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The role of aesthetic emotions in human-artifact interaction process

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*Thesis submitted for the degree
of Doctor of philosophy*

Declaration of authorship

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To the memory of my mother,
a major aesthetic inspiration in my life

Acknowledgements

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Introduction

Understanding the aesthetic

As Monroe C. Beardsley (1975) claimed, before aesthetics emerged in human culture, there was not any necessary discrimination between those artifacts that exhibited some kind of specialty, which someone could categorize as aesthetic and others that were not connected with this kind of interest. However, there was at least something, like an aesthetic interest, appropriately directed to some objects that others would not have.

Philosophy was the first, which attempts to clarify the nature of the interest that emerges in human actions and makes some artifacts -in a peculiar way- more interesting than others. From the ancient ages of Plato and Aristotle to the present, the understanding of the 'aesthetic' remains an ambitious and complex task that characterizes a wide range of human behavior.

Aesthetic experience, for Plato, is a process through which we apprehend *the good in nature*. The source of such apperception, while it results from the reflection of an *ideal form* of an object of nature or an artifact, it depends on a non-sensuous emotion of pleasure. The general argument is that emotions undermine reason and reason must dominate the emotions. Plato's student, Aristotle, reacts against Plato's approach, followed directly by his ideas on metaphysics and on human nature. Aristotle does not oppose emotions to reason, in fact he claims that aesthetic emotions of pleasure and pain are grounded in reason and therefore presuppose complex cognitive processes. Aesthetic emotions are dynamically produced when surprising events occur to the cognitive agents and especially to human agents during their interaction with the environment, and they are not outcomes that are elicited when the experience with the artifact ends. In other words, humans are aware of an aesthetic emotion only if a new event changes the current conditions and appears to play an important role in their initial or dynamic purpose.

For years, thinkers believed that aesthetic experience was a reflection of the eternal beauty of God and the *ideal form* was linked to expressions of *God's love* in artifacts that gives them a divine perfection. Only in the eighteenth century philosophers started to consider the aesthetic experience as a psychological phenomenon. Hume and Kant were the first who tried to explain the content of the aesthetic experience in psychological terms. According to Davies et al. (2009), this period shares the consensus that aesthetic experience consists in a disinterested apperception of the forms of objects, whether of nature or of fine art. This experience may produce emotions of pleasure that assume a special form of relationship with the artifact in which the agent should approach the experience without prejudice. Particularly, when a representation of the object is directly connected to aesthetic emotions, such a representation precedes to cognition and thus its *purposiveness* precedes to cognition, too. The *purposiveness* of an artifact, insofar as it is represented in perception, is not a property of the artifact itself, but it is derived from the agent's tension to understand the object (faculty of cognition). In the case that the purposiveness of the artifact derives from the aesthetic emotions of pleasure or pain, these feelings assign values to the

artifact without any cognitive justification. The artifact then is called purposive and this representation itself is an aesthetic representation of the purposiveness (Kant 2000). Hence, in Kant's terms the object exhibits "*purposiveness without purpose*" since the agent has no real intension (cognitive justification) of determining the artifact.

Following an explanation for the aesthetic that derives from a non-purposive nature of emotional activity, most of the aestheticians give the experience of beauty an even more vague and variable character that makes the conception of beauty really unsteady. For instance, the apperception of beauty is impossible when our aesthetic emotions are not universally 'valid' and widely accepted in our world. The question here is how we can be sure that our aesthetic judgment could be universally 'valid' in a world that different sociocultural contexts produce different reflections, different emotions and, thus, different aesthetic interpretations. Additionally beauty emerges only when imagination and cognition are 'playing' in 'free harmony'. Free harmony is a deeply paradoxical notion that cannot be adequately explained under usual interpretations (Rogerson 2008). Finally, the third problem of beauty derives from the second and concerns the claim for 'disinterestedness' in aesthetic perception. According to a naturalized perspective of living systems, it is impossible to understand and explain biological and mental functions, as emotions are, following a non-purposive perspective of interaction.

In this direction, there is a group of twentieth-century thinkers, known as Naturalists or Pragmatists, who aim to link the aesthetic experience to natural processes and to the underlying functionality that governs the human nature. This perspective of aesthetics considers the aesthetic experience as not an autonomous type of experience, but as a part of every other experience that the agent has, as he interacts with his environment (Beardsley 1975). John Dewey (1980) argues that the origin of the aesthetic experience is linked to processes through which we adapt to insecure and uncertain environments. Our emotions are conscious signs of breaks in experience that happens by alterations between instability and stability. This inner tension for stability and restoration of harmony is what converts an emotional experience into interest in artifacts and aid humans to perceive them as opportunities for successful interactions. Thus, an expectation of a delightful emotional perception of harmony is for Dewey the real meaning of aesthetic experience. Similarly, William James (1890) was the first who distinguished the aesthetic experience in two emotional layers: the primary and the secondary layer of emotional response to aesthetic stimuli. The primary layer consists of subtle feelings, which is pleasure elicited by harmonious combinations of sensational experiences (lines, colors, and sounds). The secondary layer offers the elegance in aesthetic taste. In most cases, the simple, primary and immediate sensory pleasure is enriched by added secondary pleasures, giving an aesthetic experience.

Besides those thinkers who aim to explain the aesthetic in a naturalized context of human activity, several other research fields are usually considered as relevant, which do not traditionally study the aesthetic. Neurologists, psychologists and researchers from interaction design now try to detect possible mental and bodily activities exhibited in agents during the aesthetic experience

and judgment. Even though in those studies the aesthetic is understood with minor or sometimes major differences, it is accepted that emotions play an important role to what we experience as aesthetically pleasant or unpleasant, resulting from an evolutionary process in which genes define what serves our goals for action (Rolls 2011). However, in every scientific field new definitions for the aesthetic and beauty are proposed.

Neuroscientists deny a separation of experience to objects of art and non-art, claiming that the aesthetic experience is a process that is related to biological and adaptive functions in human beings (S. Brown et al. 2011). In general, neurologists claim that *'no theory of aesthetics is likely to be complete, let alone profound, unless it is based on an understanding of the workings of the brain'* (Zeki 1999, 17). This idea leads to several experimental studies with sometimes interdependent findings providing several explanations that relate the aesthetic to specific brain areas, which are responsible for complex emotional and cognitive processes that human beings use through the aesthetic experience.

Additionally, over the last few years the study of aesthetics and beauty becomes a very important area in user experience research (Hassenzahl 2008; Lindgaard et al. 2006) .However, these works do not focus on the nature of the aesthetic experience as studies in neuroscience do, but they focus on how the aesthetic phenomenon, whatever this might be, affects or is related to 'known/familiar' types of experiences that are usually tested as people interact with products. Moreover, the vague term of beauty is back in several theoretical frameworks and studies, in terms of visual attractiveness, visual appearance, or as a property that is mostly associated with the form of the artifact (Tractinsky, Katz, and Ikar 2000; Lavie and Tractinsky 2004; Tractinsky and Zmiri 2006; Hassenzahl 2008; Baljko and Tenhaaf 2008; Norman 2004).

Hence, an important step towards explaining the role of the aesthetic in human-artifact interaction is to understand the scope and role of the respective emotional activity that forms the aesthetic experience in human agents.

Description of the problem

Even though aesthetics are mostly considered as an emotional or an affective component of human behavior among aesthetic philosophers (see Bahm 1947; Budd 2008; Carroll 2002; Hagman 2005; Iseminger 2003; Matravers 2003; Kant 2000; Dewey 1980), psychologists (see Frigg and Howard 2011; Guyer 2008; Prinz 2011; Rolls 2011; Schellekens and Goldie 2011; Zaidel 2011) neuroscientists (Barry 2006; S. Brown et al. 2011; Cela-Conde et al. 2011; Chatterjee 2003; Jacobsen 2006; Jacobsen 2010; Jacobsen and Höfel 2003; Jacobsen et al. 2006; Rolls 2011; Schulkin 2009; Zeki 1999) and researchers in interaction design (Norman 2003; Hassenzahl 2004a; Rafaeli and Vilnai-Yavetz 2004; Tractinsky and Hassenzahl 2005; Hartmann, Sutcliffe, and Angeli 2007; Lindgaard 2007; Baljko and Tenhaaf 2008; Locher, Overbeeke, and Wensveen 2010), it is not yet clear what constitutes these aesthetic emotions, how they are elicited and why or how they probably affect our preferences through interaction (Huh, Ackerman, and Douglas 2007).

On the contrary, in aesthetic literature the vagueness of what could be considered as aesthetic or not is increased since aesthetics are almost related to everything from a metaphysical Platonic idea to specific physical characteristics, making the existing long list of types of aesthetics even longer and more complex. For instance, Lavie and Trandisky (2004) have argued that after 2000 years of attempt to understand the aesthetic (see Beardsley 1975), readers of design textbooks can hardly find any reference to aesthetic considerations in design.

Perceived, post, classic, expressive aesthetics, etc., which are correlated to qualities that could characterize an artifact or to other types of experiences such as attractiveness, enjoinment, fun, etc. are just small parts of those aesthetic descriptions. Such a complexity, mostly for those whose work is related to aesthetic decisions (e.g. artists, architects, designers, etc.), makes the understanding and the usage of aesthetics an even more difficult task. Hassenzahl and Monk (2010) have noted that the labels for the respective aesthetic notions that are examined in most of the empirical studies differ even if they have to investigate similar or even the same issues concerning the aesthetic experience and judgment. Most of these empirical studies probably arouse several theoretical and methodological issues concerning to what the participants really perceived when they were asked to perceive and rate *aesthetics* or *beauty* in an artifact. According to Frohlich (2004), a major problem in those studies is that participants do not always understand if they can "see" *beauty*, which also means that users may not be equally sensitive to those aesthetics that those studies ask them to perceive (Tractinsky and Hassenzahl 2005).

What *aesthetics* and *beauty* stands for in an artifact's form is still a fundamental question, which is not limited to art, artists and their audience. The current approaches raise several questions about the nature and the existence of aesthetics in interaction in general which is attempted to be clarified in this dissertation:

- Do aesthetics exist in the form of the object only if someone is able to "see" them and what happens to their existence if he is not?
- In the case of the existence of aesthetics, what does the observer see or feel when he perceives them?
- What are aesthetics and where do they refer?
- Do they refer to the observer, to the artifact or both?
- Are all people able (sensitive) to "see" the same aesthetics in an object or is the aesthetic criterion personal and subjective?
- If the latter is true, could each one of us "see" his own aesthetics?

As Hassenzahl (2004a) argues, the scientific community lacks theoretical models of aesthetics that provide naturalized descriptions of the respective processes, which take place through the aesthetic experience. Interaction design needs scientific explanations and descriptions that could be evaluated by empirical studies and safely generalize experimental conclusions. Explanations that do not contain trivial philosophical terms like beauty, taste, sublime, etc., but normative processes that probably take place in cognition.

Therefore, the aim of this dissertation is not to define beauty, but to seek for naturalized descriptions of normative processes that explain the emergence of the aesthetic experience in interaction. A naturalized model of the aesthetic experience and judgment could be a useful tool that could evaluate empirical studies in several scientific fields and safely generalize experimental conclusions. Richer theoretical models could construct better empirical studies, which in turn could offer progress in interactive decisions in any field.

In this track, the major aim in this dissertation is to propose a normative explanation for the aesthetic experience that integrates scientific evidence for the known cognitive and emotional phenomena that take place in aesthetic experience and to improve our understanding of the role of aesthetics in interaction.

Research approach and methodology

In order to approach the notion of the *aesthetic* (as an experience and judgment) that an agent develops through interaction, the construction of an interactive model that aims to explain and describe those cognitive and emotional processes that lead agents to make such aesthetic selections, is critical. In this direction, aiming at a naturalized model of aesthetics, the understanding of the dynamic nature of the respective emotional and cognitive phenomena requires a supporting framework of normative functionality that will provide a further understanding and better explanations concerning the emergence of aesthetic experience in interaction in general and the design process in particular.

A naturalized model of aesthetic experience and judgment enable us to explore further natural phenomena (relations or interactions) that could be related to the respective emotional and cognitive processes that constitute the aesthetic, and at the same time to abandon traditions and prior theories about aesthetics, which were considered to be too speculative and unclear. Therefore, the most valid strategy for naturalizing the aesthetic is to look inside the living system and try to understand and explain how it works. This strategy is not based on the observer's interpretations of the respective behavior but it should mainly be supported by explanations that can be objectively verified by science (Arnellos, Spyrou, and Darzentas 2010a).

In this direction, based on the dynamic properties of agency as they are described in the work of Maturana and Varela (1973), Kampis (1999), Collier (1999), Bickhard (2004; 1997a), and Arnellos, Spyrou, and Darzentas (2010a; 2007a; 2007b) the agent is considered to be an autonomous complex system which is open to its environment as a matter of its ontological necessity (Bickhard 2004). This means that serving the fundamental need for self-maintenance, the agent has access to functional inner systems, which enable him to evaluate the environmental conditions and detect what is the best action in respect to these conditions. This is a biological realistic process of action selection and involves a continuous process of preparation through which the agent is prepared for further interactive processes. However, it is rather important to note that these preparations always exhibit the possibility of failure (Bickhard 2000a) aiding the agent to gain from failure and learn forward models of interaction.

Summarizing, an agent is considered as an autonomous system that is prepared continuously to interact with his environment in order to determine the appropriate conditions for the success of his functional processes. However, these preparations have always the possibility of failure. This is a crucial point of normative functionality upon where the proposed explanations and models of the aesthetic emotional activity and judgment are based.

Particularly the research methodology adopted and the respective models proposed on this dissertation are described in the following steps (see Figure 1):

- Based on interactive models that explain meaning-making in agents, and adopting the scientific explanations of experimental evidences concerning basic emotions of pleasure and pain, a model is proposed that explains: i) the biological origin of aesthetic emotions ii) how emotions emerge in interaction and iii) how their emergence influences the construction of aesthetic meaning.

  o Moreover, as naturalization demands, the proposed model verifies main contemporary experimental evidence for neural activations during the development of the aesthetic experience. According to neurologists, these activations correspond to the major emotional and cognitive processes described by the proposed model.

- Following the above relation between emotions and aesthetic experience, a second interactive model is proposed based on Norman's three-level model of human behavior, aiming to analyze and explain the construction of the aesthetic experience and judgment in each one of the three levels.

  o This second model defends an integration of the fundamental Peircean semiotic parameters and their related normative levels of semiotic organization with the three levels of aesthetic experience and judgment.

- Finally the model describing the role of aesthetic emotions in interaction is used to explain the role of aesthetics and in particular of aesthetic experience in the design process.

  o Therefore, following an anticipatory and goal directed perspective of design (see Bonnardel 2000; Friedman 2003; Arnellos, Spyrou, and Darzentas 2007a; 2007b; 2010a; Glanville 2007), a theoretical explanation is proposed on how aesthetics in general and aesthetic emotions in particular are engaged in the design process and how they finally affect the content of design representations.

  o Then, considering the dynamic nature of aesthetics in design, and an elaborated conception of affordances, a theoretical explanation is proposed that relates aesthetics and affordances in the design process.
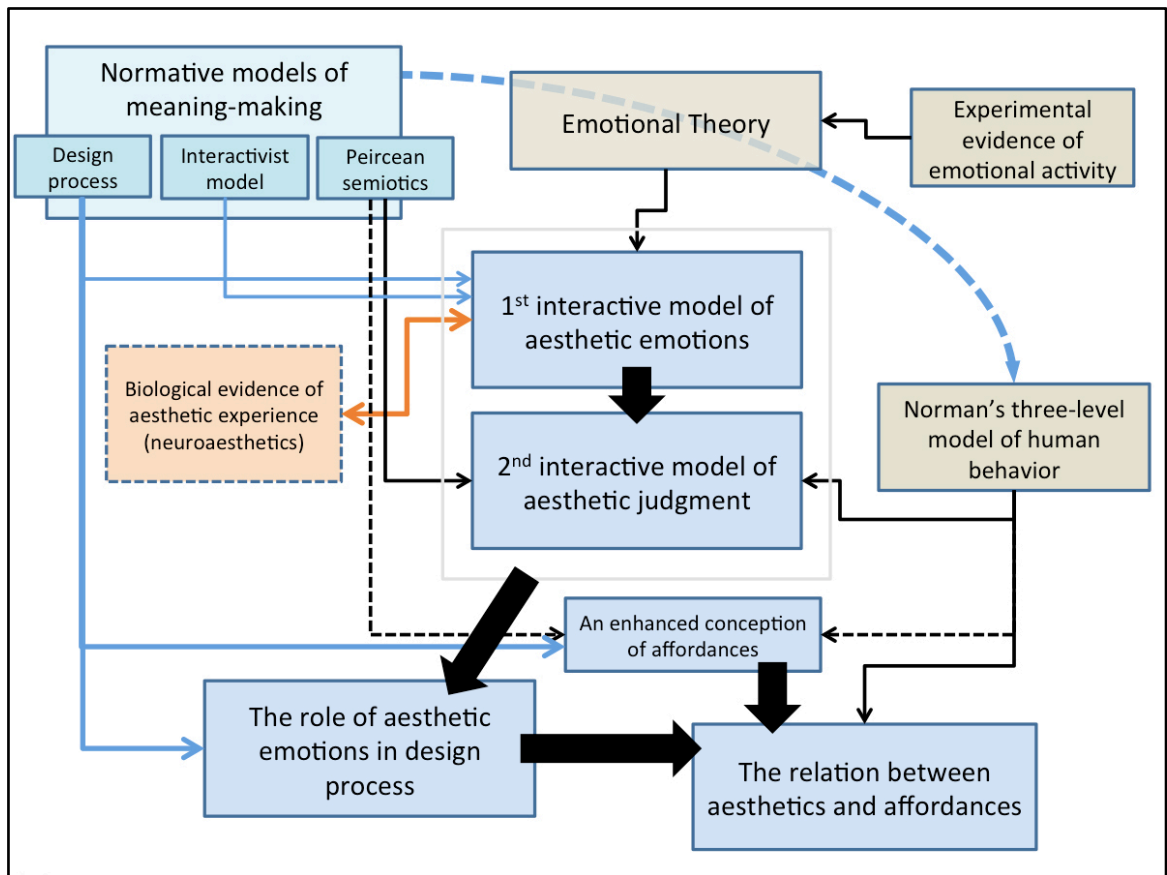
Figure 1 The above figure depicts the research methodology and the respective steps that are adopted towards achieving the goal of explaining and modeling the role of aesthetic emotions in interaction

Thesis outline

This section aims to provide an outline of this thesis and to list the respective publications that support the contribution of this dissertation. The relation between the various chapters is depicted in Figure 2.
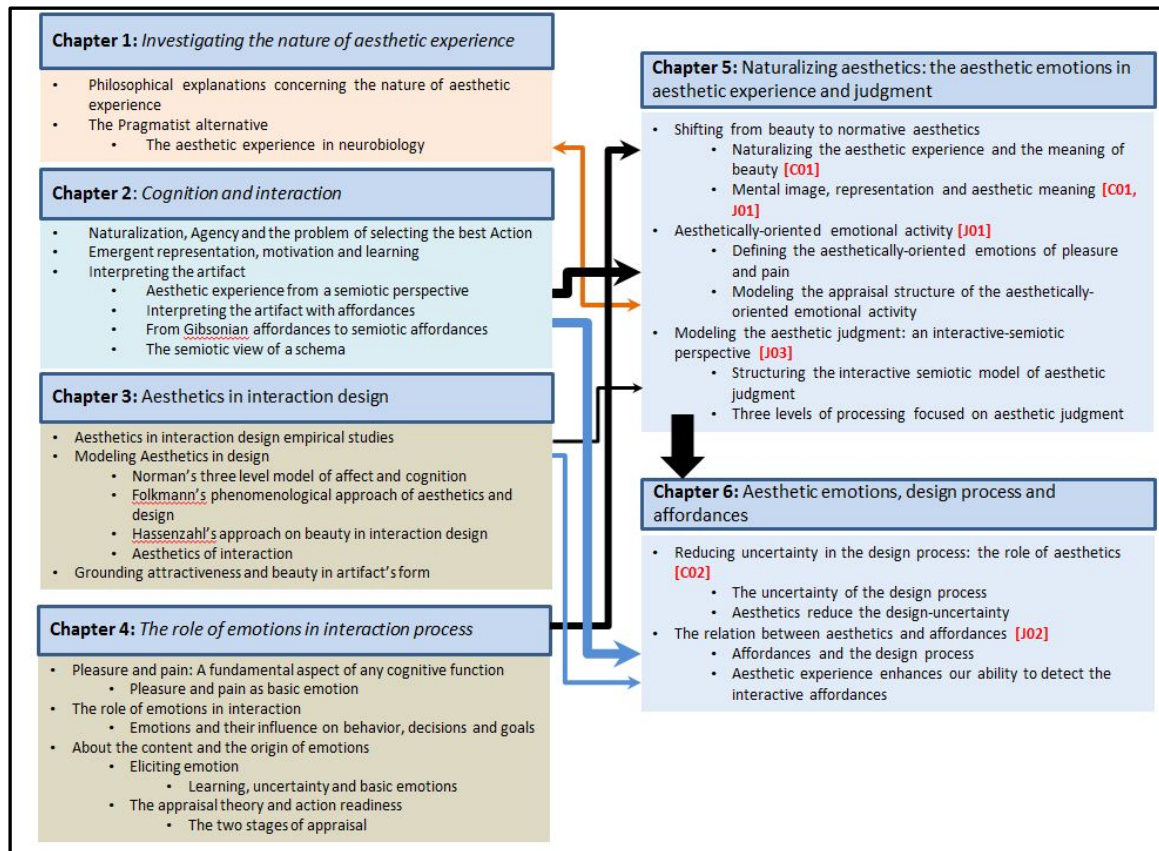
Figure 2 Dissertation Structure

Chapter 1: The first chapter introduces the reader to the main approaches that attempt to explain the 'aesthetic' as a constructive part of human behavior and not as a physical property that characterizes the work of art. Particularly, in this chapter several influential explanations are presented which consider the aesthetic responses as experiences of our interaction with the environment. Especially, we present those theoretical explanations that involve emotional or affective reactions of pleasure and pain as a fundamental aspect of the aesthetic. These explanations are distinguished in two theoretical perspectives that both influence, in their way most of the contemporary writings on aesthetics in several other fields that do not traditionally study the aesthetic (e.g. interaction design, design theory, etc.). The first is based on the metaphysical approach of the Western philosophical tradition and particularly those aestheticians who accept the Kantian approach to aesthetics, while the second, rejecting the former as speculative and unclear, is based on the philosophical writings of thinkers that are known as Naturalists, Materialists or Pragmatists. Those approaches aim in linking the experience of the aesthetic to natural processes and specifically to the underlying bio-cognitive functionality of agent's interaction with a dynamic environment.

