A New Proposal on Analysis of Artistic Creativity through Introspection

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ABSTRACT

The genesis of the creative process in Art is currently conceived as the intellectual selection by the artist of fragments of memory from her/his personal, cultural and emotional experience. Interpretation of the artistic object has been systematically developed from an external perspective of art history, literature, and fine arts or of medicine and psychology. Recent neurological findings on the molecular nature of memory have revolutioned the knowledge of the mental process of memorization, remembrance and creative synthesis. A movement of scientists defends the necessity of new tools to access mental processes, inherently subjective, such as artistic creativity. In the light of those evidences, we propose a new approach to the artwork starting from a first-person analysis, namely introspection, which offers an interpretation of the genesis of the artwork from his/her own memory. The scientific, philosophical and social background on the neuropsychological processes guiding the creative activity is reviewed. Our purpose is to integrate the previous approaches from a wide multidisciplinary perspective, and to pose a new reflection on how the autobiographical and intertextual data from the artist are modeled in a dynamic way in the complex net of mental interactions up to reach the creation of an artwork, which highlights an original new vision on the reading of art. This insight from first-person analysis might complement and enrich other analyses external to the artist.

Keywords: memory, artistic creation, introspection, first person analysis

1. Artistic creation: perspectives for a new analysis

Currently, the concept more widely accepted on the mental process of artistic creation is based on the intellectual selection by the artist of fragments of memory from his personal, cultural and emotional background and the subsequent conceptual synthesis of his work (Changeux, 1997; d'Argyll, 2oo5). The elements involved in the genesis of an artwork can thus be explored from an external perspective to the artist (second and third person analyses); or from an internal perspective by the artist himself (first person analysis). The later internal approach to analyse the genesis of the artwork has not been previously addressed methodologically.

The brain, base of the human mind and essence of who we are, is the most complex organ existing on our planet, specialized in the control of the organism and its relationship with the environment and in the potential to make decisions and have free will. It allows one to access the enormous diversity of forms of physics and biology, and moreover, it builds itself the abstract, social, and cultural world and contains its own history. This makes part to the uniqueness of the person, since there are not two equal people either in their constitution or their personal experience. The question is whether we can measure objectively the affectivity, as love or hate, joy or sadness, confidence or fear, curiosity or disinterest, all of them conscious real experiences? If this is so, can we analyze its subjective influence to activate the mechanisms of creation? Therefore, when studying mental processes, we have the limitations of the tools used by the science, which are not able to objectively measure out the intimate mechanisms of our mind (d'Argyll 2013). A movement of neuroscientists led by Francisco Varela (Varela, Thompson, Rosch, 1991; Varela & Shear, 1996) proposed the need for new tools for integrated analysis of complex dynamic living processes, such as mental processes, to reach the truth about the life experience. As

fundamental tool of study, this movement postulated the introspection as a new means of gaining access the to the psychoneurological conscious processes.

Artistic creativity has been mainly studied from a psychological discipline by reference works such as Vygotski, Eisner and Gardner, among others[1]. There are very few works on artistic creation from a purely neurological perspective; much less establishing a bridge between neuroscience and humanities (Kandel, 2012). In the study of a mental process, thus complex, subjective and dynamic process, in particular of artistic creativity might be done from a emotional, psychological and personal perspective, linking it to the cellular and molecular mechanisms that occur in our brain. Current neuroscience, with its sophisticated technology of functional neurological imaging, is able to identify the areas of the brain that are activated when we feel emotions, but it is not capable of accurately measuring its intensity or discriminating against the content of a feeling or emotion.

Science requires a methodological approach to objective phenomena, an experimental analysis in the third person, which is probably necessary but not sufficient for the study of our mind. The scientific method has systematically excluded the presence of the subjective subject (Ferrater, Mora, 1994; Popper, 1972), while the experience of consciousness is entirely subjective, thus it cannot be completely understood without ourselves, i.e., we cannot stay out of the equation. The hypothesis that we propose here is that introspective analysis of the elements involved in the genesis of an artwork by using a rigorous methodology by the artist himself, and in the light of the latest findings of the Neurobiology of memory and creation, can offer new insights into the creative process more faithful to the thought of the artist. This introspective analysis aims to be complementary and enriching to other previous interpretations in second and third person.

2. New clues on the neurological basis of memory

Virtually all the theoretic modells about the memory throughout history have been based on human instruments to store information, from the case of memories described by Descartes, to the industrial revolution representing our memory as a general file within the brain; up to the recent computational model that assimilates the brain to a computer (Benfenatti, 2oo7). There is not, however, a mathematical equation that represents the complex functioning of the brain as a whole. Memory is not just a neural circuit or storage but it is indissolubly related to other mental functions, such as curiosity, wonder, emotion, affections, etc. For instance, the latest developments in artificial intelligence research and the notion of ergosystem by Misha Gromov can provide new explanations about memory, learning and the concept of curiosity (Bourguignon, 2o11).

