



## Mind maps in service of the mental brain activity

ŽELJKA JOSIPOVIĆ JELIĆ<sup>1</sup>  
VIDA DEMARIN<sup>3</sup>  
IVANA ŠOLJAN<sup>2</sup>

<sup>1</sup>Center for Medical Expertise  
HR-10000 Zagreb, Tvrtkova 5  
Croatia

<sup>2</sup>Zagrebačka banka  
HR-10000 Zagreb, Jurišićeva 22  
Croatia

<sup>3</sup>Medical Director, Medical Centre Aviva  
HR-10000, Zagreb, Nemetova 2  
Croatia

### Correspondence:

Željka Josipović Jelić  
Specialist neuropsychiatrist  
Center for Medical Expertise  
HR-10000 Zagreb, Tvrtkova 5, Croatia  
E-mail: zeljka.josipovic-jelic@si.t-com.hr

### Summary

*Tony Buzan is the creator of the mind maps who based his mnemonic techniques of brain mapping on the terms of awareness and wide brain functionality as well as on the ability of memorizing, reading and creativity. He conceived the idea that regular practice improves brain functions but he also introduced radiant thinking and mental literacy. One of the last enormous neuroscience ventures is to clarify the brain complexity and mind and to get a complete insight into the mental brain activity. The history of human thought and brain processes dates back in the antiquity and is marked by different ways of looking on the duality of mental and physical processes. The interaction of mental and physical processes and functioning of individual results in behavior of the body being carved in the state of mind, and vice versa. Both stable mind - body relation and integrated functions of behavior and thinking are necessary for a healthy physiological functioning of a human being.*

*The meaning and nature of conscience and mind preoccupies as all. In the decade of brain (1990-2000) and the century of brain (2000-1000) numerous discussions were lead and new scientific directions formed (cognitive science, chemistry of feelings, evolutionary psychology, neurobiology, neurology of consciousness, neurophysiology of memory, philosophy of science and mind etc.) in order to understand and scientifically clarify the mysteries of mind. The research of the mind remains as one of the biggest projects for the future. A fundamental neurobiological assumption is that there is no change in the mental state of a person without a change in the brain.*

### INTRODUCTION

Tony Buzan is the author of mind mapping. He was born in 1942 in London. He graduated psychology, English language, mathematics and general sciences at the University of British Columbia in 1964. He has been writing about popular psychological topics such as spiritual intelligence, creativity and memory since early seventies of the last century. He published a book "Mind maps" in 1993. He conceived the idea that regular practice improves brain functions but he also introduced radiant thinking and mental literacy. He is best known for his books „Head First“ and „Use Your Head“ as well as promotion of mnemonic techniques on mind mapping. He based them on the concepts of awareness and broad brain functionality, on the ability of memorizing, reading and creativity. His work is partially based on the work of Dr. Roger Wolcott Sperry (1913-1994) who was awarded the Nobel Prize for Medicine in 1981.

## MIND AND BRAIN RELATIONSHIP

Scientists of the newer philosophy of mind or mental state as well as in the cognitive science are putting efforts into answering a question whether mental processes and mental states can be explained by physical - chemical brain processes (1, 2). If we want to understand the mind - or conscience in particular, - it cannot be reduced to the brain only. This is because measuring brain processes cannot give us any insight in the mental states. The mind is not an immediate behavior. The mental condition substantially fulfill brain, are mutually conditioned, and neural networks in the brain function as a self-organizing biological system, in the same manner the complex endocrine glands, circulatory, respiratory, renal or other systems function.

The history of human thought and brain processes dates back in the antiquity and is marked by different ways of looking on the duality of mental and physical processes. The interaction of mental and physical processes and functioning of individual results in behavior of the body being carved in the state of mind, and vice versa. Both stable mind - body relation and integrated functions of behavior and thinking are necessary for a healthy physiological functioning of a human being. Philosophers had different views on the soul and body relationship. Descartes (1596 - 1650) acknowledged the interplay of mental and physical processes while elaborating dualistic theory. He was the first one to clearly identify the mind with consciousness and self-consciousness and differentiated it from the brain. Philosophical theories of the mind can be divided into three groups: eliminativism - mental states do not exist, reductionism - mental states exist, but are explained only by physical processes; and dualism - mental states exist as a separate property and differ from physical processes.

