Modelling Aesthetic Judgment
An Interactive-semiotic Perspective

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Aesthetic experience, as a cognitive activity is a fundamental part of the interaction process in which an agent attempts to interpret his/her environment in order to support the fundamental process of decision making. Proposing a four-level interactive model, we underline and indicate the functions that provide the operations of aesthetic experience and, by extension, of aesthetic judgment. Particularly in this paper, we suggest an integration of the fundamental Peircean semiotic parameters and their related levels of semiotic organization with the proposed model. Our aim is to provide a further theoretical understanding with respect to the perception of aesthetics and to enrich our models regarding the functionality of aesthetic interpretation, using the theoretical interpretive richness provided by the semiotic perspective.

Keywords: aesthetic judgment, interaction, semiosis, autonomous system, cognition, affordances, aesthetic properties.

1. Introduction

Nowadays, in spite of research and the set of theories on aesthetic experience, our knowledge regarding the genesis of the aesthetic judgment in cognitive agents (especially, in humans) is minimal. Most of the studies in aesthetic philosophy have been focused on philosophical questions concerning the nature of aesthetic experience, or on aspects of aesthetics pertaining solely and directly to art, beauty, and sensitivity (i.e., Kant, 1914; Matravers, 2003; Matravers & Levinson, 2005; Carroll, 2004). This body of theory does not lead to functional recommendations that could acquire practical usefulness by, for instance, being integrated in theories explaining the design process or even more specifically, in models of human-computer interaction, architecture, interior design, and so forth.

Contrarily, most studies of aesthetics in the interesting research domain of human computer interaction (Hassenzahl, 2004; Hassenzahl & Tractinsky, 2006; Tractinsky, Cokhavi, Kirschenbaum, & Sharfi, 2006) focus on users' perception and on their psychological states during the interactive experience (Bilda, Edmonds, & Candy, 2008). In fact, they study aesthetic experience by observing the respective phenomena of the interaction process (e.g., the effectiveness of interactive systems by measuring

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the degree of usability, the number of errors, and the amount of time required for a user to complete a specific task with the aesthetic object) but they do not conclude to normative functional explanations of aesthetic experience. In the same direction, in neurobiology, the aesthetics-related experiments (Jacobsen, 2004; Jacobsen, Buchta, Köhler, & Schröger, 2004; Jacobsen & Höfel, 2003; Jacobsen, Schubotz, Höfel, & Cramon, 2006) mostly focus in the differences between aesthetic and logical judgments of different human agents when they interact with an object exhibiting a common *aesthetic* property (e.g., symmetry). Additionally, they attempt to explore the behavior of the underlying cerebral networks when human agents judge using basic aesthetic valences (e.g., beautiful versus ugly). Others consider the aesthetic meaning as an outcome of a mental image or mental representation which is dynamically composed of a complex web structure of neurons in conjunction with emotional reinforcement (Barry, 2006; Damasio, 2000). An interesting conclusion here is that the construction of an aesthetic judgment, beside the cognitive part, lies in emotional feedback, which is an internal process that appraises perceptions or events from inside and/or outside the organism, serving the well-being of the cognitive agent (Xenakis, Arnellos, & Darzentas, 2012).

Our major research aim is to construct a theoretical model in order to provide:

i.   an explanation regarding the formation of aesthetic experience in the interaction process and
ii. an explanation of the functionality of the aesthetic judgment, by which the design community could benefit by further understanding the role of the respective functions that serve and effect the formation of aesthetic experience.

An outline of the theoretical background of the proposed model is presented in section 2.

In this paper we provide a semiotic explanation of the cognitive processes proposed in the model of aesthetic judgment by suggesting, in section 2, a semiotic perspective for the fundamental aspects indicating the nodal points of the model according to the Peircean semiotic theory. Particularly, we suggest: i) the internalistic dimension of affordances, by reconsidering their nature as an element of direct perception in cognitive psychology (Gibson, 1979). The perception of a sign engages both direct and indirect perception since visual perception and stimulus information are both aspects of the same process of perception and cannot be divided ii) the existence of an inner semiotic function that enables the construction of a schema, which through the process of semiosis will emerge in a wider web of knowledge, and finally iii) we argue that Peircean semiotics could provide a wider functional framework for the indication of the important nodal points, and their representational content, concerning the construction of aesthetic experience in aesthetic judgment.

Considering the above, our main aim in this paper is the integration of the fundamental Peircean semiotic parameters and their related levels of semiotic

organization with the suggested model of aesthetic judgment. Examining the underlying cognitive processes and the ways these processes lead to an aesthetic interpretation or to an aesthetic judgment, we also propose, in section 3, that the formation of aesthetic judgment is related to the transposition from the icon and the index to the symbol, which is probably responsible for the higher order aesthetic interpretations. This approach provides the interactive theory of visual perception and action with a broader understanding, suggesting the convergence of each perceptual level of the four-level interactive model with one of the three Peircean categories and the various semiotic triads. Additionally the suggested semiotic framework appears to explain the aesthetic experience of the cognitive agent whilst providing further enlightenment regarding the functionality of aesthetic interpretation and, by extension, regarding the emergence of aesthetic judgment through the interaction process.

2. Structuring the Interactive Semiotic Model of Aesthetic Judgment

Aesthetics, in general, and aesthetic judgment, in particular, is not an a priori mysterious process and most probably it does not necessarily refer to notions like pleasure, beauty, taste, and so forth, but to processes / mechanisms, which result in emergent outcomes with particular characteristics. Therefore, we will proceed by analyzing aesthetic perception of processes that could be described by normative functions that constitute the interaction process and, by extension, the aesthetic interpretation of the environment. As such, the proposed model of aesthetic judgment is structured upon the dynamic interactive characteristics of an agent able to make aesthetic judgments. For the purposes of this paper, such an agent is considered as a living *autonomous system*, which is a complex, dynamically open system with multiple *emergent* properties and functional potentialities, such as high-level (elaborated) representations, motivation, learning and emotions.

2.1 The Theoretical Background of the Suggested Model for Aesthetic Judgment
    2.1.1 Emergent Representation as a Way to Interact with the Environment
Every autonomous system interacts continuously with the environment in order to determine the appropriate conditions for the success of its functional processes (Arnellos, Spyrou, & Darzentas, 2010), which means that the system has as its primary goal to maintain its autonomy in the course of its interactions. The functionality of the system is guided by its autonomy; therefore, the system interacts purposefully through the service of its functions. Aesthetic judgment is one of the respective functional mechanisms that detects the possibility of choosing the next appropriate action in order for the autonomous system to fulfill its primary purpose of self-maintenance.

    In his influential work Mark H. Bickhard establishes the interactive model of representation (see Bickhard, 1996, 2000a, 2000b, 2003, 2004, 2009a) arguing that such an autonomous system should have a way to differentiate among the possible

environments with which it interacts and a switching mechanism in order to choose among the appropriate internal functional processes that it will use in a given interaction. Those differentiations functionally indicate that certain types of interaction are available in the specific environment and, hence, they implicitly presuppose that the environment exhibits the appropriate conditions for the success of the indicated interactions. This means that there are many types of functional processes that could serve each level of the interaction process and the autonomous system enables them to do so in order to succeed in the indicated interaction (Arnellos et al., 2010). In this model, the interaction will be guided by the *dynamic presuppositions* of the functional processes according to the current condition. The autonomous system presupposes that such a process is appropriate and stable for the conditions of the environment as well as for its internal conditions. Dynamic presuppositions can be true or false and respectively the interaction will succeed or fail (Bickhard, 2003, 2004).