The brain exerts control over the relationship of the inner medium of the body with the outer environment in every moment, adapting and developing its own organization according to the experience of the individual, property defined by Santiago Ramón y Cajal as 'plasticity' at the end of XIX century (Ramon y Cajal, 1895). This neuroplasticity lays the foundations of the higher brain functions, such as memory and learning; and at the same time, this plasticity remodels brain anatomy and function, concepts that will have an organic correlation in artistic creation, as we try to show later.

Ramón y Cajal was also the first to describe the communication between two neurons (noble cells of the brain), as a functional space called the synapse (et. gr. σύναψις, link). The exchange of substances, namely neurotransmitters, in these neuronal synapses intervenes in neural communication (Bear, 2oo2). Until a few years ago, the biochemical nature of the memory and how it is stored was unknown. The work of the neuroscientist and Nobel Prize Eric Kandel has been a huge leap forward in the mechanisms of memory, recollection and creation process. Kandel discovered that the molecular nature of memory consists of proteins similar to prions, which have been called with the acronym CPEB (polyadenylation element binding protein), with the particularity of autoreplication.

These CPEB would correspond to the functional units of memory, which due to their structure in complementary and self-replicative moulds, allow its persistence in time and space (Kausik, 2oo3). According to these authors, the CPEB are able to stay in two chemical states, one of which is dominant and favours its self-perpetuation, so

[1] L. S. Vygotski (1987); E.W. Eisner (1972); H. Gardner (2006).

when a protein enters the prionic state can convert other proteins not prion to its state. Also has been shown that a part of its structure is self-complementary in the form of oligomers (combinations of different components) that make it more resistant to degradation, so that, once activated the prionic state, serve as stable and identify moulds in the formation of new oligomers (Majumdar, 2o12). From this particularity, we might grasp the essence of eternity inherent in own brain structure due to the persistence in this self-perpetuating chain of memories (Lorne, 2oo8). All these biochemical details could help to understand the transformations that a memory will undergo compacted in the structure of these proteins, in the process of renovation and the transmission between neurons over time.

3. In the frontier: memory and creativity

The human species is distinguished from other species of living beings and higher vertebrate by its ability of abstraction, its creativity and spiritual capacity modeled in a coherent manner throughout human evolution. Evolution seems to have focused on improving memory and learning capacities and therefore of forecasting and planning of behavior (what we call intelligence), which will promote greater representation and analysis of the world. It also implies a greater capacity of creativity, not only scientific or technological, but the sublimation of the symbolic system of the world representation, that is art.

In our conscious experience, a memory is inseparable from the time of its collection. Our memories are a concentrate of captured perceptions through our senses associated with an emotion and at a particular time point. In fact, we tend to remember especially those perceptions that have an impact on our emotions in a particular way. Memories are stocked and recalled from our childhood, are mating with other new memories in a concatenation of logical associations whose rules are still an enigma, what will make their access increasingly complex. However, after a triggering event the remembrance of this chain of memories suddenly is brought out, as the effect of a dominoes fall. For example, in the Marcel Proust's book *A la recherché du temps perdu* (Proust, 1987), the aroma of a cupcake awakens Proust's memories of his childhood in Combray (Lehrer, 2oo7). In the words of the filmmaker Luis Buñuel "is necessary to start to leak memory, even only in part, to understand that the memory fills our lives. Life without memory is not life, as intelligence without the possibility to express itself is not really intelligence. Memory is our consistency and our reason and feeling, even our action. Without it, we are nothing." (Buñuel, 1982)

The memory of the artist is an essential instrument in his creation, as the hand with the brush, the brush with the paint, the paint with the canvas, sustrate of their identity. Artistic creation, part of the previous experience of the artist, makes it from a dynamic process in which memories and direct experience are the source of inspiration, in a particular temporal context, which in turn evolves over time, which has its organic correlation in modifications of these small CPEB proteins guardians of memory. According to the hypothesis of the neurobiologist Jean-Pierre Changeux (Changeux, 1996), the performance of a painting is a complex development in time, an evolution of the painter dialoguing with his canvas. This evolution is schematically classified in three steps: the first thought or mental scheme, in which the artist appeals to images or "mnemonics" representations; the progressive evolution by the mastery of gesture; and its final implementation in an organized and coherent picture before the test of logic.

