STUDIA UBB MUSICA, LXV, 2, 2020 (p. 89 – 96)
(RECOMMENDED CITATION)
DOI: 10.24193/subbmusica.2020.2.06

NEUROSCIENTIFIC CONNECTIONS BETWEEN SELF-MANAGEMENT STRATEGIES AND THE EXPOSURE TO MUSIC

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SUMMARY. Contemporary society shows a growing preoccupation with identifying certain techniques, that facilitate personal development in all fields, with strategies that work swiftly and effectively. The article focuses on two scientifically concepts stemming from opposing historical boundaries, *catharsis* and *self-management*, in order to support the theory that would justify the necessity of integrating art into people's lives as an essential part of self-development processes. The arguments are gathered from the neuroscientific, cognitive-motivational, sociological, philosophical, and musicological literature.

Keywords: management, art, language, methodologies, cognition, music therapy.

Aristotle wrote in his "Poetics" fragments about *catharsis* (the Greek word signifying the clearing and cleaning of the soul and the mind) that surpass accessible spirituality, explaining the miraculous effect that exposure to artistic factors can have on a human being. The Greek philosopher invested the power of art with purifying functions and declared it the most valuable resource for rapid healing. In relation with the „drama of music", Aristotle claimed that the effects of "fear" and "pity", together with another fundamental concept, *mimesis* (the imitation of reality), generate powerful emotional states that attract the audience and determine them to get involved in the artistic act by means of affective filtering.

Ancient Greece absorbed, into Homeric poetry, the cathartic soul-cleaning effect of art, through actions which seemed rather to serve religious rituals, overlapping what we nowadays call "the mystery of confession". The later medical and psychoanalytic context continued working with this derived connotation of catharsis, explaining it as a state of exuberance with divine origins, associated with the elimination of powerful emotions by specific means.

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Sigmund Freud, together with his colleague Josef Breuer introduced the notion into the therapy of hysteria, applying the cathartic effect during hypnosis episodes. Although the meaning of the Freudian theory was far from the ancient concept, it also referred to the unconscious elements of the human psyche, which react to certain stimuli that we often do not understand: "before the 80s there existed almost no neurological study on music (...) nowadays there is an enormous and increasingly varied number of works on the neural basis of perception and representation of music and on the complex and often bizarre disorders that it may be subject to."

The theses of history highlight the fact that this phenomenon of catharsis is the explanation of the impact that external factors have on psychological rebalancing. The outcome of exposure to music is often hard to explain scientifically, but the relationships that are created on the subconscious level can be identified in each person's state of mind: in changes of attitude before and after concerts, in psychic rebalancing, in detachment from daily concerns and in diminishing the stress produced by everyday life – a genuine "purification of the spirit" which we attain by intense participation in the artistic act.

Regarded as an "unblocker of problems" music has played, throughout history, an important role in behavioral therapies. We shall present hereunder the physiological explanations supporting the hypothesis that there is a range of beneficial mental reactions which exposure to music generates in the human body and which, in connection to self-managing strategies may represent essential elements in potentiating physical and mental capacities that go beyond the boundaries of motivational methodologies.

The proof that music has transcendental qualities can be already found in early civilizations. Biblical stories tell of King Saul's habit of calling David with his harp as often as he felt his mind and soul troubled. Closer to our times, the medical research of the past centuries has drawn attention to the effect that music has on rebalancing the human psyche. For hundreds of years researchers have been preoccupied to find out why the brain responds instinctively to musical stimuli and which is the explanation of the fact that exposure to music causes structural and neurological-functional changes in humans.

The first neuronal field touched by musical stimuli is the *amygdala,* the center within our brain responsible for fear and pain, which processes exterior information and makes decisions in stressful circumstances. One of the most important steps in the self-management process is to force individuals to fight the challenges that overwhelm them and thus inevitably create a stress factor. Neurological research has shown that the center of the amygdala enters a sedation process as soon as the individual becomes musically active, and the strength of this physiological anesthesia is directly proportional to the level of familiarity and comfort the individual in question

has with the elements of sound; in other words, the more musically cultivated the individual, the more visible the healing effect.