The ideas of Descartes strongly influenced the development of empirical science of the living world, although he attributed a special place in the functioning of the brain to the soul. But when it comes to the physical aspect, he considered living organisms material in their nature and that they can be studied in the same way as inanimate matter. In the first half of the 19th century vitalism school advocates the idea that living creatures are guided by disembodied life forces and that those vital forces are not subject to physical - chemical laws.

David Chalmers - in his 1997 book „The Conscious Mind“ - writes that contemporary cognitive science and neurobiology have yet to explain why mental states arise from the physiological events in the brain, although the last decade of the 20th century is called the Decade of brain. The question is whether the sources of our mental abilities lay in the brain and how the biological organ, such as the brain, can generate mental processes and emotions by physical-chemical processes? Such thinking leads to conscious experience being understood in an entirely

new light, as a completely new entity, because the brain and mind are two separate entities and reinterpretation of the mind opens up an entirely new focus in contemporary neuro - science.

## HOW DO WE LEARN?

In order to be successful, healthy and happy in his professional and personal life one must train his body as well as his brain. One's personality is built through learning, memorizing and experience. Different models of learning are used: visual, auditory and kinesthetic. In order to be capable of a lifelong learning cognition, emotion, executive functions and a good educational health are important. Every kind of behavior and learning integrates all the components. Cognitive functions are defined as functions of the input, storage, processing and output of information. They are divided into receptive functions, memory and learning, thinking and expressive functions.

Educational health is a stable learning ability which depends on the mental state and health. Psychic life consists of mental processes and psychological traits. Psychological processes constitute the intellectual, emotional and willing processes.

Contemporary understanding of dualistic psychophysical relationship implies that our body's attitudes and behavior are cut into the state of our mind and vice versa, and that physiologically healthy and integrated behavior and thinking depends on good communication between mind and body, while mind and brain are mutually conditional. It is clear that the integration of thoughts exists if there is faultless communication between the brain hemispheres. Unilateral condition is a condition of a reduced function of one brain hemisphere (3, 4).

Previous findings suggest a greater role of the left hemisphere of the most righthanded and a part of lefthanded persons when verbal abilities and speech, logical, rational and analytical thinking are observed. The right hemisphere is responsible for processing of complex stimuli. Learning, behavior and conscious activity is a result of a coherent, dynamic relationship between the two hemispheres. Neurons collect and transmit information and create neural network information. Synaptic connections between the brain cells are spots where the learning process starts and runs. Imagination and associative pathways that connect homolateral and bilateral gray mass in the brain stimulate cognitive abilities. Brain cells which do not develop synapses deteriorate, the brain selectively deletes unused synapses and creates a more efficient information - processing system of processing and integration of thought.

Physical organs for learning are eyes, ears, hands and legs. About 99% of the learned materia is adopted through senses (43% through hearing, 37% through touch, 29% through vision and around 1% through smell and taste). Multisensory learning is the most effective way of learning.

By dominant learning profile - using the dominant eye, ear, hand, foot and dominant hemisphere of the brain - we acquire information throughout life, particularly in the adoption of new knowledges and when under stress.

By limited learning profile we acquire information when the senses and movement functions are on the same side as the dominant hemisphere, and the same goes for the situations in which the dominant eye, ear, hand and foot are in the opposite parts of the body. During stress only a dominant eye, ear, hand and foot that are opposite the dominant hemisphere will be able to adjust to the processing of information.

### CREATIVE LONG LIFE LEARNING IS A PREREQUISITE FOR GOOD MENTAL ACTIVITY

In addition to the traditional, critical thinking, which emphasizes the debate, logic, analysis and argument, we need creative ideas that encourage creative thinking, because in this way we encourage flexibility of thought, the ability to realistically assess the development of our own personality, an understanding of the diversity of the existence of the human species and the overall functionality of the brain and mind. An interest in a more thorough exploration of the phenomenon of human creativity developed in the second half of the last century. From the initial idea that the creativity is a feature of a small number of people and that most do not possess it, we have come to the realization that this is one of the fundamental characteristics that can be encouraged and developed, but also be suppressed and disabled. Back in 1968 Guilford indicated that creativity can not be equated with intelligence and that research of intelligence significantly contributed to the backlog in the understanding of creativity (5).

