Neuroplasticity, Cognition, and Creativity – Interdisciplinary Perspectives

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Abstract: *The topics analyzed in this article stem from the interdisciplinary research project "The Noetic Pathways of Creativity and Augmentation through Neuroplasticity", initiated in 2024 by the Institute for Multidisciplinary Research in Art within the "George Enescu" National University of Arts in Iași. These themes were discussed by specialists from both medical and artistic fields during a conference organized in collaboration with the "I. I. Mironescu" Cultural Center of the "Grigore T. Popa" University of Medicine and Pharmacy in Iași.*
This scientific communication session, now in its second edition, builds upon research initiated in 2023: "Neuroscience, Creativity, and Neural Connections in the Artistic Creation Process".
Through this article, we aim to address some of the key questions concerning the role of neuroplasticity as a means of developing creative and human potential. We explore various aspects related to the creative brain, the augmentation of cognitive functions, creative thinking, and the stimulation of imagination.

Key words: *neuroplasticity; cognition; creativity; musical research; arts.*

In this article, we analyze a series of principles underlying the augmentation of creativity through neuroplasticity, aspects related to the enhancement of cognitive functions, flexible thinking, the creative brain, learning processes, imagination stimulation, and the role of technologies in creativity augmentation. These approaches provide insight into the dimension of neuroplasticity as a means of developing creative and human potential. Moreover, these current and nationally and internationally relevant

topics were addressed at the interdisciplinary conference *Neuroplasticity, Cognition, Creativity – Interdisciplinary Perspectives*, organized in Iași in 2024 by the Institute for Multidisciplinary Research in Art within the "George Enescu" National University of Arts in Iași, in partnership with the "I. I. Mironescu" Cultural Center of the "Grigore T. Popa" University of Medicine and Pharmacy in Iași. This initiative represents a novel and challenging endeavor within the academic landscape of Iași, both in terms of its thematic scope and the diversity of specializations involved.

The conference featured a series of lectures delivered by experts in the medical, artistic (visual arts, music, theatre, choreography), and technological fields, each offering its own distinct perspective. These contributions aimed to deepen our understanding of the creative process, the mechanisms behind imagination, emotions, and empathy – elements essential not only for overcoming trauma but also for enriching artistic expression and finding creative solutions to the complex problems of contemporary society.

Gathered within this interdisciplinary framework, specialists discussed concepts related to artistic knowledge, learning, and the development of critical thinking, the language of hope and curiosity, brain-computer interfaces, the manifestation of creativity across various domains, the neural and psychological aspects of the creative process, and the intersection of arts and sciences.

Thus, several faculty members from the "George Enescu" National University of Arts in Iași contributed to this initiative. Professor Aurelian Bălăiță, PhD, explored the principles of neuroscience in artistic education, focusing on the question, "How does an artist from the performing arts learn and think?". Professor Cristian Nae, PhD, developed his discourse around artistic and experiential knowledge, as well as concepts such as artistic truth and artistic empathy, in his lecture "What is Artistic Knowledge?". Professor Octavian Jighirgiu, PhD, analyzed the essence of creativity in "Aspects of Creativity in Theatrical Art". Associate Professor Lorett Enache, PhD, examined the mental processes underlying imagination and innovation in "Levels of Creativity and Phases of the Creative Process". Associate Professor Oana-Maria Nae, PhD, explored creative potential in "The Artistic Installation – Interaction and Perceptual Challenges". Lecturer Sandra Mavhima, PhD, in her presentation "Augmenting Choreographic Experience through Neuroscience", argued for the holistic function of dance, which stimulates neuroplasticity by integrating multiple brain functions – rational, musical, kinesthetic, and emotional – requiring a high level of cognitive flexibility. Researcher Ligia Fărcășel, PhD, focused on the exploration of creative and flexible thinking in "Creative Thinking as a Factor in Optimizing Musical Research Processes". Meanwhile, researcher Mirela Ștefănescu, PhD, within the framework of current research, sought relevant answers to the question, "Why Do We Explore Neuroplasticity as a Means of Creativity Augmentation?".