Medical research conducted on patients with chronic disease has shown that pleasant music activates dopamine, the main neurotransmitter involved in controlling the centers of pleasure and reward within the brain by supporting emotional balancing, increasing energy and concentration level. In its turn, dopamine interacts with oxytocin, the neurohormone of happiness, which lowers the level of cortisone (the stress hormone) and creates room for the feeling of attachment (which explains the sensation of belonging together that performers experience when performing in ensembles).

The opioids, chemical substances meant to protect, which medicine considers related to morphine, are produced in general by the body when making physical effort, to reduce painful sensations in the body. The neuroimaging techniques of the recent years have demonstrated that strong emotions which music can trigger release a substantial quantity of opioids, minimizing the stress one experiences in highly demanding situations.

The neuroplasticity of the brain is one of the functions that explain the spreading of musical information in several regions of the brain, the centers that remain active and interconnect into new neural networks. Like a computer, the brain acts complexly and rapidly, selecting the perceived information and decomposing it, in the case of music, into intensity, duration, and timbre; then comes the process of re-composition, in order to generate the new reactions: “as the extraction of impulse takes place in the cochlea, the auditory cortex, the cerebral trunk and the cerebellum, the superior nervous centers in our brain receive a constant flow of information (...) this information is updated continuously (...) striving to foresee what will follow in the music, based on several factors” and thus forcing the brain to make logical inferences.

To draw a conclusion on the neurochemical reactions produced by music, let us recapitulate the areas of influence we have previously described:

- Social attachment: music releases oxytocin, the hormone of happiness
- Immunity – it increases the quantity of serotonin
- Stress – it balances the cortisone level
- Reward and motivation – it trigger extreme, euphoric feelings, producing dopamine and opioids in quantities similar to those produces by drugs.

In neurophysiological terms, the motivational principle is also explained as being the result of stimulating the centers responsible for rewards, an ensemble of impulses triggered by satisfied desires, be they:

- primary ones: immediate pleasures produced by the satisfaction of physiological and security needs

- secondary ones: social needs such as self-esteem, the feeling of belonging together, self-accomplishment

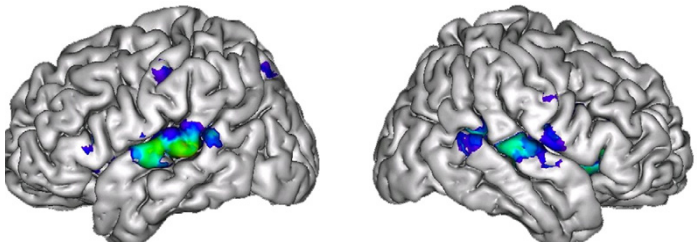
Explained in this manner, the motivational flow is maintained by the succession of positive experiences and the frequency of individual results, which determine the dependence on supplementary stimuli. As we have seen above, just like medicines, powerful emotions produce special chemical reactions which do not merely balance the psyche, but also trigger “the need for return”, that drug that can recall a state of well-being. Conditions such as Alzheimer, Parkinson, aphasias caused by strokes responded positively to music-based therapies: “music can affect us all, it calms us, invigorates us, soothes us, alters us or helps us organize and synchronize our work or our games, is particularly strong and has a huge therapeutic potential for patients with a variety of neurological disorders.”

