

DIAGRAMS AND ART: SOME THOUGHTS BASED ON PEIRCE AND DELEUZE

DIAGRAMAS E ARTE: ALGUMAS REFLEXÕES BASEADAS EM PEIRCE E DELEUZE

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Abstract: In the last decades, many studies on diagrams have endeavored to show how that kind of sign influences and is part of reasoning – not only mathematical and scientific reasoning but artistic reasoning as well. Gilles Deleuze (1925-1995), for instance, depicts the role of the diagrams in the art of Francis Bacon. The American philosopher C.S. Peirce (1839-1914), on the other hand, develops such concept mainly in the context of scientific reasoning. Bearing that in mind, we will argue that in both cases, the philosophers did not present a thorough analysis of how the diagrams are or might be part of the artistic creation. In that sense, we intend to show how relevant their philosophies and more specifically their thoughts on diagrams can be to the understanding of arts and creativity.

Keywords: Diagrams. Charles Sanders Peirce. Gilles Deleuze. Diagrammatic Reasoning> Artistic Creation.

Resumo: Nas últimas décadas, diversos estudos acerca dos diagramas têm buscado esclarecer em que sentido tal signo influencia e é parte do pensamento – não somente nos casos da matemática e da ciência, mas também no pensamento artístico. Gilles Deleuze, por exemplo, descreve o papel dos diagramas na arte de Francis Bacon. O filósofo americano C.S. Peirce, por outro lado, desenvolve o conceito de diagrama principalmente no contexto do pensamento científico. Tendo isso em mente, buscaremos argumentar que os dois filósofos não desenvolveram análises extensas sobre como os diagramas participam ou podem participar da criação artística. Com isso, esperamos mostrar a relevância das filosofias de Peirce e Deleuze, em especial do conceito de diagrama, para a compreensão das artes e da criatividade.

Palavras-chave: Diagramas. Charles Sanders Peirce. Gilles Deleuze. Raciocínio Diagramático. Criação Artística.

I. Diagrammatology – a brief context

The study and the relevance of diagrams have been presented and acknowledged by many philosophers throughout the years, such as Kant, Foucault, Deleuze, Peirce, and others². The term diagram, however, has received a great number of distinct

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² Even though Kant did not make use of the concept of diagram, the concept of schema was present in his philosophy. Foucault employs the concept of diagram to explain the different ways of organizing society, saying that there is a Roman diagram, a Greek diagram, a Feudal diagram, a Pastoral diagram, and so on

definitions. The role of the diagram in different activities is also the aim of a great number of theories. Nevertheless, it is still possible to find some general features that divide most of the diagram concepts in two types. As shown in Susanne Leeb (2011; 2012), diagrams are usually understood or presented either as a way of systematizing, of putting together relations, as in a schema, or as a vector of creation, like in a map that unfolds relations and points towards the unknown. But far from referring to two completely different objects, Leeb (2011, p.31) reminds us that “[i]t is not a question, however, of two fundamentally different types of diagram; rather, this oscillation between systematising (sic) and openness is inherent in the diagram.” Examples of such “oscillation” might be found in several texts and books on the subject: Pombo and Gerner (2010); Gansterer (2011); Leeb (2012); Wentz (2013); and many others. As for our article, we shall argue that even though Peirce and Deleuze did not develop a thorough analysis on the relation between diagrams and art, they both provide a rich background, especially regarding the concept of diagram, to the understanding of artistic creation.

Charles Sanders Peirce made the concept of diagram central in his philosophy. And as everything else that can be apprehended by a mind according to Peirce’s philosophy, a diagram is but a sign. Going in that direction, Peirce investigates the features of that sign: in what way does it relate to its object?; What are its influences on minds?; When and why do we use diagrams?; and so on. Following his steps, other philosophers have tried to come up with answers to those and other questions raised by Peirce. Pietarinen (2009, 2014), for example, investigated the possibility of a diagrammatic logic that is non-visual and a more rigorous diagram concept based on Peirce. Stjernfelt (2000, 2007, 2011) also kept the subject alive not only by explaining that concept but also by showing how it is useful to the understanding of a wide range of reasoning processes, from mathematics to literature and arts.

