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## The Process of Social Rehabilitation in the Perspective of Neuroscience Achievements

**Abstract:** The purpose of this article is to identify the opportunities of changes in the field of behavioral habits, beliefs, as well as the emotional life of a person, which are revealed in the light of results of studies conducted by neurologists using cutting-edge brain imaging technologies. Knowledge in the scope of neuroscience shows that the changes needed in the process of social rehabilitation are possible and available to people who consciously seek them and control them. This knowledge should be used in the case of social rehabilitation interactions addressed to people who have problems with self-awareness, motivation for changes and faith in achieving success.

**Key words:** social rehabilitation, social rehabilitation process, neuroscience.

### Introduction

The fact that we still hear questions like: “Is social rehabilitation a utopia or a reality?” should not be surprising, but it is shocking that we encounter people so often who despite the fact that they are professionally engaged in “social rehabilitation”, not only do they not hide that they “don’t believe in social rehabilitation”, but they openly and with full conviction try to prove that this view is the only right one, and those who have the opposite opinion are, according to them, in the best case “incorrigible idealists”, but more often they are “naive” or “ignorant”. Since in public awareness the opinion about the permanency of human nature is deeply rooted, that “what Johnny did not learn, John will not know” or “What

youth is used to, age remembers”... I believe that these stereotypes and rigid cognitive schemes should be challenged, and this is possible through the promotion of current research achievements in the field of the brain, the mind and human behavior, which defy these opinions, which have such a destructive influence on social rehabilitation practice. There is no shadow of hope for educators, who do not believe in the meaning of their work, because they think “people don’t change, if so – only for the worse”, could have a positive impact on social rehabilitation changes in their charges.

In view of the fact that the term “social rehabilitation” is used in different contexts and a certain hype has been created around it, it is worth defining in what sense it will be used in this article. I will not use the concept of social rehabilitation in terms of social rehabilitation education or the effects of social rehabilitation interaction, but in the meaning of the process of transforming one’s own personality, which the individual who is socially unadapted initiates in order to find more effective relations with oneself and the social environment. This process often takes place under the pressures of the external environment and inspiration from significant people, but the external factors are not mandatory and necessary. An indispensable element of the social rehabilitation process is intrinsic activity of the individual – only the individual can socially rehabilitate itself (Mudrecka 2004, p. 21–22). Therefore, social rehabilitation means changes occurring in the socially maladjusted individual, which always have a positive public perception – they cause that the individual is better adapted to external conditions, effectively regulates its relations with the social environment, effectively plays the assigned social roles and can in a socialized way satisfy its mental needs. The process of rehabilitation is the result of the individual’s active search of its own personal way of life, discovering how to live in harmony with oneself and meet external demands. The social rehabilitation educator is only an assistant in these activities – an adviser, who supports and helps the charge, organizes learning experience, directs the mental processes – but the charges rehabilitate themselves. In fact, the process of social rehabilitation is every positive change that occurs in a person who struggled with adjustment problems and we can talk about it as autoresocialization.

## **Epigenetics, neuroplasticity and neurogenesis – the sources of social rehabilitation optimism**

The eternal dispute between scientists who differently perceive the importance of genes and upbringing in human development in light of the achievements of epigenetics can be regarded as irrelevant. Modern scientific research proves in fact, that the human biology equipped with inherited genes do not prejudge its functioning, and the individual’s experience affect the behavior of genes, whether

or not and how they are activated. Indeed a phenomenon has been discovered called gene expression describing its mechanism. Therefore, possessing a particular gene does not prejudge its biological value, it must be activated, and for this chemical compounds are necessary, which are found in food and/or produced by the body itself under the influence of environmental stimuli (e.g. an emotional experience). “It is biologically impossible for a gene to work regardless of its environment: genes are programmed in such a way for their expression to be regulated by signals from their immediate surroundings, including hormones produced by endocrine and neurotransmitters in the brain, part of which are influenced by our interactions with the environment” (Goleman 2013, p. 183–184). Social epigenetics has appeared as a field of science that studies the impact of the environment on gene expression.

