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Artistic Assemblage

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This paper refers to the theories of Extended Mind (EM) and enactivism as cognitive frameworks to understand contemporary approaches to art practice. The essay is structured in four sections and offers examples from existing works of artists across a range of media, with a focus on the computational arts. Initially, we compare the two models of cognition by highlighting differences and similarities, arguing that the epistemic value of each approach is observer-dependent. Following, we explain why art can be considered as a form of language. Then, we echo from the concept of "assemblage" as a mode of thinking (Dewsbury, 2011) expressed in Deleuze and Guattari (1987) and more recently in Hayles (2017) by proposing the idea of the "artistic assemblage". In the end, we underline the validity of both cognitive models for understanding the system of relations, which allows the emergence of the "artistic assemblage".

1 INTRODUCTION

The last thirty years have witnessed a radical transformation in cognitive sciences that initiated new interpretations of human mind as the subject of cognition. The relevance of language as a cognitive device has been discussed by authors such as Lakoff and Johnson (1980) already in the early eighties. The intuition that metaphors actively influence our cognition through the structures of language by gathering information from the surrounding environment was one of the earlier gateways towards a new perspective in cognitive sciences. However, it was the idea of enactivism proposed by Varela, Rosch and Thompson (1992) and, a few years later, the concept of Extended Mind (EM) by Chalmers and Clark (1998), that unlocked the traditional paradigm of cognitivism, up to that moment aligned with the computational theory of mind. This new approach shifted the focus of cognition from the physical system of the brain, making the environment and the body as active parts of the cognitive process.

This paper examines how these theories influenced the arts today by referring to existing artists and their works, with a particular attention to the computational arts. The evolution and diffusion of the computational arts are a reflection of a transformed environment in which technology becomes transparent and more integrated with it. The possibilities offered by augmented perception have produced an outburst of artists proposing new ways for interpreting or playing with reality, new ways of experiencing the self and the world around us.

People like Zachary Lieberman and Golan Levin, for instance, mix coding and performative arts, but also the activists/artists Neil Harbisson and Moon Ribas, founders of the Cyborg foundation, are examples of how the theory of the EM and enactivism contributed, perhaps indirectly, to influence the contemporary art practice worldwide.

This work consists of four sections. The first part will briefly outline the differences and similarities of enactivism and the theory of EM. Then, it will juxtapose art, in this context considered as a language (Leroi-Gourhan, 1993, Manning and Massumi, 2014), with the extended mind, proposed also as a language by Clark (1998). Further, we argue the importance of technology as a tool to convey a language and therefore, to make art. By drawing from the works of philosophers such as Leroi-Gourhan, Simondon, Deleuze and Guattari we offer an alternative point of view to think about art making, introducing the concept of “artistic assemblage”. In the last part, we explore new pathways in cognitive sciences with authors such as Erin Manning, Brian Massumi and Katherine Hayles by linking their views to contemporary art works of artists such as the philosopher and painter Bracha Ettinger or the computational artist Lauren McCarthy. Eventually, we discuss the role of the self and its modalities in the “artistic assemblage”, underlining the differences between the two cognitive approaches.

The aim of this work is not engaging with the technical aspects of EM discussed in Clark (1998) or the spiritual implications of enactivism outlined in Varela, Rosch and Thompson (1992). Neither to expand about the

concepts borrowed from the philosophers taken into account. Rather, its goal is to focus on computational and traditional art practice by presenting how two different perspectives offer equally valid approaches for experiencing reality and for expressing the (augmented) self.

2 COGNITION DOESN'T HAPPEN IN THE BRAIN

Enactivism and EM can be grouped under the umbrella of 4E cognition (Menary, 2010) however, it is important outlining both the differences and the similarities of these two concepts, in order to understand the potential contribution that each approach is bringing to art practice nowadays. Chalmers and Clark (1998) and Clark (2011), talk about the theory of the extended mind as a system that moves on a Cartesian basis. The EM assumption considers the environment as extension of the subject of cognition (a human being) and preserves a dualistic coordination. In fact, EM is described more as a coupling rather than a full integration of the elements. In EM framework, the environment becomes a device: an appendix that augments the cognitive abilities of the subject. On the other hand, the theories of enactivism tend to focus on the body and encapsulate the milieu in the cognitive apparatus, merging the two elements in a new entity, which is not just the sum of the parts but is to be intended as ecology (Manning, 2013). In this sense, the subject and the object of cognition are intertwined and the system is considered as a whole.