From the "Grigore T. Popa" University of Medicine and Pharmacy in Iași, Dr. Richard Constantinescu, PhD, examined the relationship between neuroplasticity and

creativity in his lecture "Neuroplasticity and Imagination: The New Frontiers of Innovative Thinking in Medicine and the Arts". From the "Gheorghe Asachi" Technical University of Iași, Professor Marian Poboroniuc, PhD, proposed an applied approach to brain-computer interfaces through his presentation, "Current Technologies in Applications for Human Brain Communication".

Additionally, the conference featured invited speakers, including psychiatrist Georgiana Antoce PhD from Brisbane, Australia, who introduced a narrative on brain structure and the therapeutic process, emphasizing hope, curiosity, and self-awareness as essential elements in her lecture "Neuroplasticity – Our Creative System". Musicologist Gabriela Capotă from Bucharest offered a perspective on uncovering creative resources in her talk "Creativity – A Key to Unlocking Human Potential".

For this article, we have selected three of the conference presentations, with the note that the remaining contributions will be published later.

Why Do We Explore Neuroplasticity as a Means of Creativity Augmentation?[1]

To better understand the connection between neuroplasticity and creativity, it is necessary to conduct an interdisciplinary analysis of the meanings of neuroplasticity and creativity, exploring the mental processes behind imagination, as well as the fascinating potential of enhancing creativity through neuroplasticity. This exploration highlights new ways of stimulating and amplifying creativity, flexible thinking, and openness to new perspectives.

Neuroplasticity, also known as neuronal plasticity, represents the brain's ability to adapt and reconfigure itself throughout life in response to new experiences and stimuli. It is a captivating concept that opens doors to a deeper understanding of human potential. As Dr. David Perlmutter and Dr. Alberto Villoldo state in their book *Power Up Your Brain: The Neuroscience of Enlightenment*, "Neuroplasticity represents the brain's ability to reconnect and create new neural networks" (Perlmutter and Villoldo, 2018, 123), with positive implications both at the individual level and for society as a whole. In other words, research confirms that neuroplasticity changes the brain's structure with each new thing we learn and with each new activity we engage in (e. g., practicing a talent or learning a foreign language), thereby strengthening neural networks. Thus, the brain is not a fixed structure but a dynamic one, capable of modification and adaptation due to our experiences, thoughts, and activities.

American professor Michael Merzenich, a specialist in neuroscience and brain plasticity, discusses brain maps as effective tools that demonstrate how the brain changes throughout life. He asserts that "brain exercises can lead to impressive cognitive performance" (Birț, 2019, 153). Through his research, Michael Merzenich

[1] Author: Researcher Mirela ȘTEFĂNESCU, PhD.

demonstrates that learning and practicing new activities transform millions of neural connections on brain maps.

Neuroplasticity is a dynamic and promising field of research, and scientists are currently exploring a wide range of practical applications that could revolutionize the way we learn, form memories, develop skills, and recover from trauma or brain injuries.

Neuroplasticity is closely linked to creativity. The human mind is in a continuous state of evolution, and by understanding how our brain functions, we can stimulate and develop innovative and original thinking. Creativity is a critical component of human cognition and behavior, playing an essential role in fostering innovation, problem-solving, and personal fulfilment. Generally, creativity is a complex and multifaceted phenomenon that involves both individual and contextual factors.

Creativity is a complex ability that enables us to think originally, make unusual connections, and generate innovative ideas. "Creative abilities are not predetermined, but we can cultivate and train creativity with the right tools, willpower and in the right environment, leading to flexible and open-minded thinking towards new perspectives". (Bălăiță, Ștefănescu and Fărcășel, 2024, 319).

Creativity, defined as the generation of new and useful ideas in any field, is not an attribute that one either has or does not have; it exists within each of us, but context is needed for it to be put into practice. Elizabeth Gilbert, in her book *Big Magic: Creative Living Beyond Fear*, discusses what it means to live a 'creative life' driven by curiosity, where passion, courage, perseverance, and confidence are keys to uncovering the 'hidden treasures' within us:

> Even though creativity differs from one person to another, one thing remains certain: a creative life is a broader life, with a wider horizon, a happier life, and a thousand times more interesting. Living this way – persistently and stubbornly revealing the gems hidden within you – is an 'art' in itself.
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> Gilbert, 2022, 14

Exploring the realm of human creativity, David Eagleman and Anthony Brandt argue in *The Runaway Species* that "the enormous number of neurons that intervene between stimulus and action is essential to the immense creativity that characterizes our species" (Eagleman and Brandt, 2020, 35). Furthermore, they consider that being creative involves analyzing a multitude of possibilities "beyond what is right in front of us," which they perceive as "a major part of the magic of the human brain" (Eagleman and Brandt, 2020, 35).