Accordingly, in this model, the above mentioned differentiated indications constitute emergent representations and the complex web of those indications can form the representations of the autonomous systems regarding the current situation. The respective presuppositions constitute the representational content of the autonomous system with respect to the differentiated environment (see Arnellos et al., 2010 for a greater analysis). Through this process of dynamic representation the autonomous system is able to carry out the fundamental actions of distinction and observation. It observes its boundaries and it is thus differentiated from its environment. As the system is able to observe the distinctions it makes, it is able to refer back to itself the result of its actions. This makes it a self-referential system, providing it with the ability to create new distinctions (actions) based on previous ones, to judge its distinctions, and to increase its complexity by creating new meanings in order to interact (Arnellos, Spyrou, & Darzentas, 2007).

2.1.2 Motivation

Another aspect of the same interactive system ontology is *motivation*. According to Bickhard, the major question concerning the significance of motivation must be: what makes the autonomous system do one thing rather than another in the course of further interactive activity (Reeve, 2008; Bickhard, 2000a, 2003). This is the problem of interaction selection. Motivation is responsible for the function of selecting the processes and representation is responsible for the anticipation in the service of such selection.

2.1.3 Learning and Development

Learning and development is another fundamental aspect of choosing the appropriate interaction. What we call learning is a constructive process which is enabled when the autonomous system fails to anticipate the proper interactive process or when the system acts according to the set up of the next interactive process, which means that anticipation is successful. According to Bickhard and Campell (1996), learning has a

heuristic character in which the system can profit from past successes and failures. If a previous interaction has a successful outcome, this outcome will be functionally useful in an attempt of solving a new problem. This process presupposes a location where the old problem of representations and solutions are stored and a way that the system is able to locate them or those who are nearby and which may probably be useful to manage the new problem representations. Such configuration of information constitutes a *topology*. Therefore, heuristic learning and development require functional topologies, as well as the ability of the autonomous system to construct new topologies that will probably be functionally useful in future interactions.

2.1.4 The Functional Role of Emotions in Aesthetic Judgment

As it is described above every cognitive agent acts upon the environment in order to maintain its dynamic stability. Particularly due to its motivation it has the ability to enable problem-solving mechanisms by which it evaluates the current situation towards its current goal and (re)constructs new interactive plans (Bagozzi, Baumgartner, & Pieters, 1998). In general, positive and negative *aesthetic* emotions, such as pleasure and pain are evaluative mechanisms that play a major role in decision making and by extension to the survival of the cognitive agent (Xenakis, Arnellos & Darzentas, 2012). Accordingly, and with regards to the evolutionary perspective, our brain generates pleasant or unpleasant emotions, with respect to those aspects of the environment that were a consistent benefit or threat to gene survival (Johnston, 2003). What we suggest is that aesthetic judgment, in general, could be considered as an outcome of several evaluative processes that are enabled from both cognitive and emotional inner functions. The well-known—in aesthetic philosophy—notion of *emotions-qualia* of pleasure and pain serve only a functional part of the whole development of aesthetic judgment, which in turn serves only a functional aspect of the overall system's stability.

2.2 The Four Levels of Processing

The suggested interactive model divides the interaction process into four levels of processing defined as: the *visceral*, the *behavioral*, the *reflective* and the *engagement* or *appropriation* level. The first three levels are based in Norman's initial idea of modelling human behavior (Norman, Ortony & Russell, 2003; Norman, 2003, 2004). These levels, as Norman and colleagues have argued, give rise to three different levels of aesthetic appreciation or beauty. Although Norman proposes three meanings of beauty, which depend on his three levels of processing, he does not give any explanation how the functions underpinning each level are related to beauty itself. The crucial question of what beauty is still remains. Specifically, Norman (2004) makes claims for two different kinds of beauty: one in which the "beauty is associated with the object itself" (p. 314) and one in which it depends on consciousness. It should be noted that Norman's perspective, where beauty is concerned as a property of the external object, does not match with the perspective suggested in this paper.

Using the theoretical background for autonomous systems presented so far, we propose a model of aesthetic judgment in which Norman's three levels of processing are enriched with several inner processes and their functional interrelations. Moreover, an extra level of processing is added, that is, the engagement or appropriation level, which describes the potential states in which an autonomous system might be after aesthetic judgment and which is deemed responsible for the relationship between the perceiver and the respective artifact.

In this paper, the first three levels of processing will be analyzed from a different perspective. Specifically, our priority is to suggest how the fundamental Peircean semiotic parameters and their related levels of semiotic organization are integrated in the proposed levels of the interactive model of aesthetic judgment. In order to reach our theoretical goals, certain philosophical perspectives of aesthetic experience and functional notions of cognitive psychology, such as *schema* and *affordance*, which are fundamentally important for the construction of the interactive model of aesthetic judgment to be presented in this paper, will be reconsidered and extended in the following sections.

2.3 Affordances from a Semiotic Point of View

In the proposed interactive model of aesthetic judgment the concept of affordance is quite useful in constructing a more qualitative analysis of the interaction process in order to detect how the environment is perceived by the autonomous system. As we shall see below, affordances could be more than an element of cognitive psychology. They can be considered as a useful tool to understand the interaction process as the agent interprets its environment

There are two perspectives in aesthetic philosophy concerning aesthetic experience (see Iseminger, 2003). The first argues in favor of the fact that an experience is considered to be aesthetic only if we perceive the object directly (i.e., a non-inferential way to know something) as, according to aesthetic philosophers like Budd and Levinson, every *object* in its physical structure has an intrinsic aesthetic value that effects aesthetic perception. However, the way, which the object's physical structure and aesthetic value are related is not specified. According to the second perspective we are also able to perceive an object aesthetically, by the ensemble of choices intended to realize its purpose, without having a direct contact with it (Carroll, 2004).

Considering the philosophical arguments mentioned above, the interpretation of aesthetics probably engages both direct and indirect perception. The notion of interpretation is a functional aspect of understanding aesthetics, since the respective objects and events provide us with information not only about themselves, but also about other objects or events. For example, a drawing can be perceived directly (giving no information about its referent) but also indirectly, providing information on another object. A semiotic approach to aesthetics begs questions regarding the relationship between signs and reality. As Windsor (2004) claims, ecological psychology might be very helpful to relate sign-functions to the physical environment,

through the concept of affordance, and most probably, an extended notion of affordance that gets over the duality between direct and indirect perception improves the understanding of aesthetics. In this direction, Windsor states that there is no need to maintain this distinction as far as the interpretation of signs is concerned. As such, the definition of affordance which was initially given by Gibson (1986) needs to be extended in order to incorporate the functional aspects of direct and indirect perception.

The major problem in the Gibsonian approach is the objectification of the world and as a result the documentation of affordances in that objectified structure (Noble, 1981). Direct perception misses functions of acting such as intentionality, motivation and their causal affect to the representational content of the autonomous system. Besides, and according to the theoretical background (see section 2.1) in which the interactive model is sketched, every object affords different actions and interpretations according to system's motives, emotions, existing knowledge and emergent representations (Xenakis & Arnellos, in press).

In the same perspective, Noble (1981) argues that underlying the perception of an affordance is the perception and processing of other information, as for example, social agreements. Every object can be seen from both perspectives at the same time. A characteristic example that Noble (1981) refers to is the mailbox. How could a mailbox be perceived if we do not have influences from the social convention of the act of posting a letter? As we interpret a sign the process becomes not a matter of decoding, but a matter of perceiving an affordance (Windsor, 2004). Signs are not objects out there, nor thoughts in here (in our minds). They are mediated affordances initiating a dialogical relationship between the autonomous system and the world, which is physical, social and symbolic (Lier, 2004).