It is not just the brain that directs the hand, but the hand at the same time that models the brain. As enunciated in the Croonian Lecture pronounced by Ramón y Cajal in the Royal Society of London (Ramon y Cajal, 1894), in his hypothesis on the synaptic plasticity, the areas of the brain most commonly used are the most rich in complexity of the dendritic and axonal arborizations, which would be compensated by a decrease in parallel in less used areas (Garcia, 2011, Safe, 2oo5). Learning and memory cause structural changes in the brain, as Kandel has shown in the studies on the basis of memory (Kandel, 1999). Therefore, we can infer an artist will develop certain brain areas more intensely and proportionally to his creative activity. In addition, the performance of an artwork will have a plastic effect on the morphology of the brain. While I am painting, my brain will model with new forms, like clay in the hands of a sculptor.

This concept is not only valid for the artist himself, but for the spectator's gaze, in what we could call "shared empathy" on other's brain. The *mental representation* is a cerebral property by which the imagination of an action activates the same brain areas that the realization of the own action. For example, if I am mentally planning the execution of a painting or a spectator looks at how the artist paints, the same brain areas as

painting are activated, phenomenon possible due to a few neurons known as mirror neurons (Fernandez-Chacón, 2oo5). From this perspective, could we consider that the contemplation of a work is in itself a creative mental act by the fact to activate the same brain areas as the artist himself? The curator Jean-Christophe Ammann refers to the need to observe the artist painting to better understand his work. Proust thought that if any reader could read his novel and 'recognized himself for what the book says...', would be irrefutable proof of the veracity of the work, the accomplice reader. This last option would encourage intersubjectivity or proof of truth of Edmund Husserl in a reanalysis of the private against the public experiences, which provides a way of sharing in subjective intersubjective transformation, following the hypothesis of Velmans (Velmans, 2o12), also mentioned by Changeux. This proposal would be a new experience in the reading of the work by the spectator face to the already known, in interactive dialogue between the artist, the artwork and the spectator.

A big amount of literature has been written about creativity, especially from the field of psychology, such as the prolific work of Lev Vygotski (Vygotsky, 1987), the most prominent theorist of psychology of development and founder of cultural-historical psychology, precursor of Neuropsychology; or in the work of Elliot W. Eisner, with his work on art and creation of the mind and its transformative role of consciousness; or the theory of the intelligences of Howard Gardner and his work on art, mind and brain; or the theory of the visual intelligence of Donald D. Hoffman, just to name a few. The latter author discussed, from the same epicenter of creation, that the brain of the artists works "differently" to other human, as we have mentioned previously.

In recent decades there has been a growing interest in the study of the mechanisms of creativity from the scientific perspective. David Bhöm, physicist and collaborator Albert Einstein and David Peat, published a work on the nature of creativity and on the factors that prevents it, with the intention of focusing on creativity in the field of science, study from which we can make the same analogies in the field of artistic creativity. In his theory, he postulates that the essence of the creative act is a state of high energy, which makes possible a new representation, usually by means of the mind (Bohm, 1988). Creativity is blocked by the rigid tactical structure of knowledge, which cannot respond appropriately to these representations with "free play". As a result, the mind operates so that we can only create from what we already know. The imagination is a faculty in the creation process that can be a passive player of physical objects, as a form of memory; or it may be a combination, in its active form, either spontaneous or automatic, as it is the case in dreams, or directed by the intelligence or reason, as in the creative invention or fantasy that we can also relate to pleasure.

Among the mechanisms involved in the conscious and unconscious selection by the artist of the elements that are going to intervene in his work, a selection mechanism similar to that acts in the biological evolution of species proposed by Darwin, or Darwinian selection, according to a theory proposed by Changeux and followed by other neuroscientists as Kandel. According to this theory, the brain would select those images that suit best (fitness) in each work and the personal path of the artist's work. In our opinion, this process does not deal with an end-directed selection or teleological, nor strictly randomly as proposed by Changeux, but a contingent selection, with the participation of the will of the artist.

Witgenstein adds that a mnemonic image is not a photograph, and that is indisputable because the term refers to a mental representation, which in turn undergoes modifications in time; thus nor is a painting or a drawing, even if they leave the mnemonic image (Salvador, 2o1o). Nevertheless, the memory is also an inexhaustible source to activate all the memories and unleash the artistic creation, as evidenced by, for example, Louise Bourgeois, who carries out a permanent reference to memories of their lost childhood in her work (Fernandez, 2o12).