Despite the criticism (Clark and Eilan, 2006; Clark, 2011) to the sensory-motor dependency proposed in enactive models (O'Regan and Noë,2001; Noë, 2004) one important common point to both perspectives is ruling out that cognition happens exclusively in the brain. For both, cognition is part of a more complex structure that can involve the individual, the milieu – *intérierur, exterieur and technique* (Leroi-Gourhan, 2012) the perceptive mechanisms, the consciousness, and the idea of the self. Furthermore in both cases, this new organisation is flexible and adapts to circumstances.

Having considered the above premises, it may be argued that merging the human with the environment rather than coupling them, it would be just an epistemic choice made by the observer. Accordingly, this will affect how the cognitive apparatus perceives the whole system. More specifically, that choice will influence the type of information received before becoming cognition.

To understand the difference between the two theories we draw from the concepts of "becoming" (Deleuze and Guattari, 1987) and "transduction" (Simondon, 1992) applied to the human subject and the environment. The force created by their dynamic represents also the figurative space (as well as the time) in which the "difference" (Deleuze, 1994) takes place, not just by defining the new assemblage but by outlining the conceptual and cognitive diversities. In other words, the gap between the two approaches is very dependent on the way the subject is integrated into the

environment, but this involves the presence of an observer that in our case can be the actor him/herself.

2.1 A system of relations

To explain further, we can think of a sand dune. When we look at it, we see a mass of dirt and we consider that as a single "object". If we shift our perception, we start seeing that mound of sand as actually made of grains. Each grain looks identical and separated from each other, however it preserves the ontological properties of the sand and therefore it is not "less sand" to us than the whole dune. Then, if we use a microscope and observe the sand, we realise that each grain is actually very different and it looks like a small stone or a shell. Therefore, the difference between the scaled grain and the dune exists only in a perceptive domain. At the same way, if we observe any complex aggregate, for instance a neighbourhood, a city or even our entire planet, from a higher viewpoint, we will not be able to distinguish the separations between the single elements and we will end up considering the system as a whole.

But it is also possible to consider this from the opposite viewpoint. When we look at the individual parts of the system, we are actually observing a system of relations, where the separation between the elements is very dependent on our understanding of the concept of unity. Where do these considerations lead us? For this reason, we can assume that the separation between the subject and its milieu is just perceptual and is very dependent on the focus of the observer, therefore it is functional.

The relation between the subject and the environment is a topic largely explored in philosophy and psychology on consciousness, perception, reality and causality. Here, we mainly refer to the concept of "entrainment" expressed in Manning and Massumi (2013) borrowed from Michotte (1963) and inspired by the concept of "causal efficacy" (Whitehead, 1927-28).

The description of how the subject entangles with the environment in Manning and Massumi (2013) resonates with a more metaphysical conception of "becoming" as expressed in Whitehead (1927-28). Despite Whitehead's position on the non-continuity and multiplicity of the becoming, in opposition with Deleuze's monism, the common vision is the importance of a system of relations consistent with a rejection of the mind-body dualism (Shaviro, 2009).

> "In this way a group of actual entities contributes to the satisfaction as one extensive whole. [...] By reason of vagueness, many count as one, and are subject to indefinite possibilities into such multifold unities (Whitehead, N., 1978, p. 112).

The ability of our cognition to detach parts of the whole from the background is not only a philosophical speculation. In fact, there is evidence that similar dynamics seem to be embedded also in our biological conformation. For instance, the Gestalt psychology empirically tested how our visual perception of unity works (Kohler,1947).

Despite the conceptual differences between EM and enactive approaches, at present, a considerable number of works in computational and contemporary art practice can be interpreted through the lens of these two theories. This essay describes the shift from one approach to the other by considering artists and art works that, in our vision, cross the boundaries of the two models.

2.2 Artist and machine integration

Tempt One is a graffiti artist who highly influenced the Los Angeles graffiti culture in the eighties. In 2003 he was diagnosed with ALS (Amyotrophic Lateral Sclerosis) and today his whole body cannot move apart from his eyes. Around 2008-9, artists from Free Art and Technology (FAT), OpenFrameworks, the Graffiti Research Lab and The Ebeling Group, collaborated on the making of an eye-tracking device that could allow Tempt One to continue his art. Noticeable artists amongst them were Zachary Lieberman, Evan Roth, Chris Sugrue and Theo Watson. The large documentation online about this opensource device and the progress made by the community shows how, in a few years, the graffiti artist was able to "tag"[1] again with the use of an external device.

