The Informational Structure of Consciousness and Application for an Evaluation Procedure in the Music-Based Therapy

Florin Gaiseanu*

The trilogy 'Consciousness in the Universe is Tuned by a Musical Master Code' by Meijer et al, published in Quantum Biosystems, vol 11, no. 1, 2020 is reviewed.

Abstract

The music-based therapy became nowadays an effective technique with beneficial effects in stress relaxation, anxiolytic and analgesic behavior, bipolar and personality dysfunctions, attention-deficit/hyperactivity at children and even in degenerative neurologic diseases like dementia, Alzheimer's, Parkinson's diseases. Moreover, the music-based interventions demonstrates the remarkable ability to activate non-music brain circuits otherwise unavailable by other techniques, allowing the enhancement of the perception/cognition, language and motor learning at patients with neurologic diseases, even inducing brain plasticity. It is shown that the structure of consciousness presented in this paper is a valid and effective tool to explore the patient attitude concerning the compatibility between the recommended music and the patient's specific attributes, expressed by: accordance with the previous experience, acceptance of the proposed objective (music and music-based therapy), emotional implication/attachment to the objective, momentary/average status and disposition, creative co-participation, behavioral conformity according to personal predispositions and abilities, confidence and trust in successful results. The evaluation procedure allows to deduce the engaging patient's recourses in the therapeutic process, and to qualify them under the form of a reference and subsequent feedback diagram after each music applied cycle. The evaluation is obtained by narrative-based medicine type tests on each specific cognitive center of the patient, allowing a fully expressed qualification of the patient's personality before and after therapeutic process, and the optimization of the relation patient-therapy. The described evaluation procedure contributes thus to the effectiveness of the music-based therapy and its adaptation to the specific personality characteristics of each patient, and to combine the advantages of the evidence-based medicine applied for diagnostic and music recommendation with the narrative-based medicine for adaptive optimization. This procedure can be used for any similar type of therapy.

Key words: informational structure of consciousness, cognitive centers, music-based therapy, evaluation procedure, optimization of the patient/therapy relation and rehabilitation.

Quantum Biosystems. **11 (2) 22-33**

* PhD, Principal Senor Researcher (Professor), Science and Technology of Information Bucharest (Romania) and Barcelona (Spain)

Introduction

Since immemorial times, human discovered the wellbeing state associate with music. In every realm of our planet and in the tradition and culture of the local population, by music, rhythm and dance human expressed his enjoy to live, transposing by music his emotions, desires and sentiments to himself, to his dear persons and to community.

Music was therefore an yearning, a consolation and a caress, with therapeutic effects since antique époques till today. In our stressful informational era, when individual is submitted nowadays to an avalanche of problems, both of his/her own and of those of family, either concerning the status/health situation, or coming from the social conjuncture, the therapeutic methodologies started to become an useful means of

recovery/rehabilitation or preventive alternative option to maintain the equilibrium and health (Gaiseanu, 2020d).

Particularly, as the health is concerned, we assist since some decades ago to a reconsideration of medical orientation to the natural ways of health care, so that the aim of medicine, regarded as an art since centuries, returns more and more to take care of the sick, rather than to cure only the disease, medical humanities becoming an increasingly widespread attitude (Lippi, 2010). While the purpose of the evidence-based medicine (EBM) is to integrate in the diagnostic decision and in the patient health care process the clinical expertise and methods of analysis, rigorously applied to improve the uncertainty (Masic, 2008), the narrative-based medicine (NBM) assigns the central role to the patient, with his distinctive personality and his values, improving the inter-human relations with the medic and medicine (Zaharias, 2018).

In the last decades, careful studies on the influence of music on the nervous system highlighted that the music is an efficient technique applied not only for stress relaxation, rehabilitation of some dysfunctionalities like anxiolytic and analgesic behavior, decreasing heart rate rhythm, respiration rate, and blood pressure in perioperative patients (Ellis, 2012), but also is an effective therapy useful in some degenerative diseases (e.g. Parkinson's disease), in the treatment of children with attention deficits, memory and learning difficulties (e.g. attention-deficit/hyperactivity disorder) (Galińska, 2015), with positive results in cerebral palsy. This therapy presents the remarkable ability to access affective/motivational brain circuits for the enhancement of perception/cognition, language and motor learning at patients with neurologic diseases (Mainka, 2016).

The music therapy allows also the access to brain functions unavailable otherwise through non-musical stimuli (Galińska, 2015), intervening even in the brain plasticity (Bella, 2015), with beneficial effects on bipolar and personality disorder and elderly patients with cerebrovascular disease and dementia (Okada, 2009).

It is therefore demonstrated that the integration of the music therapy in the health medical treatment shows a large spectrum of applicability, with positive effects from stress relaxation to chronic degenerative neurologic diseases and even in sensitive treatment of the pain and hearth rate variability in cancer survivors (Chuang, 2010). The engagement of the sensitive-motor systems managed by the brain requires not only a careful analysis of the suitable music type for one of the large diversity of nervous dysfunctions, but also a specific attention to fir it with the particular sensitive values and receptivity/affectivity of the patient and with own active co-participation. Therefore, to assure an efficient effect, any intervention should be uniquely customized to the patient's particular conditions, taking into account the inter-relating communication and feedback resonance between conscious and autonomic nervous system involved in the therapeutic process (Ellis, 2012). In other words, a careful adaptive methodology on the basis of an advance knowledge on consciousness operability should be adopted.

