds to "duygudurum" in Turkish. Production of affect (affectus in Latin), which is composed of the components of feeling triggered by a stimulus, and emotion, which is its expression, depends on the individual's mood, which enables this production with a certain bias. Affective disorders (depression, mania, anxiety) are mainly included in the area of psychiatry, but it should be emphasized that many dementia conditions, including especially fronto-temporal dementia and acute brain damages, possess a component of affective disorder.

The term apathy is derived from the Greek word *απαθεια*. In Greek, pathos means emotion and thus apathy may correspond to a lack of emotion. The term of apatheia, which was used in Ancient Greece by the Stoics as "indifference to wealth" as a virtue which should be achieved, had been interpreted in a similar way by different theologies. However, the word "sloth," meaning inaction, is one of the fatal sins in the catholic belief. In the medical context, "apathy" is used to define the state of indifference observed as a result of the loss of affective values of all stimuli due to developmental or acquired disorders of the neural infrastructure of motivation.

The term empathy is derived from the prefix of "em," which means together in Greek, and the word "pathos" and may correspond to "feel together." As a scientific concept, empathy is divided into affective empathy and cognitive empathy. Affective empathy may be defined as the capacity of recognizing the emotions experienced by another person and responding with appropriate emotion. The component of tendency to experience discomfort (individual anxiety) in case of suffering of another

person is observed in infants aged 18 months. Experiencing sympathy and compassion (empathic anxiety) in case of suffering of another person is the other component which develops after the age of 4 years. Cognitive empathy is defined as the capacity to attribute mental conditions (beliefs, intentions, desires) to others and to understand that others may have different mental conditions, and this also develops approximately at the age of 4 years. It can be stated that cognitive empathy is equivalent to the concept of "theory of mind (ToM)" according to this definition. Functionally, cognitive empathy has been associated with mirror neurons, and affective empathy has been associated with von Economo neurons (VENs).

Damasio is one of the first names who rendered affection a neuroscientific theme with his "somatic marker hypothesis," which proposed that the behavior of deciding was directed by "somatic markers," which were emotional physical conditions (sweating, palpitation, flushing, dispnea, gastric pain etc.) produced long before the decision to be made was evaluated cognitively in conscious awareness not reaching conscious awareness (13). Although Charles Darwin and William James are considered the classical founders (14), the modern founders are surely Damasio and Joseph LeDoux, who devoted their entire careers to amygdala and fear conditioning. In Pubmed, a screening with the key words LeDoux and amygdala reveals 174 articles; the first one was published in 1983 (15). The first textbook named "Affective Neuroscience" was published by Jaako Panksepp in 1988 (16).

Conation is derived from the Latin word "conatus," which means effort, pursue, and impulse. The word *ορμη* ("orme" which can be translated as "energy for action"), which is the form developed by the Stoics in ancient Greece, was used to define the movement of the psyche towards an object and at the end of which a physical action occurs. In Rome, this principle was expanded to involve avoidance of destruction. In modern philosophy, Spinoza defines the concept of conatus, which he uses instead of free will, as the human being's (and all ontic entities') efforts to pursue their own existence. Damasio who applied the concept to cognitive neurosciences stated that all affects were conatus-mediated by referring to the study by Spinoza and proposed that the human being would experience pleasure in conditions compatible with conatus (where he can protect and maintain himself) and would feel pain in conditions that threaten his conatus (17); the action observed would be approaching in the first condition and avoidance in the second condition. In this point of view, resting and inaction (lack of action) can be understood as exposure to neutral states that do not carry affective value for conatus and thus does not require an action reflecting the interwoven state of conation and affection. As mentioned above, apathy is a continuous state of inaction where all stimuli are devoid of value and heaviness, which render them unable to create a feeling, and thus all stimuli are perceived neutrally.

In the scientific terminology, conative processes can be defined as a behavior or intentionality directed to a target; beliefs,