The first attempts of the artist to use the software resulted in very simple drawings. However, by following Tempt One's feedback, the developers of "The EyeWriter" managed to customise the software and the hardware according to the user's needs. At the same time, Tempt One adapted his skills to the device's possibilities and eventually, the practice allowed him to integrate the tool at such a deep level that now it can be considered as the artist's body extension, with a consequent improvement of the artistic results (The Eyewriter, 2010).

Another example is Neil Harbisson, a contemporary British artist born with a severe form of colour blindness called "achromatopsia" that doesn't allow him to see colours other than black, white and greyscale. This impairment was the trigger for him to build a device able to translate colours into sounds. A small microchip detects the visual spectrum properties of the objects around him and translates that into a sound frequency, which is perceived as a note: the higher the colour frequency, the higher the note.

In the prototype device, called "Eyeborg", Harbisson could hear the sound through headphones. In this way, he was enabled to synesthetically "listen" to the colours around him and compensate for his dysfunction. Besides, Harbisson uses his augmented sensoriality in art pieces where he visually represents, for instance, Beethoven or Vivaldi music (Colour Scores series) or create a series of "Sound Portraits" of famous personalities such as Steve Reich, Philip Glass, Woody Allen among the others. He named this type of art "sonochromatism", which stands for union between sound (from Latin "sono") and colour (from Greek "chromat") (Solon, 2013 and Jeffreys, 2014).

The cases of Harbisson and Tempt One have strong similarities with Otto, the patient with Alzheimer's mentioned in Chalmers and Clark (1998).

1. From Oxford dictionary: informal
A nickname or other identifying mark written as the signature of a graffiti artist. [Online] http://www.oxforddictionaries.com [Accessed 18 December 2018]

All the three men lack a structural function that is counterbalanced by an external device. Tempt One's eye-tracker, Harbisson's bionic eye and Otto's block note accomplish the same role of backup.

However, Neil Harbisson's experience differs from Tempt One's and opens up to a more substantial interpretation. In fact, following the first experimental technical trials, new and more sophisticated versions of the "Eyborg" were produced. Harbisson decided to physically integrate the device into his body by implanting a chip into his cranium. The device so constructed, was able to capture the colours and conduct the sound directly through the bones of the artist. In this scenario, the two theories of EM and enactivism overlap and start blurring. By doing so, Neil Harbisson is not only the personification of the archetypical extended mind-subject. In fact, by merging with the technical milieu, he also moves into the limits of what we can consider enactivism. Harbisson doesn't consider his antenna anymore as a simple extension of his body, he believes it to "be" his body as much as a normal eye. The artist claims he showers with it and goes to sleep with it and, as a result of this prolonged altered experience, his brain's neural network physically changed. The new cognitive entity (human and technical device) now behaves as an ecosystem that has implications in the larger social environment in which the artist lives. Eventually, his strong belief, led him to a politic activism with the goal of being recognised as a cyborg by the British government and having his antenna showing in his passport picture (The Cyborg foundation, 2015).

Despite the fact that the artists deliberately may, or may not, have taken inspiration from these philosophies, the examples above demonstrate how complex, yet powerful, these theories can be when applied to art practice. The emergence of these theories radically affected the way we look at the world and this is subsequently shaping society. Art is supposed to draw from it and express this transformation through practice. The possibilities offered by exploring the meaning of an augmented cognition are disparate and multiple. Among them, there is undoubtedly the possibility for an enhanced language.

3 ART AS A LANGUAGE

We live in a multilayered and complex reality and we constantly try to make sense of it. Our perception of reality is influenced by an array of factors such as physical and genetic structure or social background and personal beliefs. On the other hand, there is evidence of human beings' ability to represent reality through symbols at least since the Paleolithic, possible indication that this skill is hard-wired in our biology (Dyssanayake, 2001; Davies, 2012). A shared theory is that they were the first attempt to make art (Bateson, 1972).