On such a line, as a contributing effort to improve the knowledge and methodology, focused rather to an adaptive therapy, able to lower the gap width between the medic and patient communication on one side, and between the own internal psychological conflicts and barriers of the patient and his/her expectative with respect to the therapy purposes, in this paper there are presented advanced results concerning the informational structure of consciousness, revealing the activity of the component cognitive centers and their functionality, useful to be applied to elaborate a corresponding methodology for the music-based therapy (MBT), as a function of particular specific adaptive qualities of the patient.

1. The informational structure of consciousness and cognitive centers

All the signals from ambient perceived by our senses, i.e. sight, hearing, smell, taste, touch are actually information (Gaiseanu, 2019e). Our sensing elements detect these signals and transmit them to our brain, which reacts for their interpretation and insertion in a suitable decisional process, on the basis of personal decision criteria (Gaiseanu, 2018a).

We feel emotions depending also on the signal interpretation and our own previous experience, which serves as a comparative reference.

Particularly, music is also information (as shown in the right side of Fig. 1), but with a complex multi-sound/polyphonic rhythmic structure, which is interpreted, evaluated and accepted as pleasant or not, but which certainly impress us anyway.

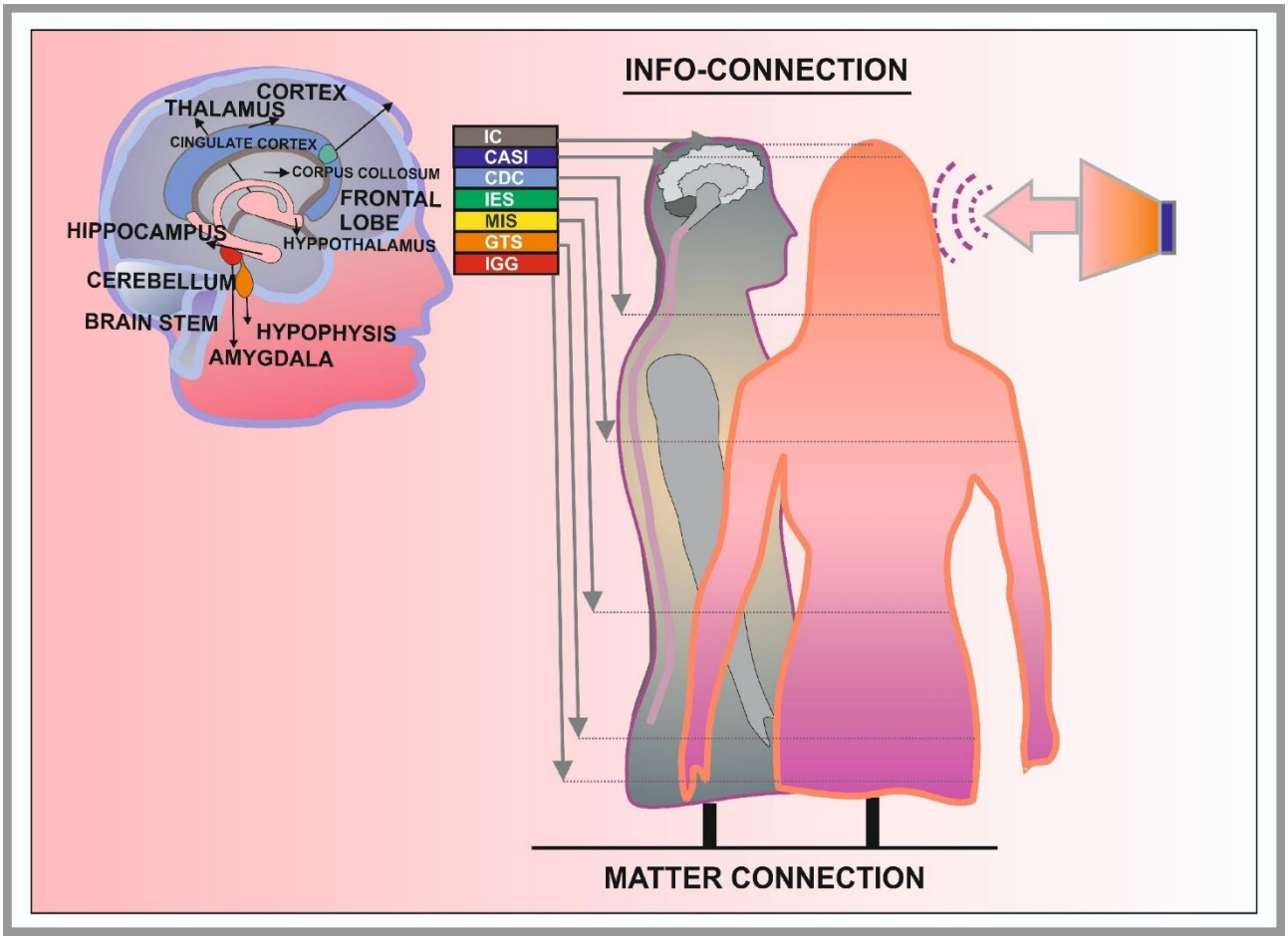

Fig. 1 Schematic representation of the music reception (right side) and of the informational circuits in human organism (left side), their connections with the brain and with the body regions (black arrows), according to the informational structure of consciousness.

Our sensory network is connected with memory, which in terms of information was defined as the Center of Acquisition and Storing of Information (CASI) (Gaiseanu, 2019c), independently of the information source (Fig. 1, left-center scheme). First of all, this information is consciously detected and momentary stored in the short-term memory, specifically in the prefrontal cortex (Fig.1 left upper side), and is memorized then in the hippocampus for a longer time, if this information is repetitive and/or of a particular interest. However, this information is not passively stored in CASI, because human is a sensitive informational system, reacting to an input information by a decision, expressed as attitude. The reactive center which processes the information in order to generate a decision was defined in terms of information as the Center of Decision and Command (CDC) (Gaiseanu, 2019c), operating mainly by cortex.