Research on social neurobiology, focusing on discovering the mechanisms of brain functioning also indicate that genes provide us only raw material to create emotional responses, and how we read them, what meaning we give them and how we deal with them depends on cognitive functions. Joseph LeDoux claims that genes “specify the type of nervous system that we will have, the types of mental processes, which it can deal with, and the types of physiological functions that it can control. But what we do, think and feel in a given situation is also determined by many other factors, so this is not pre-determined by our genes. Some emotions, if not most of them, have a biological foundation, but social factors, i.e. cognitive, also play a very important role” (LeDoux 2000, p. 159–160).

On the basis of neuropsychology, particularly well recognized is the mechanism of the effect of stress on brain functioning. Prolonged or severe stress impairs hippocampal activity, dendrites shrink and the cells of the hippocampus can be permanently degenerated, preventing the secretion of “anti-stress” hormones. This interferes with explicit memory performance (conscious) and starts disease processes (psychosomatic illnesses, e.g. stomach ulcers) (LeDoux 2000, p. 285–288).

We assume then, that social experience carve our biological foundation, and the development of a happy person requires the necessary set of genes, proper diet and proper care and upbringing in a friendly social environment. Therefore, the maladjusted behaviors we are interested in should be considered as conditioned by the occurrence of biological and environmental factors, while identifying social factors creating conditions for developing the tendency to use inappropriate behavior are particularly significant, as they can be subjected to modifications. The discovered phenomenon of neuroplasticity of the brain (the ability to form new neuronal connections regardless of a person’s age) provides a scientific basis for greater pedagogical optimism, so necessary during social rehabilitation interactions, because it proves that it is never too late for change, of course, provided that the individual wants to change something in life and is involved in the process.

Neuroplasticity was discovered when frequent cases were found of patients after strokes, resulting in significant loss of life functions, and who regained these functions, despite the fact that brain imaging clearly indicated permanent damage. It was found that the brain adapts by creating alternative neural pathways in order to recover the performance of those parts of the body that have been affected by stroke. The brain has the ability to change and reorganize, but focused attention is necessary in this process. This means that for the brain to form new neural connections, focused attention is needed during tediously repeated exercises and activities. Therefore, neuroplasticity occurs under the influence of experience in combination with attention, which generates physical changes in the structure, and then the functioning of the nervous system (Perlmutter, Villoldo 2012, p. 119–121).

It should be noted that neuroplasticity does not occur only in the case of nerve cell damage. It can occur in any situation, and a person can control it through directed intentions, concentration during regular exercise. This is simply how the brain learns: through intentional human action, according to conscious objectives. What's more, the brain does not distinguish fiction from reality, so for people it is enough to imagine doing exercise when learning (Davidson, Begley 2013, p. 30–31).

By focusing attention you can change your thoughts, emotions and behaviors in such a way as to make intentional changes in your life. For example, if existing neural networks for attenuating negative thoughts, which result in mental suffering, are not strengthened, then consequently the unused paths are removed, or at least they will cease to be of such great importance. Of course, the question arises how do you stop thinking about something unwanted? There is only one answer: you need to think about something else and through mindfulness training, repel recurrent, unwanted thoughts (Siegel 2013).

Therefore, the task consists in ceasing to supply old circuits (using what is unwanted) by introducing in their place desirable thoughts, emotions and behaviors (creating new circuits, which over time will automate and create new wants and habits). This requires concentration on a conscious objective and training. "It is time for science to finally face serious consequences of the fact that focused, conscious mind activities can clearly and systematically alter brain functioning, that intended intentional mental effort produces physical power, which has the ability to cause changes in brain functioning, and even in its structure. The result is directed neuroplasticity" (Schwartz, Begley 2003, p. 17–18).

Neurogenesis, or growth of new neurons, is also already an undisputed phenomenon, and long-term dogma that the adult brain does not develop, but is only subject to degenerative changes, was overthrown in the 1960s (Herzyk 2006, p. 88–89). The ability of the brain to develop new neurons (albeit limited) has, like neuroplasticity, great importance for the optimism of social rehabilitation educators. It proves that it is never too late for changes and that they are always

possible. At least potentially – provided that the entity works actively towards these changes.