Furthermore, Leroi-Gourhan (1993) noticed that primitive art is a system of symbols somehow representing reality through transposition rather than mimicry. He debated that one of the reasons for this primordial human activity was the need of our ancestors to communicate within the

community but more importantly the need to understand reality and thus, knowing their own selves. Therefore, the ability to create symbols and to make sense of them generates a recursive system in which one enhances and influences the other. Besides, glyphs and graffiti were compared much more to a written language than art (Leroi-Gourhan, 1993). Nevertheless, it is generally accepted that symbolic communication is strongly related to cognition and both are deeply rooted in the history of human evolution.

In the article "The Extended Mind" by Andy Clark and David Chalmers, the authors introduce the idea of language as extended mind. Like a fish is a "swimming device" able to create vortices of water around itself to improve its speed and facilitate its movement, so we are, swimming devices in a "sea of words"(Clark and Chalmers, 2002). Constantly immersed in a rich linguistic environment since birth, we developed a system able to shape our thoughts accordingly. The language to which the authors refer doesn't necessarily have to be limited to spoken ones. In this framework, the language should be intended as the carrier of cognition, that is, a link between the cognitive agents. With the above premises, if it is considered valid that language and art share the same origins and the same nature of symbolic transposition of reality, we may suggest further to consider art itself as a language, therefore as an extended mind.

3.1 Between the artists and the performance

In the work "Messa di Voce" (translated from Italian "placing the voice") the artists Golan Levin (2003) and Zachary Lieberman (Levin and Lieberman, 2004) created a set to be performed by two vocal improvisers. The whole work draws on the concept of abstract communication and language by using custom-built technology that reacts to the performers' voices. The show can be seen and read on two levels. On one hand, Levin and Zacherman are the "dei ex machina" whereas the actors Jaap Blonk and Joan La Barbara, entirely enclosed within the piece, become the extended minds of the two artists, performing their work through them. The performers embody the potentiality of the software written by Levin and Zacherman and become themselves an expressive tool completely implemented and necessary to the assemblage. On the other hand, in a sort of "Chinese boxes" structure, Blonk and La Barbara deal with the digital artefacts and design a story using an augmented language. The audience, together with the actors, are engaged in a synesthetic experience and the outcome is strictly dependent on the interaction created by this new cognitive body. The players produce their work while becoming the work, at the same way the fish generates the vortices by moving its tail.

However, an alternative interpretation could be the enactivist one. The concept of real-time and interaction are cardinal in "Messa di Voce" as well as in the enactivism expressed in Manning (2013) and Manning and Massumi (2014). The two actors are producing and at the same time experiencing the performance, altering the visuals with their voices and body, becoming themselves each time a moving ribbon, a set of particles and

blobs or a flickering shape. They override the division between the action and the visual output by using the voice as a bridge for the expression. The graphics produced by their voices create a reactive environment, which will reciprocally affect the way the actors behave. There will be one moment in which they will move from "acting" into "being" the performance. Not only will they express themselves with their voices, they will become a new entity merged with their physical body and the visuals.

The same concept of vagueness can be found in "Transcranial" realised by the choreographer Klaus Obermaier, together with the software artists Kyle McDonalds and Daito Manabe. The performance is an experimental choreography that puts on stage a conversation between the parts of the human body and the face. In the first act the performer is connected to magnetic stimulators that affect his facial expressions. In the second act, the dancer's moves are digested by the custom software and ejected in a brand new kinetic form. The code "becomes" the voice enacted by the machine. As a matter of fact, according to Obermaier, the machine and the software are considered as actors, for it is neither the computer nor the performer to control the other but it is the interrelation between the subjects which alters the dynamic and creates the dialogue (Visnjic, 2014; Obermaier, Manabe and McDonald, 2014).

Once again, it seems that the "difference" between the two interpretations can be found in the focus the observer – either external or the actors themselves – puts on the perceptual approach, in other words in the "becoming". As Manning (2013) suggests in her work about the synesthetic way neurodiversity accesses information, the challenge is to create the settings for the whole work to operate in an "ecology of relations" which could open up new pathways for expressive opportunities. In this vision, computers and software, but in a larger sense any technical object, may become active or even an independent part of a creative process.