4. The dream

"The sleep of reason produces monsters", in reference to the title of an engraving by Goya, in which the figure of an intellectual, artist or thinker, who lies asleep on his desk, holds different possible interpretations, from the power splitter and creative power of our dreams, the reason in his dream state is capable of generating non-existent creatures; to the active fantasy of our logic to generate these creatures. In dreams we can recognize our changes, our metamorphosis.

In dreams, the capacity of *emerveillement* (wonder) can also noted, another way to look at us to disabuse us of that we never be or believe to be. With the loss of the notion of time inherent to the dream, to isolate this property of wonder, one cannot make the difference between the dream and the reality. Time cannot be calculated. If every morning we write down our dreams or what remains of them, we could lead with more rigor, more common sense, the way of recognizing our own changes, our metamorphosis, mutations, we would be able to capture this fixing of immediacy. The production of new ideas captured through curiosity and fantasy, everlasting engines of creation, which continue to produce new paths through this feeling of wonder, and if there are still so many things we do not know is that there are still many reasons to be discovered. It is a fascination for novelty. Something that, in turn, could fall in the risk of a fashion of what's new for the new.

Each work will follow its own projection. From the moment in which psychoanalysis has used this term, in what refers to its meaning, some elements of the artwork as displacement of wishes, impulses or thoughts can be interpreted. The idea of projection suggested by María Zambrano seems as a dual metaphor about the dream. Zambrano says: "when we sleep we are suddenly in a cinema room to which no one but us has possible access. None of the concepts or ways of proceeding during the day serve us, but however, are we, it is our life, our flesh, our bowels, not transported to a communicative language, but nailed and tightened as skins, served in visual diagrams, in pure abstraction devoid of figure, to our eyes in sleep, stunned and forgetful. The discursive thought has no place in this time, it is not the director of the orchestra of our actions" (Zambrano, 1986).

5. Analysis in second and third persons

Mental processes are scientifically analysed by the external perspective in second and third person. The analysis of mental processes from the point of view of the third person is linked to the philosophical concept of "objective, objectivity". Approaches to the understanding of the psyche "from outside", as an object, from an attitude of impartiality face to the descriptions of other subject of the phenomena of his consciousness, to know what exactly is happening within his consciousness (Ahmeti, 2oo2; Red, 2oo8). Analysis of the artistic creation in third person is the usual method used by art critics and art historians.

From the point of view of the second person, the analysis of the mental processes acquires a "with/co", i.e., it is seen through the relationship with other (alter ego), i.e., it becomes a shared experience, emerging here the phenomenon of "intersubjectivity". The approach to the second person for the study of the psyche is more prominent and classical methodologies like the psychoanalytic method and the analytic psychology of Carl Gustav Jung (Ahmeti, 2oo2). In relation to the interpretation of the artistic work in the second person, it highlights the work of the poet and philosopher Yves Bonnefoy, which proposes an analysis of the artistic object from the study of the autobiography of artist, proposed method recently from the history of art (Sánchez-Ramón, 2oo5; Zaugg, 1990). Currently, the study of intersubjectivity integrating different methods of Phenomenology (Husserl, 1985), cognitive science and the psychology of contemplative meditation (Thompson, 2oo1) has gained new momentum. It provides a central place to the concept of "empathy" as an essential constituent and precondition of intersubjectivity or science of consciousness. The human mind is not confined to the brain of the individual, but it transcends the interpersonal sphere, the social world between the other and me. In reference to the phenomenon that was previously mentioned of *mirror neurons*, this intersubjectivity takes all its scientific confirmation.

6. Hypothesis: Analysis of the artistic creation through introspection

In recent years, various proposals have emerged that seek to define new scientific methodologies for the analysis of conscious experience, which advocate for the approach in the first person. This perspective has not been previously addressed in the analysis of artistic creation, which is a conscious experience. This first person analysis would correspond to the artist himself, claiming his dual role in the interpretation of his own work, as a creator of the work and as a source of study of the keys in the genesis and reading of the work. This methodology requires a rigorous attitude and procedure by the artist to obtain a legitimate, true and complete result. We propose and delineate the premises needed to apply the scientific method according to the premises of this new movement of the psychoneuroscience, which we want to make applicable to the field of art. In turn, this analysis is not intended as an absolute perspective, but it tries to complement and integrate into existing second and third person analysis on the creation of an artist, what would enrich and make more accurate the analysis of a

work. Artistic creation should be understood from a unified and dynamic perspective of the artist with his environment, integrating these three analyses on first, second, and third person.