drives, and desires, which are the motivators of this behavior; free will and motivation as the energy power required; and the moral reasoning as the limiting factor. The term volition, which is derived from the word *vol* and which is the root of the Latin verb *vale* meaning to hope, to wish, and to desire, can be used as the counterpart of willpower and motivation in the strict sense and as the counterpart of conation in the wide sense. Based on this term, the loss of willpower can be expressed as avolition, and the term abulia can be found particularly in the literature originating from continental Europe. Abulia is derived from the Greek word *βουλία*, which means willpower, and corresponds to the loss of willpower. In fact, the real difference between these two terms, which originate from Latin and Greek and which seem to be different, seem to be related with the fact that the letter *β* in Modern Greek corresponds to "and" but is translated as "be" in the Western languages. The willpower can be defined as the autonomous decision for action derived by the motivational feeling perceived because of a stimulus carrying affective value. Although it seems to be more practical to accept the terms apathy, avolition, and abulia as terms defining the same condition, these terms can be graded from heavy to light as apathy and abulia in the spectrum of the loss of spontaneous behavior. In accordance with this definition, conative disorders include apathy and/or avolition/abulia, which mean a loss of affective significance of all stimuli and/or a loss of willpower for behavior, dependence behavior as pursuing an instant reward despite repetitive negative feedback, and sociopathy as the lack of guidance of moral principles to social behavior. As a coarse differentiation, the developmental conative disorders are in the area of interest of psychiatry (schizoidism, drug addiction, anti-social personality), and the acquired conative disorders (acquired apathy, dopamine dysregulation, acquired sociopathy) are in the area of interest of neurology.

In the Anglo-American literature, the term "mental states" is also used as a counterpart of conation. Salzman and Fusi defined mental states as "the individual's tendency to behave and act" (18). These mental states are internal states, which are a combination of thoughts, feelings, beliefs, intentionality, activated memories, and sensations. A mental state renders the individual's tendency to behave in a certain way. These actions may be various combinations of cognitive (for example, making a decision), behavioral (for example, freezing or escaping), or physiological responses (for example, increased heart rate).

Although conative neuroscience is not mentioned, social neuroscience can be designed as a new mental science involving both mental faculties when conative processes are defined as human behavior, which is only possible in a sociosymbolic context nested with affective processes. Indeed, this term, which was used by social psychology, sociology, and politics as an effort to be included in the neurosciences for the first time in the early 1990s (19), can be stated to have recorded its establishment as an autonomous discipline with the publication of the first textbook recently (20).

As defined above, the practice of testing the social cognition concept of neuropsychology and its different components (affective empathy, emotional recognition, ToM, apathy, risky decision, moral decision) can be stated to be the neuropsychological counterpart of affective and conative processes. In the classical perspective of behavioral psychology, behavioral variant frontotemporal dementia (dvFTD) can be redefined as a progressive disorder of the social cognition neural network, which is entered by way of this anatomic gate with the selective predisposition for frontoinsula (FI) cortex VEnS (21), similar to Alzheimer's disease (AD), which is defined as a progressive disorder of the episodic memory neural network, which is entered by way of this anatomic gate with the selective predisposition for pyramidal neurons in the second layer of the entorhinal cortex. The advances made in recent years have enabled studying with functional connectivity or intrinsic connectivity networks (ICNs), which can be technically visualized more conveniently in addition to these neuroanatomic networks that are tried to be visualized by way of diffusion tensor imaging (DTI or axonal tractography), which is a special MT imaging method. ICNs have created an unexpected interface for the future meeting of neurology and psychiatry. The default mode network (DMN), which was the first one demonstrated among the ICNs, shows a selective predisposition for AD. In a short time, the other ICNs and the different neurodegenerative diseases which these ICNs show a predisposition to have been demonstrated (22). dvFTD has such a predisposition to the salience network (SN), which is another ICN. FI is one of the basic structures of SN and is the structure which is involved at the earliest, as mentioned above. In addition, when AD and dvFTDs are compared, DMN and SN activities are anti-correlated, which means that something which is hypoactive in one is hyperactive in the other (23). The number of the studies related with changes in different ICNs, including mainly DMN and SN in psychiatric diseases, has increased in recent years.

This new equipment invites the behavioral neurologist to a new transformation. I think we can call this new generation behavioral neurologist "mental neurologist" based on the fact that he/she has synthesized the mental trinity of faculty psychology as a whole by possessing the theoretical equipment of cognitive and social neuroscience and being able to use the social cognition instruments in practice. Thus, it will not be surprising to see that the new Mesulam, the third edition of which we can expect in 2015 assuming its 15-year rhythm, will be named "The Principles of Behavioral, Cognitive and Mental Neurology." This renaissance, which we can call the Hegelist synthesis of faculty psychology, will surely be not accepted as being completed without being articulated to psychiatry-based efforts. It is still not clear what this anew meeting of neurology and psychiatry will be named if accomplished. The term "neuropsychiatry" sounds too pragmatic to be a result of such an Hegelist elevation. The "elevated" meeting, which will complete this synthesis, has a high probability to fully change the components of the synthesis. As for me, the term "encephaloatry" (inspired from

another author), recommended by my valuable friend Timuçin Oral, Professor of psychiatry, is considerable attractive for the present time.

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