The sign medium provides, simultaneously, the stimulus information of direct and indirect perception. The semiotic perspective of the affordances could be the key to link the gap between direct and indirect perception and ground semiotics in a pragmatic sense. Specifically, *semiotic affordances* could be a rich and flexible tool to describe perception in a cultural environment (Windsor, 2004). The perception of a semiotic affordance is just as direct as the perception of any affordance of an event or an object. As a conclusion Windsor states that:

> Culture is perceived just as anything else is perceived, through the continuous exploration of our surroundings, and it constrains and facilitates human action through providing affordances specific to that environment. … Culture is acted upon as well as perceived, just as are our inanimate, vegetal, animal or human surroundings. Moreover, it is the active nature of this engagement with the cultural environment which allows for interpretation, interpretation being the active production of signs, not the passive receipt of meaning (Windsor, 2004, p. 192).

As any interaction cannot be understood without understanding the purpose of the activity of the actor, it also cannot be understood without considering the socio-historical context in which it takes place (Albrechtsen, Andersen, Bodker, & Pejtersen, 2001). As it is described above, the concept of affordance is very relevant to

semiotic models of cognition, offering new possibilities in this area of research. This concurs with Cunningham's (1988) proposal that such research will eventually lead to more adequate conceptions of the affordances available in this stimulus information which will possibly lead us closer to the dynamic object.

According to this approach semiotic affordances of objects are also reflections of socio-historical developments. They offer benefits to the proposed model of aesthetic judgment functional explanations, at every level of processing, by using certain types of affordances with qualitative differentiations and characteristics. Hartson (2003) introduces four different types of affordances for the role they play in supporting autonomous systems (considered as users of an artifact under consideration) during interaction and aesthetic interpretation. In brief, the *physical affordance* is a design feature that helps, aids, supports, or enables physically doing something. The *sensory affordance* is a design feature that helps, aids, supports, facilitates, or enables the user in sensing (e.g. seeing, hearing, feeling) something. The *cognitive affordance* is a design feature that helps, aids, supports, facilitates, or enables thinking and/or knowing about something. Finally, the *functional affordance* needs purpose, which is integrated in a physical affordance through its perception. Putting user and purpose of the affordance into the picture harmonizes nicely with the interaction- and user-oriented view in which an affordance helps or aids the user in doing something. This is a functional affordance. (Hartson, 2003). Hereinafter, Hartson's four divisions of affordances must be considered by the *semiotic* character that is mentioned above.

Elaborating the notion of affordances, Gaver (1991) identified also three main categories. Firstly, the *perceptible affordances*, where there is perceptual information about them available for an existing affordance. Secondly, the *hidden affordances* which are all those affordances that exist but their information is not perceptible. And finally, the *false affordances*, which are all those affordances which *transfer* information that is not correct. In the proposed model of aesthetic judgment the environment is understood by identifying the affordances that are no longer hidden because of the system's desire to act according to its motives. All those affordances that the autonomous system perceives have not always emerged from representations that have finally led to a successful interaction. In this case the affordances are false.

2.4 The Semiotic View of a Schema

It has been mentioned above that as the autonomous system observes its boundaries, it also observes the distinctions it makes and refers back to itself the results of its action. This makes it a self-referential system with the ability to create new distinctions based on previous actions. The agent interacts via structural coupling with its environment, creating an internal network of interconnected structures representing its history and experience. The respective continuous internal differentiation creates certain functional subsystems with non-linear interrelations (Arnellos, Spyrou, & Darzentas, 2007b). Piaget (1956) claims that as the autonomous system makes a new judgment it brings new knowledge and thus reduces the environment to its own terms. According to the respective perspective of the so-called "sensorimotor intelligence" an

autonomous system structures things it has perceived by bringing them into schemata. These emerging schemata are not the sum of their constructive components. Concerning the relationships between the parts and the emergent whole, which determine this organization, Piaget (1956) claims that it is sufficiently well known that every intellectual operation is always related to all the others and that its own elements are controlled by the same law. Every schema is thus interrelated with dynamic structures of other schemata and constitutes itself a totality that exhibits new emergent properties (Piaget, 1956).

This is why for Piaget, "every act of intelligence presupposes a system of mutual implications and interconnected meanings" (Piaget, 1956, p. 7). Accordingly, for Kant, as well as for Piaget, the concept of a schema contains the principle of iteration linking knowledge and action like a method that is executed repeatedly (Radford, 2005). For Kant (1914) a schema is precisely a function that supports aesthetic judgment and which mediates between the mind and the phenomenal world. The task of the schema is to ensure the link between concepts and senses, physical form and its content. However, according to Sonesson (2006), and Piaget (2001) semiotic function is a capacity of the autonomous system that has the ability to represent reality by means of a signifier that is distinct from the signified. On the same tack Radford (2005) claims that the semiotic function begins precisely when there is a differentiation between signifiers and signifieds. In other words, using Bickhard's terminology, the autonomous system is engaged in a semiotic function when s/he has the ability to construct representational content or meaning (see section 2.1.1), which is an interpretation of the environmental conditions, that serves system's stability and not reality itself. We can notice here an interrelation between semiotic function and the construction of a schema. What we suggest is that every schema has an inner semiotic function, and the process of semiosis is related to the reproduction or transformation of an existing schema to a new cognitive pattern, which has been already formed by its inner semiotic function. This process has no end and is functionally useful to the autonomous system in any attempt at solving new problems since it benefits from its past successful interactions or failures (old schemata) by constructing new topologies and semiotic chains. The whole function as we have seen before is considered as learning.

In the proposed model of aesthetic judgment, the relation between a semiotic function and a schema provides a compelling standpoint from which we are able to understand the construction of new meanings based on past experience and, by extension, the formation of aesthetic judgment, as the autonomous system uses signs to produce meanings in its dynamic physical and cultural environment.

2.5 The Semiotic View of an Aesthetic Experience

In the perceptions of art and in most of the creatively designed products, aesthetic experience is intentionally enhanced by the aesthetic artifact because artists or / and designers have intention to manipulate their materials and create signs (Brandt, 2005). artifacts have their intended uses built into their design and therefore carry historical,

social and cultural information in that design (Lier, 2004). As Brandt claims, what is fundamental in an artifact is that its structure is intentionally built from the beginning and "is therefore likely to occur in sensory perception, from which it triggers partial sketches of higher-order integration in apperception, in reflection, and most prominently in feeling" (Brandt, p. 176). Therefore, the efficient aesthetic sign must be distinguished from the sign-vehicle, and the analysis of the aesthetic work of art becomes a special case of sign analysis which exists only in a process of interpretation (Amyx, 1947; Morris, 1939; Rudner, 1951)

As the designer attempts to integrate the sign in the artifact, the latter sets an extra challenge or as Kant claims; it places us under an obligation to interpret it and at the same time it is known that these interpretations will never be exhaustive (Shapiro, 1974). In general, every genuine object of experience supports indefinitely many concepts, an endless list of them (Cohen, 2002), which means that an object is always an abstraction.

> On the semiotic account works of art are not only artifacts; they manifest or exhibit their artifactuality. And just as it is not clear that there is any exhaustive account of the ways in which something may be presented as an artifact, so there is no apparent limitation on what might count as an artifact. (Shapiro, 1974, p. 36)

A semiotic process takes place as the interpreter observes the object. In the interpretation of the object, the artifact needs to be understood as a sign. The problem in considering an artwork as a sign is our difficulty in defining how the art-sign represents its object. Shapiro (1974) suggests that the artwork must be an assertion (and that works for abstract paintings), which "can be detected only by an enormous effort of imagination" (Shapiro, p. 34). As Kant (1914) has argued in *The Critique of judgment*, aesthetic judgment of a specific representation emerges from the basic emotions-qualia of pleasure or pain, which is made from the harmonious free play of Understanding and Imagination.