Guilford believes that a process of creative activity consists of four important steps: 1. period of preparation which is dedicated to the research of a problem and gathering of information or materials; 2. incubation period during which there is no visible progress, and the activity is mostly unconscious; 3. moment of inspiration that leads to the solution and is often accompanied by strong emotions; and finally 4. period of evaluation or verification, in which we doubleproof the suitability and value of the solution. Treffinger *et al.* divided a list of the features of creativity in four categories: generation of ideas, deepening of ideas, openness and courage to explore ideas and finally listening to personal inner voice or intuition, as is illustrated in Figure 1.

Category of creating ideas includes cognitive features commonly associated with the concept of divergent thinking or creative thinking skills and metaphorical thinking. Specific features in this category include fluency, flexibility, originality, elaborateness and metaphor-

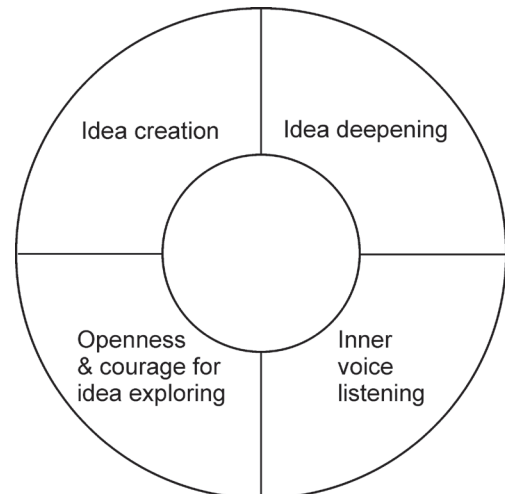


Figure 1. Four aspects of creativity (Treffinger, 2002).

ical thinking. Deepening of ideas category includes cognitive features commonly associated with convergent thinking or critical thinking. Features in this category include analyzing, synthesizing, reorganization or redefinition, evaluation, finding relations, the desire to resolve ambiguities or creating order in disorder, and preference of complexity or understanding of complexity.

Openness and courage to explore ideas incorporates some personal qualities such as interests, experiences, attitudes and self-confidence. Features in this category include sensitivity to problems, aesthetic sensitivity, courage, a sense of humor, playfulness, fantasy and imagination, risk acceptance, tolerance of ambiguity, persistence, openness to experience, emotional sensitivity, adaptability, intuition, willingness to develop, rejection of authoritarian claims without critical review and integration of diversity and contrasts. Listening to your own inner voice or intuition category involves qualities that include self-understanding, a vision of where we want to go and commitment to action that is necessary for its achievement. Features in this category include awareness of creativity, perseverance or endurance, selfleading, internal control, introspectiveness, freedom from stereotypes, concentration, energy and work ethic (6, 7).

Mental functioning of a person - as the most complex form of mental activity specific to human species - includes almost all cognitive functions as well as the processes of computation, judgment, creating concepts, abstraction, planning, and multi-dimensional and comprehensive troubleshooting.

### BRAIN MAPPING

Brain mapping is a technical and graphical way of creative learning, memorizing and thinking and it is a reflection of pictorial thought processes, which we created on the basis of information that we have already memorized

or which are to be adopted and as such are to be filed in a mental unit. They are used as a specific mental strategy in order to improve memory and reorganize knowledge in creative solving of business and educational processes as well as in analyzing of complex content of the information. Facts and relationships between concepts that are contained in the mental map firstly need to be studied, understood and designed, and then drawn. In this way we remember the information contained in the mental map visually and verbally, which increases concentration of the learning process and encourages creative and constructive thinking. In order to build our personality and grow professionally we need to develop and have imagination and creativity (which is a duty of the brain and mind), while information obtained through a computer do not allow it. The brain is a dynamic self-organizing biological system which develops – not calculates - patterns of activity and patterns of mental activity depend on the cognitive abilities of the individual (8, 9).