The most urgent in this approach is to validate the scientific method with the utmost rigor that allows the introspective analysis such as that proposed in this review. Unifying some premises used by psychoanalysis and others proposed by neuroscientists of the school of Varela, who are based in the exercise of the meditation, analysis of factors of internal and external factors, and applying it to artistic creation, we have outlined the following points that seem fundamental (Table 1). The development of this self-analysis would give a new dimension to artistic creation, even though it requires a deep and sincere personal training.

From the point of view of the first person, the method used by Freud was that he himself called his "self-analysis". Freud used the technique of free association and based primarily on the analysis of certain childhood memories, dreams, the slip of the oral or written and omissions of names or words (Zambrano, 1986). For example, as a painter, in the analysis of my work I have developed this methodology based on several scans of my memory: the analysis of memories and dreams that have marked the first period of my life and that I can be directly related to my work; analysis of the influence of my present in a particular environment; the analysis of the works that have decisively influenced in my development as an artist and that I linked in my memory through years of search; the analysis of the influence of other arts, such as literature or music (i.e., the need to listen to operas to accompany me while I paint).

The contribution of this new method for structuring the introspection of the artist and to lay the groundwork for a methodology of memory in personal artwork, can serve as a starting point to one attitude of profound meditation on aspects of personal memory that can in turn arouse new reflections and directions of exploration of the artist himself. Finally, understanding the mechanisms involved in inspiration, synthesis and implementation of a work can help also an artist to develop their creative skills.

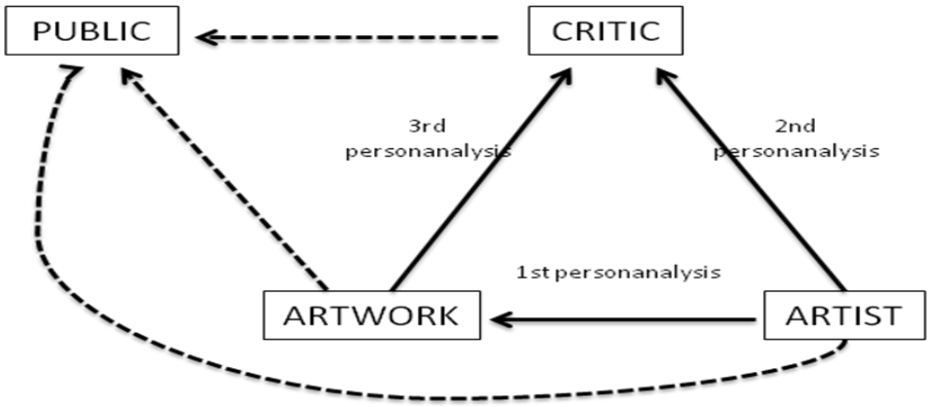

***Figure 1**. The analysis of the artwork can arouse from the dialogue between the work, a formed observer (critic) and the artist in three different and complementary approaches: third person analysis, objective interpretation of the work; second person analysis, method of interpretation to the artwork from a humanist and referential and psychological analysis of the artist; and first person analysis, introspective method by the artist himself. The public can perform their own interpretation of the work and receive the three different analyses to widen the understanding of the artwork.*

This work proposes the concept that introspection or analysis in the first person by the artist could provide a method of approach to the creative process in its own subjectivity, which is reasonably accessible to our conscious mental experience, their sources and their ways. First-person analysis would provide also the incorporation of intersubjectivity and the conscious experience of creation to the analysis in the second and third persons. Any interpretation of the artwork is understood in a relationship of communication between the artist, the work itself and the observer (Figure 1). This insight arises as a new method of scientific interpretation of the genesis of a work of art, as well as a new level of understanding of the work of art, complementary to the previously described approaches, i.e. second and third person analysis, that allows to add coherence to the

mental process in the genesis of the work and the artist's evolution. Introspection by the artist himself can interactively provide the scientific knowledge of the processes involved in the creative synthesis of an artwork.

Table 1. Essential steps in the introspective method for the analysis of the artistic creation.

Main steps	Methodology
1. Intimate memory	Analysis of specific childhood memories that are considered key to the work or the artist's life.
2. Memories of dreams.	Analysis of certain dreams that are related to the work or the artist recognizes as key in their process of creation.
3. Relationship with the arts.	Analysis of the influence of the work of other artists, writers, musicians, architects, etc., throughout the evolution of his work.
4. Collective memory.	Analysis of the influence of the socio-cultural environment and socio-political events, scientific and technological advances, etc, throughout the life of the artist.
5. Memory of knowledge and experience.	Analysis of the evolution of the work in the personal search for the artist.
6. Study of the message.	Analysis of intentionality in the work.
7. Study of the methods or procedures.	Analysis of the technical aspects of the execution of the work and external factors (geographical, physical, triggering elements of creation).

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