The acknowledgment of the subjectivity of art inhibits us from making generalizations about art. According to Shapiro (1974) this is the reason why we cannot limit the range of possible objects. As such, it is the mode of representation, which is responsible for the relation of the sign with its object. Hence, in a certain act of perception artifacts are in a way icons of their objects and they resemble their objects. artifacts represent actions and intentions when linked with their creator, which means that an artifact is also an index of the action of its designer. Finally when the observer perceives an artifact and especially a work of art, s/he does not perceive only its iconic and indexical character but also the inner meaning of the artwork, which is symbolic. For example, thorough the act of perception the observer does not confuse the marks on the canvas (index), which are made by the artist's intentions (icon), with what the artwork exhibits (symbol). Both the creator and the observer use indices, or indexical signs only for the formal interpretation which refers to the physical attributes of the artifact. According to Shapiro (1974) in higher levels of

interpretation, where the observer judges the artifact aesthetically, the relation of the art-sign to its object is not iconic or indexical but symbolic.

According to this perspective, the process of interpretation alters the aesthetic sign from iconic to indexical and then to symbolic. This means that as the cognitive process for an aesthetic evaluation is developed, the semiotic process is altered from the Peircean category of Firstness to Secondness and finally to the category of Thirdness. This integration of the cognitive levels in the interaction process with the fundamental Peircean semiotic categories is the main point of this paper, and it is further analyses in several resolutions in section 3.

Analyzing aesthetic judgment, based on aesthetic properties, Zemach (1997) argues that while aesthetic qualities are real (regarding their epistemological dimension), their ontological status is that of being supervenient. Hence, aesthetic properties are said to be supervenient upon non-aesthetic ones. Aesthetic qualities supervene upon non-aesthetic ones because our observation of the aesthetic ones is intentional (Zemach, 1997). "What is striking about the notion of supervenience is that it is spelled out in terms of seeing one thing as another" (Tilghman, 2004, p. 254). In other words, aesthetic interpretation is an intentional process by which the autonomous system tries to link the respective object to the sign. Particularly, icons and indexes are related with a symbolic meaning that through the semiotic process leads the system's aesthetic emotions-qualia of pleasure or pain.

In visual representational artworks, such as paintings of people or natural scenes—non-abstract ones—and under normal conditions, one can see what is actually depicted and not the materials used (Dilworth, 2005). In the case of an abstract artwork it is difficult to relate the sign, to its object in such a straightforward way. The icons and the indexes are not directly related with the symbolic meaning of the artwork and as such the observer might probably be susceptible of an anthropomorphic interpretation. Specifically, we observe the drawn lines to be climbing, ascending or striving not in an arbitrary or a conventional way as the observer tries to reach an indexical relation with the icon, but it is difficult to generalize this thought for all the observers. In fact, there is no convention in seeing a cloud as an animal or a face in the moon. The index may be different for everyone but none of the interpreters is wrong or right about the interpretation (Zangwill, 1998). From another point of view there are a lot of works that are difficult to see in that perspective. When the artist / or designer uses abstract forms to express emotions, s/he somehow makes the artifact a natural sign. Additionally, the artifact must be regarded as a human product and that means that the objects of art-signs must be human intentions or experience and these intentions or experiences are represented symbolically rather than naturally (Shapiro, 1974).

After all, as Shapiro (1974) claims, most probably the fundamental problem in understanding an artwork is not what kind of sign process the art is, but how the object is represented and in what particular way the artwork is regarded. As is well known, in contemporary art history a lot of exhibited artifacts have also been made up of natural objects and/or objects of everyday use, and that proves the intention of the artist to

change the perspective that an object could support. Hence, the claim of Shapiro (1974) to account for art as a symbolic representation of the intentions of an artist is closer to our inclination to explore the emergence of meaning and the ways an artwork is aesthetically judged.

Considering the above, we believe that the process of interpretation where the object is dynamically transformed from icon to index and finally to symbol is probably the key to understand the formation of aesthetic experience. What we suggest is the integration of the fundamental Peircean semiotic parameters and their related levels of semiotic organization with the cognitive levels of the proposed model of aesthetic judgment. The four respective levels of the model are presented in the next section.

3. Four Levels of Processing Focused on Aesthetic judgment

3.1 Exploring the Semiotic Functions in the Visceral Level

The visceral level is the simplest level of processing where the autonomous system establishes functions that are explicitly and directly related to its maintenance. The autonomous cognitive system presupposes that such processes are appropriate for the current condition of the environment as well as for its internal conditions. Those dynamic presuppositions can be true or false and respectively the interaction will succeed or fail. As such the autonomous system according to its motives forms mental representations in order to choose the proper interaction and make decisions and judgments. In this first primitive level of interaction the responses reflect superficial or surface judgments (Norman, 2004). These judgments are characterized by positive or negative values, true or false, (e.g., good or bad, safe or dangerous, pleasure or pain) as, at this level, the autonomous system acts almost automatically, almost unconsciously and in a very superficial manner. When the process of interest has a satisfaction value, then aesthetic judgment has a positive value or the situation is good (Ritchie, 1945).

This level is biologically determined, with only minor adaptation (minimal learning). It is a level of fixed routines and innate mechanisms, where the brain analyzes the world and responds to it (Norman, 2003, 2004). There is no possibility of complex cognitive operations (e.g., reasoning) in the first level of interaction but mostly emotional responses. According to Moors (2009) most of the theorists that explore emotions support the idea that cognition is an antecedent of emotion without equating cognition with conscious cognition. They suggest that much of the cognitive work involved in the eliciting of emotion is unconscious or automatic as in the current level.

Every interaction has both cognitive and emotional components. Cognition takes place as a parallel activity in an emotional process. Additionally, emotion and consciousness cannot be equated but they also cannot be separated. Emotions and rational consciousness act together, as both of them require the same neural substrates (Damasio, 2000). What we suggest, regarding the current level, is that conscious

cognition may be unnecessary for aesthetic emotions-qualia of pleasure or pain but unconscious cognition is necessary. As such, since at the visceral level the cognitive processes of thought are minimal, it is the emotional component of interaction that aids decisions and which is deemed as proper for the agent's motives (Xenakis, Arnellos & Darzentas, 2012; Zangwill, 1998). Since, at this level, the autonomous system uses minimal learning, the perspective of aesthetic evaluation is almost not culturally dependent (Norman, 2004).

From a semiotic point of view the visceral level has many things in common with Peircean Firstness. Peircean categories help to explain logico-cognitive processes and therefore at once the formation of signs. For Taborsky (1999), Firstness is the primary or pre-consciousness level of consciousness and has not yet entered into any interrelation with any other level in contrast with Secondness, which is directly related to Firstness. Analyzed in terms of the Peircean typology of signs, Firstness coincides with the sphere of iconicity (Ponzio, 2006). An icon is a sign of Firstness: it is what it is, insofar as some resemblance between it and something else has not been foregrounded. It is the mode of being of that which is such as it is, positively and without reference to anything else (O'Neill, 2008; merrell, 2006; Ponzio, 2006). At this level, the interpreter responds to the artifact based only on its iconic properties, which means that the icon resembles the physical attributes of the object (Shapiro, 1974). Considering the relation of the perception of the icon and the affordances, Lier (2004) claims that at a primitive level of perception, where there is no high-level cognitive process, as the agent analyzes the world, the respected affordances could probably be perceived directly and gradually as the meaningful signs emerge in Firstness. Specifically, "when we are experiencing something but we are unable to describe it, or identify it or what has caused it, then we are in a state of Firstness" (O'Neill, 2008, p. 68). The process is probably self-referential, since in this level the observer does not recall any familiar memories of signs; there is no process of semiosis at this level. This is probably why the affordances in this primitive level are perceived directly. When there is no consciousness the distinction of the real and the copy disappears, there is not any particular knowledge of existence (Secondness), and there is not any generalization (Thirdness). This is the moment in which the icon is contemplated (merrell, 2006).