Deleuze approached the concept of diagram in a quite different way, even though he acknowledged the influence of both Peirce and Foucault on his theory. From Foucault, Deleuze kept the idea of the diagram as an abstract machine (cf. DELEUZE, 2005; NABAIS, 2009). Whilst reading Peirce’s semiotics, the French philosopher endorsed the important role played by the diagrams (and the icons in general) in

(FOUCAULT, 1993). Deleuze borrows the concept of diagram developed by Foucault and by Peirce as well (cf. DELEUZE, 2003, 2005).

Peirce's philosophical system, for they provide a way of explaining thought without putting the symbols in the foreground (cf. DELEUZE, 2003). However, Deleuze thought that the Peircean concept was too narrow, for "he reduces the diagram to a similitude of relations", while a better way of grasping the function of the diagram is to relate it to the concept of modulation (DELEUZE, 2003, p.117). In the next sections, we will present with more details both concepts of diagram and explain in which sense they can be related to the artistic creation.

II. Artists think through diagrams – a Peircean perspective

But still all influences were pressing the reasoner to make use of a diagram, and as soon as he did that he was pursuing the correct method (PEIRCE, CP.1.54, 1896)

In spite of Charles Sanders Peirce's fame for having developed a detailed semiotic theory, his work is enormous and there are very few philosophical questions that he did not investigate. However, we would just like to remember the reader of some main features of his system that influenced directly the way he conceived the diagrams and that will allow us to go from sciences to art.

Before Peirce actually developed any philosophical theories, he worked as a chemist. His knowledge of chemistry, mathematics and natural sciences influenced his philosophical journey profoundly. Silveira (2014, p.105) reminds us that in the beginning of *Principles of Philosophy*, Peirce (CP. 1.7, 1897) writes that

Thus, in brief, my philosophy may be described as the attempt of a physicist to make such conjecture as to the constitution of the universe as the methods of science may permit, with the aid of all that has been done by previous philosophers. I shall support my propositions by such arguments as I can. Demonstrative proof is not to be thought of. The demonstrations of the metaphysicians are all moonshine. The best that can be done is to supply a hypothesis, not devoid of all likelihood, in the general line of growth of scientific ideas, and capable of being verified or refuted by future observers.

Morris Cohen, in the introduction of *Chance, Love, and Logic* (PEIRCE, 1923) mentions, for instance, that Peirce's concepts of chance and law were completely related to his life in the laboratories. In his article *Some Consequences of Four Incapacities*, Peirce (CP. 5.265, 1868) states in the third rule that "[p]hilosophy ought to imitate the

successful sciences in its methods, so far as to proceed only from tangible premises which can be subjected to careful scrutiny (...).”

Given his close relation with scientific theories and experiments, it is no wonder that whenever Peirce writes about diagrams, their ontology, and role, he takes the examples from science matters, such as the formulation of scientific theories, scientific discoveries, mathematical demonstrations, etc. (CP 1.383, 1888; CP 2.227, 1897; CP 2.778, 1903). However, as we are just about to show, the concept of diagram becomes so central to his philosophy that it is perfectly possible to conceive how those ideas can be transferred to the art world in order to explain artistic practices.

In the development of his sign theory throughout the years, Peirce’s ideas also became more and more influenced by his investigations on phenomenology (pharenoscopy) and hence by his new list of categories, namely, *firstness*, *secondness*, and *thirdness*³(CP 1.545, 1867; CP 1.417, 1896). Such framework gave rise to the division of the most fundamentals signs into icon, index, and symbol – all three based on the main features of each category. Being somehow an expression of the *firstness*, icons are known for resembling the objects abstractly, and therefore, they are capable of generating in the mind nothing more than a vague idea of the object represented. Some years later, diagrams and icons are presented as synonyms (CP. 1.369, 1888). However, it was only in 1903 that Peirce endeavored to create a more detailed account of the icons and divided them into images, diagrams, and metaphors (CP 2.227, 1903). Here, the diagrams are put between images, that connect to the object through simple qualities, and the metaphors, that represent the object through different kinds of parallelisms. By definition, the diagram resembles its object by means of analogous parts and structures (CP. 2.282, 1903).