Chapter 2: Abandoning traditions and arguments which are proved too speculative and unclear in order to explain the role and the content of the aesthetic in a naturalized context of

interaction, the aim of the second chapter is to provide the theoretical perspectives that describe the normative functions and their dynamic and complex interrelations, which result in a naturalized explanation of agency and interaction. Therefore, in this chapter it is attempted: i) a description of those normative characteristics that constitute dynamic agency ii) a presentation of interactive models that analyze and describe the respective processes through which the agent interacts with its environment according to his dynamic goals and motives.

Chapter 3: Over the last few years the study of aesthetics and beauty has become an important topic in the design research community as the understanding of aesthetics still bothers designers when they are about to design successful interactive experiences. This chapter explores the diversity and the limitations of the current approaches that attempt to explain the aesthetic in interaction design. The first section of the chapter presents main experimental approaches of aesthetics and beauty. The second section presents the main theoretical models, which explore the nature of beauty in our experience with designed products. Even though the emotional activity is proved to play an important role in an aesthetic interaction, it is not yet clear how these emotions influence the content of design representations and aid the design-participants to fulfill their dynamic goals. Particularly, the diversity of the current explanations shows that the problem concerning the role of aesthetics in design remains very broad vague and complex.

Chapter 4: Considering that the basic emotions of pleasure and pain in aesthetic literature from philosophy to interaction design and neuroscience are the most important features that characterize an experience as aesthetic, the aim of this chapter is to explore the complex nature of these basic emotional states in order to understand and explain the role they play in aesthetic experience and judgment. Specifically, this chapter aims to provide the main theoretical and experimental approaches in order to clarify issues concerning: i) the biological origin of emotions ii) the conditions and the processes that support their emergence and iii) their role in the construction of meaning-based actions.

Chapter 5: Considering the experimental and theoretical evidence regarding the elicitation of aesthetic emotions, in the first section of this chapter a normative explanation is proposed concerning the development of the aesthetic meaning. The proposed explanation[1] of the aesthetic meaning is based upon the normative functionality of the basic emotional values of pleasure and pain. However, these aesthetic meanings could be false thus influencing the anticipatory system on which agent's further behavior depends. Therefore, the respective normative functionality is emergent as a basic level of aesthetic experience. This argument concerning the aesthetic meaning is not limited to art, form, appearance, or abstract notions like beauty, taste, goodness, etc., but to dynamic cognitive phenomena that comprise several other normative processes. This is the main theoretical contribution of this dissertation based on which all other contributions are built.

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[1] A more detailed analysis of this theoretical explanation can be found in Xenakis, Arnellos and Darzentas (2011) [C01].

[2] A more detailed analysis of this conceptual interactive model of aesthetic emotions can be found in Xenakis,

Based on this naturalized perspective of aesthetics, two conceptual interactive models concerning the development of aesthetic emotions and aesthetic judgment are respectively proposed. The first one [2] suggests a mechanism of the aesthetically-oriented emotional activity, introducing two fundamental levels of aesthetic emotional processing. The second one[3] aims to provide a further theoretical consideration of the functionality of aesthetic interpretation, using the theoretical interpretive richness provided by the semiotic framework.

Chapter 6: Considering design as process that supports anticipatory and purposeful actions of the design-participants, the first objective of this chapter is to examine how the above interactive models are implemented in the design process and how they affect the content of the design representations[4]. Particularly, it is suggested that aesthetics are emergent in the design process, aiming to support designers and users in reducing the uncertainty of the design process. The second objective of this chapter is to propose an enhanced conception of affordances[5] introducing the term 'interactive affordances' which denotes a range of interactive potentialities in contrast to what Gibson had initially claimed are not limited to direct perception. The third objective of this chapter is to provide a theoretical explanation concerning the underlying functionality that supports the detection of affordances through aesthetics[6]. The suggested argument is that aesthetics are an important factor among others in the design process that recommends users to anticipate a successful (or not) interaction with their environment. Thus, it is proposed that aesthetics enhance the detection of affordances.

Chapter 7: This is a conclusive chapter where the proposals of this dissertation are summarized.

Summary of contribution

This dissertation defends an interactive perspective of the concept of the '*aesthetic*' that is not limited to appearance, formal characteristics or vague philosophical notions like beauty. Accordingly, in this work there is no distinction between a work of art or an activity that produce it from other objects and human actions.

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[2] A more detailed analysis of this conceptual interactive model of aesthetic emotions can be found in Xenakis, Arnellos and Darzentas (2012) [J_{01}].

[3] A more detailed analysis of this conceptual interactive model of aesthetic judgment can be found in Xenakis, Arnellos, Spyrou and Darzentas (2012) [J_{03}].

[4] A more detailed explanation concerning the role of aesthetics in the design process can be found in Xenakis and Arnellos (2012; 2013) [C_{02}, J_{02}].

[5] A more detailed explanation concerning the meaning of interactive affordances can be found in Xenakis, Arnellos, Spyrou and Darzentas (2012) [J_{03}] and Xenakis and Arnellos (2013) [J_{02}].

[6] A more detailed explanation concerning the relation between aesthetics and affordances can be found in Xenakis and Arnellos (2013) [J_{02}].

In this perspective, the aesthetic experience is considered to be a cognitive phenomenon that consists in several biological and mental processes emergent in the interaction and serving our creative goals.

The contributions of this dissertation are the following:

1. Concerning the body of knowledge in the research field of **aesthetics** and **design** this dissertation:
   - ✓ Provides a naturalized explanation concerning the development of the aesthetic meaning.
   - ✓ Provides a minimal model of the elicitation of the aesthetic emotions of pleasure and pain and defines their role in interaction.
   - ✓ Provides a minimal three-level model of aesthetic experience and judgment,
   - ✓ Provides a theoretical explanation of the role of aesthetic experience in the design process.
   - ✓ Provides an enhanced explanation of the initial conception of affordances.
   - ✓ Provides a theoretical explanation relating aesthetics to affordances in the design process.

2. Concerning the body of knowledge of **aesthetic emotions** and **aesthetic experience,** this dissertation:
   - ✓ Proposes that the emergence of the aesthetic emotions and, thus, the aesthetic experience is always a goal-related attribution, in contrast to the more dominant and philosophical approach of aesthetic theory.
   - ✓ Proposes aesthetic experience serves the same purpose as all other biological or mental activities in human beings; they function in the service of self-maintenance and stability of the agent.
   - ✓ Proposes that autonomy is a precondition for the system to produce aesthetic emotions and have an aesthetic experience. The contrary is not true.
   - ✓ Proposes a strong relation between aesthetic experience, aesthetic emotions of pleasure and pain and the interactive anticipation.
   - ✓ Proposes that the aesthetic emotions and, thus, the respective aesthetic experience serves the resolution of the interactive uncertainty emerged in the specific interaction.
   - ✓ Suggests a strong possibility for the consideration of fundamental aesthetic habits in the first stage of the elicitation of the aesthetic emotions.
   - ✓ Suggests that aesthetic emotions and, thus, aesthetic experience can function even before learning.

3. Concerning the body of knowledge of **aesthetic judgment,** this dissertation:
   - ✓ Proposes that the aesthetic judgment is defined as an action, *which is* built upon the aesthetic experience or a sequence of them regarding an interaction with an artifact,

which may also be combined with our prior aesthetic or non-aesthetic knowledge for this artifact.

4. Concerning the body of knowledge of the concept of **aesthetics** this dissertation claims that:

✓ Aesthetics are not properties of the environment out there but a bio-cognitive process that emerges through meaning-making actions. This conception of aesthetics stands in sharp contrast to the claim for disinterestedness in aesthetic experience according to the Kantian tradition.

✓ Aesthetics emerge only *in relation* to environmental conditions or events (e.g. objects of nature, designed artifacts, social events, etc.) and never alone.

Chapter 1: Investigating the nature of aesthetic experience

'Aesthetic experience is as important to human life as sex, hunger, aggression, love, and hate. Although we may rarely be conscious of it, aesthetic experience gives form, meaning, and, most important, value to everything we are and everything we do. Theoretically without it, life would be a shapeless, meaningless, and colorless series of sensations, events, and reactions' (Hagman 2005, 1)

The conception of the 'aesthetic' has always been attracting thinkers from philosophy, psychology and more recently from neurobiology. From the ancient ages of Plato and Aristotle to the present, the understanding of the 'aesthetic' remains an ambitious and complex task in the more general attempt to analyze the human behavior. However, the variety of approaches and notions that come along with the 'aesthetic' (e.g. aesthetic judgment, pleasure, value, appreciation, response, perception etc.) have proved to be vague and variable. The same aestheticians in different periods of time have often expressed distinct frustration and sometimes even skepticism concerning how they interpret the notion of the 'aesthetic' and its cognates. Probably a reason that causes this mistiness between thinkers finds its origin in the understanding of the term 'aesthetic', which refers not only to artistic expression and artistic objects, but also to events and modes of consciousness that aid the apprehension of objects and events.

Between these two views that relate the 'aesthetic' to artistic and to human thought, this chapter introduces the reader to the main conceptions that have approached the 'aesthetic' mostly in terms of human behavior. Particularly, the most influential explanations of the 'aesthetic' are

presented as a product of our experience within the environment, and especially those that involve emotions of pleasure and displeasure as fundamental aspects of aesthetic response. All problems related to the understanding, the creation, the content and the role of the works of art are out of the scope of this dissertation.

Hence, searching for the fundamental characteristics that cause and form the aesthetic experience, this chapter presents two distinct theoretical perspectives, which both influence in their way the contemporary writings on aesthetics. The first perspective is based on the metaphysical approach of the Western philosophical tradition and particularly to those aestheticians who accept the Kantian approach to aesthetics, while the second rejecting the former as speculative and unclear aims to link the aesthetic to natural bio-cognitive processes that govern the human nature. This approach for aesthetics belongs to a wider philosophical perspective defined under the umbrella of Naturalistm, Materialism or Pragmatism.

1.1 PHILOSOPHICAL EXPLANATIONS CONCERNING ON THE NATURE OF AESTHETIC EXPERIENCE

Even though an emotional response to artifacts and especially to artworks occurs quite often, and hardly seems puzzling, philosophers have raised questions about these responses when they attempt to approach the experience of the aesthetic. They argue that such aesthetic emotional responses are elicited in particular contexts or when these artifacts are viewed from certain perspectives. As Levinson (1997) argues, these philosophical questions suggest that there is indeed something puzzling about such emotions.

Plato's writings about the arts has played a foundational role in the history of aesthetics. He argued that aesthetic experience is a process by which we apprehend *the good in nature*. The source of such apperception is an emotion of a non-sensuous pleasure, which results from the reflection of an ideal form of a natural object (e.g. flower) or an artifact. The general argument is that emotions undermine reason and reason must dominate the emotions. As Carroll (2000) claims, in Plato's conception of human psychology, reason and emotion appear to occupy different regions.

Plato's student Aristotle, whose broad-ranging corpus of writings permeated the Anglo-American culture, shapes the course of both science and philosophy. Aristotle's view to the aesthetic reacts against Plato's approach, followed directly from his ideas in metaphysics and on human nature. Contrary to Plato, Aristotle believed that intelligible forms are inherent in the perceptible things, and that genuine knowledge always begins in perceptual experience. Hence, according to Aristotle, aesthetic experience is fundamentally emotional, by means that the particular emotions consist of entirely rational processes that are produced in the agent as he interacts with the artifact. Unlike Plato, Aristotle does not just oppose emotions to reason, in fact he claims that aesthetic emotions are grounded in reason and therefore presuppose a complex

cognitive process. Aesthetic emotions are not outcomes that are elicited when the experience with the artifact ends. Instead, they are dynamically produced when surprising events occur to the agent through interaction. However, these surprising events are only effective when the agent finds a causal logic in their occurrence (Potolsky 2006). In other words, the agent is aware of an aesthetic emotion only if a new event changes the current conditions and appears to play an important role in agent's initial or dynamic purpose. So an aesthetic emotion could equally please or horrify the agent, while producing the respective aesthetic experience. Aristotle's work remains important as a viable model for the relation of art to emotions and to morality, in respect to the varieties of knowledge that art may impart to people, giving place to aesthetic cognitivism.

For years, thinkers with views similar to Plato believed that aesthetic experience was a reflection of the eternal beauty of God and the *ideal* form was linked to expressions of God's love that gives in artifacts (most especially religious artifacts or artifacts of nature) a divine perfection. Only by the eighteenth century, philosophers started to consider aesthetic experience as a psychological phenomenon. David Hume and Immanuel Kant were the first who tried to explain aesthetic experience in psychological terms. The objective nature of "the good" and "the beauty of God" were replaced by psychological processes, which assign aesthetic qualities and values to the aesthetic experience (Hagman 2005).

1.1.1 The meaning of the aesthetic in a psychological context

David Hume's views on aesthetic theory are intimately connected to his moral philosophy and theories of human thought and emotion. He argued that aesthetic experience is linked to sensitivity, which associates perception with emotions. These aesthetic emotions (pleasure, delight, awe, admiration, joy etc.) assign positive values to such experiences. Thus, for Hume, human sensibility and emotion, replaced Plato's divinity and ideal form as the basis for aesthetic experience (Hagman 2005). However, in order to form an aesthetic experience, the agent must free his mind from all prejudice and intentional thoughts, allowing only a 'pure' feeling to guide the perception of the respective artifact or object of nature. In other words, Hume claimed that when we view something aesthetically, we must examine it without any intention or purpose (no-interest) in respect to its existence. As a result, *disinterest*edness becomes a condition for an aesthetic experience in almost all the 18th century aesthetic writings. This claim will also become an important part of the later aesthetic theories, especially to the Kantian approach and his followers.

The main aim of Kant was to transform the determinate notion of 'purpose' into the indeterminate notion of 'purposiveness', reconciling another pair of philosophical opposites. His philosophical goal was to accommodate two views: Aristotelian 'teleology' and Renaissance 'empiricism'. Teleology is the study of purpose in nature. It derives from Aristotle's concept of 'final cause' or the greek word *telos*. Every organism, according to Aristotle, has a 'natural place' or 'state' and all motion or growth can be explained in terms of transition towards this final state.

The Renaissance empiricism offers the knowledge that could be generated simply by detecting through observation. The role of the senses in development is a missing component in Aristotle's system. However, all those mechanical laws from observed regularities cannot explain alone the organization of an organism where its parts interrelated for that sake of the greater whole. Thus the Aristotelian notion of purpose was still a necessary explanatory component. In Kant's system, purposiveness (or the appearance of a purpose) becomes the transcendental principle, which explains how the apprehension of regularity in experience is possible (Cazeaux 2001).

Aesthetic experience is assumed to create a special form of relationship between the agent and the artifact in which the agent should approach the interaction without prejudice. This relationship would then ideally result in an aesthetic emotion or even better, in a pleasant emotional state evoked by the *specialness and refinement* of the artifact.

1.1.1.1 *The Kantian aesthetics*

Immanuel Kant (2000), made use of a psychological terminology, mainly preferring the term '*aesthetic kind of representation*' in order to describe the content of aesthetic experience. The notion of *representation* is fundamental to Kant's epistemology. All his *Critique*, after all, is about the types of representations we bear, how we get them, and what we do with them when we have got them (Dickerson 2003). In fact, Kant did not use the term 'aesthetic experience' in his "*Critique of the Power of Judgment*" (Stecker 2010). For Kant, representation is the choice by which the agent determines the artifact (e.g. the artifact, the artwork or the object of nature). Thus, Kantian representations are 'in us'; they result from an integrated cognitive function that processes our sensory inputs. They are 'determinations' or 'modifications' of our mind, resulting through a great variety of mental acts.

According to Kant, three faculties determine all of our mental acts: *the faculty of cognition*, *the emotions of pleasure and displeasure*, and *the faculty of desire*. According to these three faculties, there is always a great difference between representations that belong to cognition (affected at the same time by the faculty of desire) and the emotions of pleasure and displeasure. Even though emotions of pleasure and displeasure presuppose cognition as a determining ground they are not considered as cognitive per se. Finally, the faculty of desire is related to free-will[7] and to the causal effect that the physical attributes of object produces to the agent. A conscious determination of the faculty of desire always grounds free-will to satisfaction that the agent gains from an action (Kirwan 2004). Hence, in general the agent is aware of these representations, and variously compare, combine, recognize, synthesize and employ them (Dickerson 2003; Kant 2000).

Explaining the term '*aesthetic*' Kant claims:

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[7] The freedom an agent develops by choosing the best action with respect to his goals.

> *"... the expression "aesthetic" signifies only that the form of sensibility (how the agent is affected) necessarily adheres to such a representation and that this is unavoidably carried over to the object (but only as phenomenon). Hence there could be a transcendental aesthetic as a science belonging to the faculty of cognition." (Kant 2000, 24).*

Through the aesthetic representation the artifact acts upon our senses as a quality. This quality is not an intuition; it is sensational and appears as a change in our psychological state during the interaction. For Kant, neither empirical cognition nor aesthetic experience could be possible if we are not affected by such qualities, as we interact with an artifact. This is because we would be unable to represent an artifact only by spatiotemporal sensations since they cannot afford a representation (Berger 2009). Therefore, Kant's aesthetics are concerned with emotions of pleasure and displeasure, and not with sensation or representations that belong to cognition. Perception is the first step towards cognition, but emotions of pleasure and displeasure never are. When we form a representation of an artifact (a natural object or an artwork) that it came to our senses, this representation refers to the three faculties: cognition, emotions, and desire. When emotions of pleasure and displeasure are engaged, the agent experiences the aesthetic (i.e. has an aesthetic experience) and could form a judgment of taste (which is also aesthetic). Otherwise, when the agent 'sees' the artifact cognitively (in order to claim something objective about it), he forms a judgment of cognition (which is not aesthetic) (Wenzel 2005). For instance, a judgment such as "This rose is red" is a singular, positive and categorical judgment of cognition, according to Kant, that asserts a matter of fact. But when we claim, "This rose is beautiful" it asserts a matter of necessity. There is a subjective aspect to it, as we will see in the next section (§1.1.1.1.1) that expresses how the individual feels about the rose.