4 ARTISTIC ASSEMBLAGE

A few years ago, the British artist David Hockney (2001) reopened the discussion on the theory according to which famous artists such as Caravaggio or Jan van Eyck were using optical devices like the camera obscura or the camera lucida, to facilitate and improve the realism in their paintings. Besides, in a more recent interview (Ganguli and Auksas, 2015), Hockney talks about tools like brushes, pens and pencils as technology. Hockney compares the brush to the iPad and despite the opinion of some art critics, he doesn't see a separation between these two technical tools. In fact, he considers the new works he made with the tablet as a natural evolution of his previous production. Therefore, he does not recognise them as "less art" than his previous paintings (Miller, 2014).

This may fall into the frame of what Simondon (1958) theorised: the brush and the iPad may share the same "genesis" despite their "individuality". Therefore the iPad can be considered nothing but the concretisation of the "abstract technical object", which is the brush. The fact that a brush

is considered nowadays "the" tool for painting while the iPad has yet to be considered as such, it is therefore a cultural construct.

Similarly, if we compare a pair of glasses, used to adjust the eyesight, to a camera lucida, which is a tool that extends the abilities of the human vision, we realise that the spectacles may be considered as the abstraction of a camera lucida. In this direction, Pablo Garcia and Golan Levin (2014) produced a contemporary version of the old device, the "NeoLucida". This is interesting not only because it is an opensource and crowdfunded project but also because it is a technical tool made by artists, with the aim of demystifying the action of drawing as a "superhuman" ability in favour of assistive technology in art practice.

On the same subject of visual perception, the work "Kaleidoscopic Vision" by Moon Ribas explores the possibilities of extended sensoriality. The Catalan performer and dancer, co-founder with Neil Harbisson of "The Cyborg Foundation", wore a pair of kaleidoscopic goggles for few months and travelled around Europe without seeing anything but a combination of colours with no shape. This experiment, she reports, affected her way of relating to the surrounding space. It also re-organised her ability of relating colours with each other (Solon, 2013). According to the EM model, in this last example, the device is used to expand the artist's vision. On the other hand, the interpretation of the vision as "something we do" (O'Regan and Noë, 2001; Noë, 2004) may suggest that this can be framed also as enactivism:

> "Visual perception can now be understood as the activity of exploring the environment in ways mediated by knowledge of the relevant sensorimotor contingencies. And to be a visual perceiver is, thus, to be capable of exercising mastery of vision-related rules of sensorimotor contingency (O'Regan and Noë, 2001, p. 943).

From this perspective, thus, the camera lucida and the kaleidoscope goggles are alike to be considered as an extended vision of the artist, rather than simple tools. Similarly, the brush or the iPad become something more than an extended arm, or hand. The brush merges with the artist and becomes the "enaction" (Manning, 2013) of the artist's thought.

Moreover, from a cognitive point of view, in all the three examples, the encounter between the human being and the technical object can also be considered as a "machinic assemblage" (Deleuze and Guattari 1987), enacting a new space of articulation and expression. In fact, there is no longer I and technology but an ecological understanding that is nor human, nor technical but something new, yet to be defined. The union of the elements creates a new cognitive agent, which, in two cases enables the artists to augment their perceptive capabilities (Kaleidoscopic Vision and NeoLucida), in the other extends their expressive efficiency (iPad, brush). Therefore, the EM and the enactivist approaches offer two interpretations that we can consider as "modes of existence" of the "machinic assemblage" itself.

Nonetheless, this conceptual framework takes into account the artist and the tool but excludes the work of art as well as the action of art making from the assemblage. On the other hand, previously we proposed that

art, as a form of language, could be considered also as an extended mind and in this sense, entangled with the artist. Therefore, the proposition that can be made now is to consider art (in the making as well as a product) as a coherent part of the machinic assemblage described above. In this new modality, the action of making art represents the agency of the machinic assemblage, more specifically, it becomes the expression of what we can define as "artistic assemblage".

5 FROM MODE OF EXISTENCE TO MODE OF AWARENESS. A FLUID SELF EMERGES.

In opposition to the idea of unity of consciousness, sustained by philosophers from Kant (1781/87) to Bayne and Chalmers (2003), Jackendoff (1987) has suggested an alternative approach. Jackendoff interpretation of consciousness appears to be fragmented as it relies on different sources and presents itself as a multilayered system. However, according to the philosopher, cognition is strictly connected to consciousness, despite the disunity. Jackendoff extends the Cartesian duality of the body-mind a further step, establishing a relation between the phenomenological mind and the computational mind. The former is the mind of experience that deals with the world of phenomena. It is the mind connected to the senses and the outside world. The latter is the mind of reasoning, the computational part of the system, linked to the logical processes.