However, the reaction not only consists in the informationally processed decision, but also is accompanied by the feeling reactivity, which is given by sensations and emotions, elaborated and expressed/managed by the Info-Emotional System (IES), connected especially with the

limbic system, including amygdala, which is an automatic responsive alarm agent (Gaiseanu, 2019d).

These three centers act from the informational point of view as an Operative Informational System (OIS), because determine finally the attitude, as a result of a decision globally resulted from a co-participating process of the input information, emotion as feeling reaction and decision itself, processed by CDC. The attitude is actually the information output of the informational system of the human body (ISHB), an expression of the reactive response for adaptation to the input informatio..

The organism maintenance and operability is supported by the info-activity of the Programmed Informational System, which from the informational point of view is composed by three basic components (Gaiseanu, 2019c): the Maintenance Informational System (MIS), the Genetic Transmission System (GTS) and Info-Genetic Generator (IGG).

The main role of the organism maintenance is played by MIS, managing the metabolic processes, related with matter processing, from nutrients' absorption (air, water, foods) and their processing, to the elimination of the wastes (Gaiseanu, 2020b).

These processes are mainly managed by the inferior zones of the brain: brain stem area, medulla and spinal cord (controlling the automatic functions such as breathing, heart rate, body temperature, blood pressure and distribution, wake/sleep cycles, digestion), and hypothalamus, with integrative role. GTS manages the elaboration and transmission of the genetic information, supported especially by hypophysis, while IGG coordinates the info-evolution and development of the body according to the age by means of hypophysis and basal ganglia and hypothalamus (Gaiseanu, 2019d).

In Fig. 1 the metabolic circuit is connection to matter in the down part of the human profiles. From the informational point of view, IGG is the genetic informational input and GTS is the genetic informational output of the human organism.

As it was argued earlier (Gaiseanu, 2019f), the external information, repetitively and/or intensively acting on the sensorial receiving system is progressively integrated in the genes' structure by epigenetic processes, and can be transmitted to the next generation. Such a process allows long-time adaptation by the acquirement of new genetically inter-generationally transmitted traits, showing the remarkable potential of human organism to incorporate information in his informational structure, and demonstrating the role of information in human/brain evolution (Gaiseanu, 2020c). Particularly, taking into account these results, we have to remark that music, as a complex informational input agent and operator, may have a profound effect on functionality of body, depending how this effect is actually managed by the external source (therapy agent), as a function of the patient's available potential of reception and operability (Gaiseanu and Graur, 2018).

The mind-body relation is very close, as it can be seen from the schematic representation of ISHB in the left side of the human profile in Fig. 1, by the black arrows between the informational components (CASI, CDC, IES, MIS, GTS, IGG) and the managed body organs/regions. IC is a special info-connection center, assisting the special phenomena like near-death experiences (NDEs) and mystic and religious experiences (MREs), to mention only these main informational phenomena (Gaiseanu, 2017a,b; 2019c). The specific brain region managing this connection is the anterior cingulate cortex, selecting between YES (acceptance) or NOT (rejection) alternatives, according to the trust (believe) experience (Gaiseanu, 2020d), but the posterior cingulate cortex, involved in the mind commutation to the internal “daydreaming" experiences could be also involved.

The body organs/regions connected by the brain components of ISHB are specifically correlated with the executory transducing functions which these components manages (Gaiseanu, 2020b) and are indicated in Fig. 1 by the black arrows: CASI and IC are closely related with the brain as the informational support, and together with CDC manage the virtual information through thought, which is an informational operator on the informational field of the acquired data. CDC transmits the decisional motor-commands to the execution elements of the body (the muscle transducers)

by means of electrical/chemical agents (the nervous system), and the decision is communicated mainly by verbal/voice expression. IES is mainly connected with hearth, managing the vascular system of blood distribution, according to the type and intensity of the emotional signal. MIS is correlated with digestive system and GTS and IGG with genital system.

The deep mind-body relation can be remarked by the projection to the conscious mind of these informational systems, either belonging to OIS (OIS=CASI+CDC+IES) or PIS (PIS=MIS+GTS+IGG+IC). Indeed, it is evident that the functionality of CASI is to preserve experiential life data in the organism info-library, which is the memory. This can be expressed by the relation CASI → Iknow, where Iknow represents suggestively the manner in which CASI is perceived in consciousness. "I" refers here to the subjective perception of reality (Gaiseanu, 2019b), actually as own personal experience, which is therefore different from one person to another. We "see" (receive/judge/interpret) therefore life by our own "eyes", according to our own good/bad decision criteria acquired during our experience (Iknow) or inherited from our parents (Gaiseanu, 2018a; 2019a), by means of the projection IGG → Icreated. The judgment and interpretation of reality (input information) to make a decision is perceived in conscious mind by the projection CDC → Iwant.

IES is reflected in consciousness by the cognitive center Ilove (IES → Ilove). This center deserves a special attention, because for most of us the emotions play a fundamental (sometime a critical) role in our life, participating in a notable way in decision making (Gaiseanu, 2020a). Ilove is actually the fundamental emotional relation with life. The main aspiration of all living structures is to be alive and to survival, and Ilove expresses in unmediated way this fundamental emo-desired requirement, so from this point of view this is a union arrow between the mind and body and between the life and human. Emotions are negative or positive, according to own experience. YES/NO opposite states are actually two universal alternatives in nature, acting as an informational Bit unit (Gaiseanu, 2019e).