The interconnection between neuroplasticity and creativity provides a broad research framework for understanding how the brain adapts and how this aspect influences human creative thinking. Likewise, neuroplasticity itself can be stimulated through a series of complex processes that are triggered in the brain during our

engagement in various activities, particularly artistic ones[2]. It is obvious that "to become inventive thinkers, young minds need art. This is because the arts, due to their observable nature, are the most accessible way to introduce the fundamental tools of innovation" (Eagleman and Brandt, 2020, 242). On the other hand, we notice that "contemporary artist's tendency is to release the designs and figurative traditions of the past, in order to consecrate the contemporary world, dynamic and constantly evolving" (Ștefănescu and Ștefănescu, 2014, 242).

Neuroplasticity, through various mechanisms, plays an essential role in enhancing creativity. Specifically, it facilitates the formation of neural connections as a consequence of exposure to new artistic experiences, thereby fostering the generation of multiple and original ideas. Additionally, existing neural connections can be strengthened through the practice of painting, music, or writing, leading to greater flexibility and fluidity in thought. Moreover, engaging in creative activities can improve a range of cognitive functions, such as memory, attention, perception, and problem-solving.

On the other hand, there are various ways in which neuroplasticity can be stimulated, contributing to brain health, a more adaptable mind, and enhanced creativity. These include continuous learning, exposure to creative activities, physical exercise, meditation, a healthy diet, and quality sleep. Research and personal experiences of authors Dr. David Perlmutter and Dr. Alberto Villoldo indicate that combining these approaches "allows you to establish new neural networks that create a sense of joy and an overall state of well-being" (Eagleman and Brandt, 2020, 30), enabling individuals to develop "creativity and a new vision of the future" (Eagleman and Brandt, 2020, 30).

Art, in its many forms, holds extraordinary potential to stimulate neuroplasticity. In this context, we highlight the following: music (whether listening or playing an instrument) can optimize attention, memory, and language; painting or drawing can reduce stress and anxiety and help alleviate symptoms of depression; and dance, an expressive art form that provides a space for exploring emotions, ideas, and narratives, serves as a holistic activity that stimulates neuroplasticity by integrating multiple brain functions simultaneously – rational, musical, kinesthetic, and emotional – requiring a high level of cognitive flexibility.

Furthermore, the role of art in stimulating neuroplasticity is not limited to these examples. Art helps individuals think creatively and critically, approach problems from different perspectives, understand and share emotions – thus intensifying empathy and solidarity – and fosters a sense of satisfaction and increased self-confidence.

Speaking about courage and curiosity, Elizabeth Gilbert encourages individuals to embrace a creative life, even if it involves uncertainty: "A creative life can be an astonishing *vocation* if you have the courage, love, and perseverance to see it that way. In

[2] We refer in the article primarily to creativity manifested in the arts.

fact, in my opinion, this is the only way to approach creativity if you also wish to maintain your mental health" (Gilbert, 2022, 155).

Creativity augmentation is an impressive concept that refers to the use of technology to enhance and stimulate human creative potential. This innovative approach explores ways in which digital tools, artificial intelligence, and augmented reality can collaborate with human imagination to generate new ideas, solve problems in creative ways, and explore new horizons of artistic expression. However, ideas do not emerge from nowhere, and it is essential to emphasize that "the miracle of human creativity" (Eagleman and Brandt, 2020, 59) requires substantial cognitive effort.

Thus, augmenting creativity through neuroplasticity opens up a fascinating world of possibilities. By merging human imagination with the power of technology and science, creative potential can be stimulated, and the boundaries of imagination can be expanded to create a more innovative and inspiring future.

