

TULLIO SCRIMALI



# NEUROSCIENCE-BASED COGNITIVE THERAPY

NEW METHODS FOR ASSESSMENT,  
TREATMENT AND SELF-REGULATION

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# Neuroscience-based Cognitive Therapy

New Methods for Assessment, Treatment,  
and Self-Regulation

Tullio Scrimali

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This monograph is dedicated to my wife Wiola, *Star of the East*, who decided to share her life with me, without regard for common sense or any apparent logic. In this case, the most intense emotion, that of love, took charge and overcame all rational knowledge.

*All our knowledge has its origins in emotions*

Leonardo da Vinci

# Foreword by Arthur Freeman

In the late 1880s, an obscure Viennese physician began his scientific work in neurology by studying the phylogenetic association between the central nervous systems of lower vertebrates and humans. He gained moderate success as a basic science researcher, even developing a gold chloride stain for nerve tissue. His goal was simple: he wanted an academic career that would allow him to study and teach about neurological disorders in lower vertebrates and in humans. His earliest publications were on basic neuroanatomy but ultimately evolved into his studies and publications on infantile and child cerebral paralysis. His plans for an academic career were, however, not to be fulfilled, for a variety of reasons. A mentor suggested that this young man look elsewhere for a career. With a growing family and the need to support them, this physician, one Sigmund Freud, began to treat a variety of disorders that he judged, at the time, to be neurologically based. Although Freud's work over the years encompassed his views on religion, anthropology, psychology, and psychopathology, his neurological interests and roots were always a backdrop for his thinking. Cozolino (2010, p.1) quotes Freud: "We must recollect that all of our provisional ideas in psychology will presumably one day be based on an organic substructure."

The rest we know to be history. Freud's psychotherapeutic insights and developments became the basis for some of the most brilliant, controversial, and illuminating psychological work of the twentieth century. Freud's legacy continues today and has been the basis for all contemporary psychotherapy, whether its models were developed to support or oppose his ideas of the origins of psychopathology and the treatment of those "nervous disorders."

Though there were opposing voices to Freud's in the early twentieth century (functionalism, gestaltism, introspectionism, and behaviorism), they did not carry the weight, or influence philosophy, medicine, sociology, or even religion, to the same degree and with the same power that Freud did. Freud's journey was, however, not an easy one. As he explored possibilities regarding the etiology of psychopathology, he ran afoul of the psychiatric establishment, who believed his theories to be unsavory (e.g., those regarding infantile sexuality), and the psychological establishment, who rejected his ideas because they were derived from clinical observation rather than experimental data.

Starting in the 1930s, a significant movement emerged in psychology that focused on directed behavioral change. Salter, Jacobson, and others experimented and treated a broad range of emotional/behavioral disorders with direct interventions designed to alter behavior. Their seminal work was derided by the psychoanalytic establishment as simplistic and naïve. The behavioral group did not address the basic (and hypothesized) core unconscious conflicts that were believed by the psychoanalytic group to be the key issues in the development and maintenance of psychopathology. If one looks at the first two volumes of the *Diagnostic and Statistical Manual* (DSM-I, 1952; and DSM-II, 1968), the influence of psychoanalytic thinking is clear and abundant. Behavioral descriptions, much less targets, were all but missing.

Neurological etiology was barely evident.

