

# Neuropsychodrama: What is happening in our brains in psychodrama?

*Neuropsicodrama: O que está acontecendo em nossos cérebros no psicodrama?*

*Neuropsicodrama: ¿Qué está pasando en nuestros cerebros en psicodrama?*

Esra Bilik<sup>1,\*</sup>

Bilik E  <https://orcid.org/0000-0001-7671-0365>

**ABSTRACT:** In this article, it is explained which regions of the brain performs the fastest therapeutic intervention by activating in psychodrama. The kinesic memory of the body can reach even the most primitive records with the power of action. The intergenerational legacies through which the unfinished experiences are transmitted by the Zeigarnik effect can be reached through the wires and ties to the memory of the ancestors. This journey, which now goes back to the oldest with surplus reality and role reverse, will enable the activation of neurons from the most primitive subcortical structures to the prefrontal cortex. Significant confrontations in the scenes allow protagonists to take courageous spontaneous and creative roles while enhancing the right-left brain interaction.

**Keywords:** Psychodrama; Group psychotherapy; Neuroscience; Brain.

**RESUMO:** Neste artigo, explica-se quais regiões do cérebro realizam a intervenção terapêutica mais rápida com a ativação no psicodrama. A memória corporal cinésica pode alcançar os registros mais primitivos com o poder da ação. Os legados intergeracionais, através dos quais as experiências inacabadas são transmitidas pelo efeito Zeigarnik, podem ser alcançados através dos fios e laços com a memória dos ancestrais. Essa viagem, que remonta ao mais antigo com a realidade suplementar e a inversão de papéis, permitirá a ativação de neurônios desde estruturas subcorticais mais primitivas até o córtex pré-frontal. Confrontos significativos nas cenas permitem que os protagonistas assumam papéis espontâneos, criativos e corajosos enquanto fortalecem a interação dos hemisférios direito e esquerdo.

**Palavras-chave:** Psicodrama; Psicoterapia de grupo; Neurociência; Cérebro.

**RESUMEN:** En este artículo, se explica qué regiones del cerebro realiza la intervención terapéutica más rápida mediante la activación en el psicodrama. La memoria corporal cinésica puede alcanzar incluso los registros más primitivos con el poder de la acción. Los legados intergeneracionales, a través de los cuales las experiencias inacabadas se transmiten por el efecto Zeigarnik, se pueden alcanzar a través de los cables y lazos con la memoria de los antepasados. Este viaje, que ahora se remonta al más antiguo con la realidad suplementar y la inversión de papel, permitirá la activación de las neuronas de las estructuras subcorticales más primitivas a la corteza prefrontal. Los enfrentamientos significativos en las escenas permiten a los protagonistas tomar papeles espontáneos y creativos valientes mientras mejoran la interacción derecho-izquierda del cerebro.

**Palabras-clave:** Psicodrama; Psicoterapia grupal; Neurociencia; Cerebro.

1. Istanbul Psychodrama Institute – Istanbul, Turkey.

\*Correspondence author: [esrabilik@istpsikodrama.com.tr](mailto:esrabilik@istpsikodrama.com.tr)

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## INTRODUCTION

One of the most important discovery of our age is the formation of new neurons in the brain, which has been proved by science in recent years (Eagleman, 2015). That means there is a chance of recovery and improvement for everyone in every moment. Its known that the innate potential of the brain and the environmental factors are critical for its evolution (Weiss & Landrigan, 2000). Especially, the relationships established in the early years with caregivers are the most important determinants of healthy brain-soul development. Recent studies have shown that a psychotherapy process changes brain chemistry, and new pathways have been developed in place of the old ones (Cozolino, 2017). This study suggests that the similarities between the ways of working and learning of the brain, and the philosophy and techniques of psychodrama will place psychodrama into a much more privileged position among these methods.

## NEUROSCIENTIFIC STAGES OF A PSYCHODRAMA SESSION

### WARM-UP

A psychodrama session allows the deepest activities to be conducted with the presence of multiple therapeutic elements in the warm-up, enactment and sharing stages. The first stage, warm-up, consist of physical, emotional, intellectual, social and transcendental warm-ups in psychodrama. The warm-up process is the beginning of a protagonist study that covers more than one of these categories and this initiates activation from subcortical areas to the cortex, including emotion, cognition and memory. In this way, both the right and left hemispheres, which are also directed to different functions, begin to activate.