How does an artist from the performing arts field learn and think?[3]

Is an artist different from other people in the way they learn and think? Are their mental processes different from the ordinary ones? Should artistic education be distinct from scientific education? Can the principles of neuroscience be applied in artistic education? These are some of the questions we pose, seeking answers in the accumulated knowledge from distinct fields related to human activity and in personal experience in stage practice and university-level artistic education.

We must acknowledge that, overall, the efforts made so far in various areas of science and knowledge to decipher the mechanisms of thinking, memory, or learning in the brain have not led to a completely successful outcome. Cognitive psychology methods, as well as metacognition, have provided useful descriptions and classifications conceptually, but they have not seriously considered the biological and chemical processes that take place in the cranial box. On the other hand, we still lack the necessary tools to capture, measure, and precisely evaluate all the processes occurring in the neural network. In recent years, analogies with quantum processes, as well as those in the fields of computer science and artificial intelligence, have been made. Pseudo-sciences and therapies of various kinds appear, with varying degrees of 'success' and longevity...

It is encouraging that in the field of performing arts, more and more interdisciplinary studies are emerging related to these questions. Some of them propose new approaches or suggest, alongside talent, creativity, originality, etc., new concepts that aim to clarify how to think, how to feel, or what and how to do in the arts. For example, Anca-Bucura Mara Opriș, in her doctoral thesis *The Synthetic Body: A Metaphysical Eco-Research* defended at Babeș-Bolyai University in Cluj-Napoca, supervised

[3] Author: Professor Aurelian BĂLĂIȚĂ PhD.

by Miklos Bacs, relies on the decisive thoughts of Constantin Brâncuși: "Art is not pedagogy. Art is not learned. Art is not a lie. Art is absolute truth. Art is a mirror in which everyone sees what they think. It is the creation of things that you do not know." (Georgescu Gorjan, 2011, 43-44).

About the Synthetic Body, the author states:

> To touch the dimension of Art, to transfigure (oneself), to redefine the world and one's own being, to miraculously-kaleidoscopically recompose Nature, to bring to light the ultimate essences and align with them, means searching within yourself. The artist meant to realize the Synthetic Body is thought, action, and becoming. There is a tripartite structure of the phenomenon related to the Synthetic Body. It manifests only if there is the desire, the search of the artist, the proposal, the mental projection of the initiatory act (thought). Then comes the making. It encompasses both the artist and the evolving object of their creation. Finally, the act itself manifests. The Synthetic Body becomes visible.
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> Opriș, 2020, 268

The architecture of learning is, of course, related to memory, which can be short-term memory (STM, explicit, conscious) and long-term memory (LTM, implicit, unconscious). The content of LTM is organized, structured, filed. Forgetting is the structural technique of the mind (brain) to avoid overload with unnecessary information and knowledge.

Neuroscience can help understand how the brain assimilates new information and transforms it into skills. This can improve teaching-learning methods in visual arts, music, dance, theatre, etc. The arts are related to the study and expression of emotions. Neuroscience and the use of technology can provide insights into how emotions influence learning and creativity, helping educators create a learning environment that supports emotional expression.

Each individual has a unique way of learning. Neurosciences suggest that different types of learning (visual, auditory, kinesthetic, olfactory) can be integrated into artistic education to help students develop their full potential.

Personally, in my pedagogical activity, I have simplified the stages of learning, which also apply to the process of artist formation, according to the model analyzed by Joe Flower in the paper *In the Mush*, which has four stages: "unconscious-incompetent; conscious-incompetent; conscious-competent; unconscious-competent" (Flower, 1999, 64–66). Thus, the installation of habits, skills, and behaviors occurs at the subconscious level – it is done through learning, repetition, and reconsolidation.

The mind is not the brain. The brain, with its over 86 billion neurons connected by synapses, is the support for mental energy, for the individual's energy. The mind is the result of the intersection between Cosmic/Divine Intelligence or the Intelligence of Nature of which we are a part (or perhaps the echo of this Intelligence?) and the

brain within a particular context, under a specific set of conditioning factors. We are, each of us, different and interconnected. Each with our own unique mind, but all connected to the collective mind of human beings. The mind (conscious/unconscious) contains the matrix of the individual's optimal health. The conscious mind does not make decisions; it provides arguments. Can we clearly differentiate between the conscious and subconscious? It seems that the seat of imagination lies in the prefrontal cortex. Artists, whether true creators or those who merely present themselves, work extensively with imagination.