If one considers, as does Peirce, that enquiries, in general, cannot rely solely on the repetition of laws and instructions (*thirdness*), nor only on the direct contact with the object (*secondness*), one should then pay attention to the role played by the experimentation, rearrangements, manipulation of the sign in the process of discovery or invention. And since it is in the icons, and more specifically in the subcategory of diagrams that one can find the most malleable signs for such activities, Peirce claims that “[a]ll necessary reasoning without exception is diagrammatic” (CP 5.162, 1903).

³For a more detailed explanation with examples of the signs and categories, see Merrell (2001).

While reasoning about an object, the mind uses this kind of sign, the sign that is some sort of sketch of the object in question. When an object presents itself to a mind, there are many signs that could be created in that mind – in other words, a sign representing an object should be able to originate different kinds of impressions, feelings, and so forth, in a mind. And these effects created in a mind after grasping the sign are what Peirce named interpretant, which is also a kind of sign.⁴ If we take into account the fact that the features of an interpretant sign are determined by the sign that first originated it, that is, the sign that was representing the object, then we are able to better appreciate the relevance of the diagram for discoveries, inventions, systematizations, reasoning, etc., for it requires such kind of sign to create the adequate mental/semiotic space, so to speak, in which a mind will be able to sketch explanations, solutions, routes, alternatives, maps, and so on. Following that line of thought and assuming that artistic creation also employs kinds of reasoning, we argue that it should be possible to investigate the nature of artistic diagrams and the role they play in such creative processes – something that Peirce himself already implied (CP 2.281, 1903).

Being a specific kind of icon, a diagram resembles its object in a skeleton-like manner, capturing the proportions, the relations that exist in the object and presenting them to a mind (PEIRCE, CP 3.362, 1880). Then, it is possible to perform various experiments⁵ in order to make the sign reveal hidden features of the object, its habits, necessary truths, or the possibilities of being of that object. As Peirce (CP 1.383, 1888) states it,

The geometer draws a diagram, which if not exactly a fiction, is at least a creation, and by means of observation of that diagram he is able to synthesize and show relations between elements which before seemed to have no necessary connection.

⁴ For a more detailed explanation of the concept of interpretant, see Santaella (2000, pp.157-8). We also encourage the reader to consult the entry on C.S. Peirce in the *Stanford Encyclopedia of Philosophy* concerning the changes in the concept of interpretant throughout the years – see link: <https://plato.stanford.edu/entries/peirce-semiotics/#Int>. Retrieved January 02nd. 2017.

⁵ Peirce even states that mental experiments upon diagrams are not that different from the experiments carried out by scientists. “Such operations upon diagrams, whether external or imaginary, take the place of the experiments upon real things that one performs in chemical and physical research” (CP 4.530, 1906). Silveira (2014, p.131) writes that for Peirce, carrying out experiments on a mental diagram or in a laboratory might seem different, but the essence of the reasoning remains the same in both cases.

According to Stjernfelt (2011), while seeking a proof, the mathematician will perform the necessary experiments in the diagram, sometimes adding new elements, lines, and points, until its necessary truths become evident.

In the realm of the sciences, Hoffmann (2007) explains why the concept of diagrammatic reasoning, among other Peircean ideas, is important to the understanding of the unfolding of scientific practices. According to Hoffmann (2007, p.216), diagrammatic reasoning consists in constructing the diagram itself, performing the experiments, and finally observing the results. Besides that, Hoffmann (2007, p.222) emphasizes the role of the representational system within which the diagram will be constructed, for it can either make it easier to carry out the experiments that will solve the problem or make it impossible to do so – as Hoffmann shows using an example about a chemistry problem⁶.

However important the diagrams and the diagrammatic reasoning may be to the scientific activities, and regardless the fact that Peirce does not openly state how or if that reasoning is also the case in respect of writing a novel, or acting, or composing a choreography, we shall explain in what sense it is plausible to say that the diagrammatic reasoning is also part of the artistic practices.