These states refers not only to emotions, but also to any choice reported to a reference, something which could be accepted or rejected with respect to a criterion. A selection between the two alternatives YES or NOT is actually a decision.

The decision criteria are acquired from experience or are inherited as specific traits and behavior.

From the technical/informational point of view, YES/NO represents actually the binary informational unit (Gaiseanu, 2020a).

While emotions are rather impulsive momentary reactive states, the so called emo-states (Gaiseanu, 2019c) are rather a consequence of the cellular activity, which forms specific chemical receptors on the membrane of cells by a repetitive process, subsequently "asking" to receive the same specific type of emotional signal carried by chemical agents, as received in the initial cycles.

This type of emo-state is similar with a drug-induced state, which develops the addiction. To understand the effects of emo-states, we have to note that a prolonged repetitive melancholic or depressive situation could develop a chronical depression. The excessive and repetitive alcohol/drugs consumption induces addictive states, with bad/graves and unpredictable consequences for own person or for the others (Gaiseanu, 2020d). On contrary, an optimistic view of life events becomes a solid fundament for a wellbeing and health life. Music can induce similar stable emo-states by a repetitive process, favorable for equilibrium and organism health. Emotions and our thinking behavior make our life living and personal.

The emotional responsive impulses are different from each other's and differ from one person to another, according to the genetic inheritance and acquired experience.

All these observations are an anticipative basis to understand why the evaluation procedure presented below is of a real help to adapt a music-therapy strategy to the patient's personality, in order to obtain an efficient rehabilitation process.

The projection of MIS in consciousness is related by the cognitive center Iam (MIS → Iam), which reveals consciously the personal self-status, including the equilibrium and

health. GTS is assessable in consciousness by the relation GTS → Icreate, which refers to the creative impulses. A spectacular result explained on the basis of the informational structure of consciousness revealed by the Informational Model of Consciousness (IMC) (Gaiseanu, 2019c), with deep implications in the understanding the effects of music-therapy, refers to the mechanisms of the integration of information in own informational system.

The integration process starts with the reception of a long-time repetitive signal from CASI (perceived in Iknow) which becomes part of the informational system of the organism in GTS (expressed by Icreate), mediated by epigenetic processes, via CDC (Iwant), IES (Ilove), MIS (Iam), and transferable to IGG (Icreated) of the offspring. By these mechanisms, music could operate in the deep structures of organism, rehabilitating (by means of a suitable music-based therapy process) some dysfunctions of the nervous system.

IC is reflected in consciousness as the cognitive center Ibelieve (IC → Ibelieve), giving force and stability to the voluntary decisions of Iwant (Gaiseanu, 2020d).

According to IMC, the cognitive centers (Iknow, Iwant, Ilove, Iam, Icreate, Icreated, Ibelieve) compose actually and express consciousness (Gaiseanu, 2019c). The human organism is therefore a material (matter-related) body connected with two poles: information, as received from the informational field of ambient by means of our senses, and matter, with which the body itself is connected, as it can be seen from Fig. 1. One of the relevant results of IMC is that information, received and operated especially by OIS, can influence and even modify the body, intervening intimately into his operational/informational structures and habits.

Table 1. Evaluation procedure implemented in the Music-Based Therapy (MBT) process, resulting from the Informational Model of Consciousness (IMC) and its characteristic cognitive centers, allowing to fit the recommended music therapy to the individual corresponding qualities obtained from a Narrative-Based Medicine (NBM) type analysis.

2. Evaluation Procedure in the Music-Based Therapy Process

The following main conclusions can be extracted from the above analysis: (1) information (particularly music) is an operational active agent intervening in the brain, body and his circuits; (2) the music-based therapy (MBT) should be applied repetitively for an efficient/integrative effect; (3) we are different from each other, so MBT should be adjusted/fitted optimally to the individual qualities/capabilities in order to obtain a suitable and durable effect.

According to the conclusions drawn from the above presentation, the program for MBT application should be designed in such a manner to include an optimization process, to fit it with the specific personality of the patient for an efficient effect. In other words, a fitting process between the recommended music and the particular characteristics of the patient is to be achieved for a successful therapeutic procedure.

Such a process can be obtained analyzing/discovering the specific qualities of the patient. This is possible applying the evaluation procedure on the basis of the results presented above concerning the informational structure of consciousness and on a NBM type test applied to the patient in order to determine the characteristic qualities of his/her cognitive centers, as indicated in the Table 1.

Practically, after the EBM determination of a diagnostic and music recommendation, an adequate NBM-type test should be applied in order to detect/qualify the typical individual qualities/characteristics of the patient with respect to the proposed music therapy, according to the diagnosed disease. The attitude of the patient can be known from a series of questions addressed to him, letting know in this way the specific attributes of each cognitive center Iknow, Iwant, Ilove, Iam, Icreate, Icreated, Ibelieve, as it is indicated in the Table 1 and discussed below.