Knowledge on the functioning of our brain is consistent with the cognitive perspective, which assumes that people actively create their personal reality by creating their own interpretation of the elements of the surrounding world and assign meanings to them. The importance that a person gives a situation affects their emotions and behavior. The cognitive concept presupposes that a person is an information processing system and their behavior depends not only on current information coming from the external world, but also from information obtained in the course of learning and thinking under the influence of various life experiences, encoded in cognitive structures. Moreover, in order to understand this world, the human produces information by interpreting events, giving facts meaning. Thus, the human being is an independent and creative system. Cognitive processes such as: memory, replaying information, thinking, imagination, determine felt emotions and motivation.

## The importance of emotions in decision-making processes

In public awareness there is a common opinion encoded saying that emotions interfere with a person's ability to make rational decisions, and that they are the source of most problems. Research in neuroscience prove that these views are not justified, because emotions are essential in the process of making any decision. Reason itself is helpless here. Michael S. Gazzaniga proves that "reason develops a list of possibilities, but emotions make the choice" (Gazzaniga 2011, p. 81). A similar view is shared by Antonio Damasio, who claims that "emotions are an integral component of the process of reasoning and decision-making – for good or evil" (Damasio 2000, p. 48). Emotions are ubiquitous in our lives. Almost every object, situation, image triggered by memories connects with the essential values of homeostatic regulation, and so it is assessed from the point of view of pleasure or pain, punishment or reward, it is connected with approaching or withdrawal, with personal gain or lack of it, and consequently, it arouses specific emotions. "But when consciousness is available, feelings gain the greatest impact, and the individual is capable of even reflection and planning. It has a means to control the continuing tyranny of emotions: it is reason. Ironically, however, its mechanism requires emotions, which means that its controlling power is often moderate" (Damasio 2000, p. 67). Indigenous emotions and awareness, or consciousness of the present (as opposed to expanded consciousness concerning the autobiographical "I", therefore, past and future) usually occur or disappear together (Damasio 2000, p. 110).

Richard J. Davidson, a neurobiologist as well as psychologist and psychiatrist, believes that the distinction between cognitive and emotional processes is

artificial, since the emotional circuits in the brain often coincide with circuits responsible for cognitive processes. In fact, “emotion interacts with cognition in an integrated and uninterrupted manner, allowing us to coordinate our relationships, work and spiritual development” (Davidson 2013, p. 115). The fact that there is no clear border between emotions and processes of reasoning allows you to change emotions through your own thoughts and vice versa. The coupling that occurs between emotions and thoughts is another source of social rehabilitation optimism, because it is a mechanism used in therapy, social rehabilitation and self-development.

Davidson does not use the term personality, as he discovered the neurological basis for individual emotional styles that determine how people perceive the world and how we react to it, what’s more, they define the way in which people enter social interaction, as well as crystallizing and pursuing life goals. The emotional style is a relatively stable way of responding to life experiences, which is controlled by the respective circuits in the brain, indicating the probability of the occurrence of specific emotional states and reactions to external and internal stimuli. Davidson discovered six dimensions of this style:

- Resistance – controlling how quickly or slowly we get up after defeat.
- Attitude – defining how long we are able to maintain positive emotions.
- Social intuition – responsible for how well we are able to read social cues sent by the people around us.
- Self-awareness – controlling the extent to which we recognize physiological feelings that reflect emotions.
- Sensitivity to context – dictating how well we can regulate our emotional responses, given the context of the situation.
- Attention – determining how much we are able to focus on something (Davidson 2013, p. 13).

The emotional style of every human is based on brain circuits, which are formed early in life due to inherited genes and the environment. Davidson proves that these circuits are not static and, therefore, emotional style “can be modified at any time of life by unexpected experiences, as well as by conscious and deliberate actions when we intentionally shape specific habits and characteristics of the mind” (Davidson 2013, p. 31). The results of his research show that “mind training can change brain activity patterns and thus enhance empathy, compassion, optimism and well-being” (Davidson 2013, p. 18).