Being creative is an imperative in the fast paced business and scientific world, and the use of mental maps during noting of one's own and others' ideas encourages the linking of facts in a meaningful whole, developing successful learning and remembering the important knowledge. To think correctly it is necessary to understand the facts and information available, for sometimes - due to the excessive amount of information - one does not recognize the key facts and what is most important. Creative persons have a broader understanding of learning and a balanced use of the right and left hemispheres of the brain. Researches of Roger Wolcott Sperry (1913-1994) - an American neuropsychologist and neurobiologist, who along with David H. Hubel and Torsten N. Wiesel won the Nobel Prize in Physiology and Medicine in 1981 - showed that each person has the same potential of the right and that of the left hemisphere of the brain. How this potential will be used depends on a range of intellectual and creative skills. Perceptive, parallel, vertical and lateral thinking stimulate creative thinking. Vertical opinion develops gradually, a thought is focused on one goal and one solution, a conscious control ensures that rational thought process is continuous and slow which results in the generally effective outcome. At the same time lateral thinking is "crooked" with jumps. There are a lot of associations which constantly enrich the main stream of thought, and the use of existing information reorganizes understanding and develops creativity. Restrictions, prohibitions, rigid control and self-criticism are not allowed, ideas appear suddenly and solution to the problem imposes in a "flash".

The equilibrium between vertical and lateral thinking is important. Lateral processes freely generate original ideas and move around spaces of imagination. Vertical processes arrange thoughts and analyze ideas in order to choose those that are most effective and efficient. Mind maps are a visual expression of our lateral way of thinking,

main ideas and thought show information from the center to the lateral which actually represents the balance in the vertical and lateral thinking. To create mind maps one needs a piece of white paper without lines, pens or color pencils and imagination. Mind maps are convenient for watching, reading, thinking and remembering. Creating a mind map starts with a blank sheet of paper turned sideways in which the main idea or information is drawn. This is followed by the drawing of lateral branches in all directions and linking keywords with the central drawing. Branches of the second and third levels are associated with those of the first and second levels. In this way, mind maps show the facts and relationships between concepts (10).

Mind maps increase concentration in the learning process and problem solving, they encourage creativity and anyone can realize creativity since we are born as creative thinkers and can think unconventionally. Releasing the creative potential of an individual also depends on psychological safety and psychological freedom. Occasional dissociation from the problem helps in designing solution.

Psychological freedom entails playing with symbols and their use for self-expression. According to the theory of Carl Rogers, one person is more creative than another because she has learned to play with ideas; she is more open to new experiences and pays more attention to self-evaluation instead of evaluation of others (11).

Work is required for creative thinking as well as passion and determination to engage in the creation of new and different ideas. New ideas activate the neural network in the brain and infinite intellectual freedom.

There is no only one correct solution and only one good idea, there is no failure, because if we perceive the existing problem as a challenge and by creating mind maps we will achieve visual control over information that is related to the problem and thus we will be able to analyze the conditions that led to the problem. One needs to trust his instincts and free his imagination because they stimulate free association creation on the mind map.

## CONCLUSION

Mind maps act as a conduit between the personal and the outside world and stimulate the imagination. Creative geniuses do not think analytically and logically, instead they have different patterns of thought, they study scientific and artistic theories and focus on original and unusual ideas. In 2000 Leonardo da Vinci was proclaimed the mind of the millennium. He used the infinite ability of the mind and brain, his imagination in creating his exquisite art. His working notes were decorated with pictures, symbols and associations; because he knew that his creative image maps and ideas stimulated his artistic creativity. Albert Einstein said: "Imagination is more important than knowledge, because knowledge is limited to all

we currently know and understand, while imagination involves the entire world and everything that will ever be available to knowledge and understanding.”

The meaning and nature of conscience and mind preoccupies us all. In the decade of brain (1990-2000) and the century of brain (2000-1000) numerous discussions were held and new scientific directions formed (cognitive science, chemistry of feelings, evolutionary psychology, neurobiology, neurology of consciousness, neurophysiology of memory, philosophy of science and mind etc.) in order to understand and scientifically clarify the mysteries of mind. The research of the mind remains as one of the biggest projects for the future. A fundamental neurobiological assumption is that there is no change in the mental state of a person without a change in the brain.

The modern world needs new ideas and creative people who explore the possibilities because when we think about the future we never have complete information, and creative thinking, learning and imagination can help us create the future and make the present more beautiful.

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