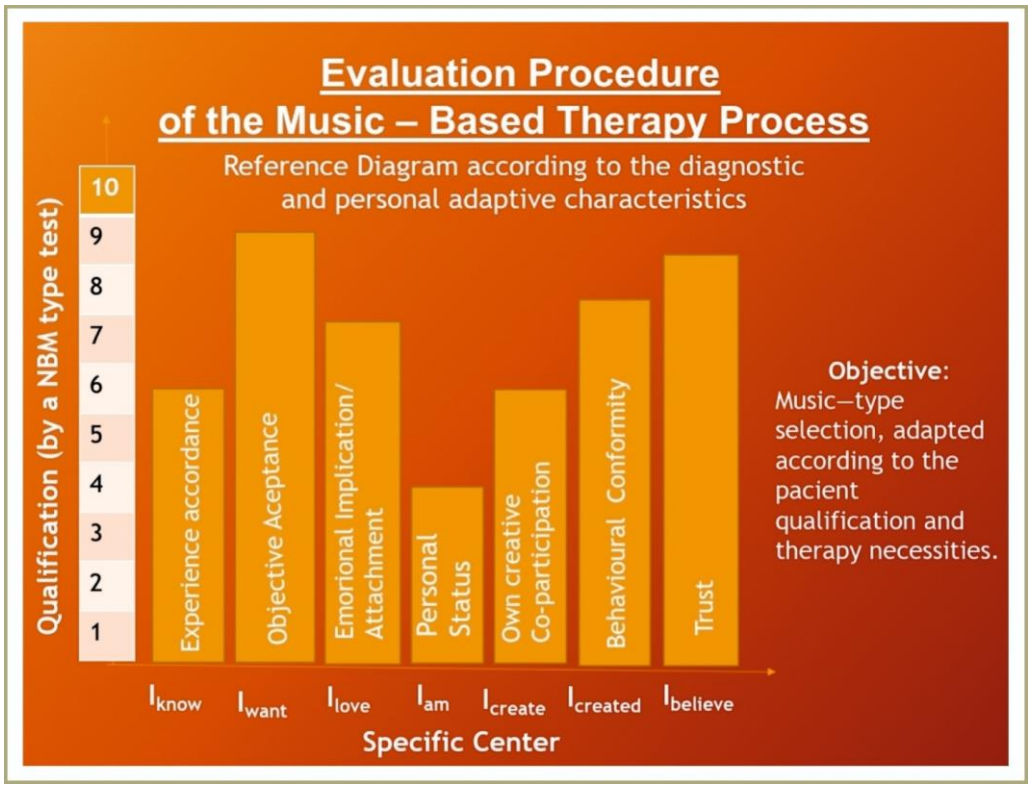

Fig. 2 Schematic representation of a reference diagram according to a qualification of each cognitive center by the application of a NBM-type test to know the attitude of the patient with respect to the proposed music, before the initiation of the therapeutic procedure.

Our language expresses by words our thoughts, attributing (assigning) a concept to every specific part of reality (Gaiseanu, 2019b). In the context of the music-based therapy process, the specific activity of every cognitive center can be characterized by associated typical concepts. When we refer to CASI/Iknow, we think to describe it assigning qualities according to life experience, accumulated in memory.

Always when we perceive a new information, we compare it with a similar concept which we already have been registered in memory, and a recalled information is also searched in memory by an associative process to a stable information earlier acquired (Gaiseanu, 2020a). In order to fit better the recommended type of music with the particular qualities of the patient, we have to know his/her earlier experience and to quantify the degree of concordance with this experience: if the proposed and experienced type of music are in accordance, the expected efficiency of the therapy should increase, if not, the type of music should be finely tuned, maintaining however the same category of music initially proposed.

On an arbitrary scale from 1 to 10, a numerical quantification should be marked with respect to an ideal value on a diagram, as it is shown in Fig. 2, where is represented a reference diagram obtained by the application of a NBM-type test to know the attitude concerning each of the seven cognitive centers before the initiation of the MBT process. Applying the same type of procedure for each center, the corresponding values of numerical quantification are obtained.

From Fig. 2 it can be seen that the required/analyzed quality for Iwant is the degree of the objective acceptance (the objective is the proposed music) and for Ilove is the emotional implication/attachment. The personal status, own creative co-participation, conformity with personal behavior and trust correspond to the cognitive centers Iam, Icreate, Icreated and Ibelieve respectively (Gaiseanu, 2019g).

The emotional implication is fundamental for the efficiency of the therapy process, because the emotions induce a profound effect on the corporeal reactivity and mood. The personal status is referred to momentary or average disposition state for the therapeutic process, an open disposition creating an optimal reception of the musical effect. The personal surveillance of own momentary status during the application of MBT and the orientation to an engaging attitude, helps the therapy efficiency. The creative co-participation indicates the degree of the personal integration in the music therapy, which can be manifested by singing and/or dancing in own personal style, alienated however to the recommended one, any way participating actively to the therapeutic process.

This is an engaging conscious (or spontaneous) process, mobilizing the personal creative (either mental or motor) recourses. The conformity with the personal behavior is referred to the inherited or acquired predispositions and abilities (Gaiseanu, 2018a). Trust in the successful effect of the applied therapy maintains the corporeal and mental attention/adhesion to the objective under a stable animation/optimistic state, for the fulfilling of this objective.

From the informational structure presented above we can deduce that the full personality I_P of a patient P could be described by the following relation:

$$I_P = Iknow + Iwant + Ilove + Iam + Icreate + Icreated + Ibelieve \quad (1)$$

The full qualification $Q(I_P)$ of a patient P with respect to the Objective (Music-Based Therapy) is obtained by the sum of the numerical quantitative qualifications Q of each analyzed center (i.e. Q(Iknow), Q(Iwant), Q(Ilove), Q(Iam), Q(Icreate), Q(Icreated), Q(Ibelieve) under the form:

$$Q(I_P) = Q(Iknow) + Q(Iwant) + Q(Ilove) + Q(Iam) + Q(Icreate) + Q(Icreated) + Q(Ibelieve) \quad (2)$$

After the application of each therapeutic cycle, a feedback NBM-type test should be applied to observe the modifications of each level of qualification obtained from earlier testing process, and a feedback evaluation diagram is achieved, as exemplified in Fig. 3.