It is important that physical warm-up begins with action, our first repertoire in life. The warm-up walking activates the kinesic memory of the body (Schützenberger, 2012), preparing the body for its deepest record. At this stage, the psychodrama therapist maintains physical contact with the protagonist, “being together”, “feeling together” and “doing/making together”. This first contact represents the first trust relationship between the mother and the baby. In this way, the protagonist is enclosed in the secure network necessary for self-disclosure. That means they will warm up to new networks to be formed with the memory and emotions activated during the psychodramatic warm-up. Together with the process of warming-up and the process of remembering the second part of psychodrama start (enactment).

### ENACTMENT

The aim of the psychotherapy is to provide integration. The integration of neural networks is devoted to emotion, cognition, sensation and behavior. Normally interrupted neural networks are activated and become available for conscious processing (Cozolino, 2017).

Even though psychodrama includes many therapeutic elements in each stage, the action phase is the most important phase where more than one region of the brain is activated at the same time, and the path leading to new synapses is opened and new structures begin to take place. One of the secrets lies in the concept of “surplus reality”. Surplus reality, where people discover that they know more than they think they know, leads to significant expansions and catharsis in the mind. Eagleman (2015) uses the concept of “traveling in time” for the decision-making mechanism of the human brain taking advantage of experiences and life accumulations. Meanwhile, especially the orbitofrontal cortex is active. Journeys to the memories in psychodrama scenes



sometimes take the form of recalling known memories (Retrieval and Recall) from the narrative memory in which memories are recorded at the consciousness level, in the hindbrain regions and association cortexes. However, most of the time protagonists are observed remembering the memories they suppressed and seeing the connections they never made. These are rather memories recalled from the power of action and the memory of the body.

As the most powerful recordings are recorded with stimuli such as smell and sound accompanying the strong emotions, psychodrama enables the senses to be regressed and the catharsis in a way that activates the senses to establish memories with all the details. That is why Moreno describes scenes as semi-hypnotic place (Altinay, 2015). Recalling the trauma and bringing it to the stage enables the reactivation of the noradrenergic system, the hypothalamus-pituitary-adrenal gland neurohormone systems and many regions of the brain. These include the prefrontal cortex associated with personality and higher cognitive functions, the amygdala associated with memory and emotions, the hippocampus, the dorsal raphe nucleus and the locus coeruleus. In addition, high levels of adrenaline and cortisol hormones secreted in the anterior cingulate gyrus and upper right temporal gyrus were found to be high in stress situations (Öktem, 2013). These important discoveries in the scenes also provide a certain level of anxiety and stress, which is found to be necessary for permanent recovery. Moreno's phrase "Every true second time is the release from the first" (Moreno, 1923 cited by Kellerman, 1992) summarizes the therapeutic power of these encounters. However, confronting the truth can diminish its power and it turns out to be an opportunity to fill its place with more appropriate behavior. Meanwhile, the protagonist's reactivated neurons, which have reached a higher level of reality, also move towards new synapses. Not only the protagonists are healed in a protagonist activity; there are some other members making many discoveries in their selected roles or watching the activity, thus warming to their own themes, sometimes experiencing intense affect and catharsis. In other words, it would not be wrong to say that most of all the brain activations stated happen in all group members.

Symbolic realization scenes, which are mostly established towards the end of the enactment, complete the transition to the new one. It promotes the learning of new life truths and the formation of new synapses between neurons in the brain of the protagonist, whose nodes are untied during the game. This is a complete change. As the power of the old synapses changes, information begins to move through the network in different ways. A sufficiently weak connection will eventually fade away; new connections that are getting stronger will grow by sprouting. A part of this restructuring process is driven by reward systems and allows the neurotransmitter dopamine to spread throughout the network. Symbolic realization scenes mean the active use of the central brain (ventral tegmental area and substantia nigra), which are the reupdate and decision-making centers of the brain (Eagleman, 2015).