Brain imaging research on the effects of music on the body managed to reach certain generalizations about the resources considered to be highly efficient in structural and sonorous terms. Thus, in order to trigger a complex range of chemical reactions in which serotonin, dopamine and endorphins are released concomitantly, musical materials are used whose components relate to two levels, a so-called environmental or background one, a harmonic *perpetuum mobile* of no more than two or three sound clusters rich in harmonics, which alternate slowly while supporting a main tune consisting of consonant leaps, which is more often than not pentatonic [3] or made up of sounds taken from nature. [4] As in meditation exercises, we observe that these clinically significant impulses actually cause a trance-like effect by engaging nervous centers responsible for triggering stress, pain, sadness, anxiety. In fact, repetitive blocks of sounds compel the brain to calm down, to refresh its functions, to detach itself from disturbing factors, to rest, and to reinterpret reality correctly. This is the reason why the songs experts employ for therapeutic purposes are composed especially for these treatments, most often using computers, based on neuroimager findings which demonstrate the reaction of the brain to sounds which possess certain features. Other examples, used to induce states of safety, exuberance, merriness, appeal to the same consonant elements paired with repetitive rhythms relying on musical discourses with ludic features; for the sake of boosting physical energy, we usually come across rhythmic groups made up of anapests, dotted rhythmic values, ascending melodic lines, consonant lively accompaniment made up of sixteenth notes.

Modern therapy has associated with neurosciences to conduct advanced research on the healing potential of music. The human capacity of responding to musical stimuli originates in intrauterine life, when the foetus can perceive spoken and sung sounds. The studies involving new-borns who had been exposed to musical stimuli proved that there are areas responsible for musical memory which become activated and develop when familiar elements appear in their auditory context. Moreover, since exceedingly

early ages, music can be used to soothe the body and, which is more important, to enhance the capacity to communicate, developing the hearing centers in the brain. We can notice in the image below that one of the nervous centers stimulated when exposed to music coincides with the center of expressive language.

Image 1



Networks for music (right) and language (left)

It is therefore credible that music contributes significantly to human psychic and mental development, even if most people seek it for comfort, relaxation, and motivation.

We have mentioned that therapists use music nowadays to reactivate brain parts deteriorated due to diseases or accidents, in the case of patients who lost their memory but nevertheless react to songs they recognize or in patients with strokes for whom attempts are done to modify cerebral mechanisms so that healthy neurons may take over the motoric and aphasic functions; doctors use musical environments in order to calm the blood flow in people who are about to undergo surgery, so that less anesthetic is required; speech therapists use musical games to communicate more easily with autistics and determine them to develop their attention; oncologists work with music in order to diminish anxiety episodes and interrupt the chain of genetic mutations that create cell anomalies and to persuade patients to attend cures that work by eliminating stress; sociologists use musical instruments for motivational purposes, in all fields in which progress is directly connected to the quantity of effort invested.

Music can produce physiological changes which turn into concrete high-value functional outcomes, activating more than the common capacities of the brain. It is an antidote for the hectic world we live in. Contemporary science, be it medicine or psychology, regards the field of music as a mystic pole that produces changes in the human nature. Current research is conducted mostly empirically, starting rather from the effect towards the cause, with the ambition to demonstrate the categorical influence that music has on the neuronal networks. Special machines are devised to monitor cerebral

activity to accomplish clinical research on the impact of certain music styles on human beings. We believe that in this regard a supplementary interest from musicians who have the expertise to select from the literature those titles that correspond to peoples' special needs and to motivate the necessity of integrating them into processes of personal development or recuperation, as medicine sees them, would be a necessary contribution in order to support the growth of music therapy as a domain so necessary in our times.

The search for identity, the search for the self is in fact the search for the purpose of life. What best matches one's real identity should be the equivalent of identifying one's vocation and implicitly of the intrinsic destiny for which an individual is efficiently structured. Self-knowledge is the antechamber of all answers and the axis that places us in the environment in which we can accomplish our best performances.

Self-management, one of the most widely spread 21st century trends, which we come across in the literature under related names such as *self-help, leadership, and personal development,* brings up motivational elements with the role of constructing and consolidating certain personality traits able to generate success.