The relative (r) qualification coefficient $Q_r(I_P)$ corresponding to the patient P can be defined as a ratio between the full qualification after the therapy cycle and the full reference qualification at the initiation of the therapeutic

process, used as a reference, and can be written as follows:

$Q_r(I_P)$ = [Q(Iknow) + Q(Iwant) + Q(Ilove) +Q(Iam) +Q(Icreate) + Q(Icreated) + Q(Ibelieve)]$_{cycle}$ /

[Q(Iknow) + Q(Iwant) + Q(Ilove) + Q(Iam) + Q(Icreate) + Q(Icreated) + Q(Ibelieve)]$_{reference}$ (3)

allowing the comparative analysis of the rehabilitation process.

If $Q_r(P)>1$ after a certain cycle or process, the general evolution of the applied MBT cycle/process is favorable; if not, a new adjustment should be applied, which can be deduced from the last evaluation diagram. The application of the subsequent iterative steps allows to adjust the therapy as a function of the feedback response observed after a new evaluation of the response of each informational center. The same evaluation method could be applied for any other therapeutic procedure.

The relative full qualification $q_r(I_P)$ of the patient P with respect to the ideal (maximum) qualification can be expressed by the relation: $q_r(I_P) = Q(I_P)/70$, where 70 is the maximum obtainable value summing the maximum values (10) of each center. From the reference (R) evaluation diagram represented in Fig. 2 it is obtained the value $q_{rR}(I_P) = 0.65$. The obtained value shows a good chance for rehabilitation, because $q_{rR}(I_P)>0.5$.

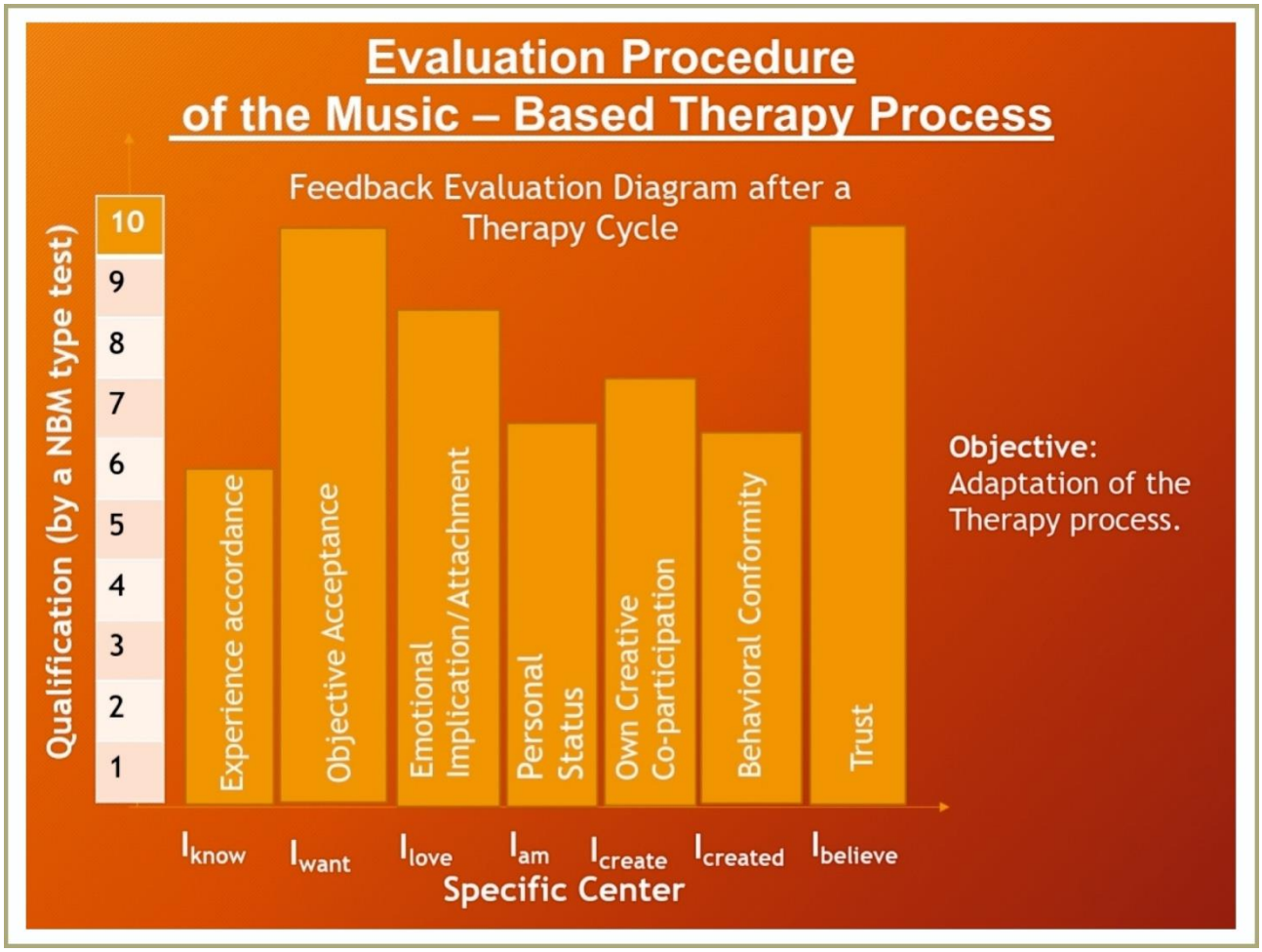

Fig. 3 Feedback evaluation diagram marking the patient responsive reactions after a music-based therapy cycle, which allows to evaluate the integration degree of the patient in the rehabilitation process and its compatibility.