1.1.1.1.1 The role of emotions of pleasure and displeasure in the aesthetic judgment and the claim for beauty

According to Kant (2000), aesthetic emotions of pleasure and displeasure lie between the faculty of cognition and that of desire. The whole idea is that we use our emotions of pleasure and displeasure in an attempt to determine the artifact, as we try to understand it or use it logically. So, there is a subjective (aesthetic) aspect in a representation that constitutes the relation of the object with emotions of pleasure and displeasure. This aesthetic component that relates the respective representation to the artifact is for Kant an *aesthetic property*. This subjective aspect in representation cannot become an element of cognition since the faculty of emotions is connected with it.

Therefore, if a representation is immediately connected with aesthetic emotions, such a representation precedes cognition and thus its *purposiveness* precedes cognition too. The *purposiveness* of an artifact, insofar as it is represented in perception, is not a property of the artifact itself, but it is derived from our tension to understand the object (faculty of cognition). In the case that the purposiveness of the artifact derives from pleasure or displeasure, those feelings

assign values to the artifact without a cognitive justification. The artifact is called 'purposive' and the representation itself is an aesthetic representation of the purposiveness (Kant 2000). Hence the object exhibits "*purposiveness without purpose*" since the agent has no intention (cognitive justification) of determining the artifact.

In other words, if pleasure or displeasure is connected with a mere apprehension of the form of the artifact (following an intuition that is not related to a concept for a determinate cognition), the representation is, thereby, related not to the artifact itself, but solely to the agent. Thus, through an aesthetic representation, the feeling of pleasure and displeasure is nothing but a subjective aspect that aids the cognitive faculties to form the respective judgment. Every judgment, according to Kant, is characterized by a comparison of two faculties: the mere intuition, which is *imagination* and the faculty of concepts, which is *understanding*[8]. This comparison takes place even for non-intentional actions. Particularly, Kant claims that this is the process by which the aesthetic judgments are produced:

> *"Now if in this comparison the imagination (as the faculty of a priori intuitions) is unintentionally brought into accord with the understanding, as the faculty of concepts, through a given representation and a feeling of pleasure is thereby aroused, then the object must be regarded as purposive for the reflecting power of judgment. Such a judgment is an aesthetic judgment on the purposiveness of the object, which is not grounded on any available concept of the object and does not furnish one." (Kant 2000, 76).*

Hence, having no-intentions of acquiring a concept from the object (act unintentionally) is a condition to develop an aesthetic judgment. This non-interested behavior that the agent shows for the existence of the artifact is what Kant calls *disinterestedness*.

When the agent interacts unintentionally with an artifact and the apprehension of its physical attributes, forms an aesthetic representation - derived from the feeling of pleasure- the agent forms an aesthetic judgment with positive value. Only when this apprehension is confirmed by other agents who have the same aesthetic judgment, we could call this object *beautiful*. This faculty of judging through pleasure with universal validity is called *judgment of taste*. As Kant claims:

> *"In order to decide whether or not something is beautiful, we do not relate the representation by means of understanding to the object for cognition, but rather relate it by means of the imagination (perhaps combined with the understanding) to the agent and its feeling of pleasure or displeasure. The judgment of taste is therefore not a cognitive judgment, hence not a logical one, but is rather aesthetic, by which is understood one whose determining ground cannot be other than subjective." (Kant 2000, 89).*

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[8] Understanding is non-sensible; it is discursive and works with general concepts, not individual intuitions; it is the active faculty of producing thoughts (Crawford 2001).

As it is mentioned in the beginning of this section, during an aesthetic experience, the feelings of pleasure or displeasure assign values to representations. Those faculties of desire that are affected by judgments of taste provide to the agent satisfaction that is characterized by *disinterestedness* and the object that produces these judgments becomes an "*object of an entirely disinterested satisfaction or dissatisfaction*". For Kant (2000), satisfaction deriving from an aesthetic representation is totally different from those representations that occur when things please our senses through sensation. The latter, as Kant claims, is combined with interest and forms *judgments of sense*. Hence, an aesthetic judgment could evoke such satisfaction, which is not grounded on any interest, but it finally produces an interest. According to Kant, all pure moral judgments lie in this category.

For Kant there is a strong differentiation between *pleasure of beauty* and any other kind of pleasure. The kind of pleasure we feel as we apprehend a beautiful object is not a pleasure based on any kind of interest (e.g. the one that could be produced by sensual pleasure). For instance, in the case when a candy is satisfying our craving for sweetness the pleasure derives from our intentional action to fulfill our craving for sweetness. In the same direction, the pleasure that is based on utility does not introduce beauty into judgment, since utility always involves intentional actions(Crawford 2001).

Hence, Kant distinguishes mere pleasant sensation from pleasure derived from discrimination of the sensuous or perceptible properties of the artifact that we experience. For instance, if the pleasure a meal gives, lies just over the feeling of one's hunger, this does not consist aesthetic pleasure. But if the experience is focused on the food and its various qualities (e.g. texture and tastes in relation to one another) then it is an aesthetic experience, which has also its source in sensual pleasure (Stecker 2010). Stecker calls this conception as "object-directed sensuous pleasure." The problem however in this example is that we could 'see' beauty in a meal only when we exhibit disinterest for food. But why should we taste a meal if we have no interest for it at all? The understanding of beauty in aesthetic theory is an ambiguous problem a clarification of which is attempted in section § 1.1.2.

The demand for disinterestedness in aesthetic experience is followed by several theorists in the 18th century. They argue, accordingly to Kant, that our aesthetic emotions are not based on expectations that will increase our happy feelings when we choose the respective actions. Generally, their conception, concerning the aesthetic, is quite puzzling when they ground the aesthetic in a divine source which comes from the form of the artifact and it does not arise from any knowledge of principles, proportions, causes, or from the usefulness of the artifact, but it strikes us at first with the *idea of beauty* (Guyer 2009).

1.1.1.2 *Experiencing the aesthetic*

As we have seen so far, the definition of the 'aesthetic' is puzzling and elusively vague not only in the philosophical writings of the 18th century, but as we shall see, it is vague even for contemporary thinkers.

The term 'aesthetic' has derived from the Greek word '*aesthisis*' (*αίσθησις*) to describe sensory perception and was first used by Alexander Baumgarten to characterize what he regarded as our lower or more sensory faculties of cognition. However, the 'aesthetic', as it has already been mentioned, is used to describe experiences with artifacts beyond sensory determination, which is guided by the faculty of cognition. In modern thought, however, the 'aesthetic' has a more specific meaning than that of having to do with sensory perception in general. Theorists emphasize in a mode of sensory perception, which is not centrally driven by personal desires or concern. (Levinson 2005).

Moreover, the concept of 'experience' in philosophical inquiry is ever more elusively vague, problematically polysemic, and confusingly controversial than the aesthetic. The Greek word for experience, 'empeiria' (εμπειρία), is the source of the English term 'empirical'. As Shusterman claims:

> *"Experience is also invoked by religious, aesthetic, psychological, and somatic theorists to argue for meanings and knowledge not captured by ordinary scientific discourse or even by any conceptual language at all. These points only begin to suggest the vast array of variant ways of understanding experience" (Shusterman 2006, 218)*

The problem of understanding the concept of 'experience' is similar to the problem of understanding the concept of 'aesthetic'. Experience exhibits the same objective-subjective character as the aesthetic, denoting both the object of experience (artwork, artifact, natural things, or even simply distinctive qualities) and the subject (perceiver or user) that experiences the object. As Mitias (1982) claims, experience is always the experience of some '*thing*'. Accordingly, the meaning of having an experience is determined by the content of such experience (an artifact or an idea). The identity of an experience (e.g. a religious or a moral experience) is determined by the identity of its content. An experience is always an experience of a cognitive agent being at a certain time, in a certain place, and in relation to a certain object (mental or spatiotemporal). Moreover, experience refers not only to a completed event but also to a continuing process of experiencing, which is actively generated by the agent or by an inner change. This means that experience denotes not only our conscious life, but it also includes processes that stand out from consciousness and reflectively aid the agent to evaluate the current event as a real experience (Shusterman 2006). Gary Iseminger (2003) characterizes the first, as the *phenomenological* concept of experience and the second as the *epistemic* one.

A *phenomenological* conception of aesthetic experience answers to what is like to have an aesthetic experience. Moreover, the phenomenological conception implies also the existence of an

artifact that the agent experiences. Therefore, aesthetic experience cannot be a mere subjective state; it always has an intentional character of some kind, even if this object is only imaginary. In having an intentional character, aesthetic experience always implies the creation of a meaning. This means that the aesthetic experience is not about a blind sensation, but it carries some kind of meaning that aids the agent to be aware of the aesthetic conception (Shusterman 2006).

An *epistemic* conception of aesthetic experience is a conception of a non-inferential way of knowing something (Iseminger 2003). It is about a special mental state of perceiving and appreciating certain features of an artifact (for their own sake) but without any need for subjective emotion to be present or felt (Shusterman 2006). The debate between these two accounts of experience is still an interesting topic in philosophical writings concerning the nature of the aesthetic.

Carroll (2002) examines traditional approaches to the aesthetic experience and categorizes them into three types, which are often combined with each other:

- The *affect-oriented* approach, emphasize in experiential qualia as a fundamental element in an aesthetic experience. Disinterestedness in the Kantian sense is a precondition for an impartial aesthetic experience and judgment.

- The *axiologically-oriented* approach, aims at defining aesthetic experience in terms of value. A common argument is that the artifact exhibits an intrinsic value or value for its own sake (when seen through disinterestedness). Following this approach, someone can claim that he experiences the aesthetic only when this experience is valued for its own sake or it is intrinsically valued. Since in aesthetic experience disinterestedness is combined with emotional activity, the axiologically oriented approach can also be combined with the affect-oriented approach.

- The *content-oriented* approach distinguishes the specific artifacts from the experience, thus directing the formation of aesthetic experience to the specific features or meanings that may evoke such experience. Many theories combine content dimensions and affective ones.

Considering all the categories of experiencing the aesthetic as presented above, in the next section we describe those factors that may alter an ordinary experience to an aesthetic one.

1.1.1.2.1 What makes an experience aesthetic?

It is generally agreed that the aesthetic emotions of pleasure and displeasure and their elusive properties are the main components that are responsible for the *transition* of an ordinary experience to an aesthetic one (Mead 1926; Thornton Read 1940). This approach is originated in the Kantian tradition where we can detect two distinct types of pleasure.

The first type is known as the '*feeling approach*' and it is correlated to experiences that have their origin in our senses, which are regarded as *objective properties* of a situation or an event. The 'feeling approach' refers to those emotional reactions that are constituted by internal feelings

or set of sensations (Levinson 1997). Hence, every experience that is based on those *objective properties* is called as an *ordinary experience* (Mead 1926). These types of feelings that are elicited through senses could be pleasant or unpleasant in perception, but they have nothing to do with the pleasure that we get from the perception of the aesthetic. Even though the '*feeling approach*' mostly involves 'mindless' emotions and bodily reactions to situations, it has trouble to accommodate the intentionality and the influence to reason that many of such emotions exhibit. Similarly, while the 'mindful' *thought* approach could include essentially cognitive elements, that is, thoughts with specific contents, which are in many cases socially shaped, they fail to involve passive emotions (Levinson 1997). Moreover, it is problematic how the *feeling* approach, which is mindless, could only form sensual experiences and not true aesthetic emotions, while the thought approach, which is mindful could not form aesthetic emotions since it introduces cognition into thought.

The second type is about *thoughts* and judgments and specifically all those emotions that refer to a particular kind of evaluation that leads to complex thoughts (Levinson 1997). As it is already mentioned in §1.1.1.1.1 there is a strong differentiation between pleasures of beauty and other pleasures. The emotional pleasure we feel by apprehending something beautiful is not based on any interest that has its origin on sensual pleasures (Coleman 1971). Stecker (2010) claims that *"the line here is drawn by distinguishing between mere pleasant sensation, and pleasure derived from discrimination of the sensuous or perceptible properties of the object of the experience"* (p. 49).

What we can understand from those claims is that an aesthetic pleasure should not involve any purposive cognition or other feelings that relate the experience with senses. However, how the agent could be aware of a non-sensuous pleasure or how could he act in a 'mindful' process have not been addressed so far. In philosophy these two pleasurable experiences, the *ordinary* and the *aesthetic*, are encountered by two types of emotions. However, both of them are considered as problematic with respect to their explanations. Additionally to this puzzling division, theorists have argued that an element of the 'real' world, whatever it might be, and an object of our activities or cognition could not be identical to the aesthetic object in experience (Ingarden 1961). Since we have the ability to perceive the same artifact in both ways, aesthetically or not, there must be something that distinguishes these two kinds of perception.

Generally, in philosophy such characteristics are proposed, which distinguish an aesthetic state of mind from any other ordinary state. Levinson (2005) mentions some of these characteristics in the following list:

1. Disinterestedness or detachment from desires
2. Needs and practical concerns
3. Non-instrumentality
4. Contemplative or absorbed character, with consequent effacement of the subject
5. Focus on an object's form,

6. Focus on the relation between an object's form and its content or character
7. Focus on the aesthetic features of an object and,
8. Figuring centrally in the appreciation of works of art.

Combining the tree types of aesthetic experience the affect-oriented, the axiologically-oriented and the content-oriented approach (see §1.1.1.2), Mitias (1982) argues that an experience could be characterized as aesthetic, mainly because it possesses a kind of *property*, which finally someone would call 'aesthetic'. This means that aesthetic experience is not an autonomous reflection but is elicited as a sequence of processes that take place in the agent. So, since an aesthetic experience refers to some sort of a mental activity, which is not as 'objective' as the perception of the real world, such *property* could only be a *feeling*. In fact, as he claims, the basic structure of every experience is based on *feelings*. In contrast to the most theorists, Mitias uses the term '*feeling*' not as a sensation or emotion, but as a complex combination of four main types of mental ingredients: emotion, idea, image, and sensation. Thus, before an experience becomes aesthetic, Mitias suggests that we should get through different types of processing (e.g. practical, religious, moral, etc.) because experiences are not discrete, but they are developed during a sequence or a flow of individual experiences. Then the life of an agent could be considered as series of experiences in which a type of experience succeeds another. Thus, in the flow of interaction, the agent should switch from emotional experiences to ideas or high-order thoughts etc., constructing finally the whole experience. These complex states (emotions, ideas, images, and sensations) that the agent forms through interaction are considered as the content of the aesthetic experience, which "*is not an activity of passive sense-perception but of a reflective imagination: it is also conscious, purposeful, meaningful, creatively-made, and enjoyable.*" (p. 162). In this way we cannot claim for *'aesthetic objects'* in the sense that they carry some formal characteristics that make them aesthetic. *'The aesthetic character of an object does not belong to its simple nature; it rather befalls the object: "aesthetic-ness" happens to the object'* (p. 164). However, with respect to questions like: *'what makes such a feeling aesthetic?'* or *'In what way, and under what conditions, does a complex experience become aesthetic?'* Mitias suggests that we could not give any credible answers.

Similarly, Roman Ingarden (1961) combines the *affect-oriented* and the *axiologically* approach, in an attempt to investigate how we transit from an ordinary experience to an aesthetic one. He proposes an explanation concerning the functionality of aesthetic emotions primarily based on a set of qualities that we perceive. For Ingarden, aesthetic experience is not a momentary emotion of pleasure or displeasure, which arises as a response to some data of sense perception, but a complex process divided in a number of phases, which contains many heterogeneous elements. Considering that the aesthetic experience starts by perceiving purely the artifact through our senses, the most complex part is the transition from sense perception to aesthetic experience.

The first moment of this process is when the agent is *struck* with a peculiar quality or with a multiplicity of qualities or, at last, with a gestalt quality, while he perceives the physical

properties of the artifact. These qualities will come to perception as properties of an artifact, only if they appear in cognition as independent from relevant circumstances.

Whatever this initial quality may be, it evokes a special emotion, (Ingarden calls it *preliminary emotion*) that starts the process of aesthetic experience. The perception of such a quality is fleeting in a way that when the whole process is suddenly interrupted, the agent probably cannot realize what kind of quality he perceives. As Ingarden (1961) claims, in this first moment we receive the impression of this quality, which means that we experience it rather than we perceive it. Hence, the *preliminary* aesthetic emotion is full of *dynamism- eagerness for satiation (or desire)*, which occurs at the moment we have already been excited with this quality that could potentially fulfill our goal (satiation). Under the influence of the preliminary emotion, the perception of senses is essentially modified by an inner urge to *satiate* with the respective quality in two cognitive stages:

a) The conviction of the existence of the perceived artifact is neutralized from its initial dynamism, and

b) The quality, which has primarily occurred as a property of the real artifact, is set free from its formal structure.

This means that, instantly, the initial quality seems to be a *pure quality*, which in the further phases of the process will alter the real artifact to an aesthetic one. However, it is not clear how the initial *eagerness for satiation* of the artifact could neutralize the awareness of its existence, since this awareness produces the feeling of satiation and finally the artifact becomes 'free' of its form.

In a further phase, according to Ingarden, the *preliminary emotion* changes into a complex emotional experience. This process could be analyzed to three steps:

a) an emotional activity, that make us aware of the quality that is being experienced,

b) a desire to possess this quality and to augment the delight that the respective quality has promised to offer by an intuitive possession of it,

c) a tendency to satiate oneself with the respective quality and to consolidate the possession of it.

All these criteria are set in order to differentiate the aesthetic from the ordinary pleasure as two distinct emotional or cognitive states of mind. This is because emotions are typically undervalued in recent aesthetic theory by concentrating on the role of cognition in aesthetic experience and not by exploring how emotions operate and affect cognition. As Shusterman (1998) argues, thinkers falsely presume that emotions and cognition conflict rather than working together, thus they are led into puzzling conclusions concerning the nature of aesthetic experience. Traditional theoretical approaches fail to recognize the emotional complexity and the pragmatic dimension of experience. While ancient and medieval thinkers explored aesthetics and its role in religious experiences, today's thinkers simply assume that pleasure must be something banally light and

easy that is related to pleasantness or fun. This doubtful conception of the role of emotions in aesthetic experience affects directly the scope of the aesthetic in our lives.

1.1.1.2.2 Which is the scope of the aesthetic experience?

In previous sections we attempted to clarify what constitutes the aesthetic, following the philosophical tradition. However, this seems quite difficult as any attempt to clarify the essence of the aesthetic runs up against the problematic scope of the aesthetic. In aesthetic philosophy there are different conceptions of the scope of aesthetic experience and judgment and none of them seems to be the right one (Budd 2008).

In contrast to traditional approaches that relate the scope of the aesthetic to art, Marin Seel (2008) proposes that aesthetics are mostly related to acts that serve the well-being of the agent. According to Seel, the understanding how the agent perceives the aesthetic is the first step in order to clarify the scope of the aesthetic in our lives. The aesthetic perception depends on how something is presented to our senses. Such a perception does not presuppose a high level of education or high-order thoughts. Aesthetic perception is a basic capacity of our consciousness that can make something present in determinacy or in its indeterminacy. In other words, the aesthetic perception is based on our initial goal to determine and control the undetermined and the uncontrolled in our life.

So aesthetic is what enables us to take pleasure in a situation when we sense something "*not in the determinacy of its being-so but in the distinctiveness of its appearing—in the manner in which it is present here and now (and frequently only here and now) in our bodily surroundings. By lingering with the appearing of things and situations, aesthetic perception acquires a specific consciousness of presence.*" (Seel 2008, 99). In other words, our aesthetic intuition enables the emotion of pleasure as a process that evaluates uncontrolled events in order to control them and act properly. Following this process we do not sense the artifact by determining it logically, but following the essence of its appearance as an evidence to control life here and now. In this context, events are considered as intended actions when a particular occurrence acquires significance in a certain way at a certain biographical or historical moment. In other words, an event occurs when we focus our attention to something that until now was or seemed impossible and suddenly is possible. Historical presence in which such a process takes place, presents near and remote, familiar and unfamiliar, anticipated and unanticipated possibilities for action and thought, experience and desire, which in the various spheres constitute the culture and form of a society.