Self-management is in fact a combination of behaviors that leaders cultivate, a recipe of "appropriate conduct" meant for certain situations, which they learn and make use of in the right circumstances to become strong in the relationship to themselves. Contemporary motivational literature is full of examples and indicators of the ideal self-management variant, and the great majority highlight the same points:

- Permanent self-control and equilibrium to be able to act clearly, very realistically and be well organized and in any situation
- Planning details to establish "implementation steps" based on gradual strategies in the short, medium, and long term
- Concern to identify all the solutions that may positivize vulnerable spots and the levers of opportunity that support action plans
- Energetic and proactive attitude made to create and support maximal efficiency by means of positive habits

In 1968 *Psychological Films* California broadcast an interview with Abraham Maslow on the theory of "self-actualization" which defined motivational coordinates. As primary attitude, Maslow depicted the elementary need to induce the state of wellbeing into the subconscious and to develop, by all possible means, the sense of humor, an essential step for coping with the efforts required by self-management. He also spoke about social interest and interpersonal relationships, which are useful elements in introspection processes, being considered psychological units for the measurement of

identity, community integration, self-esteem, and appreciation. He also brought up the need for clarity in the perception of reality, for *relinquishing the senses,* that the self-manager must appeal to objectively analyze the situations which he confronts, to judge correctly and formulate realistic expectations based on concrete proof and not on thoughts influenced by transient factors. In connection to these theories, Maslow speaks about the *mystical states* that individuals go through when experimenting profound emotions deriving from pleasures that are triggered in special situations, for instance when exposed to music, and calls such feelings "peak experiences"[2], which usually linger in the individual memory and produce major changes in the structure of the personality.

The same theory presents the power of creativity to enhance certain areas of the brain which might contribute to a greater psychic availability in relation to the personal development strategies. He refers mainly to instinctive moments when we like to create without rules, as a supplementary element of affective communication of a subjective nature. This is the realm of inspiration pertaining to composers, painters, sculptors, and to all improvising artists who give free rein spontaneously to their creative impulses.

Abraham Maslow stood out in psychology due to the concepts he formulated on motivation and personality. One of the most celebrated images that define him is his "hierarchy of needs" pyramid, which has often been explained in relation to the theory of marketing.

A real model of conduct for personal development, "Abraham Maslow was the man who had the courage to listen to himself (...) he was called a pioneer, a visionary, a philosopher of science, an optimist. He was one of the promoters of humanistic psychology (...) he had an essential role in the emergence of two major forces in psychology: humanism and trans-personalism. Both employ human nature in all its richness and complexity (....) he realized that people involved in self-actualization are motivated by the values of the being… (...) which develop naturally in healthy individuals, without being imposed by religion or culture (...) Maslow exploited… the rich cultural life of New York and fell in love with theatre and classical music."[3]

The self-management theory offers a motivation for the introspective side of our personality – a dynamic, interactive phenomenon subject to various influences. Individuals resort to the strategies they know in order to provide meaning to daily experiences, many of the significances being nevertheless subjective due to certain cultural backgrounds and education

[2] Levitin, Daniel. *Creierul nostru muzical* (Our Musical Brain). Humanitas Publishing House, Bucharest, 2010.

[3] Gavreliuc, Alin. *Psihologie Interculturală (*Intercultural Psychology). Collegium Polilorm Publishing House, Bucharest, 2011.

levels which pre-establish their systems of values: social reality is divided according to such dichotomies as *we-others, the good-the bad*, and the establishment of a asocial identity tends to define itself through rejection, bordering on aggressive expression in relation to the *other*. There is a permanent process of comparison with *the other* and an inclination, confirmed by the attribution theory, to attribute positive features to one's self and to the group one belongs to and negative features to *the other."*

The changes in personal development strategies force us to transform, to revise our identity and reshape our feelings of belonging by reference to the new components that define us. It is therefore necessary that, before anything else, we reflect on our existence with all the features that characterize us, from the primary-biological needs to the sociocultural and spiritual ones, to understand that elevated experiences (such as those triggered by musical stimuli) require first and foremost a change of paradigm, an availability for novelty, a sensitivity that we need to accept as being something beneficial and necessary.

Translated in English by Alina Pop

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