From the feedback (FB) diagram represented in Fig. 3 can be calculated the relative full qualification coefficient $q_{rFB} = 0.77$ with respect to the maximum value, which is significantly superior to that of the reference value, showing a positive evolution of the applied music-based therapy.

From the above definitions, Qr(IP) can be calculated by the relation Qr(IP) = qrFB(IP)/qrR(IP), which is equivalent with relation (3). By using the previously calculated values, it is deduced that Qr(IP) = 1.18 >1, showing a positive integration of the patient into the rehabilitation process of MBT, expressed by an increase with 18% of the relative responsiveness after the applied therapy cycle.

On the other hand, the diagram represented in Fig. 3 allows to evaluate the quality of the patient-music relation, indicating the specific center which is better activated or not, and to adapt furthermore this relation during the subsequent cycles. Therefore, the presented procedure is not only an explicit quantitative way for the optimization of this relation, but also a valid and suitable method to combine the advantages of EBM (diagnostic and music recommendation) with that of NBM (adaptation process).

Conclusions

The music-based therapy became nowadays a sustainable helping procedure for health recovery/rehabilitation by its integration in the medical curative treatments, allowing to intervene with positive effects in stress relaxation, rehabilitation of dysfunctionalities like anxiolytic and analgesic behavior, and even in degenerative neurologic disorders like dementia, Alzheimer's, Parkinson's and attention-deficit/hyperactivity diseases and brain plasticity, showing a remarkable ability to activate non-music brain circuits otherwise unavailable by other techniques, enhancing the perception/cognition, language and motor learning at patients with neurologic diseases.

The integrative music-based therapy is a direct beneficiary of the informational model of consciousness, emphasizing the informational structure of consciousness, which can be described by seven informational systems (CASI, CDC, IES, MIS, GTS, IGG, IC), reflected in consciousness as cognitive centers Iknow, Iwant, Ilove, Iam, Icreate, Icreated, Ibelieve. By means of these cognitive centers and the application of an adequate NBM-type test, the attitude of the patient become accessible, permitting to optimize the therapeutic process in successive steps of application, according to the fully-expressed personality of the patient concerning: the accordance of the recommended music with the previous experience, acceptance of the objective (music-type and music therapy), emotional implication/attachment, momentary/average personal status and disposition, own creative co-participation, behavioral conformity according to own predispositions and abilities, trust in the successful results.

The presented evaluation procedure allows the qualification by numerical values of the implication of each cognitive center in the MBT process and the representation of the results in a reference and subsequent feedback diagrams after each of the successive therapeutic cycles, allowing the comparative analysis and optimization of the patient/therapy relation. This evaluation procedure is suitable to be applied also for other similar therapeutic processes, and is a scientifically based valid/appropriate method to combine the advantages of EBM, concerning the diagnostic and music recommendation, with that of NBM on the adaptive optimization process.

Acknowledgment

Grateful thanks to Professor PhD Massimo Pregnolato for stimulating themes of this Journal.

This work is dedicated to my son Adrian and to his family.

In memoriam of my loved parents and brother.

References

Bella Simone Dalla. Music and Brain Plasticity, The Oxford Handbook of Music Psychology, Second Edition, Edited by Susan Hallam, Ian Cross, and Michael Thaut, 2015: 1-17),

Chuang Chih-Yuan, Han Wei-Ru, Li Pei-Chun, Young Shuenn-Tsong. Effects of music therapy on subjective sensations and heart rate variability in treated cancer survivors: A pilot study. Complementary Therapies in Medicine (2010) 18, 224—226. doi:10.1016/j.ctim.2010.08.003.

Ellis Robert J., PhD, Koenig Julian, MA, and Thayer Julian F., PhD. Getting to the Heart: Autonomic Nervous System Function in the Context of Evidence-Based Music Therapy, Music and Medicine, 4(2), 2012; 90-99.

Gaiseanu Florin. Quantum-Assisted Process of Disembody Under Near-Death Conditions: An Informational-Field Support Model. NeuroQuantology 2017a; 15(1): 4-9. https://www.neuroquantology.com/article.php?id=1645.

Gaiseanu Florin. An Information Based Model of Consciousness Fully Explaining the Mind Normal/Paranormal Properties. NeuroQuantology 2017b; 15.2: 132-140. https://www.neuroquantology.com/article.php?id=1676

Gaiseanu Florin. Destiny or Free Will Decision? A Life Overview From the Perspective of an Informational Modeling of Consciousness Part II: Attitude and Decision Criteria, Free Will and Destiny. Gerontology & Geriatric Studies 2018a; 4(1): 354-360. https://crimsonpublishers.com/ggs/pdf/GGS.000576.pdf.