The first thing we must bear in mind in order to understand how wide Peirce's ideas of reasoning and diagram are, is that icons are not the only kind of sign employed in the diagrammatic reasoning (cf. SILVEIRA, 2014, p.137), and that not only deductive reasoning, but also inductive and abductive reasoning are diagrammatic, or at least they are up to a certain point⁷. That means that Peirce did not exclude from reasoning the symbols and the indexes as the other categories of signs that mediate the contact between the mind and the object. As notices Silveira (2014, p.137, our translation)

[f]rom the observation of a diagram, as was stated before, it will emerge a general habit and, therefore, the diagram will acquire a

⁶ Hoffmann writes about a hypothesis formulated by Ida Noddack in 1934 to a chemistry problem. At first, the scientific community ignored the explanation presented by Noddack. It was only four years later, when another group of scientists formulated the very same hypothesis, that the scientific community approved it. Hoffman then argues that in the core of that shift was the different diagrams employed to represent the problem and the hypothesis. It is also worth stressing that in this specific case Noddack's hypothesis might have been ignored due to sexist reasons as well.

⁷ This thesis was proposed by Bellucci at a symposium in 2013 called *Imagination and diagrams in scientific discovery*. The abstract can be accessed here: <http://philo-sci21.fc.ul.pt/wp-content/uploads/2013/05/S1.pdf> (Retrieved July 3rd, 2016).

symbolic function. Whilst referring to the experience, and accordingly, to the object of that same experience, the diagram will only be complete if it also carries indexes that will assign the relation observed in the diagram to the object of the experience.

Going through Peirce's writings, one can find very few moments in which he dropped a clue on the relation between art and reasoning. In most of those moments, the philosopher explains the diagrammatic reasoning in such a broad way that several activities could fit in it. For instance:

As to that process of abstraction, it is itself a sort of observation. The faculty which I call abstractive observation is one which ordinary people perfectly recognize, but for which the theories of philosophers sometimes hardly leave room. It is a familiar experience to every human being to wish for something quite beyond his present means, and to follow that wish by the question, "Should I wish for that thing just the same, if I had ample means to gratify it?" To answer that question, he searches his heart, and in doing so makes what I term an abstractive observation. He makes in his imagination a sort of skeleton diagram, or outline sketch, of himself, considers what modifications the hypothetical state of things would require to be made in that picture, and then examines it, that is, *observes* what he has imagined, to see whether the same ardent desire is there to be discerned. By such a process, which is at bottom very much like mathematical reasoning, we can reach conclusions as to what *would be* true of signs in all cases, so long as the intelligence using them was scientific. (PEIRCE, CP. 2.227, 1897, emphasis in the original)

We would like to call the reader's attention to the following sentence: "[b]y such a process, which is at the bottom very much like mathematical reasoning (...)". As Stjernfelt (2011) notices, even though Peirce usually takes examples from mathematics or geometry, his idea is much wider than that, in the sense that he is not only trying to explain how the mind reasons in the mathematical domain, but how the mind reasons in general.

This argument pertains to a pure, mathematical diagram reasoning; now what about the vast amount of applied diagrams representing empirical state-of-affairs? Peirce's system of the sciences offers an explanation of the efficacy of such diagrams – namely that they inherit, explicitly or implicitly, the mathematical structure of pure diagrams and add further constraints to those diagrams stemming from the special science of the domain to which they pertain. Thus, all deductive reasoning, everyday or scientific, is taken to involve a mathematical-diagrammatic scaffolding, and necessary inferences in all sciences as well as in everyday reasoning employ mathematics, implicitly or explicitly. (STJERNFELT, 2011, p.307)

It was Stjernfelt (2007) himself that investigated in his treatise *Diagrammatology* how much helpful Peirce's ideas are for the understanding of several processes not only in sciences and mathematics, but also in literature, drawing, and so on. According to him

precisely this is the great advantage of his diagram concept: a whole series of semiotic processes – the tropisms studied by biosemiotics, the contemplation of pictures, metaphorical, analogical, and poetical reasoning, linguistic and narratological syntax, basic sensorymotor schemata, as well as mathematics proper – become understandable as different realizations of one and the same basic rational semiotic behavior, namely, diagram experimentation. (STJERNFELT, 2007, p.115)

However, Peirce gets even closer to the idea we are developing here when he states that