In psychodrama sessions, not only the protagonist but also the memories of the older generations are on the stage. In cases where the subject goes to intergenerational extensions, this goes back to much older ancestors (Schützenberger, 2012). It is known that important experiences become permanent and form our genes (Eagleman, 2015). The main issue here is that the incomplete tasks remain strong. The Russian psychologist Bluma Zeigarnik called it as the Zeigarnik effect because the organism tends to complete unfinished tasks (Schützenberger, 2012). Anniversary syndromes, farewells, and all incomplete tasks do not go away until they are complete and continue their intergenerational transmission, and individuals can only move to a new one after completing the old one. It is only possible to solve these difficulties at the cellular level in psychodrama, to be able to work at the level of reality achieved by attachments, tele, role concept and role change, and to be able to enter and modify the memory of the body with operational techniques.



## Sharing

The sharing phase is where the digestion starts after receiving the nutrients during the action phase. Since the integrity of meaning is the stage for the protagonist, it could be stated that the prefrontal cortex, Wernicke's and Broca's areas related to expression and meaning, and limbic regions are active in the brain. It is the stage in which the support for the protagonist is completed with group support and warming and learning for the group members (Ganong, 2002, Guyton & Hall, 2001).

## CREATIVE, SPONTANEOUS AND ACTIVE NEURONS

The first experiences of the infant also shape the neural networks. The brain organizes various defense strategies for the anxiety that will arise if there are problems with the baby's initial bonds with the mother or caregiver (Cozolino, 2017; Henckens, 2009). This distortion occurs especially in unconscious memory circuits that control anxiety and fear administered by the amygdala, hippocampus and cortico-striatal-thalamo-cortical circuit. The anxiety experienced in the early years paves the way for various pathologies that may occur in later periods.

However, the human baby has adaptive skills that make it distinctive from other species. Humans come to the world fully equipped so that they can adapt to almost any condition. Experience and learning occupy a great place in the emotional and neurobiological development of human beings. The brain continues to develop by becoming a permanent structure of the neural networks formed by connecting each new knowledge and acquisition learned. The adaptation process allows the maintenance and protection of the individual, whereas it may cause a virtual sense of security. The environmental factors that Moreno calls "cultural conserves" can turn people into creatures compatible with their environment and remove them from their creative essences. This causes individuals to be trapped in both the brain regions (especially the limbic system) that give "get-away-from-anxiety" alarms (Rajmohan & Mohandas, 2007) as well as the inability to have all their roles in life in a healthy way.

Being at the moment is getting closer to one's own reality, and sometimes anxiety arouses. Psychodrama members boldly meet with their own facts at the present moment. Instead of old and dysfunctional behavioral patterns, new creative and spontaneous responses of the members lead to the emergence of neuronal nodes formed by anxiety and fear. This emergence is the release of a great energy. So that the neurons of people who are at the moment reunited with their creativity and spontaneity are activated. The neurons of the people who are at the moment are open to the possibilities to establish new synapses. The development of creativity also supports the development of the right hemisphere. The predominant left hemisphere is more cautious, closed to innovations, acting according to established thought patterns, and show resistant features, while the right brain is on the wider, analytical, intuitive side. When individuals become at the moment, they become creative and spontaneous. Creativity and the development of spontaneity increase activation in the right brain. Providing an integrated working system by establishing the right and left brain balances supports the mental health of individuals in a positive way.

Action, in which creativity and spontaneity are being aroused, is the most important complementary part of all decisions. Action is not the end but the first step that makes sense. As in the definition of the neurologist Oliver Wolf Sacks (2010), there is "no perception without action, nothing is seen without looking" (p. 194). Action, our first language in life, is also a powerful tool in psychodrama to break the resistances and reach the body's records. In psychodrama sessions, every moment passes through an action including warp-up walking, touching/holding, sculptures and the animation of scenes. The fact that action



is an indispensable part and need of human nature is also the most permanent means of reorganization for the brain system developing through learning.

## THE MEMORY OF THE BODY

The first role in which the baby establishes a relationship with life is the somatic role, which covers everything about the body. In this pre-language period, the first language of the baby is action (Altınay, 2015). The mother's response to the baby's calls is very important. It is the first record of body memory that the baby has experienced in the somatic role it has taken since the birth. Schore (2001) stated that as concerning amygdala and hippocampus, the development of amygdala as two important memory section-related regions was completed before the hippocampus, and that the traumatic events in the first relationships with caregivers were recorded in the amygdala and, on the other hand, the memories were not recorded as hippocampal. The suppression of memories in later ages can also be achieved by suppressing hippocampus functions due to increased stress hormones. The "don't tell, but show it" principle of psychodrama causes people to regress and use their body memory by using action they used in the first period without words. Unlocking the physical locks with operational techniques enables a quick progress especially in the body-related difficulties and psychosomatic disorders where the suppression mechanism is the most powerful.