Although Jackendoff's assumption reduces the consciousness to a projection of the computational mind, he introduces into the debate of cognitivism the concept called the "mind-mind problem". The question that this theory tries to answer is what kind of relation exists between the phenomenological and the computational mind. In other words, how do the world of experience and reasoning work together in order to create the idea of the self?

Without inquiring into the dialectic between single-track and multitrack theories of consciousness (O'Brien and Opie, 1998; Zeki, 2003), we think Jackendoff's view offers a strong interface to understand further possibilities that an amplified sensoriality and augmented awareness could bring to the progress of art practice. In short, a framework where consciousness emerges from the relation between a phenomenological and a computational mind may be particularly functional when the "artistic assemblage" contains a computational element.

5.1 Cognitive actors

We can argue that whenever the self amplifies itself, cognition is strongly enriched. Let us consider, for instance, the Lisa Park performance for brainwaves called "Euonia" (Park, 2013 and Olivia, 2014). Her work can be considered as a modern interpretation of the seminal piece by Alvin Lucier, "Music for solo performer" (1965). However, in "Euonia", the computational element is extended in the digital and algorithmic domain. With the support of a wearable device, the performer is able to control sound

waves generated by her cerebral activity. Custom-built software translates the EEG (Electroencephalography) signal into sound, which is later visualised through cymatics on water surface. In this case the extended self is able to radically affect the surrounding environment, which rebounds into the perceptive mechanism, altering and augmenting the cognitive experience. In this performance, the involvement of the human body is limited to the brain activity and to its reaction to sounds, which indirectly generates in a feedback loop. The actor somehow merges, almost vanishes in the background and "becomes" sound.

This interpretation may also attune with ideas presented by Erin Manning and Brian Massumi. For Manning (2013) the self is not a contained individuality but has to be intended as a folding entity, a fluid modality where the system of relationship is pivotal. The importance of the milieu is central, for the artist becomes the work of art and transforms into an autopoietic organism: the painter becomes the painting, painted by this new "body".

In "Always more than One" she analyses some of the paintings by Bracha Ettinger who focuses on the synchronicity between the act and the thought. Massumi and Manning (2014) explain that painting for Ettinger is not about seeing, it is about relating forces and fields. It is the intercommunication between the "outside" and the "inside". It is about "feeling in the making" and "thought in the feeling". In Ettinger's painting "Autisticwork n2" the artist's performance turns into a continuous folding of events, a complete synesthetic experience. Furthermore Manning emphasises the role of the rhythm as expression of the multiplicity of temporality, which is also essential for the "becoming" of this new "mode of existence of what we called "artistic assemblage".

On the other hand, in the book "Hackers and Painters" the author Paul Graham (2004) equates the painting and the coding, since both are made by "makers". He underlines the analogies of these two actions. According to his experience as a painter and a programmer, the approach to the act of painting and to hacking is comparable. His opinion recalls Hockney's statement about comparing a traditional technical object like a brush to a computational technical tool such as software.

However, an opposite view has been suggested by Katherine Hayles (2015). She proposes that technical tools such as a hammer (or in our case a brush) and an algorithm have a substantial difference that extends in the domain of cognition and consciousness. Hayles' broader definition of cognition focuses on the ability of the subject to *interpret* and *choose*, common to biological and technical tools like algorithms. Hayles explains further, that "nonconscious cognition" can happen before the thinking, can be independent from consciousness and can be located either in the individual or in the whole system. These conscious/unconscious "modes of awareness", to use her words, can only happen in a system of relations and it is essential in the formation of the self. Furthermore, she argues that the "unconscious awareness" is a prerogative of a living system or something that behaves like one, indeed an algorithm. Tools like financial or genetic algorithms manifest an "intention towards", a task which in the case of a

biological organism like a bee, to use Hayles' example, is the protection of the beehive, whereas in artificial intelligence is the progression to a more efficient generation. In this sense, algorithms and technical "cognizers" are elevated from simple "agents" to cognitive "actors". This technical ecosystem entangles with the biological one made of humans and animals, in a more complex apparatus defined "cognitive nonconscious assemblage" (Hayles, 2017).