When an interpreter apprehends an iconic sign-vehicle, s/he apprehends directly what is designated (Morris, 1939). The iconic sign denotes any object, which has a selection of the properties that itself has and this could be the reason why the observer, as an autonomous system, has an inner potential response, which derives from already formed habits that serve the successful maintenance of the agent in the environment. As such, iconic interpretation takes place at the visceral level whether the apprehended object is an artifact or not. The responses to it have the same structure. It is most possible that a designed artifact or a work of art needs a more complex sign relation (e.g., symbolic) in order to be understood—but only at a higher level of interpretation. In the current primitive level of interpretation—where the autonomous system acts in fixed routines, through innate mechanisms, almost automatically,

almost unconsciously and in a very superficial manner, (Norman, 2003, 2004)—the artifact may appear to be a pure icon (Sonesson, 2006).

According to Smith (1972) it is possible to connect the icon interpretation with qualia of pleasure or pain. The cognitive system responds to the environment without any analysis of the properties that constitutes the environment. Particularly, Smith states that "The icon has no dynamical connection with the object it represents; it simply happens that its qualities resemble those of that object, and excite analogous sensations in the mind for which it is a likeness…" (Smith, 1972, p. 24). As Smith (1972) adds, the interpretation at this level is actually "supported by two of the ends claimed for aesthetics, things that embody qualities of feeling and things considered simply in their presentation, for both can be identified as belonging to the category of Firstness" (p. 22).
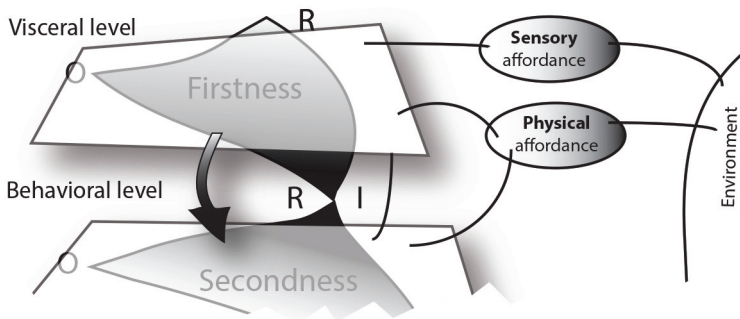

Figure 1: The visceral level

Considering the characteristics of the visceral level, and using Hartson's (2003) discrimination between different types of affordances, it can be said that, so far, in the course of interaction, the affordances that have been shown to the subject are the physical and the sensory ones. "The physical affordances refer to the material attributes of the artifact that help, aid, support, facilitate or enable the subject to physically do something" (Hartson, 2003, p. 319). Hence, they are responsible to transmit the physical characteristics of the object. According to the fundamental definitions provided by Gibson (1986), material objects are combined with values to produce meaning. It is not possible to divide them in an ecological environment. The sensory affordances are probably responsible for these values, particularly the characteristically aesthetic ones, which emerge from qualia in the current level. Furthermore, sensory affordances help, aid, support, facilitate or enable the perceiver to sense (e.g., seeing, hearing, feeling, etc.) the object in question (Hartson, 2003). Finally, interpreting a sign at this level is not a matter of decoding, but a matter of perceiving an affordance. The resemblance connection between sign and the perceived event, which characterizes the visceral level, is closer to an icon (Windsor, 2004). The iconic sign involves "mere abstract potentiality"(CP 1.422) or quality, which has the nature of Firstness as being essentially indeterminate and vague

(Queiroz & merrell, 2006) with respect to the object it stands for, giving the observer the ability to form a negative or a positive judgment about the object (e.g., in the case of a portrait that stands for a person there is a quality that makes the observer positive or not about this portrait). The analysis made so far implies a combination of the characteristic aspects of the type of affordances and of the semiotic structural components (R: representamen, O: Object, I: Interpretant) involved at this level. This combination is depicted in figure 1.

Further analysis will take place at the next level. These iconic signs are functional representations and will be turned to symbols in the next levels of aesthetic interpretation. As a result, at the current level it can be said that, adopting a more general perspective of the semiotic affordances, unconscious cultural aspects are perceived while simultaneously the process provides a function of minimal learning.

Hence, at this level the perception of the object's form, which affects aesthetic judgment, is not an abstract thing but it is embodied in the object as a rule of action, a disposition, a real potential or, simply, a permanence of some relation—as mentioned by Peirce (1931)—which can show the nature of Firstness and Thirdness (Queiroz & merrell, 2006). Aesthetic evaluation is probably a superficial judgment at the visceral level but it will become full-fledged at the reflective level.

3.2 Exploring the Semiotic Functions at the Behavioral Level
All the processes that take place in the behavioral level stem from the inner ability of the autonomous system to differentiate from its environment and especially from the observing object itself (Arnellos et al., 2007b). Such differentiations are the basis for setting up indications for further interactive potentialities. These differentiations are in general generated by the internal outcomes of previous interactions. Hence, the autonomous system can locate itself in a web of conditional interactive indications (Bickhard, 2004) or emerging structures of schemata. This is what we experience as Secondness. It is where we begin to differentiate the *us* from the *not us*, ourselves from the world around us, sensations of pain from causes of pain and actions from reactions (O'Neill, 2008).

As such, a further analysis of the environment demands an evaluation process at the second level. This is the level where the topologies (web structure of knowledge) are established which are then functionally available to the autonomous system, serving the process of learning. Moving on from Firstness, we experience the phenomenon that we do not recognize or cannot fully identify something. This is also an experience of Secondness (O'Neill, 2008), where the autonomous system attempts to get the whole impression of the artifact considering each detail of it (Lavie & Tractinsky, 2004). The real meaning of perception is to have awareness of the forms and / or the surfaces of an object (Gibson, 1986). According to Morris (1939), in aesthetic perception, which is a process of semiosis considering the artifact as an aesthetic sign, "the interpreter performs a complex perceptual activity, passing from part to part of the art object, responding to certain parts as signs of others, and building up a total response" (p. 138) this is the total object of perception. This passing from

part to part and the change between known and unknown forms is fundamental for that awareness. The perception becomes wide, more delicate, clearer and complete as the autonomous system examines the object. That differentiation between known and unknown sides of the object derives from the internal outcomes of previous interactions. Probably there is an interaction control system that decides on further investigation or action (Bickhard, 2000a). For Peirce (1907, as quoted in Queiroz & merrell, 2006 p. 38) "the full meaning of a conceptually grounded predicate implies certain types of events that would likely occur during the course of experience, according to a certain set of antecedent conditions." Concerning this process Morris claims, with regard to aesthetic perception, that

> In this process non iconic signs play their part as in any perceptual process: what differentiates aesthetic perception from other perceptual activities is the fact that perception is directed to value properties which are directly embodied in certain of the iconic sign vehicles which form part of the total sign complex. (Morris, 1939, pp. 138-139)

There is a possibility that some of these properties derive from the direct visceral level in iconic sign-vehicles that are reconsidered at the current level using prior knowledge for the continuation of the process of semiosis. The system has access to previous established schemata (webs of experiences and concepts), which were also established in previous interactions with the same object or a similar one. As is mentioned in section 2, learning has a heuristic character in which the system can profit from past interactive outcomes. If a previous interaction has a successful outcome, this outcome will be functionally useful in an attempt to solve a new problem at the next level (i.e., the reflective). In order to succeed in action selection, the control system may combine the use of several affordances from previous experiences with this object or with any pre-existing knowledge of its function (Borghi, 2005), with the currently perceived affordances. This is the point where the *action of signs* or semiosis begins as it involves the continuous development of triads. As Peirce (1907, cited in Queiroz & merrell, 2006) claims, meaning is the consequence of these triadic inter-relations (Sign-Object-Interpretant) as a whole, and also through differential correlates among the sign, the object and the interpretant.