Summarizing, Seel's claim concerning the scope of the aesthetic is:

> "*Aesthetic experience allows what is indeterminate in the determinate, what is unrealized in the realized, and what is incomprehensible in the comprehensible, to become evident, and it thereby generates consciousness for the openness of presence.*" (Seel 2008, 105)

Therefore, aesthetic perception is a common process, which is possible everywhere and it is not limited to art. Despite aesthetic perception, aesthetic experience refers to an event that leads to enjoyment or pleasure. Aesthetic events function in order to draw our attention and engage us in aesthetic experience. When we attempt to evaluate and control unexpected events and this process is not based on any kind of cognitive or logical processing (following the Kantian tradition) these events are considered as aesthetic. However, the process by which the agent 'mindfully' assigns values to these events and transforms the uncontrolled to control, is still unspecified in these writings.

1.1.1.3 *The value in aesthetic experience*

As it has explained in the beginning of this chapter, the aesthetic experience is considered as an experience of great value. Kant argues that the experience of organization in nature leads to the idea of an existence of a designer and a design that they have a purpose beyond nature. This purpose has no scientific value though it has great moral value in leading us to see our own moral development as the only possible ultimate purpose of nature.

Thus, value is another inner force of ours, which gives us the ability to evaluate all those factors that may allow us to fulfill our purpose as living systems. From the Kantian perspective *"the experience of our insignificance in relation to physical forces leads us to the realization that there is another force in us, the faculty of practical reason and the freedom of the will that it gives us, which gives us a value that cannot be damaged even by forces, which would suffice for our physical destruction. This again produces a complex mix of displeasure and pleasure, which is even closer to the moral feeling of respect."* (Kant 2000, xxxi). However, the notion of 'value' seems to be another ambiguous concept in aesthetic philosophy (Lorand 2000) which has at least two distinct meanings:

1. The value as ordering principle:

    "A value is an ordering principle, a concept that is chosen to serve as a criterion for determining the worth of particular cases in the relevant domain." (Lorand 2000, 209)

In this sense, value expresses a choice or a preference. It is a principle chosen to determine the worth of particular situations. The selection of these principles and their hierarchy is dependent on the context, which could also be sociocultural. For example, considering that health is a value, then eating ice cream is bad while eating carrots is good. But considering pleasure as a different value, we can say that eating ice cream may be considered better than eating carrots. In the question "which value is the right one to evaluate the situation?" there is not just one answer. It depends on the hierarchy of the respective values that one holds for the current situation: one may put pleasure above health, but another may put health above pleasure. According to Lonard (2000) these types of values are neither moral nor aesthetic, but they can affect both moral and aesthetic judgments. Although values are not aesthetic *per se* (in the sense that it is exclusive to

aesthetic evaluation), aesthetic evaluation could use this value-hierarchy that someone holds for a situation.

2. The values as a degree of order:

> *"A value is the measure of a given set—its degree of coherence with a chosen ordering principle." (Lorand 2000, 209)*

In another sense, value is the degree of *conformity* found in an object, which has an inner ordering principle. For instance, the value of carrots as healthy food is probably higher than the value of ice cream. Accordingly, we can consider beauty as a value that is at the top of the aesthetic order. However, low degrees of this order are aesthetic values which are placed lower than beauty. So, an ugly object also exhibits its aesthetic measures.

According to Lonard (2000), preferences and their hierarchy may be dynamic, traditional or could be dictated by our natural tendencies. In contrast, as Lonard claims, the value of an object as degree of order is not a matter of choice. It expresses a relation found between two given elements: the set and its principle. For example. admitting that carrots contain more vitamins than ice cream does not determine the actual preference for carrots over ice cream. The "objective" measure does not determine the hierarchy of values.

The question one may ask about this conception, is how do artifacts get their degree of order. Who establishes the objective measure? What if someone hates the orange color of the carrot and the brown color of the ice cream? Which could be the objective measure at a given moment? The claim is that there are socio-cultural and natural tendencies that affect our goals and the way we assign values to artifacts, which may help us accomplish our natural purposes. So, if someone's goal is to take vitamins from food could the carrot be for him an object with great value or a beautiful object of nature? Otherwise, if the goal is a sweet flavor, could the ice cream be the best choice for him? In the context where aesthetic experience presupposes *disinterestedness,* it is very difficult to say that those values lead to the claim of beauty.

1.1.1.3.1 Values and emotions

A possible solution to the respective problem of aesthetic value could be based on the correlation between values and emotions. The aesthetic emotions of pleasure or displeasure could assign quantitative values in various degrees of intensity, as two poles with positive and negative measures. However, most of the authors which accept the Kantian account of aesthetic experience, even though they argue about the hedonic dimension of our activities, they mistakenly relate the positive value of the aesthetic with pleasure. For instance, according to Bahm (1947) every emotion of pleasure is directly related to beauty and as such emotions and beauty share an intrinsic value. Since an aesthetic value is irrelevant to aesthetic sensitivity that someone exhibits (or learns) in detecting (or seeming to detect) aspects of an artifact, someone could assign a value to an artifact without indicating any properties of it or particular characteristics that could be considered as attributes (Budd 2007). In order to understand this traditional account of aesthetic

experience we must bear in mind that aesthetic experience is valued for its *own sake* and not for the sake of anything else (specific attributes of the artifact). As we have seen so far, what differentiates an aesthetic experience from other sorts of experience counts on disinterested pleasure (see §1.1.1.1.1). Under this hypothesis aesthetic experience is not goal-oriented and we assign value to it *"for its own sake, because it is held to be intrinsically, rather than instrumentally, valuable"* (Carroll 2000, 44). Summarizing, the aesthetic experience takes a value, which comes from disinterested emotional responses, correlating the aesthetic emotion of pleasure with aesthetic positive value and beauty.

However, there is another perspective, in which aesthetic emotions of pleasure are not correlated to positive values. Considering that the aesthetic assigns values to the artifact through our emotions, the argument is that there are values, which can be present in aesthetic experience without the existence of pleasure. Pleasure can be absent form an experience that is aesthetically valued. Experiences of displeasure (e.g. a disturbing shock, fragmentation, disorientation, puzzlement, horror, protest, or even revulsion) can be valued for the feelings and thoughts they provide. Feelings of displeasure can give rise to a distinctive form of pleasure at a higher level of cognition. For instance the experience of a frightening movie that finally pleases the audience. Additionally we can find valuable the experience of a certain shock without having been able to transform its disturbing character into some higher pleasure (Shusterman 2006).

This argument shows that the outcome of an aesthetic experience is necessarily a value, which could not be the one of pleasure. We can claim for positive values that they are not necessarily based on feelings of pleasure, and negative ones that they are not necessarily based on the feelings of displeasure. This means that the feeling of displeasure could lead to an experience with positive value, which is a positive aesthetic experience and which could be related to beauty.

Summarizing, we can say that aesthetic experiences could be considered all those experiences that are anticipated or intended to deliver pleasure or enjoyment to us. Under this perspective, an unpleasant aesthetic experience is still an aesthetic experience that finally fails to deliver pleasure (Carroll 2002). In other words every aesthetic experience that fails to fulfill the anticipated outcome is an unpleasant aesthetic experience. This explanation gives to aesthetic experience a broad meaning that shifts from the sensory pleasure or displeasure to expectations and anticipations that are formed by the deliverance of pleasure or not. For example, when someone is pleased with sensory pain, he anticipates from the artifact the kind of "pleasure" yielded from unpleasantness. In the case that such "pleasure" fails to be delivered because the artifact delivers sensory pleasure or combinations of them, then the individual experiences aesthetic unpleasantness, while he is still in aesthetic experience.

1.1.2 **The problem of beauty**

According to Plato beauty is a very serious matter to be commandeered by art. So art needs to be cut off from beauty. Arguably, Plato's concept of beauty is quite different from the modern

aesthetic concept. In his writings, Plato uses the Greek term *kalon,* which is translated as 'beauty' or 'fine'. Fineness is what pleases us, as we hear or see things. Beauty finds its most significant treatment in the dialogue *Symposium*, in the speech of Socrates. This speech is usually seen as revealing Plato's own philosophical views. In Socrates' account, beauty is love's highest object. This is beyond the beauty of things as they occur through the senses. The eternal, unchanging and divine *form of beauty* is not accessible to the senses, but only to the intellect. In the sensible world, something is beautiful at one time and not at another; in one respect or relation and not in another; to one observer and not to another, thus giving variability to beauty. However, the beautiful itself lacks all such variability. The *Form of Beauty* is itself beautiful (Janaway 2001).

From another point of view Aristotle considers beauty as a real property of things, in terms of magnitude and order. While order is a result of logical thoughts, magnitude results from several cognitive processes in the perceiver's mind. Smallness or largeness are not absolute qualities but they reflect the position and cognitive abilities of the viewer (Potolsky 2006). Aristotle speaks for a context-dependent conception of beauty where magnitude is a necessary condition, but magnitude is relative to a thing's nature and the same holds for order and proportion. Particularly, he argues that beauty has a dynamic nature and changes its meaning as the context and our personal development are also changing through the years. Aristotle claims that beauty relies on both order (that is, completeness) and magnitude. An interesting argument is that Aristotle considers beauty as ability that it is not limited to human beings. He argues that all living things, according to their design, have an inner purpose to complete: they have to stay alive (an mechanism of self-maintenance) and this is what beauty refers to. According to Aristotle's argument, beauty is connected to such functionality, which does not belong to the object itself but to the agent in connection to object (Pappas 2001). So, an object of beauty (physical or not) is the one that could provide the agent with such meanings that aid him to complete their purpose.

Even though Aristotle's view on beauty exhibits many potentialities for a credible explanation that grounds beauty into dynamic cognitive and biological processes, which determine agent's purposes and goals, Plato's approach to beauty persisted for many centuries and still remains a powerful influence in aesthetics. Only in the eighteenth century thinkers reconsider the role of the perceiver's personal development in the perception of beauty. The source of beauty was no longer considered as a quality of things. For Hume and the Romantics, beauty is directly related to emotional activities, and the pleasure that came from beauty lives in our senses similarly to sight and taste.

Kant believed that the source of beauty is originated in *a priori* ideas embedded in man's mind and is manifested while he experiences things. Thus, the perception of beauty was relegated to the domain of taste, but in a way that is beyond a subjective opinion. As it is mentioned in section §1.1.1.1, Kant argues that an object is beautiful under the condition that it gives us pleasure through a mental state (similar to cognition) entitled "free harmony of the imagination and the understanding". Whatever this mental state might be, it puts the judgments of beauty above mere

subjectivity. Which means that Kant, in a way, tries to justify a kind of "objectivity" about aesthetic judgments (Hagman 2005; Rogerson 2008). In fact, when he argues that aesthetic judgments are "*cognitive subjectively universal*," he actually claims that judgments of beauty are *cognitive subjectively objective.*

The subjective aspect of beauty derives from the objective structure of emotions. Only when emotions have positive values of high order (e.g. emotions of great pleasure), beauty comes into perception (see §1.1.2) but this is not enough to establish beauty. We can speak for beauty only when the object evokes great pleasure to everyone, which means that it is universally pleasing. It is this claim about universality that makes aesthetic judgment like an objective empirical judgment. The question here is how can we be so sure that our aesthetic judgment could be universally "valid" in this world, since we know that different socio-cultural contexts produce different reflections, different emotions and thus different aesthetic representations? Is it valid to claim that the same object in different socio-cultural contexts could produce universal pleasurableness? So the *first problem of beauty* lies to the possibility of the attainment of a universal pleasurableness. Otherwise, beauty is impossible.

The *second problem of beauty* concerns the meaning of "free harmony" between imagination and understanding in order to experience beauty. When exactly could someone act in this mental state and how such a state could lead only to a pleasure that is universally accepted? This argument is quite controversial. The Kantian perspective of beauty is based on the argument that the aesthetic object provokes us to make such associations (in a harmonious play between understanding and imagination) of its elements, that come together in such a way to illustrate high order *ideas* that go well beyond an ordinary experience. In this way, aesthetic appreciation could be about moral, religious or other *ideas* that they can never be known by mere empirical cognition. 'Free harmony' is a deeply paradoxical notion that cannot be adequately explained under usual interpretations (Rogerson 2008).

The *third problem of beauty* derives from the second and concerns the claim for 'disinterestedness' in aesthetic perception. Kant (2000) connects the aesthetic judgment and thus the judgments of beauty to what he calls 'subjective' purposiveness. Purposiveness is a condition by which the agent fulfills his fundamental purpose. In the case of the aesthetic, a purpose is fulfilled in such a way that is accompanied by emotions of pleasure or displeasure. According to Kant emotions are the only kind of sensation that we do not automatically transform into a judgment about artifacts, and thus they are interpreted exclusively as a sign of our own mental condition. Kant's basic idea is that when imagination is in a free harmony with representations and the agent is unguided by any predetermined concept of what the object is or ought to be in order to serve a purpose, only then understanding fulfills its aim to find unity in experience. Emotions of pleasure endure the feeling of satisfaction that brings such unity, but in a way, that keep the agent unspoiled from any interest, concerning the purpose of the object itself.

In contrast to Kant, Hegel who was inspired by Plato, understands beauty as a property of the object itself. Beauty is considered as the direct sensuous manifestation of freedom (truth), not just the appearance or imitation of freedom. Since true beauty is the direct expression of freedom, it must also be produced by free spirits for free spirits, and thus it cannot be a mere product of nature. Nature can produce 'formal' beauty, and life is capable of what Hegel calls 'sensuous' beauty but 'true' beauty is found only in works of art that are freely created by human beings to bring a free spirit before our minds (Houlgate 2010). Hence, *only artistic beauty reveals absolute truth* through perception. He claims that the conception of beauty in aesthetic artifacts (artworks) carries a metaphysical knowledge that reveals what is unconditionally true (Wicks 1993). This *absolute truth* offers a perception of '*the divine*' or '*what is godlike*' that is apprehended equally to descriptions of an ancient god's appearance (Wicks 1993; Wicks 2009). From Hegel's view, the task of beauty is to display 'the divine' aspect of humanity (with its attendant principle of self-consciousness) and its respective expressions. These expressions are far above either the inanimate natural beauty of sunsets and rainbows, or the sentient beauty of creatures such as butterflies, etc. According to this view, degrees of beauty correspond to the degrees to which self-consciousness is made perceptible (Wicks 1993). Hegel distinguishes judgments of beauty from other kinds of value judgments in terms of the specific purpose that beauty has. A judgment of beauty in general, involves an estimation of the purpose of a beautiful thing, which through the object, as a medium, expresses 'the divine' or evokes the perfection (Wicks 1993).

For centuries, emotion and cognition have been conceived as distinct and opposed forces that guide our perception and action. Falsely, most of the thinkers presume that emotions and cognition conflict rather than work together, leading in to puzzling conclusions concerning the nature of aesthetic experience and the real meaning of beauty. In this way many thinkers consider beauty as a conceptually abstract notion that is perceived in a non-sensory path. Emotions are affected by our natural purpose, but in a way that keeps the agent unspoiled from any interest concerning the purpose of the object itself. These traditional theoretical approaches fail to recognize the role of emotions in our everyday life, and how they do affect our decisions and judgments. Modern theories challenge most of the arguments that constitute the aesthetic tradition, making all those claims for the aesthetic experience and pure beauty really groundless. Modern contributions to aesthetic adopt a naturalistic view in the sense that aesthetics are a combination of mental phenomena that are included in what we call aesthetic experience. This approach changes the whole attitude of how modern scientists approach the aesthetic. Their new claim is that we can understand aesthetics in detail as a consequence of natural processes that are revealed by science, without the need of resorting to supernatural transcendental explanations. Most of the thinkers who firstly attempted to reconsider the meaning of the aesthetic under the naturalistic conception, are known as Pragmatists.

1.2 THE PRAGMATIST ALTERNATIVE

As discussed above, certain Western aestheticians adopt a metaphysical approach to the aesthetic, which has been traditionally defined in opposition to the practical and it has been characterized in (Kantian) terms of disinterestedness and purposelessness (Shusterman 2009). However, there is a group of twentieth-century thinkers that could also be considered as adopting a metaphysical perspective. This perspective of philosophy might be designated as *American Naturalism* that embraces a number of philosophers, who have called themselves Naturalists, Materialists, Pragmatists, Instrumentalists, or Contextualists (Beardsley 1975). As prior aesthetic theories were considered to be too speculative and unclear, Pragmatists aim to link the aesthetic experience to natural processes by means of the respective functionality that governs the human nature. So, one of the most central features of aesthetics for Pragmatists is Naturalism. However, Pragmatism has long recognized the great significance of the aesthetic, not only for life but also for philosophy itself.

John Dewey and his work *Art as Experience* (1980) is regarded by many as one of the most important contributions to this area in the 20th century. Dewey along with most noteworthy American Naturalists as George Santayana, Sanders Peirce and William James attempted to ground aesthetic experience in our natural needs and the respective embodied activities of our organism (Shusterman 2001). Even though William James and Sanders Peirce have not paid very close or persistent attention to aesthetic problems, they have made a significant contribution in the conception of the aesthetic (Beardsley 1975) and preceded and influenced Dewey and altogether constituted the three towering figures of classical pragmatism (Shusterman 2009).

According to Dewey's (1980) naturalism, the aesthetic has the same scope as all other activities in human beings; to serve their well-being. In other words, aesthetics are there to aid us to fulfill our initial goals. Thus, aesthetic experience should be understood in terms of the conditions of life, which means that is grounded to our basic vital needs, and their satisfaction. Since life goes on, not only in an environment but also in interaction with that environment, the aesthetic experience needs to be considered as a part of this interaction. This conception of aesthetics stands in sharp contrast to the extreme emphasis on disinterestedness, which analytic aesthetics inherited from the Kantian tradition (Shusterman 2001) (see §1.1.1.1.1). In his Carus lectures, *Experience and Nature*, Dewey (1929) proposes that there are two alternatives in understanding the meaning of aesthetic experience. The first is to consider the aesthetic as a *'continuation, by means of intelligent selection and arrangement, of natural tendencies of natural events'*, and the second is to consider the aesthetic as something that is *'dwelling exclusively within the breast of man'* (p. 389). The latter is compatible with the existing philosophical tradition, while the former gives a new orientation to aesthetics: aesthetics are the outcome of *'dealing with natural things for the sake of intensifying, purifying, prolonging and deepening the satisfactions which they spontaneously afford'*. Through this process, new meanings are developed providing the agent with new traits of enjoyment as every other activity. Hence, for

Dewey the aesthetic experience is not another type of experience but it is part of every experience that the agent has, as he moves for 'consummation' (Beardsley 1975). So, in order to understand how aesthetics are developed in our perception, he proposes to turn away our focus from the experience of art to ordinary experiences.

Considering the aesthetic experience in this wider sense, the aesthetic provides such a quality that could characterize natural situations as they occur through interaction (Dewey 1929). Hence, for Dewey the aesthetic is a product of interaction between the agent and its environment. Such interaction involves a reorganization of energies, actions, and materials. This means, that the physiological processes that constitute the aesthetic are not confined only to the artist/designer. The perceiver, the other part of interaction, must be engaged in this process by his natural feelings and energies, as well as his physiological sensory motor responses in order to experience the aesthetic (Shusterman 2001). In this way the object reflects to the agent emotions and ideas that are associated with his chief institutions of his social life (Dewey 1980).

As Dewey claims, harmony, union and equilibrium are not the results of mechanical processes but of rhythmic resolution of tension. Hence, every time that the agent loses the integration with environment and then recovers the equilibrium, new conscious meanings emerge in him (Dewey 1980). Dewey understood that the origin of this process is linked to adaptation to the world, a precarious place, fraught with insecurity, instability and uncertainty (Schulkin 2009). Our emotions, according to Dewey, are conscious signs (or signals) of a break in experience that happens by alterations between far-from-equilibrium and equilibrium. Such breaks could be actual or impending through interaction and they can be resolved through reflective action. Dewey calls the inner tension for stability or harmony '*desire for restoration of the union*' (p. 15) and converts, as he claims, '*mere emotion into interest in artifacts, as conditions of realization of harmony*'. This means that artifacts come to our interest or we assign meanings to them, not as mere artifacts but as conditions that support potentialities of harmony or stability.

Following the above argument, everyone (not only the artist) could have an aesthetic moment when between the moments of stability one develops ideas of acting and corporate them as meanings into artifacts that he interacts with. In fact, as Dewey (1980) claims, agents do not have to project aesthetic emotions into the artifacts they experience. Aesthetic emotions elicit from the reestablishment of the equilibrium. Experiences are constituted by '*rhythmic beats of want and fulfillment, pulses of doing and being withheld from doing*' (p. 16). In such experiences the action, the emotion, and the meaning consist a single whole and their outcome is balance or counterbalance, harmony or disturbance, success or failure. This process is not static nor mechanical but dynamic in interaction. According to Dewey (1980), there are only two sorts of possible worlds in which aesthetic experience would not occur. The first is in a '*world of mere flux*', where '*stability and rest would have no being*', and the second is '*a world that is finished, ended, would have no traits of suspense and crisis, and would offer no opportunity for resolution*' (p. 17).