The fact that members bring out the deepest memories and confront important facts leads to emotional catharsis. Anger catharsis which is the strongest feeling, provides great relief and purification (action catharsis). At this stage of the action, it can be said that it functions as ejection and discharge of toxins. In the meantime, if neuroimaging techniques can be utilized, it is expected that changes in serotonin, norepinephrine and dopamine releases may be observed, particularly in sensory limbic systems (especially amygdala), imaging of increased activations in the ventral prefrontal cortex, cingulate cortex (Yalçın & Erdoğan, 2013; Shore, 2001; Siever, 2008).

## DOUBLING, ROLE REVERSAL AND MIRRORING EMPATHY AND BEYOND

The mother is the first double of the baby's life. She is also likely to be the first antagonist at the time of individualization. With the first role change in the baby's development process, what he sees from the eyes of his mother is the determinant of self-development, relationship with life and brain development. Moreno adapted the three basic techniques of psychodrama from the first relationship patterns (Özbek & Leutz, 1987). In this way, the protagonist navigating through three different levels of reality (objective, subjective, surplus reality) through doubling, role reversal and mirroring, allows him to retrieve information he forgot or never knew.

Doubling is a technique where the protagonist feels the greatest support of the leader and the group and makes discoveries. During the doubling, it could be noted that the orbitofrontal cortex, mirror neurons, and the language related Broca's field in the left hemisphere, associated with empathy of the leader or the group members, are active. In the meantime, especially the prefrontal cortex and limbic system of the protagonist who makes many connections, internalizes, judges, invokes memories, experiences and maybe restructures, will be activated (Blakeslee, 1997; Altınbaş, Gülöksüz, Özçetinkaya & Oral, 2010).



Recent study (Altınbaş et al., 2010) has found that especially mirror neurons are autonomous structures related to empathy. Mirror neurons help us to empathize and understand the emotional worlds of others. Researches (Eagleman, 2015) have shown that emotions are achieved by mimicking the facial expressions of another individual in order to understand the working principle of mirror neurons (mirroring). Strikingly, it was shown that people with botulinum toxin application, who lost flexibility in facial muscles, began to have difficulty in understanding emotions shown from facial expressions. The fact that we imitated the other person's emotions to fully understand them made us think of how active the mirror neurons were during the role reversal. On the other hand, the knowledge that the data received during the mirroring of each other was synthesized according to each person's own experience and showed that role change was one step further. During role reversal, members no longer carry any information from themselves when they move from subjective to surplus reality. In the meantime, it could be said that it is the information coming from our invisible bonds extending from the mirror neurons to the macrosystem through the intuitive brain rather than the mirror neurons. This information is obtained in groups by the help of the group's co-unconscious. The intuitive brain is a set of networks rather than an independent region and will be discussed in the next section (Eagleman, 2015).

Mirror, the last basic technique, is the technique that brings the members together with objective reality (Özbek & Leutz, 1987). When protagonists look at themselves or their reflections in the mirror, they become an eye that deters from their own reality and evaluates them from the outside. Here, the prefrontal cortex, which evaluates, criticizes, and mentions the reality, is active rather than limbic structures (Guyton & Hall, 2001).

## INTUITIVE BRAIN, TELE AND ATTACHMENTS

Eagleman (2015) has stated that the roots of our social skills go deep into the neural circuits. The brain is a structure in which intricate networks observing others, feel their pain, evaluate their intentions and read their emotions. In order to survive even in the most primitive level (subcortical brain structures) and to understand who a friend or an enemy, an individual has to look after others based on the subtle clues presented by the sensory data. Neural networks are formed through intuitive networks that we bring from birth to feel others with experiences. The most illuminated place in the neurobiology of intuition is called precenium. It is a small part of the superior parietal lobe, located in the middle of two hemispheres. Precenium is also concerned with episodic memory, audiovisual processing and conscience. Based on previous experiences, the ventromedial prefrontal cortex and caudate nucleus, which provide a rapid analysis and alarm, may also be linked to the intuitive mechanism (Blakeslee, 1997).