Considering the perception of semiotic affordances and past experience, the perceiver is able to confront a new or a hidden affordance (Gaver, 1991) no matter how s/he already interacts with the same object. As will be mentioned in the analysis of the next level, the subject is able to bind the object with new concepts, which may result in a list without end (semiosis). In fact, according to the interactive model of representation, past experience plays only a secondary role in reasoning. Experience never introduces meaning into thought, except as a function of the present organization of the living system (Bickhard, 2000b, 2009; Piaget, 2001). It should be noted that the new meaning for the perceived object arises as the cognitive agent investigates the forms of the object through its physical affordances, which are simultaneously carrying information from the previous level. Furthermore, every differentiation in the perception of the form creates new signs, which are based on the

previous interpretation while being related to the following interpretation that takes place in the next perceptual level giving the continuous development of semiosis.

From the behavioral level onwards, each possibility of objectivity in aesthetic judgment disappears. One of the basic characteristics of the behavioral level is that it is manipulated by the anticipation to understand the artifact during the use of it (Norman, 2004). During this process of understanding, the cognitive affordances appear to aid, help, support, facilitate, or enable the cognitive agent to think and / or know about the object with which s/he interacts (Hartson, 2003). The anticipation to understand the object for a successful interaction is directly related to the special medium of desire. Desire and anticipation have something in common: they include the sense of aim (purpose) or motivation and, for Kant (1914), this is a fundamental presupposition in order to call the object a good one.

The aim depends on the needs of the autonomous system and creates an intention of use. Our environment is understood by identifying the affordances that are no more hidden because of our desire to act according to our motives. Since an affordance ceases to be hidden, a new part of the process of semiosis begins and a new schema is ready to be established. The whole process builds a complex structure of semiotic functions and schemata, which are dynamically connected to each other, trying to ensure the total experience. This cognitive process does not differentiate itself in the case of an aesthetic interpretation. Each purpose, if it is regarded as a ground of satisfaction, always carries an interest with it—as the determining ground of judgment—about the object of pleasure. In other words, the attainment of a purpose is related to the emotion of pleasure (Kant, 1914) and this possibly refers to an a priori need of the subject to be self-maintaining. Hence, besides the concept of successful interaction, self-maintenance involves also the concept of a positive aesthetic judgment, which is one of pleasure. Whether this purpose will be satisfied or not is a matter of the next perceptual level, the reflective, in which the subject has the potentiality to be led in positive or negative aesthetic judgments.

While physical and cognitive affordances are being perceived, the intention to act is established through the desire of the perceiver to understand the environment or through her/his motives for successful interaction. Since physical affordances are related to a purpose without being able to support it, functional affordances emerge. In other words, functional affordances help users to accomplish the potential actions (Hartson, 2003). While a new physical and cognitive affordance appears carrying all relevant cultural history, the sign links with its object indexically giving information about its physical attributes and their relations. Only at the next, reflective level, will the interpreter consider the inner meaning, the intentions of the artifact and be able to make an aesthetic judgment. Index, which is governed by Secondness, is physically and existentially connected with its object as an organic pair but the interpreter only remarks this connection after its establishment (Shapiro, 1974; Smith, 1972).

Concerning the relation between Firstness and Secondness, Peirce notes that there is a causal connection between the two semiotic levels. It is impossible to be in Secondness without experiencing Firstness first (Taborsky, 1999) and that is also the

relation between the visceral and the behavioral level: the visceral is also a presupposition for the behavioral level. This combination, the semiotic structural components involved at this level and the characteristic aspects of the respective type of affordances, is depicted in figure 2.
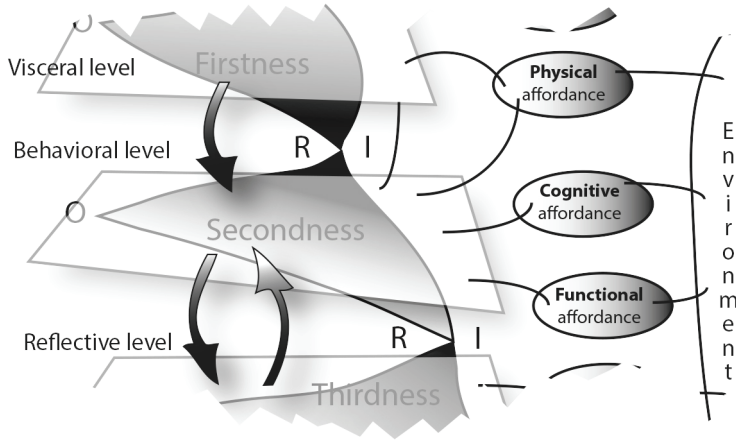

Figure 2: The Behavioural Level

3.3 Exploring the Semiotic Functions in the Reflective Level

The reflective level consists of aesthetic evaluation, which is actually an integration of the first two levels. It does not evolve automatically, but it rather depends on complex influences (Lavie & Tractinsky, 2004). One of these influences is the direct connection with the behavioral level. The reflective level depends on prior experiences and knowledge that were established in the behavioral one. It is conscious and aware of emotional feelings (Norman, 2004).

In contrast to the visceral level, the reflective provides deep and considered judgments. Every negative or positive disposition that has been formed in the first level has many possibilities to change now. So, the question will be: What procedure does our mind follow and make us change our judgment? The only thing of which we can be positive is that the form of the object does not change at all. Considering the aesthetic properties and, by extension aesthetic judgment, which probably derives from them, it seems that the latter does not depend only on physical properties like shape and color.

If a painting of a lake, for example, is seen for the first time, the two elements, canvas and lake are grouped together in a perceptual whole constructing a schema. It can be considered that the element canvas consists of a complex structure of schemata linking semiotic functions. The canvas has colors, brush strokes, and so forth. However, this is not the whole truth about the painting. The process of understanding may successfully apply concepts to the painting, but in every case a part of the object has been neglected. Every genuine object of experience supports indefinitely many

concepts, an endless list of them (Cohen, 2002). The perceived object is always an abstraction.

This is also a semiotic function of representing concepts by a sign or a symbol or another object (Piaget, 1970, as cited in Radford, 2005). Piaget argues that the symbol arises from non-symbolic schematism. More specifically, Piaget claims that there is continuity between the sensorimotor signifiers and the emergence of the first symbols. The symbol itself is an abstraction. The object of a symbol is not a particular thing, but a type of thing that corresponds to an idea or general law to which the symbol is associated through a rule or interpretative habit (Santaella, 2003), connecting the reflective level with the previous one, the behavioral. That means that the symbol, depending on the behavioral level, has a social character by nature, which is a result of the usage that a community makes of it (Santaella, 2003). As such, this third level, the reflective one, is similar to Thirdness. All the signifiers related to the sensorimotor capacities appear in the first two levels (mostly at the behavioral and lesser at the visceral). This has been the beginning of semiosis, which continues, following a symbolic route, at the reflective level. The combination of the aspects of the type of affordances and of the semiotic structural components involved in the reflective level is depicted in figure 3.
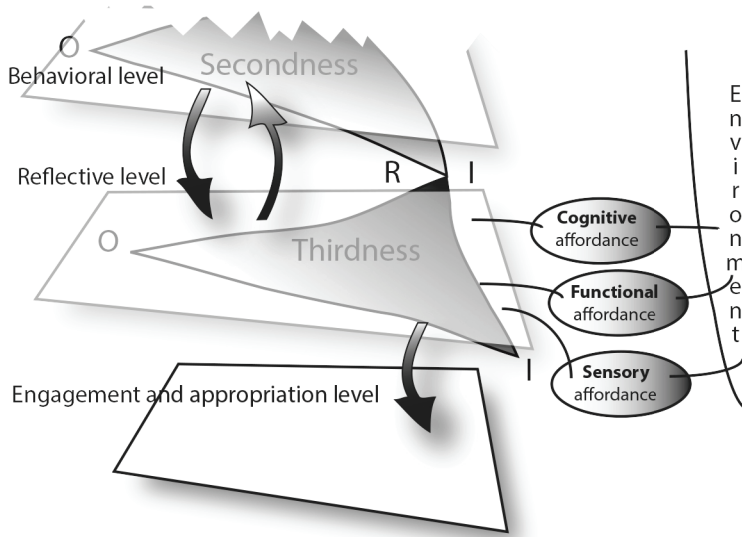