Gaiseanu Florin. Destiny or Free Will Decision? A Life Overview From the Perspective of an Informational Modeling of Consciousness Part I: Information, Consciousness and Life Cycle. Gerontology & Geriatric Studies, 2019a; 4(1): 400-405. https://crimsonpublishers.com/ggs/pdf/GGS.000586.pdf

Gaiseanu Florin. Language Patterns and Cognitive-Sentient Reality: Certainty/Uncertainty in Cognitive-Sentient Exploration of Reality, Chapter in Media Models to Foster Collective Human Coherence in the PSYCHecology, Ed. Stephen Brock Schafer, USA, IGI Global, 2019b. DOI: 10.4018/978-1-5225-9065-1.ch003. https://www.igi-global.com/gateway/chapter/229328

Gaiseanu Florin. The Informational Model of Consciousness: Mechanisms of Embodiment/Disembodiment of Information, NeuroQuantology, 17(4), 1-17, 2019c. https://www.neuroquantology.com/article.php?id=1322

Gaiseanu Florin. Informational Neuro-Connections of the Brain with the Body Supporting the Informational Model of Consciousness, Archives in Neurology & Neuroscience 2019d, 4(1): 1-6. ANN.MS.ID.000576. DOI: 10.33552/ANN.2019.04.000576. https://irispublishers.com/ann/pdf/ANN.MS.ID.000576.pdf.

Gaiseanu Florin. Informational Model of Consciousness: From Philosophic Concepts to an Information Science of Consciousness, Philosophy Study 2019e 9(4) (Serial Number 81):181-196. http://www.davidpublisher.org/Public/uploads/Contribute/5d1c009c3567e.pdf DOI:10.17265/2159-5313/2019.04.002.

Gaiseanu Florin. Epigenetic Information-Body Interaction and Information-Assisted Evolution from the Perspective of the Informational Model of Consciousness, Archives in Biomedical Engineering & Biotechnology 2019f, 2(2): 1-6. DOI: 10.33552/ABEB.2019.02.000532 https://irispublishers.com/abeb/pdf/ABEB.MS.ID.000532.pdf

Gaiseanu Florin. The Silent Voice of Those Who are no Longer: Transgenerational Transmission of Information from the Perspective of the Informational Model of Consciousness. Gerontology & Geriatric Studies 2019g; 5(1): 482-488. DOI: 10.31031/GGS.2019.05.000604.https://crimsonpublishers.com/ggs/pdf/GGS.000604.pdf.

Gaiseanu Florin. Physics of Consciousness and Life: Informational Model of Consciousness – Information in Neurosciences, Biocomputers and Biosystems (Fizica Constiintei si a Vietii: Modelul Informational al Constiintei – Informatia in Neurostiinte, Biocomputere si Biosisteme (in Romanian)), GlobeEdit (OmniScriptum International Group, Germany, 2020a. https://www.amazon.com/Fizica-Conștiinței-Vieții-Informațional-Neuroștiințe/dp/6139421705

Gaiseanu Florin. Information-Matter Bipolarity of the Human Organism and Its Fundamental Circuits: From Philosophy to Physics/Neurosciences-Based Modeling, Philosophy Study 2020b; 10(2): 107-118. doi: 10.17265/2159-5313/2020.02.002. http://www.davidpublisher.com/Public/uploads/Contribute/5e5b3d8e74433.pdf

Gaiseanu Florin. Information Based Hierarchical Brain Organization/Evolution from the Perspective of the Informational Model of Consciousness. Archives in Neurology & Neuroscience 2020c 7(5): 1-9. ANN.MS.ID.000672. DOI: 10.33552/ANN.2020.07.000672. https://www.academia.edu/42766159/Information_Based_Hierarchical_Brain_Organization_Evolution_f

rom_the_Perspective_of_the_Informational_Model_of_Consciousness

Gaiseanu Florin. Informationally-Assisted Equilibrium and Health: Specific ACC Contribution from the Perspective of the Informational Model of Consciousness, EC Psychology and Psychiatry J. 2020d; 9(5), 37-49. (https://www.ecronicon.com/ecpp/ECPP-09-00692.php)

Gaiseanu Florin and Graur Alexander. Cognitive Centers Related Attitude: Application for an Iterative Evaluation Method in Music-Based Therapy Process. Abstract Book of the Conference on Science of Consciousness (Co-Chair Prof. Stuart Hameroff, The University of Arizona—Center for Consciousness Studies, Tucson, Arizona). Consciousness and Education—Cognitive Development, Concurrent Session C27, 165; 2018: April 2-7. http://www.consciousness.arizona.edu/documents/TSC2018AbstractBookfinal3.pdf

Galińska Elżbieta, Music therapy in neurological rehabilitation settings, Psychiatr. Pol. 2015; 49(4): 835–846. http://dx.doi.org/10.12740/PP/25557.

Lippi Donatella, Roberti di Sarsina Paolo, D'Elios, John Patrick. Music and medicine, Journal of Multidisciplinary Healthcare, 2010:3 137–141. 10.2147/JMDH.S11378.

Mainka Stefan, Spintge Ralph, and Thaut Michael, Music Therapy in Medical and Neurological Rehabilitation Settings, The Oxford Handbook of Music Psychology (2 ed.), 2016: 1-22.

Masic Izet, Miokovic Milan, Muhamedagi Belma. Evidence Based Medicine New Approaches and Challenges. Acta Inform. Med. W008; 16(4): 2019-2025. Doi: doi: 10.5455/aim.2008.16.219-225.

Okada Kaoru, Kurita Akira, Takase Bonpei, Otsuka Toshiaki, Kodani Eitaro, Kusama Yoshiki, Atarashi Hirotsugu, and Mizuno Kyoichi. Effects of Music Therapy on Autonomic Nervous System Activity, Incidence of Heart Failure Events, and Plasma Cytokine and Catecholamine Levels in Elderly Patients With Cerebrovascular Disease and Dementia, International Heart Journal, 2009 50(1): 95-110.https://doi.org/10.1536/ihj.50.95.

Zaharias George. What is narrative-based medicine? (1) Narrative-based medicine, Canadian Family Physician | Le Médecin de famille canadien } Vol 64: MARCH | MARS 2018: 176-180.