Another example of the use of a likeness is the design an artist draws of a statue, pictorial composition, architectural elevation, or piece of decoration, by the contemplation of which he can ascertain whether what he proposes will be beautiful and satisfactory. The question asked is thus answered almost with certainty because it relates to how the artist will himself be affected. (PEIRCE, CP. 2.281, 1903)

Or when the philosopher mentions the importance of art in the manipulation of diagrams, stating that

But the greatest point of art consists in the introduction of suitable **abstractions**. By this I mean such a transformation of our diagrams that characters of one diagram may appear in another as things. A familiar example is where in analysis we treat operations as themselves the subject of operations. (PEIRCE, CP. 5.162, 1903, emphasis in the original)

Based on what has been presented so far, one might safely draw a few conclusions. The first thing we would like to emphasize is that the notion of diagrammatic reasoning is central to Peirce's philosophy. The diagram in Peirce – as an icon (not a symbol or an index) – becomes the very “language of thought”, to use the anachronism introduced by Pietarinen (2009, p.2). The second conclusion we shall infer is that the thesis of a diagrammatic reasoning is developed by Peirce whilst having mathematics and other sciences in the background, even though the concept is not at all

exclusive of the scientific fields (not to mention here that Peirce understood the term “science” in a much wider way). The last thing we shall point out is that Peirce’s philosophy has enough room to accommodate the process of artistic creation within the scope of diagrammatic reasoning. And the issue regarding this last conclusion is that Peirce’s philosophy does not detail in what sense the diagrams could be part of the artistic creation, or what kind of diagrams those would be⁸. That being said, let us now turn to Deleuze’s theory and see how the French philosopher deals with that matter.

III. The diagram as an abstract machine in the artistic creation – Deleuze’s thesis

In a way, music begins where painting ends
(DELEUZE, 2003, p.54)

While Peirce built a more scientific oriented philosophy⁹, Deleuze’s philosophy is intersected by art in several moments¹⁰. His thought on art is better expressed by him and Guattari quoting the writer James Lawrence (cf. DELEUZE, GUATTARI, 1994, p.203-4) saying that artists “make a slit in the umbrella” that protects people from the “free and windy chaos”. Nabais (2010, p.170) describes Deleuze’s conception of art with the following words:

Art is capitulation of the insensitive forces of the cosmos, of the vibrations, of the living lines. Art is the expression of a non-organic life which exists and which vibrates in the universe. There is a force of life, a force of time that only art manages to capture.

Continuing with Nabais, it is said that “[t]o succeed in this process [of creating art], each creator uses specific procedures. But they all concentrate themselves on the same point: the becoming-inhuman, the becoming-color, the becoming-cry, or pure

⁸ The problem regarding a supposed lack of specificity in Peirce’s concept of diagram is addressed by Pietarinen (2009, 2014). The author claims that the general notion of diagram taken as valid by some of Peirce’s scholars is actually way too general, and then he makes an effort to narrow down the scope of the concept. As we see it, this issue makes it clear that the possible uses and applications of that concept are not yet a matter settled.

⁹ It is worth mentioning, however, that as Ibri (2009; 2010) explains it, in a closer look, one shall also find traces of an aesthetic-oriented philosophy in Peirce’s system.

¹⁰ See for instance his books on Cinema, on Proust, on Kafka, on Bacon, and so on.

sound of a man”¹¹ (NABAIS, 2010, p.168). At this point, we go further and propose that not only the goal of the artists is the same, that is, “becoming-something”, but also the specific procedures to create art preserve at least one main element: the diagram. It is the diagram that makes it possible for the artist to go through chaos and finally capture the “insensitive forces of the cosmos”. Let us start with Deleuze’s notes on the work of Francis Bacon and then we shall explain in which sense the diagram is also present in many art practices.

Deleuze (2003) dedicated a whole section of his book *Francis Bacon: the logic of sensation* to describe the role of the diagram in Bacon’s work. In that context, the diagram is understood as the element that makes it possible for the new to be introduced in the painting. In the process of painting, “one starts with a figurative form, a diagram intervenes and scrambles it, and a form of a completely different nature emerges from the diagram, which is called the Figure” (DELEUZE, 2003, p.156).