I have noted some of the functions (directives) of the subconscious, according to the studies of Neuro-Linguistic Programming (NLP), with applicability in understanding and practicing the performing arts, including: storing memories – temporal (in reference to time), or atemporal (outside of time); is the domain of emotions – behind every emotion is a thought; organizes all memories (uses the timeline - the mechanism is Gestalt-based); represses memories with unresolved negative emotions; shows us repressed memories for resolution (for rationalization and emotional release); holds repressed emotions, for the protection of the individual; controls body functions (has a body schema in the present and for perfect health); protects the body (to maintain bodily integrity); is moral, ethical (the morality you were taught and accepted, in consciousness, as normal for you); is extremely service-oriented (it wants to serve the individual permanently with the best intentions but needs clear directives to follow); controls and protects all perceptions (common ones through the main senses, or telepathic ones, transmitted through the subconscious); receives and transmits perceptions to the conscious mind; generates, stores, distributes, and transmits 'energy'; maintains instincts and creates habits; needs repetition until a habit is established; is programmed to constantly assimilate more (we always have the need to discover new things); works best as an integrated unit (does not require parts to function normally); is symbolic (uses and responds to symbols); takes everything personally (the basis of the concept is that what we perceive from the environment is first present in our projection); operates on the principle of minimum effort (the path of least resistance); does not process negations (from a negative expression, it recognizes only the affirmative part).

I believe that we can make contact with the subconscious, with our own mind, by learning its language. We can communicate with our own brain through self-dialogue, by paying attention to our own thoughts and being mindful of them, through meditation, hypnosis, or dreams. The practice of mindfulness in art means being aware at every moment of every thought, every emotion, every sensation, and simultaneously of the surrounding environment. Deliberately, attention is directed towards the present, accepting it as it is, both internally and externally, without letting thoughts drift toward the past or future.

In his work *Think Like an Artist... and Lead a More Creative, Productive Life*, Will Gompertz suggests that we are all artists (creative individuals) and encourages us to

believe this. He views great artists as enterprising, independent, very courageous, confident, sceptical, very attentive, critical, and experimental people. Moreover, he argues that all schools should be art schools, because an art school teaches you how to think, not what to think.

Speaking about neuroplasticity, Mara Dierssen states:

> All brains undergo remodeling when we learn. (...) Family, culture, friends, the films we've watched, all the conversations we've had leave microscopic and permanent marks on our nervous system, which accumulate and determine what we are and, eventually, what we can become.
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> Dierssen, 2024, 122

Art schools create the framework in which young people develop to discover their talents, to know themselves as well as possible, to expand their knowledge, to develop their skills, to experiment, to acquire new competencies, and to refine themselves as discerning individuals.

In conclusion, we lean toward an integrative education that appropriately and gradually accesses elements from all components of human functioning and resonates them with the individual potential.

Creative thinking as a factor in optimizing the musical research process[4]

Why do we conduct musical research? Does music need to be researched? What exactly do we research in music? What is the purpose of musical research? Is the community of musicologists a niche circle, with activities and results significant only within its area of interest, or does it prove relevant to other fields as well? In the exact sciences, research is essential and universally recognized, as it provides new practical perspectives, ultimately reflecting in everyday reality. However, the researcher in the arts faces a serious challenge: in their research endeavor, they must provide not only the actual analysis but also the explanations that demonstrate the concrete relationship between these and social reality, with all that it implies. Artistic research has a history far younger than scientific research, and by the nature of its objects of study, it has flexible boundaries, easily relating to various domains. This array of issues represents the intrigue of the research endeavor we propose. Research does not only serve to provide results, but the questions and problems are, in fact, the stable pillars of the research. For how could we issue answers without questions and doubts? Accepting this truth is nothing more than proof of honesty and openness. Researcher Susan Greenfield believed that "it is better to know some questions than all the answers". (Greenfield, 2020, 9). This is, in fact, the foundation of research. The results would be incomplete in

[4] Author: Researcher Ligia FĂRCĂȘEL, PhD.

the absence of its winding path, similar to a chain, where the questions and answers link together, interrelating and perpetually requesting each other.