## The roots of evil – changes in the circuit of empathy

In the book *The Science of Evil. On Empathy and the Origins of Cruelty*, Simon Baron-Cohen (2014) presents his own concept, based on long-term studies on the so-called cerebral empathy circuit, explaining the causes of human cruelty. Abnor-

mal functioning of this circuit makes it impossible to feel empathy, which opens the gates to harming other people, because it leads to the imperceptibility of the suffering of others, and thus prevents feeling moral sentiments (remorse, guilt and shame) and the desire to repair the damage, or at least to refrain from similar actions in the future. This lack of empathy causes one not to feel psychological discomfort in a situation harming others and at the same time understanding their emotions. Empathy, according to this author, is “the ability to recognize thoughts or feelings of another person and to respond to their thoughts and feelings with the appropriate emotion” (Baron-Cohen 2014, p. 32). Its absence causes that others are treated as objects, and the objectification of a person gives grounds to use them for one’s own selfish purposes. Even if the perpetrator of injustice, who has zero empathy, is informed about the feelings of the victim, this is irrelevant and continues to treat the victim like objects: uses them, and when no longer useful – abandons them.

Empathy is not a constant state – depending on what we are thinking about, what we are focusing on, it is turned on or disabled. Thinking about oneself – disables empathy, and about others – it turns it on. Temporarily disabling empathy (focusing on ego) can be a source of harm to the partner of interaction, but after a while, watching his reaction, empathy may be turned on again, which generates the desire to apologize, for restitution, compensation of harm, promise to improve. But there are people whose zero state of empathy never changes – it is a permanent condition. Baron-Cohen talks about four groups here: people with borderline personality disorder, narcissism, psychosis and Asperger’s. The latter, given the nature of brain functioning, it is very different from the other groups and is referred to as zero-positive. I will not discuss it at this point, as it is only in the sphere of interest of the theory and practice of social rehabilitation. When searching for the causes of zero empathy in people, Baron-Cohen found not only biological factors are important, but also social and environmental factors, such as parental neglect, harming a child, the child experiencing deep mistrust (lack of a secure model of attachment) (Baron-Cohen 2014, p. 32).

There is a theory that connects mirror neurons with empathic skills. Mirror neurons were discovered in the brains of monkeys by Italian scientists, who found that they are activated when the animal is active or when watching someone else performing an action. So the neurological basis of imitation was discovered, which is very important in the process of social cognition, particularly when reading other people’s intentions, desires, facial expressions. It is believed that the mirror neuron system plays a key role here, and that is why they constitute the neural basis of empathy, or compassion (Jaśkowski 2009, p. 245).

The thoughts and feelings of others for people with zero empathy simply do not exist, because they are not “visible” and recorded by the brain, therefore, they are not taken into consideration. Consequently, everything they do is dictated only by selfish interest and through their own point of view. The result of this

a belief in one's own infallibility, and if others do not share this belief – in the best case, it is considered that others are wrong, and most commonly – they are fools (Baron-Cohen 2014, p. 55).

## The efficiency of cognitive control

The left hemisphere is responsible for the human tendency to discover order in chaos. Even if, due to lack of information, one does not understand what has happened and why, the event must be explained in order to find meaning in it. This phenomenon is called the left-hemisphere interpreter. Lack of knowledge does not matter; the left hemisphere will always find some sensibly-sounding explanation and accept it as the truth, even if, due to lack of information, it is ridiculous (Gazzaniga 2011, p. 296). “The left-hemisphere interpreter creates theories to turn on perceived information into a comprehensible picture of the world” (Gazzaniga 2011, p. 297). Therefore, a story (narrative) is formed to better cope with similar events in the future, but at the same time this entails the adverse result in the form of lack of accurate perception of the situation.