Moreno (1978) has stated that the intuitive brain uses tele to describe part of the relationship. However, its development depends on the trust relationship established by the caregiver when the baby passes through from the organic placenta to the social placenta. According to Fonseca Filho (2004), the experience of spontaneity between the infant and the caregiver also creates a series of flows between neurons and the orbitofrontal cortex, which is sensitive to the meaning of facial expressions and especially face-to-face communication and plays an important role in the development of telic sensitivity or future empathy capacity.

Moreno (1978), in suggesting the concept of group psychotherapy, similar to the working principle of the brain, stated that an individual without social relations is a social fiction. He completed his psychodrama theory with sociometry and sociodrama, went beyond a psychotherapy system and provided us with a deep knowledge of life that both disease and healing come from others, and that important learning in life can only be gained through relationships. As Heidegger (Eagleman, 2015) has pointed



out “you need others to exist, what makes you yourself is largely the world around you. The self cannot exist in the void” (p. 176). In other words, the healthy development of the transcendent role is by discovering the bonds we are in from micro to macro. This approach dealing with all aspects of human beings has also made it possible to focus on individuals’ pathologies and to take a holistic view without ignoring their healthy sides.

## GROUP

Moreno’s discovery that the system of existence is based on bonds formed the basis for establishing the group system for healing and learning. The group, as defined by Moreno, forms the social placenta, the protective network of the individual at the same time; it meets the need of closeness and support which is its most basic need (Moreno, 1978). Experiments have shown that mice prefer robots with feathered arms to wrap them instead of mannequins providing milk. It has been shown that touched mice have dramatically higher survival rates and more advanced brains than others. Similarly, social and brain development was found to be incomplete in infants left alone by their caregivers in nursing homes. In addition to being an important source of discovery, the group also provides members with the emotional support and closeness they need, together with the leader. Touching has an important place in psychodrama and it gives individuals a sense of security with their primary basic needs and provides therapeutic intervention by increasing oxytocin, known to provide bonding in the brain. In studies on the effects of touching, it has been observed that the danger threat of limbic systems of patients receiving touching support have decreased. Moreover, it has been shown that touching induces stimulations in the basal ganglia region related to motor-sensory systems and learning. Physical touch is also an element bringing together and deepens the members and the leader as a representation of touching many themes emotionally and mentally (Eagleman, 2015).

As Siegel (2012) has argued, cells can only exist in the network of relationships as human beings. Each cell has a meaning only when it is a part of the group. Although there are autonomous regions in the brain such as speech, memory, problem solving, etc., these regions can only work through connections in unity. When there are cells that are damaged in the brain, the surrounding regions, like a cohesive group of solidarity, begin to compensate with new organizations. The life story of Cameron, whose half of her brain was removed since she had a neurological disorder, is a striking example for a life. All functions of the brain are almost the same as that of other children. The healthy hemisphere of Cameron has been dynamically rearranged to take over the missing functions, so that all operations are compressed to half the normal brain volume (Eagleman, 2015). While Moreno is interested in sociodrama and sociometry, he emphasizes the transformative power of individuals in societies, contrary to many theories that advocate the opposite. Being together with others is a part and necessity of human nature. It is observed that social pain that occurs in the exclusion state activates the same regions in the brain as physical pain (Eagleman, 2015). We, like our neurons, owe both our existence and the meaning we carry to others.

## CONCLUSIONS

The functioning of the brain and the ability to maintain its development by establishing new connections is like the representation of group dynamics in psychodrama. The brain and psychodrama system are both so similar that they are the product of Moreno’s genius, inspired by the system of existence. The fact that neurons need other neurons to make sense, that the energy-releasing



synapses and structures are created whereas that the main force is in a single neuron that will initiate the ignition, is like the representation of a relationship between individual and group, individual and society, individual and macroplan.

Recovery is only possible when individuals reestablish a healthy trust relationship with life and people. Every moment means a new opportunity for a choice. Making new choices means the reorganization of neurons within themselves at the cellular level. The psychodramatic view of the soul and body as a whole moves in cycles, each of which affecting one another. The individual's emotional expansions and consciousness raising have the potential to change the entire structure. The purpose of the psychodrama is to remind individuals as part of the macroplan, that they have creative power. Beyond this recovery, the individual also achieves the integrity of existence by attaining the transcendent role. The power of psychodrama should be demonstrated by various neuroimaging techniques that have been studied for different views of psychotherapy.

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