Therefore, to take a further step, can we consider musical research a field in which research is scientific? To what extent and in what sense does creative thinking affect the musicologist's analytical approach? Can research be done without creative thinking? But, in fact, are there people entirely lacking creativity? Can creativity be acquired as a skill? These are questions that may prompt us to adopt an open attitude in order to identify solutions to optimize the musicological contribution beyond the academic sphere. Because pure research, without relevant results in everyday reality, proves to be barren. Thus, the endeavor to explore creative thinking is a necessary one in the context of modern research, where interdisciplinarity is no longer an option, but a norm.

An honest first step in approaching the proposed subject is to recognize the role of research, regardless of the field we bring into discussion. Whether we are talking about art, medicine, technology, or any other area of development, research has been and remains essential for evolution. Although there are doubts regarding the usefulness and purpose of research in the artistic field, ultimately, if we detach ourselves from the ignorant side of perception and adopt a realistic perspective, we recognize that artistic research not only contributes to the fulfilment of society through *Beauty* but also stabilizes it, providing balance and even solutions to problems. According to experts, artistic research resembles qualitative research, where the goal is not so much to measure the object being researched but to understand it (Hannula, Suoranta and Vadén, 2005, 159).

What does the process of musical research actually entail? Viewed from the early stages of training, a (future) musicologist is placed in the position of observing both auditorily and visually, analyzing musical scores, and issuing stylistic, historical, and any other interpretations pertinent to the work being analyzed. In other words, they perform musical studies. Here, comparative analysis can be a useful practice. A musical work may have different analytical perspectives, and consulting two or more opinions can help the researcher gain a broader view, so that, in turn, they can formulate an original opinion. On the other hand, their activity also involves the journalistic aspect of music, with the presentation and reviews of musical events. Without claiming exhaustiveness, I will propose two methods for conducting musical research, which can be practiced independently but ensure superior results when combined. The first method involves, starting from a solid knowledge of the foundations of music theory and style, the researcher exploring a particular work or thematic area, which they deepen through musical analysis *per se* and the contextualization of the subject. Here, the in-depth analysis of the musical content takes precedence, being the starting point for further considerations. The second approach suggests the opposite: the researcher focuses on reflecting a particular cultural, social, or historical space, concentrating on specific sections of interest, while the actual musical analysis is used as a tool to illustrate and optimally understand the topic. In certain contexts, the researcher may opt to entirely omit musical

analysis. One of my personal examples is the study *A Perspective on the Musical Criticism of Iași From the Interwar Period* (Fărcășel, 2023, 109-116), which examines the interwar cultural atmosphere in Iași, reconstructed from the press of the time, without including any actual musical analysis.

Do we need creativity to conduct musical research? It seems like a rhetorical question. And yet, I believe it will be useful to make a bridging step to connect the two concepts. Music itself is a field in which rigor and creativity occupy equal positions and are closely interrelated. In order to use creativity in interpretation, composition, or musical analysis, it is mandatory to master the knowledge base and adhere to classical rules. However, strict adherence to patterns, in the absence of a creative, unique, extraordinary contribution, leads to an arid, conventional artistic result, devoid of the power to impress. In other words, to achieve results that are rich in meaning, creativity is a *sine qua non*, a component that must be leveraged and enhanced. As specialists in psychology have noted,

> Creativity (...) makes possible the creation of real or purely mental products, constituting progress on the social plane. The main component of creativity is imagination, but the creation of real value also involves motivation, the desire to achieve something new, something extraordinary. And since novelty is not easily achieved today, another component involved is willpower, perseverance in making numerous attempts and verifications.
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> Cosmovici, 1996, 154

How can a musicologist be creative in research? For an artist, whether we are talking about music or any other form of art, being creative is the norm, and the composition process perpetually demands it. For instance, a composer fully exploits their creativity in crafting musical themes or timbral combinations to consistently achieve a result with varying degrees of novelty. But how is the idea of creativity applied in the field of musical research? First and foremost, a musicologist who wishes to make a truly valuable contribution has to be creative starting from the very thought, the research idea. They consider and reconsider it, formulating it in such a way as to reach extraordinary perspectives, making associations between ideas, and researching in non-artistic fields as well.