The behavioral work of the early pioneers laid the foundation for the growth of a behavioral focus in psychology in the 1950s and 1960s. Joseph Wolpe and later Arnold A. Lazarus began treating patients with behavioral technology. Although trained in a psychoanalytic model, Wolpe made brilliant observations regarding the obvious. If an individual were anxious, they were hard-pressed to be calm. Conversely, an individual in a state of relaxation would be hard-pressed to experience anxiety. Looked down upon by the psychoanalysts as simplistic and inelegant, these pioneers persisted. Their work, and that of their students and colleagues, can be viewed as the “first wave” in the growth of contemporary behavioral and cognitive behavioral therapies. In the 1950s another young and unknown physician working in a ward for the neurologically damaged was told that in addition to his neurological training he would also have to seek some training in psychiatry. This was not something that he wanted to do, inasmuch as he saw psychiatry at that time as far too “soft” and unscientific. This young doctor, one Aaron T. Beck, has gone on to rival Freud as a major proponent of a new model of psychotherapy. This model, based, in part, on Beck's psychoanalytic training, marked the beginning of the “second wave” of cognitive behavioral therapy (CBT). The addition of a cognitive focus rooted in an information processing model was not new. The ideas that underlay his model were espoused by the Stoic philosophers, many researchers, and clinicians, notably George Kelly and Albert Ellis. In 1977, Michael Mahoney called cognitive therapists the “barbarians at the gates” of the psychoanalytic establishments. The cognitivists were pounding on the gates and demanding entrance, but in those early days their calls fell on deaf ears. In the twenty-first century, however, cognitive behavioral work is firmly in place well within the establishment, and trying, as is the custom in our field, to deny access to other possible differing treatments. (Our pattern has been that when we as clinicians and researchers perceive someone or something different, we follow the model set up by nomadic tribes centuries ago: we circle our wagons for protection, and then the tribes shoot at each other.)

In the 1960s another important revolution occurred: the pharmacological revolution. Starting almost by accident, Dr Nathan S. Kline became a spokesperson for the use of pharmacotherapy for all of the major psychiatric disorders. As with any movement, there were those who opposed it, believing that medication masked the symptoms of disorders and did not allow the disorders to be available for psychotherapeutic treatment. Therefore, they argued, medication was to be minimized or even avoided.

Through the 1970s and 1980s the cognitive and behavioral models grew in terms of their following, sophistication, and importance. In the late 1980s and into the 1990s a “third wave” was developing within the CBT establishment. This new wave, lead by Marsha Linehan, Steven Hayes, and their collaborators, has grown significantly. Within the CBT movement, there have been a number of variants, some focusing on a specific problem, such as anxiety, while others have been more ubiquitous and offered models applicable to many different disorders. Some variants focus on discrete patient groups, such as children or elders, while others are more wide-ranging. Some, intending to be ground-breaking, have cut bits and pieces from other models and then offered their new “model” to the field. We have CBT models that have discovered the

work of Ainsworth and Bowlby, while others have rediscovered and integrated the interpersonal psychiatry of Harry Stack Sullivan into their CBT model. Others still have even rediscovered Alfred Adler without, unfortunately, any recognition or citation. Often, the model may die or decline with the death of the founder. Witness what happened to gestalt therapy when Fritz Perls died.

One of the models that emerged in the 1980s was what was termed a “constructivist” approach. The underlying idea behind it was that each individual constructs their own reality. While this was not a new idea, it drew major interest from many quarters. We have been inundated by waves; some bigger than others, some more powerful than others.

In directing a doctoral program in clinical psychology, we have adjusted the curriculum to make sure that our graduates are familiar with the social bases of behavior, the cognitive bases of behavior, and, possibly the most important element, the biological bases of behavior. This area is one that has grown exponentially since 2000 with the development of more and better technology for assessing neurological functioning. For example, I completed a degree in neuropsychology over twenty years ago as part of my postdoctoral study but what I learned, I am embarrassed to say, is not only outdated, but naïve, given today's data. Our understanding of neurology, neuropsychology, neuropharmacology, and neuropsychiatry is an essential ingredient in understanding the development and maintenance of “emotional” problems. This neuroscientific focus must be viewed as the “fourth wave” in CBT. What we have been lacking is a voice that can integrate all of these apparently diverse elements. Fortunately there is such a person. For many years, Dr Tullio Scrimali has been developing and honing his ideas. I have worked and collaborated with Tullio over the past twenty years or more. I have heard his learned papers, read his excellent texts, attended his workshops at major international congresses, sat for hours with him discussing his work, and witnessed his growth as a scientist/clinician. I have also heard him chided or even derided for his ideas. Admittedly, Tullio has never been shy to voice an opinion, or to tackle big problems. Despite setbacks, like a true scientist, Tullio has been undeterred.

The current volume is the result of that life and professional mission, of that clinical observation, data, and insights. There is very little that he has left out. He has written a book for the experienced CBT clinician, for the academic, and for the novice in CBT. This neuroscientific model is well laid out and beautifully explicated.