Hyperactivity of the limbic system, responsible for generating, experiencing and perceiving emotions and feelings, places a negative filter on the brain through which positive thoughts can barely get through. It is a source of the formation of life pessimism, and even a sense of hopelessness and mental depression. Such persons are tormented automatically by negative thoughts. Characteristic of this situation is thinking in terms of “always”, “never”, focusing on the negatives, pessimism, mind-reading, thinking through feelings, sense of guilt, labels, personalization (assigning personal significance to innocent events) and blaming (Amen 2009, p. 83). A vicious circle is created, e.g. thinking through feelings causes that if you feel something, then it is considered proof to the existence of truth, in accordance with the principle “I trust my feelings”. But emotions are often reactions to what you think. If the thought is irrational, it brings about irrational emotions and feelings. Therefore feelings do not always testify to the truth. So, it is important to look at your own emotions, test them and ask yourself: are there reasons to feel this way?

It is difficult to free yourself from your own thoughts. But accepting them as true just because “I always thought like this” (stiffness, stereotypes, schematic), “I often heard about it” (e.g. proverbs, sayings) is irrational and illogical. Automatic thoughts appearing in our heads are not governed by the laws of logic, but automatic laws: I did this often, so I do it more and more often and more efficiently. Daniel G. Amen warns: “Remember that in order to distinguish truth from false, you must be aware of your own thoughts, be able to soberly look at them. Most negative thoughts appear automatically and remain unnoticed. It's really not you who decides how to react in a given situation, only the bad habits



of your brain. To find out what is true and what is not, you have to question the emerging thoughts. Do not believe everything you hear – even in your own mind!” (Amen 2009, p. 84).

The key to success is willpower, which is nothing other than the ability to focus attention on one thing and ignore others, which is referred to as cognitive control or self-control. Goleman cites evidence that this understanding of self-control is a better predictor of good professional, family and social adaptation leading to a fulfilling life than IQ or being born in a rich family, which provides education in private schools and the best universities. What’s more, self-control can be learned by practicing the ability to focus attention. The researcher concludes that: “Willpower keeps the focus on goals, despite the fact that we are distracted by impulses, passions, habits and cravings. Such cognitive control is a “cool” system of the mind, which tries to realize goals despite the “hot” emotional reactions – reactions that are fast, impulsive and automatic” (Goleman 2013, p. 110).

Perseverance in achieving your own goals and the ability to postpone during pleasure, in addition to problems with empathy, are weaknesses of socially maladjusted individuals and social rehabilitation interactions should be focused precisely on them. In addition to the training of attention and meditation, cognitive-behavioral therapy can be used for this purpose, which is essentially training the mind, as through cognitive restructuring an individual learns to challenge one’s own thoughts, casts doubt on the validity of conclusions reached, reinterprets previously assigned meanings to external stimuli, and learns healthy response to one’s own emotions, thoughts and behaviors. Davidson claims that “new methods of thinking acquired as a result of cognitive-behavioral therapy can fundamentally change the behavior of the brain, allowing people to abandon unhealthy patterns of thinking and acquiring new, healthy patterns that again allow them to feel joy and get rid of feelings of sadness, shortness of affection and paralyzing habit of thinking” (Davidson 2013, p. 215).

## Conclusion

To conclude, it should be emphasized that the study results on brain functioning confirm the justification of using social and cognitive concepts which emphasize the importance of the cognitive aspect in social rehabilitation work. *Cognito*, cognition, is the key not only to understanding oneself, others and the world, but also makes optimal development possible for every individual, inseparably connected with incessant changes. However, programming and making changes to the unadapted functioning of a person requires faith not only that it is possible, real but also achievable. This faith should be based on rational arguments that changes are to be provided with by educators, because they have (should have)

knowledge of the intricacies of the functioning of the human brain and mind. For a charge to succeed in life, they must have clearly defined goals, know what must be done to achieve these goals and be focused on implementing them. However, the essential condition is cognitive activity of the charge and intensive and persistent exercises in developing own self-control. Because changes in life are certain, and people, whether they like it or not, change (it is enough to give the argument of the biological aging of cells). The direction in which these changes occur, depends primarily on the person. Therefore, it consists in charges finding willpower inside themselves for positive changes, thanks to which their lives will be more fulfilling, which will raise the quality of their lives and their loved ones. This will mean the realization of social rehabilitation objectives and achievement of social rehabilitation using the latest achievements in the field of neuroscience.

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