Relating to fields connected to the subject of research is a good choice because it offers the researcher the opportunity to gain a complex image of the object under analysis. Every work of art, and particularly every musical work, has its own creation context, profoundly marked by events, moods, or various other stimuli. Therefore, a strictly musical perspective on a work is most likely incomplete in the research process and thus requires non-musical additions. For example, when analyzing the works of English composer Benjamin Britten, it is not enough to note that his musical style remains within the area of moderate modernism; in order to understand him better, we must also turn

to the history of the first half of the 20th century to observe the musician's repulsion towards the atrocities of war and the way this is reflected in his compositions, such as the *War Requiem* Op. 66 (1962). Or, in gaining a deeper understanding of Olivier Messiaen's music, it may be useful to approach the field of zoology and familiarize ourselves with ornithology. Or, to better understand the dissonances in a piece like *Carillon nocturne* by George Enescu (from Suite No. 3 for Piano, *Pièces impromptues* Op. 18), knowledge of certain elements of physics, which explain the formation of harmonics in sound, is useful.

Thus, a creative way to research music is through contextualization, both by understanding the circumstances in which it was created and through reconstruction. In this approach, an interdisciplinary perspective is welcome, where various fields of art collaborate in syncretic performances. And here is how a creative attitude is more than necessary, and its practice ultimately becomes the researcher's declaration of receptiveness and adaptability to connection. A research endeavor conducted with openness and creativity becomes relevant in a cultural and social context. Moreover, creative thinking, firmly anchored in realism, brings benefits to the researcher themselves, fostering the harmonious development of the brain and enhancing self-esteem.

Creativity, of course, entails a variable degree of subjectivity, but what would art be without subjectivity? In fact, art in general and music in particular should not be perceived merely as a provider of beauty, but also as a conceptual mirror of history, society, and humanity. If we look (or listen) honestly to the (musical) works created throughout time, we will witness an impressive fresco of human history. Therefore, music, especially contemporary music, should be perceived as an experience to live, rather than merely a soundtrack to listen to. Here, compositional creativity has almost no limits, and the openness to experimentation is largely valued. This is why the most suitable place to listen to or experience music is where it is performed *live*.

Always, a musical work born from a creative mind will be interesting, captivating, and perhaps even provocative. We desire an attitude of openness because we want the contribution of musicological research to transcend the strictly academic realm. And, undoubtedly, we all agree that we wish to listen to music because we want to enrich ourselves spiritually, culturally, and, why not, intellectually.

Conclusions

It is evident that we cannot cover in a few pages the numerous studies conducted so far by specialists, but through our approach, which is new in the academic space of Iași, both in terms of the addressed topic and the diversity of specializations involved, we can open a series of interdisciplinary research projects in this direction, connected to the dynamics of current society.

Thus, through our research, we sought to briefly answer some questions related to the aspects that concern us, exploring the symbiosis between art and science as a means

of understanding neural connections during the creative process and how we can stimulate our creativity from the perspective of neuroplasticity.

Exploring the creative universe, the enhancement of creativity through neuroplasticity, and the complex neural networks activated during the creative process represent the catalysts of internal mental processes that make innovation possible. The interference of the arts with science strengthens existing neural connections in various areas of the brain, enhances cognitive flexibility, and the ability to learn and adapt, challenges us to analyze different perspectives, and find creative solutions to complex problems.

If we have advanced as a society, it is largely due to the creativity that has driven us to innovate. What is exceptional is that scientists have discovered that the emergence of new connections between neurons is largely stimulated by an individual's desire to progress, engage in diverse activities, create, their curiosity, emotional availability, willpower, and thinking.

In conclusion, we affirm that by combining human imagination with the power of technology and science, we can stimulate our creative potential and explore the limits of our imagination, and neuroplasticity compels us to embrace change as an opportunity for evolution and fulfilment.

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