Tullio starts by exploring some basic ideas, that is, the interface between neuroscience, clinical psychology, and cognitive therapy (CT). He next addresses the classic mind–brain problem. He then moves on to more biological issues that involve motor theories of the mind and the coalitional mind and we are taken on an exploration of the central nervous system. He then addresses the issues of memory and internal representational systems that include both imagery and internal dialog. The next chapter requires careful reading because of its centrality to his thesis and the fact that it is crammed with information. It deals with knowledge processes that include the unconscious and tacit dimension, process coding, tacit and explicit knowledge, procedural knowledge, and social knowledge. He then moves on to an exploration and explanation of the phylogenesis of the brain and ontogenesis of the mind, and

discusses biological and cultural evolutionism.

In his chapters on psychophysiology, clinical psychophysiology, and neuroscience-based CT, Tullio begins his integration of the neurosciences model with CT. His descriptions of electroencephalography (EEG) and quantitative electroencephalography (QEEG), electrodermal activity (EDA), and quantitative electrodermal activity (QEDA) set out new tools for the clinical scientist. He describes complex psychological diagnosis with QEEG in identifying dementia, schizophrenia, depression, and attention deficit hyperactivity disorder (ADHD). He offers data regarding specific disorders including generalized anxiety disorder, panic attack disorder, post-traumatic stress disorder, phobias, obsessive-compulsive disorder, depression, eating disorders, addictions, schizophrenia, episodic mania, ADHD, stuttering, hypertension, irritable bowel syndrome, and premenstrual syndrome. Further, Tullio describes the neurobiology of relational processes such as attachment, reciprocity, and the “strange family situation.” He then describes the use of meditation, mindfulness, and Biofeedback-Based Mindfulness.

Finally, there is an excellent and integrative chapter on training and continuing education in the field of neuroscience-based CT.

There are few scientist/clinicians who could have written this book, and even fewer who could do so with the tenacity of Professor Tullio Scrimali. I am grateful for his years of friendship, his clinical insights, and his collaboration. To be allowed even the small job of writing this foreword is a great honor for me.

# Preface

In accordance with a personal tradition, now almost thirty years old, this book begins with an epigraph. However, one novelty is that this is the first time I have taken inspiration from modern times, having referred to ancient Greek scholars such as Plato, Protagoras, Heraclitus, and Thucydides in my previous books.

There are various reasons for this unprecedented choice. The most important is that Leonardo da Vinci's aptitude for exploring diverse fields in the sum of human knowledge, such as poetry and music, painting and sculpture, engineering and architecture, as well as medicine, means that he completely embodies the complex man. From the time I fell in love with complexity and established it as the epistemological foundation for my research, I understood that Leonardo could be the perfect reference for work that constantly evolves in tandem with the brain, mind, and society, requiring analysis and synthesis in fields ranging from neuroscience, information technology, and analog and digital microelectronics to medicine, psychology, psychiatry, psychotherapy, sociology, politics, and humanistic sciences. Not even art is unrelated to my work, and while guitarist-singer Joseph LeDoux performs with his Amygdaloides group in New York, I have formed a band called Entropy of Mind, holding concerts in various cities in Sicily. Music, dramatization, and painting are also an integral part of the emotional "Tacita ... Mente" lab that I developed and tested with Desirée Arena, Ileana Milano, and Simona Ingrà at the ALETEIA Clinical Center in Enna.

There is another reason for my linking myself to da Vinci's genius. Having specialized in psychiatry and trained in Milan, I sensed Leonardo's spirit in his *Last Supper* and in his garden, painted in the rooms of the Sforzesco Castle. During my training in the city of Navigli, I breathed the presence of the master who lived and worked there for a considerable time. Several years ago, I went to Amboise, France, to visit the places where Leonardo spent the last days of his life. In that French village, I saw his home, the objects of his everyday life, his deathbed, and, above all, his last writings. Among them, the aphorism I quote at the opening to this book moved me profoundly and seems to have anticipated epistemological choices in Italian cognitivism (Guidano and Liotti, 1983; Guidano, 1987, 1991; Scrimali, 2008). Emotion or perception comes before rational knowledge and, in any case, always guides and determines it. I then resolved to adopt this phrase for one of my next books. With this volume, the moment to call on da Vinci's aphorism seemed to have arrived. A book that sought to merge brain, mind, and technology seemed very appropriate, though inadequate, to honor the great man.