The final goal of the artist, as explained by Deleuze in the book on Bacon, is not the figurative, the narrative image. The work of Bacon is explored by the philosopher precisely because the Irish painter finally managed to suspend the “story-telling” features of the images. One of the elements used by the painter to achieve such a domain of art is the diagram – not as a way of systematizing the painting’s structure, or as the painting itself (which is a practice Bacon criticized), but as the smudge, as the blur, introduced in a specific and not so large part of the painting. The introduction of a diagram helps to neutralize the narrative features of the images that are already on the canvas (virtual or real images). Such is the case of the work *Painting*, 1946. According to Bacon (cf. DELEUZE, 2003, p.156-8), the first idea was to paint birds landing in the meadow. But then the diagram was applied in a specific area of the canvas, in a moment of insubordination of the hand, in a “manual relation”, as Deleuze put it. The outcome can be seen in the very painting: it became a man under an umbrella. The unsubordinated lines and traces of the diagram were responsible for disorganizing in a catastrophic manner the figurative image, that of the birds, and, by doing so, something else could emerge from the diagram and it “raise it [the painting] to the power of the pure Figure, beyond the figuration contained in this whole” (DELEUZE, 2003, p.157) .

¹¹ As Deleuze and Guattari state in *What is Philosophy?*, in different art practices emerge different techniques with one goal: to make the work of art stand up on its own.

Therefore, “[t]he diagram is a possibility of fact – it is not the fact itself” (DELEUZE, 2003, p.110). And it is in that aspect of the diagram that lays the admiration and the critique of Deleuze to Peirce. While the French philosopher admired Peirce’s idea of a sign that is not symbolic and yet is indispensable to reasoning in general, Deleuze also argued that this category should be understood in a much more radical way: the diagrams “are nonrepresentative, nonillustrative, nonnarrative. They are no longer either significant or signifiers: they are asignifying traits” (DELEUZE, 2003, p.100). The very core of the diagram is not the similitude features with its object, as Peirce would have it, but its capacity of “modulating” the objects and transforming them in Pure Figures (and Pure Sounds, Pure Colors...). In this sense, the random lines of the diagram, in Bacon’s case, are what throw the artist into the chaos where he can “capture the intense forces of the universe”. Besides that, we believe that Deleuze’s development of Peirce’s concept of diagram might also be understood in a wider context and accordingly might also be employed in the understanding of many art practices.

As shown in Knoespel (2001), the concept of diagram is used by Deleuze in different texts referring to slightly different phenomena, even though they all keep some important fundamentals such as the idea of the diagram as a vector more than a systematizing structure. According to that author’s reading of *A Thousand Plateaus*, diagrams are the means through which we think, for it “provides order and stability (...) [and also] it is a vehicle for destabilization and discovery” (KNEOSPEL, 2001, p.146). Therefore, in the context of science and cognition, the diagram would be responsible for generating a “cognitive sweep that extend (sic) the possibilities of thought” (KNEOSPEL, 2001, p.148). Then, in another book also written with Guattari, *What is Philosophy?* (DELEUZE, GUATTARI, 1994), the diagram is related to the concept, for the latter is an extension of the former (KNEOSPEL, 2001, p.141). In Deleuze’s readings of Leibniz and Foucault, as shown in *The Fold* and *Foucault*, Deleuze also associates the diagram with an instrument of social control as much as an instrument to *transgress* the established order (cf. KNEOSPEL, 2001; NABAIS, 2009).

Just as the concept of diagram keeps some main features regardless the context in which it is being employed, the concept of art in Deleuze also has some constants. According to O’Sullivan (2009), some features of what Deleuze and Guattari called *minor literature* in their book on Kafka can easily be found in different contemporary art practices. For instance, the idea that the writer suspends the “signification” of the

text whilst putting in the foreground the “affective and intensive quality of language” (O’SULLIVAN, 2009, p.247), is also part of many works of art. As O’Sullivan depicts it, contemporary artists, not only writers, aim at creating “affective-events” more than a narrative.