5.2 Equilibrium between the modes of awareness

How tools like software and algorithms alter our cognitive apparatus, is a subject explored in particular by computational artists. For instance, Lauren McCarthy is an emerging artist and programmer interested in the relations between social interactions and technology. Her works range from Internet art to performances and there is particular attention to the way algorithms and automation influence our everyday life. "Social Turkers" (McCarthy, 2013) and "PplKpr" (McCarthy and McDonald, 2015) are two interesting examples of how augmented cognition can affect our relations with other people.

In "Social Turkers" McCarthy dated some people contacted using a dating mobile app. With the help of her smartphone, she streamed in real-time every meeting to an audience hired on "Amazon mechanical Turk" which offers an on-demand workforce. The observer group was paid to make comments about the date via text message, which would eventually affect the social interaction during the meeting.

The other work is "PplKpr", a mobile app that, connected to a wearable device, allows the user to filter social relations according to his/her biological response. Every time the user meets someone, the app will track and record the physical and emotional reactions and will accordingly propose, for instance, to meet again, to cut the conversation maybe, or to avoid this person in the future.

Both works are provocative and engage with the idea of the self-awareness and the relation with the "other". In particular, the artist criticizes the way automation and algorithms are influencing our decision-making abilities and therefore transforming the idea of the own self. Which one is the decisional agent if the nonconscious cognition is influenced by an algorithm? How can we (re)define agency in this context?

When we consider Bracha Ettinger, we have no doubt that the new system "painter plus painting", or "painter plus brush" will live in an autonomous ecology, depending mostly on her ability to merge into the background and "become" action. On the other hand, whenever we introduce a computational actor, such as software or an algorithm, the new extended entity depends on the equilibrium between two potentially nonconscious "modes of awareness". The substantial difference is that a brush will, very unlikely, be able to make any decision, whereas an algorithm may be. This alternate decisional process between human and technical actors recalls what Hayles (2017) defines as "punctuated agency".

The considerations above expressed may suggest that some differences exist. However whether the self extends to any external device or merges with the milieu, it brings to the cognitive process a whole new synergy for the "artistic assemblage". This consists not only in the nature of the technical object or of the environment's characteristics but also in the embedded expressive potential of each element of the assemblage, despite their mode of awareness.

In this perspective, we can argue that the cognitive modality of an "artistic assemblage" can also help in reducing the risk of separation between human creator and human audience, in works of art created with artificial autonomous systems, as explained in Daniele and Song (2019). Experiencing the art making as agency of the artistic assemblage would give the cognitive co-existence (human plus technical) a new equilibrium.

6 CONCLUSION

Today the boundaries of art, science, social sciences, psychology and philosophy often overlap. Sometimes these fields of study merge or communicate with each other like in a homeostatic organism. Therefore, when we discuss one of these disciplines, we indirectly implicate the others. Many artists do not come from a traditional fine arts setting. They may approach art from very diverse backgrounds like, computer science, psychology or philosophy.

The implications of this combination have echoes in many fields. By applying their creativity, artists cross the borders of medicine or technology for instance, solving physical impediments like in Neil Harbisson and in Tempt One's cases. In other circumstances they offer an alternative perspective for neurological diversities like the enactivism seen by Manning and Massumi.

The experiences presented in this work are a small sample of an ongoing activity in the field of the arts that explores augmented awareness. By undertaking the approach of a not "brainbounded" (Clark, 2011) mode of existence, the possibilities for the artist's creative process extend towards something as yet unknown. Whether art emerges as a language, as an extended mind or as "artistic assemblage", it will decisively expand the individual's and subsequently the collective cognition.

From what we discussed, what may open up for further research in the field of arts and science is the "difference" between nonconscious modalities. The interplay between biological organisms like human beings with algorithms, for instance, or autonomous machines, can create a system of relations that may spring unpredictable outcomes between conscious and nonconscious modes of awareness. Nonconscious modalities in art practice, combined with an augmented cognition could unleash a set of creative possibilities, for none of the actors (biological and technical) will be able to predict the exact outcome. In this way the act of producing art will get closer to some form of improvisation and will have to rely highly on intuition. As expressed in Bateson (1972, p. 147)

> "Art becomes, in this sense, an exercise in communicating about the species of nonconsciousness

Finally, what seems to be mutual among the cognitive models described above is the importance of a system of relations in which the "difference" between the elements in the systems, works as the "transducer", allowing the "becoming" of the new cognitive assemblage.

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