Figure 3: The Reflective Level

At the behavioral level, the cognitive agent begins to understand every concept of the object. In the present reflective level, the artifact is approached conceptually by examining its content through the process of understanding. As Peirce (1931) claims, the objects of understanding, considered as representations, are symbols, that is, signs that are at least potentially general. However, some concepts do not appear or make

their appearance later. Gibson's affordance theory claims exactly the same thing. The more we observe an artifact, the more concepts emerge and the more cognitive, functional and sensory affordances appear.

At this phase the critical question is what will happen when we are not able to understand what we gaze at. When we encounter a situation that we cannot understand in the behavioral level, and we reflect on our experience trying to make sense of it using our prior knowledge and there is still no information, it is necessary to move to the reflective level and make a conceptual approach through the process of understanding. The reflective level uses the rich history of prior experiences and personal meanings to evaluate every experience (Norman, 2004), either known or not. This is a process of assimilation in which the action of the cognitive agent on the object depends on previous behavior involving the same or similar objects (Piaget, 2001). All these personal meanings have already formed adaptive schemata or mental assimilations, which come from the incorporation of objects in patterns of behavior capable for an active repetition.

According to Piaget (2001) this process of intelligence has an increasing complexity: "the pathways between the subject and the objects on which it acts cease to be simple and become progressively more complex" (p. 11). When a thinker tries to recognize the meaning of a picture, a certain number of paths in space and time can be both isolated and synthesized. Interpretation translates the object of the sign but also increases our understanding with new concepts (Moriarty, 1996). This is a two-step function; the first is the process of translation, which involves previous personal meanings and experiences, and the second is the extension in new concepts leading to an infinite chain of signification. "The idea of an endless chain of signification is what makes Peircean semiotics such an open system of meaning construction" (merrell, 2006, p. 178). Since semiosis is a process of intelligence, the pathways between the interpretant and the representamen become progressively more complex as the process of semiosis is unlimited but in a logical structure.

Hence, the reflective level is the level of the concept analysis. We can see the same in Thirdness, where ideas are predominant, more complicated, and most of them require careful analysis to be clearly apprehended (Peirce, 1931). Also, the relation between visceral behavior, and reflective is similar to the Peircean components of our architecture of consciousness: "Secondness is an essential part of Thirdness though not of Firstness, and Firstness is an essential element of both Secondness and Thirdness" (CP 1.530). "Thirdness does not replace Secondness, nor Secondness replace Firstness, rather, they are added, transforming signs into more complex signs as the process of semiosis progresses" (Lier, 2004, p. 53). The behavioral level is a precondition of the reflective level as it grounds the new concepts in physical attributes and/or in prior knowledge through physical and sensory affordances and maintains them, as will be shown below, as formed knowledge for the next interaction. The highly cognitive (at this level) autonomous agent is unable to return from the behavioral or the high reflective to the visceral level. In contrast, as it has already been argued, the visceral level is fundamental for the existence of the next two levels. The

relation between these aspects of the cognitive levels, the type of affordances and the process of semiosis is depicted in figure 4.
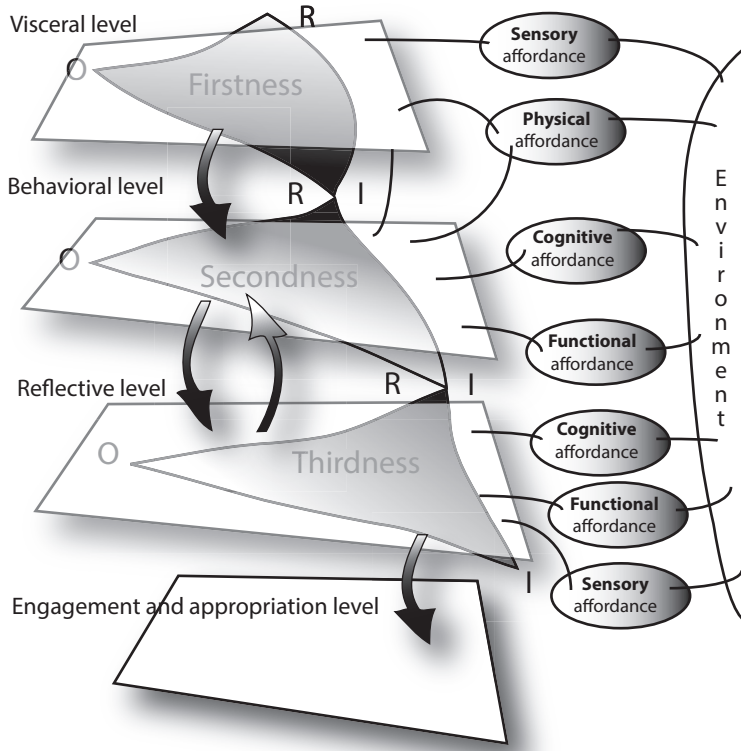

Figure 4: The Process of Semiosis Through the Interactive Cognitive Framework

The cognitive affordance goes on from the behavioral level and provides us with new information about intentions of use. The emotions produced through the conceptual part of the interaction indicate the involvement of sensory affordances. When emotions become involved in interpretation, and the analysis includes appreciation and evaluation, then, aesthetics are introduced (Vihma, 2003). The perception of the aesthetic properties depends on the sensory affordances since affordances do not only fit our perceptual motor skills, but also our emotional and cognitive skills (Overbeeke & Wensveen, 2003). In other words, the observer, through semiotic sensory affordances, has the ability to perceive all those social agreements and cultural aspects that garner an aesthetic property using a symbolic interpretation (Windsor, 2004).

The aesthetic evaluation of an artifact with respect to its aesthetic properties (e.g,. a painting) is highly possible to fail. While the observer stares at a painting, s/he may not discern its elegance or economy or other aesthetic properties (Tilghman, 2004). This might happen because of lack of previous experience and knowledge of similar schemata that may provide the potentiality of understanding the aesthetic properties

primarily as concepts and the ways in which they supervene in the physical attributes of the painting. Therefore, the sensory affordances, which are responsible for the feelings (i.e., possible qualia) and the knowledge of aesthetic properties, are still hidden for the observer.

The sensory affordance is connected with another conceptual process, the imagination. Gibson (1986) refers to the unity of object and subject. This unity naturally includes someone's intentions and every action an observer is able to perform, including imagination (Overbeeke & Wensveen, 2003). Imagination is a major part of aesthetic experience. Pure intuitions (imagination) are the ability to have mental representations, which is a capacity of Thirdness as Peirce claims, to produce or to reproduce either potential or empirical intuitions. All that imagination does is to represent forms that are possible in space and time while the empirical intuitions are perceptions of actual forms in space and time that also have color, texture, and so on (Guyer, 2003). Guyer, referring to Kant, claims that when imagination is connected with understanding, it leads to a high order aesthetic judgment, which produces cognition.