Following that line of thought, O’Sullivan goes through some of Deleuze’s writings on different works of art and shows what elements described by the philosopher as relevant to certain practices are also found in many other works. For example, the diagram, as seen in Bacon’s paintings, says O’Sullivan, is one of the means through which many artists, not only painters, can achieve the “affective-event”, since “[f]or Deleuze-Bacon it is the diagram that enables this deterritorialization of the face and the production of the ‘body without organs’” (O’SULLIVAN, 2009, p.255). In this context, O’Sullivan argues that many art practices can be said to be grounded in diagrams as “modulators”, as elements responsible for introducing the “chaos” that will make it possible for the artwork to break through the figurative, the narrative, the cliché, and become an “affective-event”. However, neither Deleuze nor his scholars have yet endeavored to investigate the use of diagrams in different works of art.

Now, let us mention just a couple more authors to finish up our argument that Deleuze’s concept of diagram is extremely suitable for the understanding of art (not only painting). The architect Teyssot (2012) explores the diagram concept based on Deleuze’s studies of Foucault (cf. DELEUZE, 2005). Therefore, the starting point there is the notion of diagram as an abstract machine that is “concerned with the representation of relation of forces, belonging to a stratified formation, and it doubles the stratification (for examples, the strata of history and of society)” (TEYSSOT, 2012, p.6). However, instead of restraining the diagram’s power to the analyses of historical or sociological facts, Teyssot argues that a relevant feature of this kind of “abstract machine”, namely “the phenomenon of becoming”, makes it perfect for the characterization

of works of art, including Proust’s *In Search of Lost Time*, Artaud’s schizo-poetics, or Francis Bacon’s exhibition of the flesh. The diagram offers the tools to map art’s phyla and genus, its phylogenesis as much as its heterogenesis. (TEYSSOT, 2012, p.6-7).

To sum it up, Gerner (2011, emphasis in the original) presents an interesting perspective on the matter, arguing that the important features of the diagram go beyond

its representational possibilities. According to him, diagrams might also be linked to creative thought in sciences and art as well:

Diagrammatic thinking is, however, not so much about the concrete shapes and forms of the geometrical configuration of knowledge *represented* as about the dynamic of how the structures of connectivity and separation—together with attentive abstractions and the relation of points of connectivity (territorialization) and disconnection (deterritorialization) and reconnection (reterritorialization)—are *performed, evolve, and show forces of change*.

IV. One or two comments on what has been presented

So far we have described the following scenario: on the one hand, Peirce developed a philosophy in which the diagram play a central role as the sign that makes all kinds of reasoning possible, even though other signs might also be part of the reasoning process. But – and this is our point here – Peirce did not endeavor to show how the diagrams can be (or are) used by artists in the composing or creating processes in general. On the other hand, Deleuze borrowed Peirce's notion of diagram, developed the concept by applying it to other domains not explored in Peirce's theory, and emphasized the diagram as an analogical thought opposed to the symbolical thought.

Now, regarding Deleuze's interpretation of the concept of diagram in Peirce, there might be another Peircean concept necessary to better grasp the creative potentialities of the diagram and that Deleuze fails to mention: the concept of abduction. Even though it by no means nullifies Deleuze's critique of the representative features of Peirce's diagram, it still provides a path for those interested in understanding how the artistic creation could fit in Peirce's philosophy. Since this is not the place to present a detailed exposition of the concept of abduction, it will suffice to describe it as the only kind of reasoning that makes it possible for something new to be inferred (CP 2.96-102, 1902; CP 5.189-191, 1903). Whilst deduction and induction are limited to what is already on the premises, the abduction, says Peirce, will introduce a new element, and by doing so, it should expand the set of habits of a certain mind¹².

¹² For a more detailed analysis on the relation between creativity, abduction and habits, see GONZALES, M.E.Q, HASELAGER, W.F.G, Raciocínio Abduitivo, Criatividade e Auto-Organização. In: **Cognitio**, n.3, pp.22-31, 2002.