Thus, pleasure is a product of a fulfillment of the inner desire for restoration of stability. In the process of living, the attainment of equilibrium is at the same time a start of a new relation between the agent and the environment that will bring about new emotions and will assign new meanings into artifacts.

A promise of a delightful perception (anticipation for equilibrium or stability) is for Dewey the aesthetic experience.

Hence, every experience formed in order to fulfill a goal, always evokes an emotional reaction and this makes the experience an aesthetic one (Dewey 1980). When this experience satisfies us emotionally, then we talk about a positive aesthetic experience. This conception of aesthetic experience proposes that there is no clear separation between the aesthetic and the intellectual, since every purposeful interaction engages emotions. As he claims:

> '... esthetic cannot be sharply marked off from intellectual experience since the latter must bear an esthetic stamp to be itself complete.' (Dewey 1980, 38)

The above argument is grounded on another claim concerning the unity of our experience. According to Dewey, our experience cannot be divided to emotional, intellectual and practical. *'The "emotional" phase binds parts together into a single whole; "intellectual" simply names the fact that the experience has meaning; "practical" indicates that the organism is interacting with events and artifacts which surround it'*. Hence, the aesthetic experience elicits in every interaction as the agent attempts to fulfill his goals. In this way, it can be said that aesthetic values cannot be permanently fixed by assumptions of aesthetic theory or criticism but they evolve dynamic as we developed through experiences (Shusterman 2001).

Several philosophers like Goodman and Beardsley have built on the Deweyan perspective to enrich the tradition of pragmatist's aesthetics and apply it to more contemporary aesthetic issues. They reject the idea of *autonomous aesthetic artifacts*, which are valued merely for the pleasure of their form. Considering aesthetics as a part of the cognitive function, their perspectives should be conceived as an integral part of metaphysics and epistemology. Goodman, Dewey and Beardsley insist that what we perceive aesthetically is not about the object's structure but how it functions in dynamic experience (Shusterman 2001).

Pragmatism introduces a cognitive perspective to aesthetics proposing that they are a way to cope with the world, to represent the world, to learn, to reduce some of its uncertainty to something predictable.

Nowadays researchers from several scientific fields focusing in cognitive the emotional phenomena that take place through interaction, attempt to approach the mystery of the aesthetic by studying its impact in the human body. Neuroaesthetics is a growing field of research in neurobiology concerned with the biological foundations of aesthetic experiences.

1.2.1 **The aesthetic experience in neurobiology**

One of the central arguments in epistemology, ontology, and philosophy of mind especially for Pragmatists as William James, is that our experience with the world is not a fixed, independent, and immutable given set of processes but it is rather based on complex outcomes of types of functions that are linked to embodied biological processes that help us to make selections. Those criteria that aid us to make such selections are in large part aesthetic (Shusterman 2011).

1.2.1.1 *Embodied aesthetics*

Under this *somatic naturalism* of Pragmatism, Shusterman claims that,

> *'aesthetic experience is not otherworldly emanations from a divine ethereal Muse but rather embodied expressions of natural energies engaged in our living interaction with our natural and cultural contexts, but also mediated and refined through these contexts. Our highest artistic expressions and most sublime aesthetic experiences, no matter how culturally mediated, are ultimately grounded (like our culture itself) on underlying aesthetic dispositions that have evolved in conjunction with the biological and experiential development of our bodies and our brains (which, of course, are part of our bodies)* (Shusterman 2011, 351).

For James (1890), aesthetics are mostly about perceptual feelings that give pleasure or displeasure. All these perceptual feelings are essentially somatic. This means that perceptual feelings do not only require bodily organs for sensing and acting, but also require the feeling of awareness of those bodily functions and internal conditions that our own body experiences during interaction. Thus, our embodied perceptual feelings of pleasure are linked to somatic instincts and appetites that are shaped by our evolutionary and personal history. As Shusterman (2011) claims, James's view to somatic naturalism does not reject bodily instincts (for instance the appetitive instincts) from the aesthetic experience. For James there is continuity between more basic, instinct pleasures and more abstract and refined forms. The sensuous pleasures have an aesthetic character in essentially the same way as the formal harmonies of artifacts (artwork, music, etc.). He insists that emotions are essentially bodily functions and we perceive the aesthetics because of them.

James (1890) was the first to distinguish between a primary and a secondary layer of emotional response to aesthetic stimuli. The primary layer consists of subtle feelings, which is pleasure elicited by harmonious combinations of sensational experiences (lines, colors, and sounds). These primary aesthetic emotions derive through specific teleceptors and those brain areas that detect the design of the artifact. This level offers an immediate pleasure in certain pure sensations and combinations of them (Shusterman 2011). To this primary layer a secondary layer can be added. The secondary layer of pleasure offers elegance in aesthetic taste. So, even an optical or auricular feeling is a bodily feeling and it involves our body's active attention. In most cases, the simple, primary and immediate sensory pleasure is enriched by added secondary pleasures, providing thus an aesthetic experience.

Therefore, in the search for the origins of aesthetics, what should be accepted is that emotions play an important role in which what is pleasant or unpleasant, a reward or a punisher results from an evolutionary process in which genes define what serves our goals for action (Rolls 2011). By the term reward, Rolls refers to anything for which an organism (which includes humans) will work, and by the term punisher, to anything that an organism will escape from or avoid. Many approaches or theories of emotion involve an evaluation whether something is rewarding or punishing. Rolls proposes that emotions can be usefully seen as states, providing values that are produced by instrumental reinforcing stimuli. Such value will be assigned as the stimuli activates our reward or punishment systems according to our goals that through evolution will increase the fitness of our genes. Moreover, these gene-defined goals may include a wide range of reinforces, including many involved in social behavior, and define some of the things that make people and objects attractive.

In an attempt to naturalize aesthetics, researchers from fields that do not traditionally study the aesthetic are now trying to give explanations in terms of the biological functions that take place through the aesthetic experience. Studies from neuroscience and evolutionary biology deny a separation of art and non-art, and claim that aesthetic processing is biological and adaptive in its scope (S. Brown et al. 2011). The aesthetic experience has direct physical effects not only on the body (e.g. the nervous system, cardiac rhythm, muscle tone, breathing etc.), but also in the brain itself. Most of the studies have shown that the aesthetic processing is correlated with areas in the brain that are also responsible for the emotional activity. Hence, there is a new field of research, emerging at the intersection of psychological aesthetics, neuroscience and human evolution, named Neuroaesthetics. Neuroaesthetics is a term coined by Zeki (1999) and refers to the study of the neural bases of beauty perception in art. The main objective of Neuroaesthetics is to characterize the neurobiological foundations and evolutionary history of the cognitive and affective processes involved in aesthetic experiences and artistic and other creative activities.

1.2.1.1.1 Neuroaesthetics

Although neurologists are typically concerned with medical problems and solutions, they recently have shown interest in exploring the nature of our aesthetic responses. The exploration starts by understanding how the visual brain works. In particular, how the brain discards the inessential information from the visual world in order to represent the proper character of the objects (Cinzia and Vittorio 2009). These studies observe the way information from the senses becomes meaningful in the brain and the way emotion and cognition governs the experience of both life and art (Barry 2006). As the work of many researchers in neurology shows, aesthetic experience can now be considered as a neurological function based on evolutionary cognitive development.
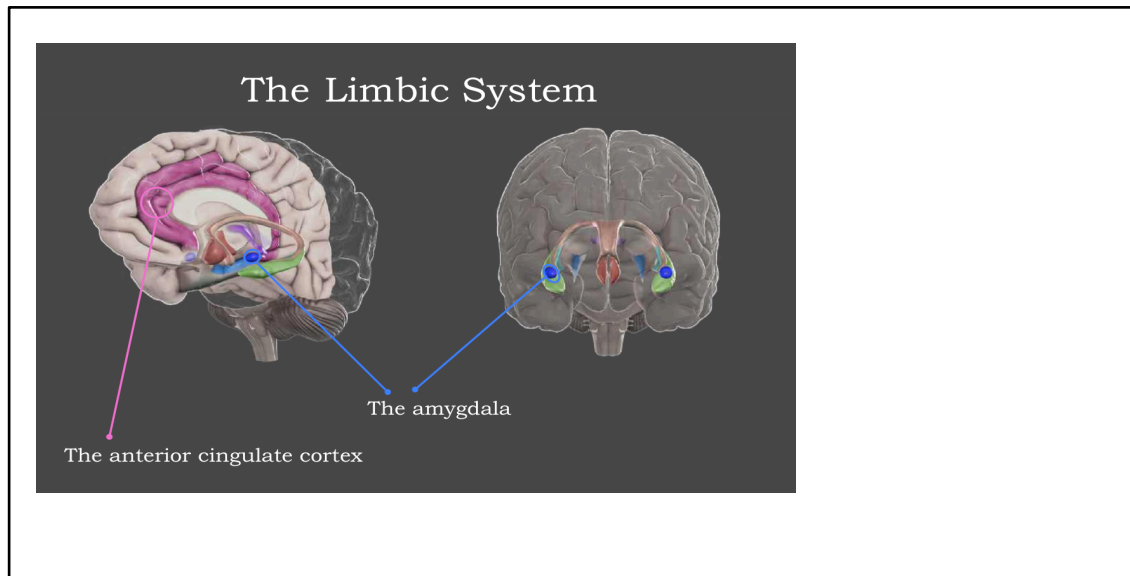
Figure 3 The limbic system is a complex structure of nerves and networks in the brain, involving several areas near the edge of the cortex concerned with instinct and mood. This area of the brain is intricately involved in motivation and basic emotions like fear, pleasure, or anger and drives hunger, sex, dominance, care of offspring. Also the limbic system receives incoming sensory stimulation (sights, smells, tastes) that activate rather automatic emotional reactions (Reeve 2008; Fellous, Armony, and LeDoux 2003). However, the limbic system anatomical concept and the limbic system theory of emotion are both problematic (LeDoux, 2000).

The aesthetic processing begins with a visual analysis of the stimulus, which then undergoes further levels of processing. This progression of processes may lead to an aesthetic experience on the basis of some biological and embodied mechanisms that can be formed by factors such as the socio-cultural context, the goals of the perceiver and his prior knowledge. This is a fundamental function of our cognitive development, where the perceptual function, "…derives primarily from an interaction with the environment and thereafter develops according to accumulating knowledge and emotional influence and memory" (Barry 2006, 137). Even more fundamental is the distinction between emotions- directly associated with aesthetics- and the cognitive processes that may produce rewarding experiences to the beholder. Hence aesthetic processing, at its core, can be equated with appraisal processes, resulting in emotions and other cognitive processes which are the major factors in guiding motivation and decision making. Therefore, as neuroscientists expect, aesthetic experience could involve neural pathways and brain areas that are responsible not only for perception, but also for homeostatic processing, emotions, motivation, and motor control as well (S. Brown et al. 2011; Cinzia and Vittorio 2009).

According to Barry (2006), the brain, as a controller of our biological system acts in this way only because it has evolved through experience within a larger environment. '*As natural selection predicts, as we adapt to our surroundings the circuitry in the brain adapts by building new circuitry, reinforcing existing circuits through limbic system reinforcement and repeated use, and by weakening and reabsorbing connections that are no longer useful'*. (p. 137). Hence, according

to this conception, all of our knowledge, emotional influence and memory derive from our interaction with the environment that is supported by a perceptual system upon which all communication is built. In that sense, what we perceive as pleasurable is based on recognizable patterns linked to evolutionary survival mechanisms. Hence our aesthetic response may also be considered as a result of utilizing those basic cognitive and emotional mechanisms.

Ramachandran (2003) argues that the solution of the fundamental aesthetic problem (i.e. what is the origin of aesthetics and what is an aesthetic judgment) lies in a better understanding of the connections between the visual centers in the brain, the emotional limbic structures (Figure 3) and the internal logic, which drives them. The visual system functions by generating visual images. Through its 32 subsystems, and as a part of a larger network of systems, the visual system interacts by using neural images. Particularly, Ramachandran and Hirstein (1999) claim that when the agent stares at any object, the image is extracted by the 'early' visual areas and sent to an area of the brain, the inferotemporal cortex which specializes in pattern recognition problems involving choice and discrimination (Figure 4). Neurons in this region typically respond to very large areas of the visual field and their responses are highly modified by visual experience and by the nature of the visual task currently being executed (Bridgeman 2003). As Fukushima (2003) claims, the visual system seems to have a hierarchical architecture in which simple features of the object are first extracted from a stimulus pattern, and then integrated into more complicated ones,

The **inferotemporal cortex** is the inferior surface of the temporal lobe that is particularly important for object recognition.

Anatomists have long considered **the temporal pole** as a part of an extended limbic system playing role in social and emotional processing.
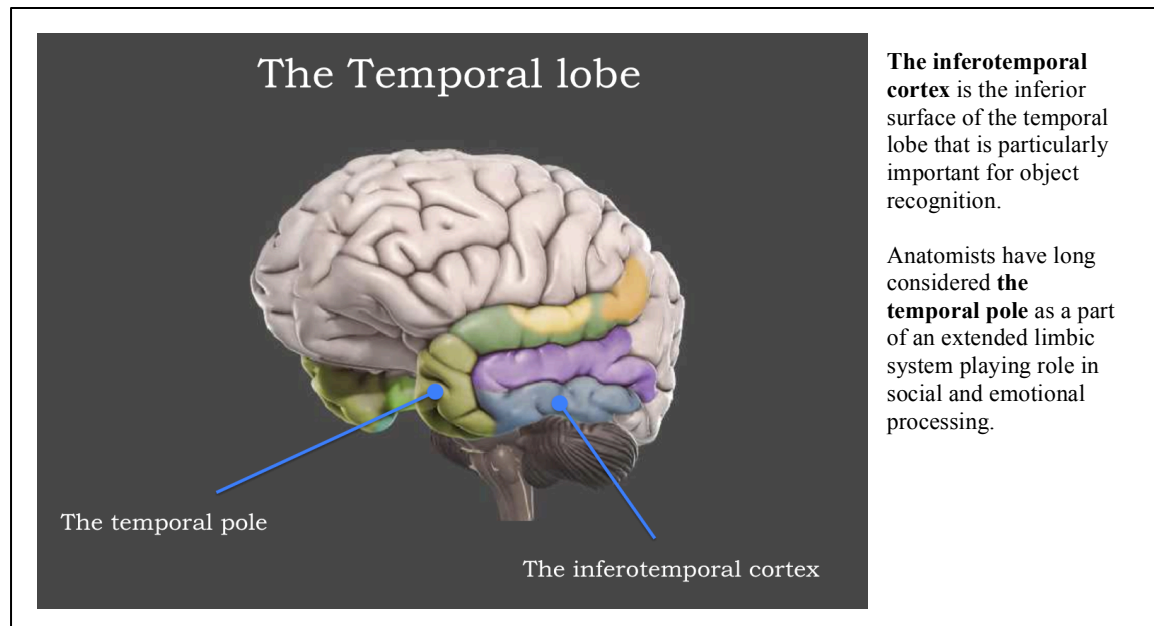
Figure 4 The temporal lobes are important for the processing of semantics in both speech and vision. Hippocampus which is contained in the temporal lobe, plays a key role in the formation of long-term memory. It also subserves functions of language, emotion, and memory.

developing a hierarchical network that consists of many layers of neuron-like cells. There are forward connections between cells in adjoining layers. Some of these connections are variable

and can be modified by learning. This means that the process of recognition in the inferotemporal cortex can acquire the ability to be enhanced by learning, based on previous visual experience of similar objects (Fukushima 2003; Tanaka 1996).

When "the object has been recognized, its emotional significance is gauged by the amygdala at the pole of the temporal lobe and if it is important, the message is relayed to the autonomic nervous system (via the hypothalamus) so that you prepare to fight, flee, or mate" (Ramachandran and Hirstein 1999, 32). The image produces a limbic (emotional) activation, which is mostly unconscious. Hence, for Ramachandran and Hirstein, aesthetic responses may similarly be only partly available to conscious experience.

Stimulation studies show that mental images, thoughts and feelings, as well as visceromotor and hormonal responses, are produced by the amygdala in the limbic system (Figure 3). However, amygdala processes might still precede any conscious evaluation (van Reekum and Scherer 1997), which does not pertain to aesthetics, since from another perspective, Damasio (1995) argues that there might be the case that the frontal lobe influences the development of affective responses, which are suited to a new interactive situation. Patients with damage in this area, even though they have stable representations or factual knowledge of future outcomes (i.e. anticipation), they lack the capacity to mark a positive or a negative value, regarding those outcomes, which in turn results in the inability to reject or accept a future outcome.

If these allegations could be empirically confirmed, then, as van Reekum and Scherer (1997) specifically state, "the frontal lobe can be considered as a crucial relay station in emotion-related processing in the sense of affectively priming conceptual processes" (p. 276). This shows that not only the amygdala, or the limbic system in general, is responsible for the evocation of emotional responses related to aesthetic appreciation. Additionally, Jacobsen et al. (2006) argue that aesthetic judgments produce activations in the brain located in the medial wall and bilateral ventral prefrontal cortex, regions which have been previously reported for social or moral evaluative judgments on persons and actions. They also mention the fact that aesthetic judgments are also engaged in the left temporal pole and the temporoparietal junction. However, when the participants in an experiment judged a pattern to be beautiful or not, it appears that not only brain areas- dominant in aesthetic judgments- are engaged, but there is also the specific engagement of another area, which has a fundamental role in the processing of more logical judgments, such as symmetry for example. Moreover, common activations of the aesthetic and the symmetry judgment reflected that participants encountered decisions under uncertainty, as indicated by activation of mesial BA8, anterior insula, and ventral tegmental area. In the aesthetic versus symmetry judgment, the center of activation was located within BA 10/9, and BA 10 activation was restricted to its polar subdivision. Functionally, this region has been related to the explicit processing or introspective evaluation of internal mental states, i.e., one's own thoughts and feelings. The notion of evaluation of internally generated information (as in contrast to externally available information) takes into account that the same area and networks were found in tasks

related to mentalizing, which requires self-reference as well. Additionally, the co-activation of the temporal pole with BA 10 in aesthetic judgment, has been suggested to be concerned with generating, on the basis of past experience, a wider semantic and emotional context for the material currently being processed (Jacobsen et al. 2006) (Figure 5).

The prefrontal cortex of the frontal lobe seems to play an important role in our every day experience and probably in aesthetic experience. Activations in this area are related to both working memory and social modeling, maintaining an abstract representation of the world that allows anticipation of future interactions. Moreover, the prefrontal cortex aid the development of affective responses, which provide the capacity of assigning positive or negative values, giving the agent the inability to reject or accept a future outcome (Damasio 1995; van Reekum and Scherer 1997).

The prefrontal cortices integrate the outside world, the state of the internal milieu, and the recognition of drive-relevant objects with knowledge (learned social rules, previous experiences) relating to reward and punishment.
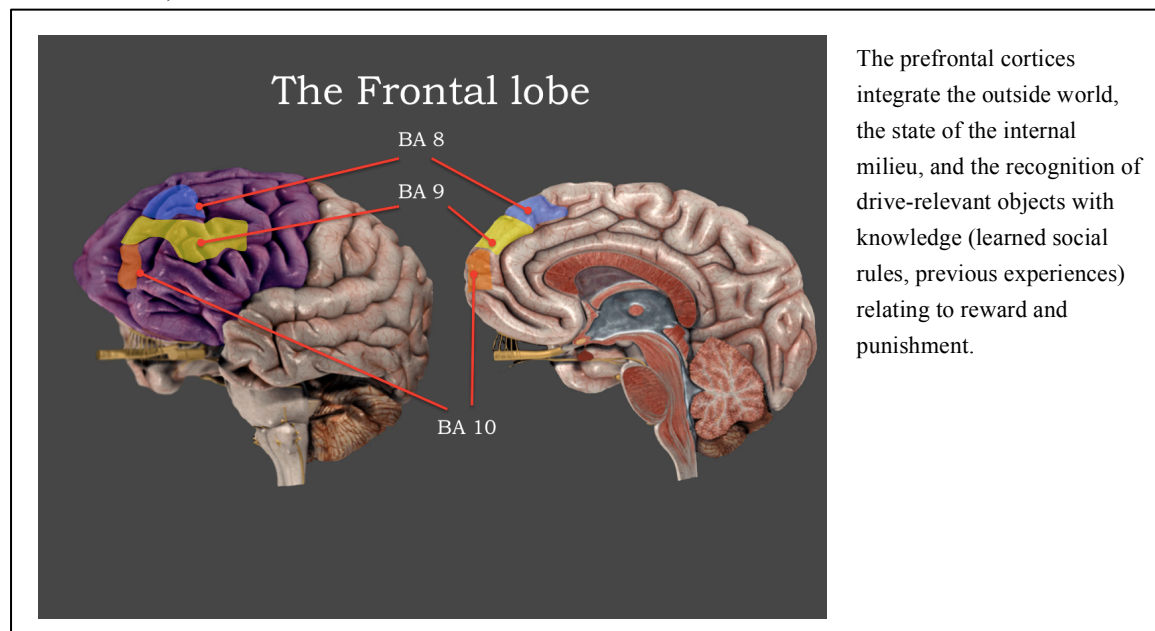
Figure 5 Aesthetic judgments produce activations in the brain located in the medial wall and bilateral ventral prefrontal cortex, regions which have been previously reported for social or moral evaluative judgments on persons and actions.