When we try to make a judgment of an object with actual forms in space and time, the object lives in imagination where it has a possible structure in space and time. The process of understanding supplies the object with various concepts, the process of imagination tries to arrange its contents, and when they comply with each other, the two faculties are in agreement, and thus we have a statement like, "the rose is red" (Cohen, 2002). This might be another description of a symbolic chain through the process of semiosis. The representamen is the rose, which is the visible part of the sign. The object is the redness of the rose (among many other issues), and the interpretant infers that the rose is red. In the semiotic approach the thinker is able to come to an aesthetic statement like "this is a pretty color." These interpretations are derived from the subject seeing the red color; they are an understanding of the sign and what it means, and therefore this is equivalent to Thirdness. But the rose is not only a color, it is a flower, it has petals etc., so the chain is unlimited. According to Piaget (2001) if an infant regards the red rose for the first time, the infant develops at the first perception the relation rose implies red. As he clearly states: "If the two elements are really seen for the first time, with neither analogy nor anticipations, they are certainly already grouped together in a perceptual whole" (Piaget, p. 107). The relation happens not by the conjunction of the two elements (rose-red) that originally are seen separately, but rather from their immediate fusion through complex structuring. This is not a necessary link; it is a beginning for a possible schema and will be an element of the complex web structure with many other concepts (elements) like the flower, petals and so forth, which have their necessary relations in the web structure in order to form a genuine schema through generalization (Piaget, 2001).

In the case that the interpretation is "the rose is pretty" which is a judgment of taste, the process of imagination is not instructed by only by understanding but in conjunction with understanding as Kant (1914) claims. This type of process, where an actual form in time and space fits with the possible one and leads exactly to qualia of

pleasure is extremely complex and at the time cannot be understood. What is implied is that the qualia of pleasure lead to the judgment that the object is beautiful (Matravers, 2003). Our interpretation of an abstract situation like a beautiful rose is more than just a sensation or recognition as it involves the manipulation of several mental models. According to Moriarty, we have models in our mind for a beautiful rose and "we make sense of things by comparing them with these mental abstractions or schemas" (Moriarty, 1995, p. 175). Sometimes the process of interpretation is too fast to stop and put verbal labels on everything, making interpretation independent of language processing (Moriarty, 1996).

3.3.1 The Process of Generalization

Our beliefs come from generalizations that were established at the behavioral level but they were produced in the reflective one. The reflective level is the home of conscious thoughts, of learning new concepts and generalizations of the world (Norman, 2004). The generalizations are those that produce our beliefs, which influence new concepts in the reflective level, through which new aesthetic judgments will be produced. In case these judgments are repeated (web of schemata), they become generalizations (genuine schema), which perhaps lead to beliefs, making an interminable circle. This is the circle of aesthetic experience and it is continuously altered as long as the environment and our beliefs are altered too (see figure 5).
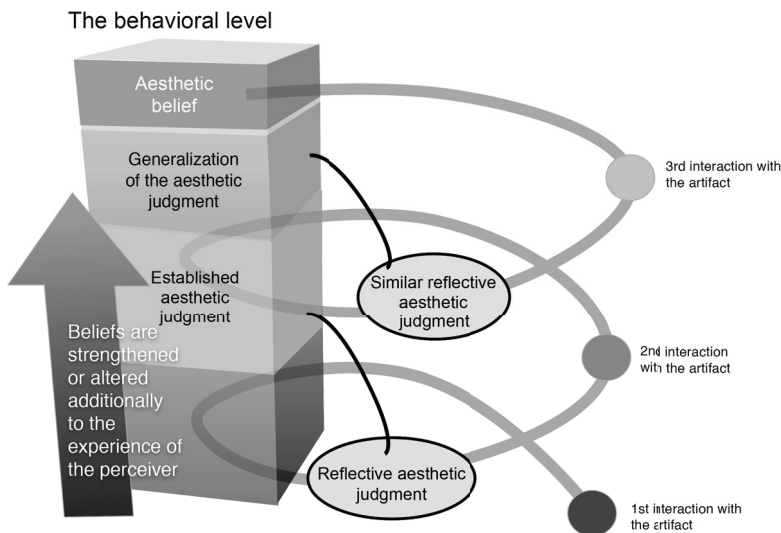

Figure 5 The course of aesthetic experience

The description of the figure below shows the dynamic relation of visceral and reflective level as the behavioral level increase its dimensions. The symbols, in semiotic terms, grow through their interpretation and this makes every artifact (not only a work of art) a dynamic symbol. In other words, the inner meaning of an artifact grows through its interpretation by other known artifacts or concepts (e.g., user-

centred design changes the whole interaction experience in most artifacts and consequently their meaning in everyday life) offering unlimited meanings and ways of interaction.

This approach to generalization looks similar to Peirce's abductive reasoning. Broadly speaking, abduction is a reasoning process invoked to explain a puzzling observation. The first common characteristic is that the process of generalization and the abductive reasoning might fail (Aliseda, 2006). The process that leads from a cognitive judgment to generalization and then is used in a new interaction as a belief (hypothesis) also has the possibility to fail as the next interaction may not have the expected outcome. The second is that such reasoning has a logical form, as Peirce believes that the way we make sense of signs is through logical reasoning following a predictable form (Moriarty, 1996). And finally in both generalization and abductive reasoning, the "process begins with observation and then proceeds in a back-and-forth process of developing hypotheses and comparing the observations with information known and field in memory" (Moriarty, p. 181). What probably characterizes all the processes in the reflective level is the abductive reasoning which is the base for the creative way that the cognitive agent produces new content for known and unknown observations (Arnellos et al., 2007b).

3.4 Engagement and the Appropriation Level

This level is a corollary from the reflective level. It is responsible for the relationship between the perceiver and the artifact. It produces the feeling of property or makes us use the artifact in the same way as the first time we interacted with it. It may be probably connected with the genuine or false need to either get or use an object. It affects also both the behavioral and the reflective level in possible interactions with the same object.

The notion of engagement in the human interaction with the artifact came from the recent research work of van Vugt, Hoorn, Konijn, and de Bie Dimitriadou, (2006), in which they study, using affordance theory, the interaction of a human with interface characters. They created a model (i-PEFiC) which is based on psychological theories of emotion and interpersonal attraction and which explains the user engagement with fictional characters.

Continuing from the reflective level, aesthetic judgment is able to produce engagement (involvement or distance) with the artifact. It is important to note that intentions of use can operate independently from aesthetics. For example, although an artifact may produce displeasure to the user, it is very possible to be used by him in order to accomplish his aims (Xenakis & Arnellos, 2012). This is one type of engagement and the respective affordances are called affective affordances. On the other hand, the aspects of appearance of the artifact may evoke emotions, which are very possible to influence the intentions of use (van Vugt et al., 2006).

Through engagement and appropriation, the highly cognitive perceiver acquires a particular relation with the artifact, which will lead her/him to select it among other artifacts with the same possibilities of action. This level seems to be more responsible

for the choice of certain ways of using the artifact than others. To be sure, much more research is needed to establish the existence of this level as the next level of perception after the reflective one.

Conclusion

Peircean semiotics is ambitious and encompassing enough to illuminate any development in cognitive psychology offering a better understanding in functionality from simple nervous activity to full-fledged higher level behavior of an organism. Considering the semiotic dimension of aesthetic experience, of the affordances and of the schema, we suggested a four level interactive-semiotic model in which we indicated and described the relation between the characteristic aspects of each cognitive/perceptual level and the respective type of semiotic processes. Additionally, the suggested interactive-semiotic model appears to explain aesthetic experience of an autonomous system in order to provide further understanding regarding the functionality of aesthetic interpretation and, by extension, of the emergence of aesthetic judgment through the interactive/semiotic process.

Considering the richness of the Peircean semiotic processes in combination with a much more elaborated functional analysis of the characteristics of an aesthetic interaction (i.e., emotions), this framework may be used as a platform for the demystification of aesthetics and the understanding of aesthetic judgment.

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