The authors that have tried to connect those two concepts – diagrammatic reasoning and abduction – have not yet investigated the artistic creation processes. However, as said right above, they might provide a path to follow. We would like to mention two relevant articles regarding that matter: *seeing problems, seeing solutions: abduction and diagrammatic reasoning in a theory of scientific discovery* and *diagrams as scaffolds for abductive insights*, both written by the philosopher of science Michael Hoffmann (2007, 2010). In them, the author explores an important feature of the diagrams as understood by Peirce, and that has also been acknowledged by different authors, such as Stjernfelt¹³, that is, the possibility of making it visible some of the object's features that were not visible before. Or even better: the diagrams, as icons of relations, might reveal some of the object's *habits*, to use another Peircean concept. It is in this regard that Hoffmann connects the diagrammatic reasoning with the possibility of creating new ideas or having new insights.

In the case just described, the representative character of diagrams in Peirce is still present. However, it seems that when we take into account the relation between abduction and diagrams, the idea of using Peirce's concept to better understand the creative processes in arts becomes less implausible. In other words, the concept of abduction immerses the diagrammatic reasoning (easily seen as a science-oriented concept) in creativity, openness, and potentiality. As Silveira (1983, p.21, our translation) describes it

The practices recognized as artistic can only be so by developing the signs – not only linguistic signs – making it emerge from the codes that impose the sign's use new ways of presenting different features of the object represented. Whilst breaking through the imperative past, they even propose new objects and, accordingly, new signs. By doing so, such practices expand the universe of possible conducts, they create new objects adorable and admirable, and diversify the possibilities of interaction between the "scientific" intelligence with the world. They make it grow, in their own way, the very perfection of the universe.

However, it seems worth noticing that it does not require much effort to acknowledge that both philosophers work with a rather similar concept of diagram, even though at first glance they might seem more distant. It is true that when Deleuze investigates the diagrams in paintings the outcome is an enrichment of the concept.

¹³ In Stjernfelt (2000, p.368) the author states: "[t]he diagram, then, can be seen as making explicit (some of) the habits already inherent in a symbol."

Deleuze explores the powerful capacity of *inventing* new lines of thought, while Peirce focuses much more on the *discovery* of features and habits of a particular object represented by the diagram. Notwithstanding, such particularity does not put the philosophers on opposite sides. A more careful reading of the chapter *Analogy* (DELEUZE, 2003, pp.111-121) shows that Deleuze's critique of the concept of diagram elaborated by Peirce is more related to the difficulty of explaining "what an analogical diagram is, as opposed to a digital or symbolical code." In that sense, it is also possible to argue that Deleuze did not refuse Peirce's concept, but only made a new association between the concepts of diagram and modulation¹⁴ in order to better grasp the essence of how a diagram actually operates in the domain of painting, namely, as the modulator responsible for breaking through the figurative in order to actualize the Figure – "to paint the scream more than the horror" (DELEUZE, 2003, p.60).

In such context, one of the points we wanted to emphasize is the possibility of finding diagrams in different works of art besides painting. Even though Deleuze focused on the works of Francis Bacon to think the role of the diagram in the domain of art, it seems plausible to assume that the diagram, as a sort of abstract machine, is also indispensable to many artistic creations. In this regard, we believe that it is also possible to find diagrams in works of literature, in music compositions, in sculptures, and so on – not necessarily as random traces and lines, but also as gestures, words, and, most importantly, as rhythms, that work as abstract machines to wash off the clichés, the figurative, the narrative, and to make the work of art "stand up on its own" (DELEUZE, GUATTARI, 1994, p.164). And such conclusion falls closely enough to a famous Paul Klee's saying extensively used by Deleuze: art does not reproduce the visible; it makes visible.

Considering what has been previously presented, we believe it is also safe to conclude that even though Deleuze's approach of the diagram is usually seen as more suitable for the understanding of works of art, the same concept as elaborated by Peirce might also be useful for that matter. With a philosophy considered more scientific oriented and with a concept of diagram usually associated with the ideas of "organization" and "systematization", Peirce does not eliminate the creative potentialities of the diagrammatic reasoning. Thus, both authors, and especially their

¹⁴ "The diagram, the agent of analogical language, does not act as a code, but as a modulator" (DELEUZE, 2003, p.120).

thoughts on diagrams, are still rich sources of concepts that might help philosophers and artists to better understand what goes on behind the curtains in the moments of artistic creation.

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