According to Rolls's (2004) review paper on the functions of the orbitofrontal cortex, the prefrontal cortex may be divided into three main regions. One of them is the region of the magnocellular, medial part of the mediodorsal nucleus projects to the orbital (ventral) surface of the prefrontal cortex (which includes areas BA 13 and BA 12) (Figure 6). It is called the orbitofrontal cortex, and receives information from the ventral or object-processing visual stream, the taste, the olfactory and the somatosensory inputs. Moreover, the orbitofrontal cortex seems to receive strong emotional inputs from the amygdala. The orbitofrontal cortex plays an important role in behavior, containing major cortical representations (e.g. taste and flavor) that act as primary reinforcers i.e. without learning as a reward or punishment. However, a representation of primary reinforcers is essential for a system that is involved in learning associations between
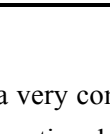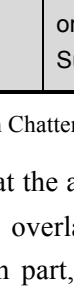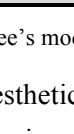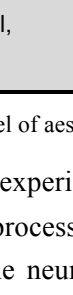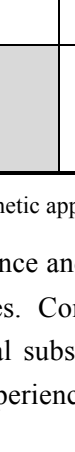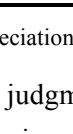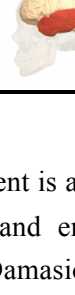
previously neutral stimuli and primary reinforcers. The content of the representation in the orbitofrontal cortex is a reward value that relates the sight of the object with the primary reinforcement. Humans suffering frontal lobe damage can show impairments in a number of tasks in which an alteration of behavioral strategy is required, in response to a change in environmental reinforcement contingencies. In other words the agent with damage in this area fails to anticipate a future consequence of his actions. Summarizing Rolls (2004) claims that *"the orbitofrontal cortex is involved in decoding and representing some primary reinforcers such as taste and touch; in learning and reversing associations of visual and other stimuli to these primary reinforcers; and in controlling and correcting reward-related and punishment related behavior, and thus in emotion"* (p. 301).
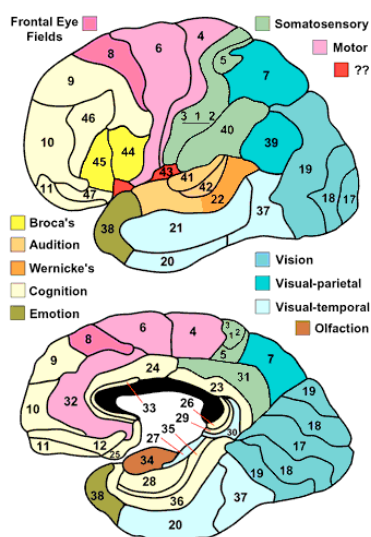
Figure 6 The Brodmann brain areas

Recently, Ishizu and Zeki (2011) claim that the activity in medial orbito-frontal cortex (mOFC) (Figure 5) is correlated to the experience of beauty and particularly with pleasure and reward, whether it is real, imagined or anticipated. This finding gives strong evidence, in a neurobiological context, for a relationship between positive aesthetic experience and emotions of pleasure. Particularly, they conclude that the experience of beauty derived from visual and musical sources correlates with activity in the mOFC and specifically with activity in a common field (A1) of this area. Hence, the experience of beauty could derive from at least two modalities, the visual and the musical, which share a common cortical locus in the A1 field of mOFC. In that sense they define beauty as: *'Beauty is, for the greater part, some quality in bodies that correlates with activity in the mOFC by the intervention of the senses'* (p. 7). For Ishizu and Zeki (2011) ''beauty is a value'' and value evokes desire. Hence, although we tend to place beauty more in the perceiver than in the object, we cannot deny that the objects should exhibit those characteristics that make us assign values to them. This implies that a) there must be an intimate link in the cortical processing that is linked to value, desire and beauty and also b) there might be a system in the brain that assigns those values. In this context, Ishizu and Zeki claim that the positive aesthetic judgments are strongly linked to reward and pleasure. However, they did not find activity in A1 of mOFC that correlates positively with the experience of ugly stimuli, although ugliness, involves an aesthetic judgment. Instead, they detect activity in the amygdala and the left somato-motor cortex during the experience of ugliness. For their account, this implies that there may be a functional specialization within the brain for at least two different kinds of aesthetic judgment, those related to positive, rewarding experiences and those related to negative ones.

On the same track Chatterjee (2004) provides a theoretical model of the cognitive and affective processes involved in visual aesthetic preference that is based on visual neuroscience and describes the aesthetic appreciation in five information-processing phases, where the activations are detected in similar regions (Table 1):

The process	The activated area	
Visual processing	The occipital	
Attention given to stimuli shape and color features	Frontal–parietal	
Attributional experience of stimuli	Temporal	
Aesthetic evaluation	Frontal–parietal	
Enhancement of aesthetic experience	Frontal–parietal–temporal	
Emotional engagement	Medial temporal	
Deep aesthetic experience	Medial and orbitofrontal, Subcortical	

Table 1 Brain activations in Chatterjee's model of aesthetic appreciation

Those studies show that the aesthetic experience and judgment is a very complex activity with emotional and cognitive overlapping processes. Conscious and emotional activities are not separable; they require, in part, the same neural substrates (Damasio 2000a). All those several components that are engaged in an aesthetic experience, activate several neural networks, which involve several different processes:

- A process of recognition which is enhanced by learning, based on previous visual experience of similar objects (Fukushima 2003; Tanaka 1996)
- The creation of a context based on past emotional experiences (Jacobsen et al. 2006),
- The assessment of the reward value of the stimuli (Damasio 1995; van Reekum and Scherer 1997; Kawabata and Zeki 2004),

- Evaluation of internally generated information such as thoughts and feelings denote a self-reference process (Jacobsen et al. 2006).
- These positive or negative values are correlated to our ability to reject or accept a future outcome (Jacobsen et al. 2006).
- Reward is correlated with our expectations concerning the image of the object, rather than its sensory properties. The object's image evokes expectations or predictions of rewarding (Kirk, Skov, Hulme, et al. 2009; Schulkin 2009).The aesthetic decisions are under uncertainty (Jacobsen et al. 2006).

1.3 SUMMARY & CONCLUSIONS

Even though all philosophical approaches accept a relation of the 'aesthetic' to emotional phenomena, the role and the content of such aesthetic emotions seem puzzling and elusively vague, even in contemporary writings. It is possible that this vagueness is based on the argument that 'mindless' emotions of pleasure and pain are considered as a criterion that differentiates the aesthetic from the ordinary experience as two distinct states of mind. Emotions are undervalued in recent aesthetic theory by concentrating on the role of cognition in aesthetic experience and not by exploring how emotions operate and affect cognition.

Unlike Aristotle who argued that aesthetic emotions are grounded in reason and therefore presuppose complex cognitive processes, for the most of the thinkers, an aesthetic emotion is a product of non-intentional thought, which is not originated to sensations or to representations that belong to cognition. Under this conception, in order to apprehend something aesthetically, the agent must evaluate it without any intention or purpose in respect to its existence (no-interest). *Disinterestedness* was, and for the most aestheticians still is one of the initial arguments in order for someone to experience the aesthetic.

However, the argument that cognition and emotion are conflicting rather than working together, is gradually abandoned, as thinkers moved forward from assumptions to scientific conclusions that came from the tendency to ground aesthetics to natural processes. The new aim is to explain aesthetics by taking advantage of the respective functionality that governs the human nature and can be experimentally detected. On this perspective, John Dewey, along with other Pragmatists, reconsidered the Kantian constrain for disinterestedness in aesthetic experience and attempted to ground aesthetics in terms of natural needs and embodied processes that take place as humans interact with their environment. Following a Naturalistic perspective, the aesthetic has exactly the same scope as all other activities that humans select in the service of their well-being.

Despite the diversity about the meaning of the aesthetic, there is a common conclusion concerning the role of aesthetic emotions. Aesthetic emotions *assign values* and allow the development of meanings with respect to objects or events. For the Western tradition philosophers, the assignment of a value expresses a choice or a preference. For them value is a principle that the agent chooses in the attempt to determine the worth of a particular situation in order to act properly. For Pragmatists, the origin of the assignment of value is linked to adaptivity, as we interact with insecurity, instability and uncertainty. Our environment comes to our interest or we assign meanings to it, not as mere combination of artifacts, but as conditions that support potentialities of harmony or stability.

Following this Naturalistic perspective of interaction, Chapter 2 will provide a theoretical analysis of the fundamental and main processes that aid the agent to interpret his environment and assign meanings to it. The understanding of all these cognitive and emotional processes that influence our thoughts, judgments and actions will be crucial in order to move towards and naturalistic grounding of the aesthetic experience.

Chapter 2: Cognition and interaction

'Naturalization requires the justification of an explanation based on natural relations or interactions. Such an explanation is not just an observer's adaptive strategy for interpreting the behavior of other systems, in terms of the observer's beliefs and desires… …it is also an attempt to look inside the system and try to understand and explain how it works. This seems to be a valid strategy for naturalism, as in such cases, the respective explanations can be objectively verified.' (Arnellos et al., 2010, 297).

Following the Naturalistic tradition, aesthetic experience and judgment is not an *a priori* mysterious phenomenon, and it does not necessarily refer to beauty, taste, or other unclear notions, but to natural processes or mechanisms, which result in emergent outcomes with particular characteristics. Therefore, an important step is to explore those natural phenomena and the underlying functionality of the interaction process. Considering cognitive agents as living systems that interact intentionally with dynamic and complex environments in order to fulfill their goals, the aim of this chapter is to explore those conceptual and material ingredients that constitute a naturalistic behavior. This is the first step in order to approach the aesthetic experience as any other naturalistic behavior.

The *interactivist* model as introduced by Mark Bickhard (1997a; 2000b; 2004; 2009a; 2009c), could provide the right functionality for this purpose by explaining these normative phenomena, which emerge during the action selection. In section §2.1.3, the main features of this model are described such as *emergent representation*, *motivation*, and *learning*.

Additionally, semiotics could provide an alternative understanding of the functionality related to the ways a cognitive agent seeks to understand and appreciate the environment and to the ways he attempts to interpret it in order to ascribe meanings to objects (artifacts, designs, artworks, etc.)

or events that are related to his goal fulfillment. In this direction, an internalistic dimension of affordances is suggested, by reconsidering their nature as an element of direct perception in cognitive psychology (Xenakis et al. 2012). Additionally, the existence of an inner semiotic function is suggested that enables the construction of a schema, which through the process of semiosis will emerge in a wider web of knowledge.

Aesthetic experience seems to be related to several processes or mechanisms that the agent develops in the course of interaction. Through them, the agent remembers things, interprets, understands, and reflects upon the world he lives in. It is important to clarify those mechanisms in order to have a better understanding on how the agent assigns values to events and finally judge them.

2.1 NATURALIZATION, AGENCY AND THE PROBLEM OF ACTION SELECTION

2.1.1 **What does it mean to naturalize?**

Explanations within naturalized epistemology provide different answers from those of traditional epistemology, regarding the source of particular a priori beliefs that most of them are established as an outcome of observed data on the behavior of the system (Arnellos et al. 2010a).

> *'Naturalization requires the justification of an explanation based on natural relations or interactions. Such an explanation is not just an observer's adaptive strategy for interpreting the behavior of other systems, in terms of the observer's beliefs and desires… …it is also an attempt to look inside the system and try to understand and explain how it works. This seems to be a valid strategy for naturalism, as in such cases, the respective explanations can be objectively verified.'* (Arnellos et al. 2010a, 297)

Following a naturalized perspective, the possibilities of discovering new and different mechanisms of processing in natural phenomena are increased, while most of those mechanisms are not detectable by observing the respective behavior. Since science is inherently progressive, *'naturalization has no end or a specific and discrete final state, but it is an ongoing and open-ended process of scientific inquiry. In other words, naturalization is the continuous formulation of questions regarding a phenomenon considering the quantitative but also the qualitative progress of science regarding notions and beliefs pertaining to this phenomenon, and aiming towards a better understanding and modeling of this phenomenon'* (p. 297).

Non-naturalized explanations and models ignore important bio-cognitive processes and mechanisms by considering them as mere black boxes. Thus naturalization, demands a continuously updated scientific 'input' regarding the notions and beliefs pertaining to the phenomenon in question, in order to provide a better understanding and explanatory model. Thus according to Arnellos et al. (2010a), naturalization can be considered as a wider *paradigm* in

interdisciplinary research. This *paradigm* aids contemporary researchers and scholars to analyze and define behavior by understanding, explaining and probably testing complex phenomena such as meaning making, action selection, etc. Following this perspective, the processes that constitute agency may acquire many different scientific descriptions and explanations provided with reference to contemporary scientific findings. All these different scientific descriptions could be equally naturalistically valid since agents and their respective environments are not static and can been seen from many different perspectives. According to Arnellos et al. (2010a), what constitutes an agent *'are some dynamic and incrementaly conceptual and material ingredients that are complexly integrated'* (p.298) to varying degrees. In other words, in specific external conditions and at a specific time, different agents may exhibit different degrees of agency and the same agent at two different points in time may also exhibit different degrees of agency.

The aim of the next section is to explore the fundamental characteristics that the agent should exhibit in order to construct (aesthetic) meaning-based actions.

2.1.2 **The dynamic properties of agency**

2.1.2.1 *Autonomy, self-maintenance, and agency*

The notion of autonomy is a central concept in the study of biological, cognitive and adaptive systems. The concept of autonomy denotes an abstract kind of organization by which a system can change what it does in order to maintain stability in accordance with changes in environmental conditions. Such systems are known as *recursive self-maintenant systems* and require an organization, by which i) they can differentiate the environmental conditions, ii) they have appropriate switching relationships between these differentiations and iii) they can choose between the alternative ways of interaction with respect to their goals (Bickhard 2004).

As such, autonomy is a self-defining process that establishes the uniqueness of a system as differentiated from all other surrounding processes. Autonomy is realized in different biological scales and domains. Cognitively driven behavior is the result of a higher level of autonomy, wherein the neural system creates invariant patterns of sensorimotor correspondences in order to determine the behavior of the system as a unit that exists and acts in space. In other words an autonomous agent is a system situated within and a part of an environment that senses and acts on it (Ziemke 2008). This is the reason why in this framework the naturalized understanding of the cognitive process is indissolubly connected with the phenomenon of life and of being alive in general (Arnellos, Spyrou, and Darzentas 2010a).

According to Kampis (1999) there are three fundamental properties, which characterize the strong notion of agency in systems' theory: *interactivity*, *intentionality* and *autonomy*. *Interactivity* is the ability of an agent to perceive and act upon his environment by taking the initiative in order to achieve his goals. *Intentionality* is the ability of an agent to perceive and act upon his environment in order to effect a goal-oriented interaction by attributing purposes, beliefs

and desires (i.e. meaning) to his actions. *Autonomy* can be characterized as the ability of an agent to operate intentionally and interactively, based only on his own resources (Arnellos, Spyrou, and Darzentas 2010a; Kampis 1999). Through these properties, agency is considered as emergent in the functional organization of a living system, as Arnellos et al. claim.

As already mentioned in the beginning of this section, following the second-order cybernetic epistemology, an agent 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 cognitive system is able to observe the distinctions it makes, it is able to refer the result of its actions back to itself. 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, and Darzentas 2010a). Such self-referential loop can only exist in relation to an environment. If we cut them off from their environments, they cannot remain far from equilibrium, they cannot be differentiated and they cease (Arnellos, Spyrou, and Darzentas 2010a; Bickhard 2004).

Therefore, *meaning* is also linked to agent's organization, guiding the constructive and interactive processes of the functional components of the autonomous agent in such a way that these processes maintain and enhance its autonomy. The enhancement of autonomy is linked to intentionality since the agent forms certain goals for himself guiding its behavior through meaning (Arnellos, Spyrou, and Darzentas 2010a). Collier (1999) suggests a very interesting relation between *interactivity*, *intentionality* and *autonomy*. Specifically, he suggests that there is no function without autonomy, no intentionality without function and no meaning without intentionality. These three properties are quite interdependent, and there is no possibility for the agent to qualitatively increase any of them in isolation from the others. Hence, following the claim of Arnellos et al., a system in order to exhibit agency:

> *'...it needs to exhibit the degree of autonomy that will provide for the functionality that is needed in order to support its intentional and purposeful interaction with the environment, the result of which will create new meanings that will further enhance its autonomy. Moreover, agency has an interactive and a goal-oriented character, which results from the interactivity and the intentionality of the respective cognitive system.'* (Arnellos, Spyrou, and Darzentas 2010a, 299)

Summarizing, agency has a goal-oriented nature in order to support intentional and meaningful interactions that will enhance the autonomy of the agent.

Thus, an autonomous agent interacts continuously with his environment in order to determine the appropriate conditions, for the success of his functional processes (Arnellos, Spyrou, and Darzentas 2010a). This illustrates a fundamental fact about autonomous systems: they are open to their environments as a matter of their ontological necessity (Bickhard 2004). Given the need for self-maintenance, an agent has the ability to evaluate the environmental conditions and detect which is the best action in respect to these conditions. A biological realistic process according to

Bickhard (2000a) would involve a continuous process by which the agent is prepared for further interactive processes. It is important to mention that the process by which the agent evaluates those conditions should exhibit the possibility of failure when such selection results in goal failure.

Aiming at a better understanding of these normative phenomena that emerge during the (inter)action selection the *Interactivist model* as it is introduced by Mark Bickhard (1997a; 2000b; 2004; 2009a; 2009c), provides the right functionality for this purpose. As Bickhard (2009c) claims, the Interactivist model has multiple convergences with the Pragmatist tradition (see §1.2). They share the concept of processing and action as the proper framework for modeling mental phenomena focusing also on the consequences in action and interaction. The Interactivist model is more akin to Peirce's model of meaning, Dewey's discussion of language, Piaget's genetic epistemology and constructivism, Gibson's theory of perception and action, and other models with pragmatic aspects.

In the next section, we describe the concepts of *emergent representation*, *motivation,* and *learning* as the main features of the Interactivist model ontology.

2.1.3 **Emergent representation, motivation and learning**

In order to understand these kinds of models we should recognize that living systems as human beings have a central nervous system, which is always active from single neurons to the entire system and by extension to the entire organism (Bickhard 2011). This active state, as it has already been mentioned in the previous section, presupposes conditions and functions that aid every autonomous agent to interact continuously with his environment in order to serve his primary goal, i.e. to maintain and enhance his autonomy in the course of interaction. Thus an autonomous agent always do something; doing nothing means that the agent is dead.

Autonomy requires conditions of process and interaction closure, such as the ones in which functional meaning emerges by selecting the function that will achieve process and interaction closure while the agent interacts with the environment. This, as already mentioned, implies a conceptual as well as a practical interdependence among autonomy, functionality, intentionality and meaning, but it does not, in any way, imply that the goal of self-maintenance should be explicitly represented in the autonomous agent (Arnellos, Spyrou, and Darzentas 2010a).