Purely by coincidence, this choice proved particularly timely. A recent opinion poll of 140,000 European Union citizens on the occasion of the fiftieth anniversary of the Treaty of Rome asked who was the European genius par excellence. The poll provided a clear-cut response: Leonardo da Vinci, distantly followed by Shakespeare, Mozart, Einstein, and Socrates. From the celebrated European genius Leonardo, the epigraph for this small book written in Sicily, island in the middle of a sea of history, serves as



the perfect metaphor for complexity.

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# Acknowledgments

Many people collaborated in the clinical work and research described in this book. So as not to be too verbose, I will mention only those that made the largest contributions.

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Even two nonhumans, though with good souls – Baika, my West Highland terrier, and Ghenia, my Scottish terrier – provided their support, helping me to relax during long hours spent at the computer, playing around me or cuddling up at my feet to lend encouragement and reinforcement from the depths of their diminutive eyes!

A special mention is due to my American friends James Claiborn and Arthur Freeman. Jim worked on revising the text after its translation into English. It was no easy job! Unfortunately, writing a book in one language, in this case Italian, and then translating it into another does not easily result in a text that is both well formed and fully comprehensible. Professional translators frequently do not have sufficient understanding of the specific matters on which the book is focused, especially when they have to deal with new topics such as those treated in this book. Thanks, Jim.

What can I say about Arthur Freeman and our fantastic friendship? I could tell endless stories of our adventures of the mind, while teaching, lecturing, researching, traveling, and sharing fantastic experiences all around the world. But the most important thing I can say is that meeting Art in Toronto, about twenty years ago, changed my life. I was a quite unknown “Italian” researcher and clinician. Art was already a very important author on cognitive therapy with a strong and deserved international reputation. I was a son of little Sicily and Italian culture; he was a son of great America. So many differences in our background and our personal stories. But, across these differences, a strong friendship has been built and with his help, encouragement, and support, step by step, I have been able to develop an international career, of which this book is a new stage. Thanks, Art.

The last friend I would like to thank is Darren Reed. We worked together for more than a year in developing the editorial project on which this book is based. Our collaboration and friendship have been truly “dialectic,” due to our different profiles. I am a “Latin” author; he is a very “British” manager. Can you imagine anything more challenging? In the end we attuned perfectly to each other, and this book is the “complex” result of this fantastic and somewhat difficult job. Thanks, Darren.

Finally, a special thank you to my readers. If you have purchased this book with a

view to implementing the new methods I discuss, you will most certainly provide a small but important contribution to the development of a new chapter in clinical psychology. Send your feedback to: [tscrima@tin.it](mailto:tscrima@tin.it)

Tullio Scrimali

# Abbreviations

ATR	antidepressant treatment response
CAT	computerized axial tomography
CBT	cognitive behavioral therapy
CCT	complex cognitive therapy
CNS	central nervous system
CT	cognitive therapy
DSM	<i>Diagnostic and Statistical Manual of Mental Disorders</i>
EDA	electrodermal activity
EABCT	European Congress for Cognitive and Behavioral Therapies
EEG	electroencephalogram, electroencephalography
EMG	electromyography
fMRI	functional magnetic resonance imaging
fNIR	functional near-infrared based optical brain imaging
ICCP	International Association for Cognitive Psychotherapy
ICD	International Classification of Diseases
MANOVA	multivariate analysis of variance
NINCDS-ADRDA	National Institute of Neurological and Communicative Disorders and Stroke/Alzheimer's Disease and Related Disorders Association
NIR	near infrared
NS-EDRs	nonspecific electrodermal responses
NS-SCRs	nonspecific skin conductance responses
OCD	obsessive-compulsive disorder
PET	positron emission tomography
QEDA	quantitative electrodermal activity
QEEG	quantitative electroencephalogram, quantitative electroencephalography
REM	rapid eye movement
SCL	skin conductance level
SCRs	skin conductance responses
SPECT	single photon emission computed tomography
SSRIs	selective serotonin re-uptake inhibitors
TOTE	test, operate, test, and exit
WCBCT	World Congress of Behavioral and Cognitive Therapies