Bickhard (1997a) argues that such an autonomous agent should have a way to differentiate between environmental conditions, and should enable a switching mechanism in order to choose among the appropriate internal functional processes the best for a given interaction. This means that these differentiations functionally indicate that some type of interaction is available in the specific environment and hence, they implicitly presuppose that the environment exhibits the appropriate conditions for the success of the indicated interaction (Arnellos, Spyrou, and Darzentas 2010a). As such, these differentiations are the basis for setting up indications of further interactive potentialities (Bickhard 2004). According to Bickhard, all those conditions that are

internal or external to the agent constitute the *dynamic presuppositions of interaction*. Dynamic presuppositions can be true or false and the interaction will succeed or fail, respectively (Bickhard 2003; 2004). This is a crucial point of normative functionality: activities and the respective ingredients that they induce can be for instance inappropriate to the environment. As Bickhard (2011) claims they can be dysfunctional and the respective activity can be inappropriate or wrong.

These differentiated indications constitute emergent *representations* and the complex web of those indications can form the representations of such objects. These presuppositions constitute the *representational content* of the agent with respect to the differentiated environment (Arnellos, Spyrou, and Darzentas 2010a). Through this process of dynamic representation, the agent is able to carry out the fundamental actions of distinction and observation. In other words the agent evolves a capacity to make distinctions based on historically evolved habits and actions, according to his dynamic architecture and organization. Moreover, the agent is able to detect all those distinctions providing also feedback for his progress in the course of interaction (Hoffmeyer 1998; Pugh 1979). The process of detection refers to observation by means that the agent integrates himself into its own self-maintaining loop. From the agent's perspective, only actions, which provide feedback to the agent's sensor systems, can be detected. The agent cannot observe any other action, which simply disappears in the environment. Thus, as Porr & Wörgötter (2005) claim, *"there is no other chance for the organism as to analyze its inputs, as this is the only aspect that the organism is able to observe. Even its own actions are only observable through its inputs"* (p.109). Hence, and in that way, the agent has the ability to observe its own boundaries in a self-referential loop by which he refers back to himself the result of his own actions. This makes the agent a self-referential system, providing 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, and Darzentas 2007a).

Summarizing, in general, an agent should have the requisite variety and this could be an adaptive anticipatory system that acts before learning. The anticipatory system aid the agent to react against the signal, which initiates a deviation from the desired state in its feedback system and learn forward models of its own reflex-loops (Porr and Wörgötter 2005). This means that every chosen activity constitutes a process of preparation for this functional activity. As it is mentioned before, this activity could finally be wrong and as a consequence all these preparations for that activity could fail. Considering an anticipatory character of these preparations to function,

such anticipation of the interactive outcome can be false (Bickhard 2011).

"an interactive system will be continuously interacting and continuously preparing itself for further interaction on the basis of prior interactive flow" (Bickhard 2000b, p.2)
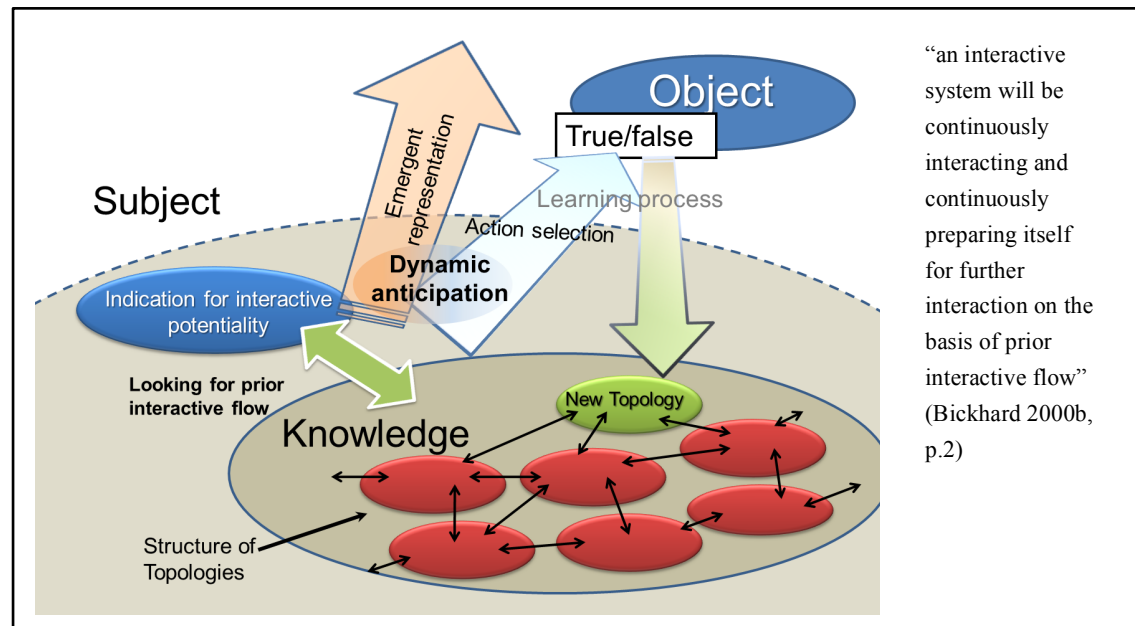
Figure 7 An attempt to depict the dynamic functions of emergent representation and of the general learning process, which are playing a primary role in the synthesis of Bickhard's Interactivist model (Xenakis et al. 2012).

If representation is a fundamental aspect of interactive system ontology, then another equally important aspect of the same ontology is *motivation*. Living systems, however, as far-from-equilibrium and self-referential systems must always be in interaction with their environment in order to maintain their far-from-equilibrium conditions. According to Bickhard's claim, the major question, concerning the significance of motivation, must be: 'what makes an organism do one thing rather than another in the course of further interactive activity?' (Reeve 2008; 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. Both representation and motivation are aspects of a more fundamental form of process in certain far-from-equilibrium systems (Bickhard 2003).

Learning and development is another fundamental aspect of choosing the appropriate interaction with respect to the current condition of the agent. Learning is a constructive process, which introduces destabilization when the system fails to anticipate or stability when the system acts according to the setup of the next interactive process, which means that anticipation is successful. An autonomous system tends to stabilize on interaction process and proceed successfully according to its anticipation and to its goals. According to Bickhard and Campell (1996), learning has a heuristic character in which the system can profit from past successes and failures. The successful outcome of a previous interaction will be functionally useful in the agent's attempt to solve a new problem. This process presupposes a location where the old

problem representations and solutions are stored and some way for the system to be able to locate these and/or the adjacent ones, which may probably be useful to manage the representations of the new problem. Such a configuration of information constitutes a topology. Therefore, heuristic learning and development require functional topologies, as well as the ability to construct new topologies.

Summarizing, any complex autonomous agent needs to solve the problem of choosing the appropriate action. Action selection is the fundamental problem of what the agent must do in his next steps. Many potential interactions can be indicated in association with the internal outcomes of those interactions. All those internal outcomes pertaining to what can be expected by the agent play a major role in interaction selection. Representation emerged naturally in the evolution of interactive systems as a solution to the problem of interaction selection and as such, it functions as an aspect of indicating further interactive potentialities. The indication of an interactive potentiality will be conditional on system's motives and on all those outcomes of particular prior interactions (Bickhard 2000a). Those functions provide the system with the appropriate conditions in order to anticipate its future courses of interaction. In general *"an interactive system will be continuously interacting and continuously preparing itself for further interaction on the basis of prior interactive flow"* (p. 2) (Figure 7).

2.2 INTERPRETING THE ARTIFACT

As the agent seeks to understand or to aesthetically appreciate the environment he interacts with, he attempts to interpret it in order to improve his current level of understanding, discovering in it the significance that it has for him. In other words the agent ascribes in a way meanings to objects (artifacts, designs, artworks, etc.) or events that are related to his goals (Stecker 2005).

In this way, aesthetics in a broad sense are involved in the cognitive process, supporting the agent in ascribing such meanings. Thus, according to Brandt (2005) aesthetics support the communication between the two sides of interaction; the *receiver* (the experiencer, the user, the interpreter) and the *sender* (the maker, the crafter, the designer or the nature). The *sender* "*is deliberately both redundant and elliptic*" (p.185) since he is 'represented' by his artifact in interaction process. This artifact could be considered as the communication medium in interaction. The *receiver* in this process is constantly exposed to *sender's* meanings to which he is supposed to respond. The receiver is also guided by his inner goals and personal meanings that are not probably related to those that the *sender* initially add to the medium. The artifact as a communication medium that affords meaning-based actions is similar to the concept of 'mediation' as it is introduced by Peirce and Vygotsky in order to describe the way in which the actual form of the object is imbued with meaning (Sonesson 2006).

The process through which a sender or a designer creates a meaning that it 'stands for' something equivalent in a receiver's or interpreter's mind, is the process of *sign* development. As Pierce (1955) claims:

> *"A sign, or representamen, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign."* (Peirce 1955, 99)

Additionally, the process in which the person (receiver/interpreter) generates the respective sign (meaning) that someone (sender/designer) creates in the communication medium is the process of interpretation (Moriarty 1996). The notion of interpretation of signs in respect to the meanings that they furnish to us, mostly in relation to the other objects or events, is a crucial aspect of semiotic process (Windsor 2004) (Figure 8).

> *"That sign which it creates I call the interpretant of the first sign. The sign stands for something, its object. It stands for that object, not in all respects, but in reference to a sort of idea, which I have sometimes called the ground of the representamen."…"In consequence of every representamen being thus connected with three things, the ground, the object, and the interpretant, the science of semiotic has three branches."* (Peirce 1955, 99)

Anything can be a sign, as long as it mediates between its object and an interpretant. According to Peirce the sign consist of three inter-related parts:

- The sign's ground (the nature of the sign in itself),
- The sign's relation to its object
- How the sign is represented in its interpretant

Peirce's triadic sign

Interpretant

Representamen   Object

"That sign which it creates I call the interpretant of the first sign. The sign stands for something, its object. It stands for that object, not in all respects, but in reference to a sort of idea, which I have sometimes called the ground of the representamen."…"In consequence of every representamen being thus connected with three things, the ground, the object, and the interpretant, the science of semiotic has three branches." (Peirce 1955, 99)

Figure 8 Peirce's conception of a sign consists of three distinct parts: the *Object*, the *Representamen* and the *Interpretant*

According to the second trichotomy of signs, which concerns the relation of the sign to its object, Pierce developed a tripartite system in order to classify that complexity. A sign may be termed as *Icons*, *Indexes*, and *Symbols*. Particularly he defines each one of them as follows:

> *"An Icon is a sign which refers to the Object that it denotes merely by virtue of characters of its own, and which it possesses, just the same, whether any such Object actually exists or not."*(Peirce 1955, 102)

An *Iconic* sign carries some quality of the *Object* it 'stands for'. For instance the portrait of someone is an *Icon* of the person that it 'stands for'. Often an *Iconic* sign is a representation, such as a drawing or a photograph (Moriarty 1996).

> *"An Index is a sign which refers to the Object that it denotes by virtue of being really affected by that Object."*... *"In so far as the Index is affected by the Object, it necessarily has some Quality in common with the Object, and it is in respect to these that it refers to the Object."*(Peirce 1955, 102)

Indexes are connected physically with their Objects. They are indications that something exists now or existed in the past. For instance a footprint, which is an imprint of someone's foot, means that someone walked in this place (Moriarty 1996).

> *"A Symbol is a sign which refers to the Object that it denotes by virtue of a law, usually an association of general ideas, which operates to cause the Symbol to be interpreted as referring to that Object."*(Peirce 1955, 102)

In the case of *Symbolic* signs, the relation between the Object and the interpreter is somehow arbitrarily by means that the sign 'stands for' something through a process of consensus (convention). *Symbols* are conventional and they are subject to a more closed than open interpretation process. For instance, most spoken and written words, country flags etc. are symbols. In contrast, *Icons* and *Indexes* are more open to interpretation. They are not based on *arbitrarily determined meaning* relationships but they are developed through our personal experiences with artifacts, in contrast to *Symbols,* which their *meanings* are learned (Moriarty 1996). So, a stop sign always tells us to stop but a hummer is not always telling us to nail tacks.

For Saussure (1959), the sign and the process, by which it is interpreted, have two parts. The first part is the *signifier,* which refers to the physical part of the medium (e.g. a sound, an artifact, an image etc.). It is an input from the environment that we perceive and we must process in order to interpret it as a sign. The second part is the *signified,* which pertains to the meaning of this sign. Particularly Saussure proposes:

> *"I propose to retain the word sign [signe] to designate the whole and to replace concept and sound-image respectively by signified [signifie] and signifier [signifiant]."*(Saussure 1959, 67)

The *signified* is the meaning that we want to communicate. As O'Neill (2008) argues, this meaning could be a set of experiences, impressions or emotions that can be elicited as we interact with an object or a situation. For instance the *signified* is the mental representation of the act of walking when we see a footprint, which is the *signifier*. Emotions of pain, for example, could inform us as a signified when we identify that this footprint (signifier) belongs to a wild animal e.g. a lion.

2.2.1 **Aesthetic experience from a semiotic perspective**

As Brandt (2005) argues, the sender or the designer of the sign intentionally enhances the aesthetic experience, by manipulating materials in the communication medium, in order to create these signs. We should have in mind that an artifact has always got a structure that was 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"* (p. 176). So, even though we could not be aware of the initial intention of the artifact, we can realize that its designer has made it for some reason, for a particular or a range of possible actions. Designer's intentions are always behind the artifact, even if we can't recognize them – even if we don't know what his intention was. Then the artifact becomes a sign to our eyes of the designer's intentions. Most of the times we guess these intentions as possible functions that its Object represents. Design most of the times involves this semiotic process, aiding the communication between the designer and the user through the artifact (Mono 1997). Following this conception, the perception of the aesthetic could count on this communication. Particularly, the designer attempts to integrate the aesthetic sign in the artifact

and sets an extra challenge to the user, as Kant claims; the designer places us under an obligation to interpret the artifact aesthetically 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.

A semiotic process takes place as the interpreter (user) observes the Object. In the interpretation of the Object, the artifact needs to be understood as a sign. The problem here lies in our difficulty to define how the aesthetic-sign represents its Object. The acknowledgment of the subjectivity of the aesthetic inhibits us from making generalizations about it. According to Shapiro 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.

As it has already been mentioned, artifacts represent actions and intentions when linked with their creator (designer), which means that an artifact is also an Index of the action of its designer. Finally when the agent perceives an artifact, he does not only perceive its Iconic and Indexical character but also its inner meaning, which is always Symbolic. For example in an artwork, during perception, the agent does not confuse the marks on the canvas (Index), which are made by the artist's intentions (Icon), with the content that the artwork exhibits (Symbol). Both designer and the user 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 agent judges the artifact aesthetically, the relation of the aesthetic-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, using the fundamental Peircean semiotic categories, is one of the main points of this dissertation, and it is further analyzed in several resolutions in Chapter 5:.

Analyzing aesthetic judgment, based on aesthetic properties, Zemach (1991) 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. "What is striking about the notion of supervenience is that it is spelled out in terms of seeing one thing as another" (Tilghman 2004, 254). In other words, aesthetic interpretation is an intentional process by which the agent tries to link the respective Object to the sign. Particularly, Icons and Indexes are related to a Symbolic meaning and aesthetic emotions through the semiotic process.

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In visual representational artifacts, such as videos 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 form of artistic expression it is difficult to relate the sign to its Object in such a straightforward way. The icons and the indexes are not directly related to the symbolic meaning of the artifact and as such the agent (user) might probably be susceptible of an anthropomorphic interpretation. Specifically, we observe the drawn lines to "climb", "ascend" or "strive" not in an arbitrary or a conventional way as the agent tries to reach an Indexical relation with the Icon, but it is difficult to generalize this thought for all the agents. 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). When designers use abstract forms to express emotions, they somehow make the artifact a natural sign. Additionally, the artifact must be regarded as a human product and that means that the Objects of aesthetic-signs must represent human intentions or experiences 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 aesthetics is not what kind of sign process the artifact is, but how the Object is Represented and in what particular way the artifact 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 to account for aesthetics in artifacts, as a symbolic representation of the intentions of a designer, is closer to our inclination to explore the emergence of meaning and the ways an artifact 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 an approach to understand the formation of the aesthetic experience. What we suggest in Chapter 5: 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.

2.2.2 **Interpreting the artifact with affordances**

The concept of 'affordance' has been used for long as an element of cognition that aids the perception and interpretation of what an artifact represents. The term was originally introduced by the psychologist J. J. Gibson (1986) to refer to all those possibilities or opportunities for action that the environment supports on objects (artifacts, objects of nature) or events. For Gibson, affordances are part of his direct perception theory, denoting a value of objects or events in relation to the intrinsic physical features of the agent (You and Chen 2007).

Based on this body of theory, the absolute duality of "objective" and "subjective" is false. As Gibson states:

> *"An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behaviour. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer"* (Gibson 1986, 129)

Additionally, an affordance could be defined as the perceivable potentiality of the object that supports the intended action, without requiring memory, inference, or interpretation (You and Chen 2003). Gibson characteristically states that:

> *"The affordance of something does not change as the need of the observer changes. The observer may or may not perceive or attend to the affordance, according to his needs, but the affordance, being invariant, is always there to be perceived. An affordance is not bestowed upon an object by a need of an observer and his act of perceiving it. The object offers what it does because it is what it is"* (Gibson 1986, 138).

Under this conception, affordances are primarily facts about action and interaction, not perception. This contrasts with the common impression that affordances refer to— approximately—situations in which one can see what to do. Affordances allow meaning to be understood in terms of the relations of humans and their environment (Gaver 1996). Affordances per se are independent of perception. As Gaver points out, they exist whether the perceiver cares about them or not, whether they are perceived or not, and even whether there is perceptual information for them or not. For example, a glass of water affords drinking, whether or not someone is thirsty. For Gaver (1991) there are three main types of affordances identified:

1. *Perceptible affordances* are all affordances in which there is perceptual information (i.e. ways of interaction) available for an existing affordance.
2. *Hidden affordances* are all those affordances that exist but their information is not perceptible. These affordances concern possible actions, which can be silent or may be hidden, as in case of unwished actions (Susi and Ziemke 2005).
3. *False affordances* are all those which 'transfer' information that is not correct.

However, from another point of view, many authors in the design community consider affordances as one of the 'semantic dimensions' that describe functional meanings in the designed artifacts. As Krippendorff (2005) claims, affordances suggest us an action in order to change an existing situation to a better one. Affordances in artifacts are a range of potential opportunities for action. Through cognition we can recall existing meanings, predict new interactive outcomes and develop new meanings, experience emotions, etc. All these meaningful information constitute what an artifact means for the agent (Krippendorff 2005; Windsor 2004). Therefore as You and Chen (2007) argue, what signifies the content of an affordance is not the artifact itself and what it could offer to users, but the way designers control how users perceive an artifact. So, the terms 'semantics' and 'meaning' are probably the key to understand how the appearance of an artifact, as a sign, forms the aesthetic preference. This social factor in perception denotes that the relationship between sign and signified is mainly socially convened.

The concept of affordance is quite useful in constructing a more qualitative analysis of the process by which the agent perceives and interprets the environment. As we shall see in the next section, affordances could be more than an element of cognitive psychology. They can be considered as a useful tool to understand the interaction process, where the agent interprets its environment (Saussure 1959). As the agents attempt to understand the artifact or the respective event, they interpret signs of alternative actions. As Norman (2008) claims, in our interaction with the environment we search for any sign that will be functionally helpful to understand and cope with. So, what is important for us in an artifact is what signifies meaningful information in it that could be related to our initial goals. For such a purpose, the initial Gibsonian concept of affordance is not enough to denote our social life.

2.2.2.1 *From Gibsonian affordances to semiotic affordances*

There are two perspectives in aesthetic philosophy concerning aesthetic experience (see §1.1.1.2). 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). According to aesthetic philosophers every artifact in its physical structure has an intrinsic aesthetic value that effects aesthetic perception. However, the way, which the artifact's physical structure and aesthetic value are related, is not specified. According to the second perspective, we are also able to perceive an artifact 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 semiotic 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 insist on 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 objectivated structure (Noble 1981). Direct perception misses functions of acting such as intentionality, motivation and their causal affect to the process of selecting the best action from the range of those interactive opportunities. In the same

perspective, Noble argues that the perception of an affordance is most of the times related to the perception of other information, as for example, social agreements. Every object can be seen from both perspectives at the same time. Noble uses the characteristic example of 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"? The interpretation of a sign is not a matter of decoding information, 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 agent 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, 192).

As any interaction cannot be understood without understanding the purpose of the activity of the agent, it also cannot be understood without considering the socio-historical context in which it takes place (Albrechtsen et al. 2001). As described above, the concept of affordance is very relevant to semiotic models of cognition, offering new possibilities in this area of research (Xenakis et al. 2012). 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.

2.2.3 **The semiotic view of a schema**

As the agent observes his boundaries, he also observes the distinctions he makes and refers the results of his action back to his self (see §2.1.3). This makes him a self-referential system with the ability to create new distinctions based on previous actions. The agent interacts via structural coupling with his environment, creating an internal network of interconnected structures representing his history and experience. The respective continuous internal differentiation creates certain functional subsystems with non-linear interrelations (Arnellos, Spyrou, and Darzentas 2007a). Piaget (1956) claims that as the agent makes a new judgment, he brings new knowledge and thus reduces the environment to his own terms. According to the respective perspective of the

so-called '*sensorimotor intelligence*', the agent structures things he 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.

This is why for Piaget, *"every act of intelligence presupposes a system of mutual implications and interconnected meanings"* (Piaget 1956, 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 (2000) 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, the physical form and its content. However, according to Sonesson (2006), and Piaget (2001) semiotic function is a capacity of the agent that has the ability to represent reality by means of a signifier that is distinct from the signified. On the same track Radford claims that the semiotic function begins precisely when there is a differentiation between signifiers and signifieds. In other words, using Bickhard's terminology, the agent is engaged in a semiotic function when he has the ability to construct representational content or meaning (see §2.1.3), 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 is suggested 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 it is functionally useful to the agent 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 (Xenakis et al. 2012).

In the proposed model of aesthetic judgment (see Chapter 5:), 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 agent uses signs to produce meanings in its dynamic physical and cultural environment.

2.3 SUMMARY & CONCLUSIONS

Considering cognitive agents as living systems that interact intentionally with dynamic and complex environments in order to fulfill their goals, the aim of this chapter was to explore those conceptual and material characteristics that constitute a naturalistic behavior.

In this way, the cognitive agent is considered as a system that is open to its environment as a matter of his ontological necessity and with which it interacts continuously in order to determine the appropriate conditions for the achievement of his dynamic goals. Since agents interact continuously with their environments they also continuously preparing themselves for further interactions on the basis of their prior interactive flow. Given the need for self-maintenance, agents have the ability to evaluate the specific environmental conditions and detect, which action will be the best with respect to their dynamic goals. Hence, action selection is the fundamental problem of the next interactive step of an agent.

Many potential interactions can be indicated in association with the internal outcomes of those interactions. All those internal outcomes, pertaining to what can be expected by the agent, play a major role in interaction selection. Representation emerged naturally in the evolution of these interactive systems as a solution to the problem of action selection and as such, it functions as an aspect of indicating further interactive potentialities. The indication of an interactive potentiality will be conditional on agent's motives as well as the outcomes of particular prior interactions. Those functions provide the agent with the appropriate conditions in order to anticipate its future courses of interaction. However, that anticipation may exhibit the possibility of failure when such selection fails to provide the anticipated results.

These meaning-based actions are functionally useful to the agent in his attempt to understand and appreciate the environment that he interacts with. Meaning is an emergent outcome of the agent's attempt to interpret the environmental conditions in order to improve his current level of understanding and to discover the significance that those conditions have with respect to his goals. The notion of interpretation of signs, with respect to the meanings they furnish to the agent, mostly in relation to the other objects or events, is a crucial aspect of semiotic process.

The semiotic function that takes place while the agent interprets his environment, as it is proposed in this chapter, is linked to the aesthetic experience. Aesthetic interpretation is an intentional process by which the agent tries to link the Object to the sign. Particularly, Icons and Indexes are related with a Symbolic meaning, which leads the agent's aesthetic emotions of pleasure or pain through the semiotic process. Such semiotic process is suggested as an internalistic dimension of affordances, which allow us to reconsider their nature as an element of direct perception in cognitive psychology. This perspective engages communication and social issues in interaction, as the creator of the message (designer) tries to communicate his meanings to the receiver (user) through the communication medium (artifact).

The semiotic function is a capacity of the agent who has the ability to represent reality by means of a signifier that is distinct from the signified. Particularly, the semiotic function begins

when there is a differentiation between signifiers and signifieds. What is suggested is that the agent is engaged in a semiotic process when he has the ability to construct representational content or meaning, as an interpretation of the environmental conditions that serves his stability and not reality itself. Therefore, in this chapter an interrelation between the semiotic process and the construction of a cognitive schema is also proposed. Every schema has an inner semiotic function, and the process of semiosis is related to the transformation of an existing schema to a new cognitive pattern, which has been already formed by its inner semiotic function.

This process is endless and it is functionally useful to the agent for his future attempts to solve new interactive problems since the agent benefits from the old schemata (past successful or not interactions) by constructing new topologies and semiotic chains.

Chapter 3: Aesthetics in interaction design

'We all agree that beauty is important to our lives—beauty, pleasure, and fun. But that's where the agreement stops, because trying to define these elusive concepts gets us entangled in centuries of debate about the nature of these concepts; a debate that mixes up different issues, that cuts across world views and disciplines, that uses different terminology to describe the same phenomena, or the same terminology to describe wholly different phenomena, that pits the precise measurement of the scientist against the artist or humanist who believes measurement is impossible and irrelevant.' (Norman 2004, 312)

Even though there has been given some attention to the understanding of the aesthetic qualities of the non-functional (e.g. emotional) factors in design (Folkmann 2010), the research area of aesthetics has been neglected of for years. Paradoxically, this 'non-functionality' of emotions and aesthetics aids researchers to seek for technical explanations that may include those vague notions of aesthetic and beauty in design. However, as Locher, Overbeeke and Wensveen (2010) have claimed, those researchers have failed to provide the proper technical explanations to these concepts and to describe the aesthetic outcome of an interaction, which still remains a central problem in this emergent research field.

Over the last few years, the study of aesthetics and beauty has become a part of user experience research (Hassenzahl 2008; Lindgaard et al. 2006). Nowadays, the understanding of the aesthetic experience is proved to be a very important topic aiding designers to develop successful interactions. In fact, the aesthetic decisions appear to be of the most crucial ones in the design

process. Hence, over the last few years, several experimental studies have taken place that attempt to approach the aesthetic mostly in the field of Human Computer Interaction. In these works, the aesthetic experience is studied as a perceptual multi-dimensional phenomenon thus focusing in this way on the properties of effectiveness and usability. This approach leads to a long list of types of aesthetics such as perceived, post, classic, expressive, etc., which are correlated with qualities (e.g. adorable, cool, strong, trustful etc.) that could characterize a product or with other types of experiences such as attractiveness, enjoinment, fun, etc. In fact, these studies do not focus on the nature of aesthetics but on how the aesthetic phenomenon, whatever this might be, affects or is related to 'known' experiences in our interaction with products. Thus, readers of human–computer interaction textbooks can hardly find any reference to aesthetic considerations in design (Lavie and Tractinsky 2004). As it is already mentioned, there is a gap between interaction design as a subject that expresses design functionality and solutions and human computer interaction as a behavioral science. However, researchers believe that by expressing functionality in the design process necessarily involves aesthetic considerations that affect user's behavior (Petersen, Hallnäs, and Jacob 2008).

This chapter aims to present the diversity of the current approaches that study the aesthetics in interaction design. In the first section of this chapter the main experimental approaches of aesthetics and beauty are presented, while in the second we present the main theoretical models that attempt to explain the origin of aesthetics and beauty in our experience with designed products. Even though there is a common ground according to which the emotional factor of interaction is the most crucial in aesthetics, the diversity of the current theoretical and experimental explanations shows that in design studies the problem concerning the nature of aesthetics is still very broad and complex. Therefore, any attempt to gather all those perspectives and conclusions in order to construct a single model that describes what constitutes the aesthetic experience in the interaction process seems to be a hard task.

3.1 AESTHETICS IN EMPIRICAL STUDIES OF INTERACTION DESIGN

In the HCI research community, the term 'aesthetics' exhibits a variety of explanations that most of the times are related to each other in a way that any attempt to categorize them in main approaches seems difficult. There are works that focus primarily on the form of the artifact and its properties that are perceived mostly visually, with vague relations to the functionality and instrumentality of systems (Petersen et al. 2004). This explanation considers aesthetics as an added value in the whole design development (Fogarty, Forlizzi, and Hudson 2001) and the term has been used, synonymously to appearance, visual appearance, or even beautiful in appearance (Baljko and Tenhaaf 2008). Djajadiningrat et al. (2000) and Ben-Bassat et al. (2006) argue that aesthetics could be applied in objects as a design feature making products desirable in appearance.

Moreover, Ben-Bassat et al. (2006) believe that these aesthetic features in appearance can be measured in such a way that we can compare them as "more, less, low, high aesthetic" (ordinal measurement) or even numerically quantified (interval measurement).

In other works, aesthetics, among other characteristics, are mostly considered as an emotional or an affective component of the whole design process. A component, which is related with such design factors that could trigger our emotions as we interact with products (Kim, Lee, and Choi 2003). Almost all of the community conclude that our emotional (affective) reactions are another crucial facet in our experience with designs that affects our tension for positive interactive experiences (Norman 2003; Hassenzahl 2004a; Rafaeli and Vilnai-Yavetz 2004; Tractinsky and Hassenzahl 2005; Hartmann, Sutcliffe, and Angeli 2007; Lindgaard 2007; Baljko and Tenhaaf 2008; Locher, Overbeeke, and Wensveen 2010). However, in those empirical studies it is not clear what really these aesthetic emotions are constituted of, how they elicit and why or how they probably affect our preferences through the interaction process (Huh, Ackerman, and Douglas 2007). However, the vague term of beauty comes back when Hassenzahl (2004a) refuses to equate aesthetics with beauty but he claims that aesthetics have something to say about beauty, and that objective, perceptual features of objects cause beauty. Similarly, several authors approach *beauty* in terms of visual attractiveness, visual appearance, or as a property that is mostly associated with the form of the artifact (Tractinsky, Katz, and Ikar 2000; Lavie and Tractinsky 2004; Tractinsky and Zmiri 2006; Hassenzahl 2008; Baljko and Tenhaaf 2008).

In contrast, other researchers propose that we need to shift from *beauty* in appearance to *beauty* in interaction, of which the beautiful appearance is a part (Djajadiningrat, Overbeeke, & Wensveen, 2000; Wensveen, Djadjadiningrat, Overbeeke, & Hummels, 2002). Consequently, the artifact is not aesthetic in itself but rather the aesthetic artifact is a result of the socio-historical appreciation of the material, and the shapes that influence the aesthetic perception as we interact with artifacts (Fogarty, Forlizzi, and Hudson 2001; Djajadiningrat, Overbeeke, and Wensveen 2000). The term 'aesthetics of interaction' (see §3.2.4) has been used in the sense of eliciting enjoyment, beauty, or pleasure in interaction: products that are "beautiful in use" (Djajadiningrat, Overbeeke, and Wensveen 2000).

Even if it is not clear how the notion of beauty is used as an affective state, researchers have given an extra role to it (mostly in mediating sensory experiences) searching for a relation between beauty and usability. Djajadiningrat et al. (2000) propose that aesthetics of interaction has a focus on "enjoyment of experience," as opposed to usability or ease of use. They claim that the goal should be to focus on functionality that contributes to the overall experience, an experience that may challenge, seduce, surprise, reward etc., all of which result in enjoyment of experience. All of these facets play a role in usability, which is more than mere ease of use (Baljko and Tenhaaf 2008; Djajadiningrat, Overbeeke, and Wensveen 2000).

This wave of research on the visual aesthetics of interfaces suggests that aesthetics is a strong determinant of pleasure experienced and could be a primary predictor of overall impression and

preferences of such interfaces (Jordan 1998; Schenkman and Jonsson 2000). Tractinsky found beauty to be highly correlated with the seemingly orthogonal dimension of the system's perceived usability both before and after the interaction, as well as with user satisfaction (Tractinsky 1997; Tractinsky, Katz, and Ikar 2000; Lindgaard and Dudek 2003; Lavie and Tractinsky 2004).

However, in all of these studies that test the correlation between beauty and usability it is not clear which is the real meaning of the term beauty and how it is related with the object's physical appearance. Hassenzahl and Monk (2010) note that the labels for the respective notions that are examined in most of those studies differ even if they had to investigate similar issues about the aesthetic experience. Those empirical studies probably arouse theoretical and methodological issues concerning to what the participants really perceived when they asked to perceive and rate *beauty* in a design. What *beauty* stands for in product's form is still a fundamental question. According to Frohlich (2004) a major problem in those studies is that participants do not always "see" *beauty*, which means also that users are probably not equally sensitive to aesthetics (Tractinsky and Hassenzahl 2005).

3.2 MODELING AESTHETICS IN DESIGN

While authors give their personal interpretation to what aesthetics are in design, others attempt to go one step further and construct their theoretical or empirical models of aesthetic experience and beauty in interaction design. In this section the most known attempts to model the aesthetic are presented. Norman's three-level model is the most known in interaction design attempting to explore the human behavior, relating biological and psychological evidence of interaction to aesthetic experience and interaction design. Several authors are affected by or use Norman's model in order to explore the aesthetic experience. However, there are other attempts that aim to clarify similar notions such as attractiveness in relation to beauty, to propose measures of the aesthetic quality, to import theoretical perspectives (e.g. phenomenological, pragmatic) purposing models that explore how form and appearance can support the aesthetic communication between the user and the artifact.

3.2.1 **Norman's three level model of affect and cognition**

Norman, in his initial idea of modeling human behavior, suggests a three-level model of affect and cognition: the reaction, the routine and the reflection (Norman, Ortony, and Russell 2003, 87), which are redefined in his latter writings as "the visceral", "the behavioral" and "the reflective" (Norman 2003). This model reflects in part the biological origins of our brain concerning cognitive and emotional processes. Specifically, Ortony, Norman and Revelle (2005) claim that this model depends on a dynamic interplay of four domains: affect, motivation, cognition and behavior. In the "*Emotional Design: Why We Love (or Hate) Everyday Things*" Norman states that "beauty comes from the reflective level" (Norman, 2003, p. 87) and in the

"*Introduction to This Special Section on Beauty, Goodness, and Usability*" he states that "if there is any level at which beauty is associated with the object itself, it is at the visceral level" and later in the same paper that "most discussions of beauty focus upon either surface appearances (visceral) or deep, hidden meaning (reflective). Few accounts talk of behavioral beauty or pleasure,.." (Norman, 2004, p. 314). However, it is not clear how all these functional aspects that constitute each level are functionally related to *beauty* itself.

The whole model of human behavior, which Norman proposes, passes in two distinct kinds of information. The first has its origin in processes that are related to affect and emotions, and the second to those that are responsible for cognition. These two processing systems are deeply intertwined and require one another for optimal functioning. People with neurological damage in brain areas that are related to emotional processes exhibit disabilities to make selection and judge situations in their everyday life (Norman, Ortony, and Russell 2003; Andrade and Ariely 2009; Baumeister et al. 2007; Bechara 2004).

The agent according to Norman Ortony and Russell (2003) has developed mechanisms in order to remember things, interpret, understand, and reflect upon the world that he lives in. However, the agent has a second set of mechanisms through which he "rapidly evaluates events to provide an initial assessment of their valence or overall value with respect to the person: positive or negative, good or bad, safe or dangerous, hospitable or harmful, desirable or undesirable" (Norman, Ortony, and Russell 2003, 38).

Therefore, Norman Ortony and Russell (2003) propose three levels the Visceral (or Reaction) level, the Behavioral (or Routine) level, and the Reflective level. Every level involves processes that serve two different functions: i) the affect, which is about the evaluation of the world and what is happening in it and ii) the cognition, which refers to interpretation of what is happening in the world. Norman (2004) associates these three levels of processing with aesthetic experience and particularly he relates each of these levels to respective levels of beauty.

3.2.1.1 *The Visceral, the Behavioral and the Reflective level of human behavior*

According to Norman (2003), these three levels reflect, partly, our biological origins of the brain, from primitive one-celled organisms to complex animals like human beings. For simple animals, like vertebrates, mammals and apes, the act of living is a continuing set of threats and opportunities in which animals must find ways to respond appropriately. Animals develop such functionality in order to analyze an interactive situation and respond to it. In a case of an external threat the animal could run, attack, or freeze. In contrary when a situation is good or desirable the animal can relax and see the conditions as opportunity to fulfill its goals. The advantage of human beings is that they can reflect upon a situation they experience and communicate it to others. This is the highest evolutionary level of consciousness, where humans can think about themselves and make plans.

3.2.1.1.1 The Visceral level

The visceral level consists of such low-level processes that most of them are genetically determined and innate (Norman, Ortony, and Russell 2003). These processes are fixed routines and mechanisms where the brain analyzes the environmental conditions and responds to them (Norman 2003). This level, according to Norman (2004), *'is biologically determined, with only minor adaptation or classical conditioning possible (in other words, minimal learning)'* (p. 314). So, the agent could not recall here his past experience and knowledge from interactions of the same or similar situations. Thus, as Norman et al. (2003) claim, the information that triggers the visceral level is coming only by the sensory system of the agent through fast, hard-wired detectors that require a minimum of processing. When the agent detects problematic situations, *'it interrupts ongoing higher-level processing (if there is any), it heightens arousal, and it initiates an immediate response, or response preparation, along with a concomitant diversion of resources'* (p. 39).

In this level the agent receives powerful emotional signals from the environment and interpret them automatically (Norman 2003). Those emotional signals are restricted to here and now and not to the future or the past (Ortony, Norman, and Revelle 2005). Our preferences concerning bodily characteristics (e.g. faces) or other preferences such as size, color, and appearance, probably result from judgments in this level that we are biologically determined to make (Norman 2003). Hence, according to Norman *'when we perceive something as "pretty," that judgment comes directly from the visceral level'* (p. 66). Only in this level we can associate the artifact with beauty since we have evolved to make judgments to experiences and situations or events positively or negatively. For Norman this kind of beauty is only skin deep and is perceived by simple pattern recognitions through those innate mechanisms.

3.2.1.1.2 The Behavioral level

Following the visceral, the behavioral is still not a conscious level of processing. It is a very valuable level where well-learned routine operations take place like motor skills and language generation (Norman 2003; Ortony, Norman, and Revelle 2005). The behavioral level is quite complex by means that it involves processes of selecting and guiding behavior. Here, the agent has access to both working and permanent memory and to mechanisms that could aid him to evaluate situations and form plans. Inputs come from the visceral level below and the reflective level above. However, the behavioral level can both inhibit and activate reflective responses when the anticipated outcome is not confronted to norms or routine expectations. Predictions of and expectations about the near future, are intimately connected to behavioral responses. Generally, the behavioral level is expectation driven where positive affects emerge when the agent understands and acts in control, during the use of a product. In contrary, when expectations and actual experiences are in mismatch or when the agent lacks of control, he feels negative affects (Norman 2004).

'People frequently become angry at objects that let them down and respond by kicking or hitting them. Such reactions derive from the Behavioral level, where the failure of objects to live up to expectations generates strong emotional responses. It is because of their dependence on how our routine interactions with things ought to feel that we call reactions at the Behavioral level "expectation-induced."' (Norman and Ortony 2003, 4)

As Norman (2004) claims, both the visceral and behavioral levels produce feelings but not true emotions. Particularly he states that '*most discussions of beauty focus upon either surface appearances (visceral) or deep, hidden meaning (reflective). Few accounts talk of behavioral beauty or pleasure, of the pleasure of the smooth responses of a well-crafted mechanism.*' (p. 314).

Although the behavioral level is automatic and sub-conscious, there is awareness. This is the level where power users usually act. Here an agent could work subconsciously while he consciously thinks of something else at the reflective level (Norman 2003).

3.2.1.1.3 The Reflective level

The reflective is the higher evolutionary level of development. It is about those meta-processes that allow the agent to think about its own operations deliberately (Norman, Ortony, and Russell 2003; Norman 2003). Reflection is such a meta-process which, according to Norman and his colleagues, performs operations of internal representations of the agent's experiences, of his physical embodiment, or behavior about the current environment, offering to the agent outputs of planning, reasoning, and problem-solving. This level does not use information from sensory inputs, which means that the reflective level is not responsible for direct behavior. In contrast he has input only from the two lower levels of processing the visceral and the reflective, which can also interrupt the agent while he acts in the reflective level (Norman, Ortony, and Russell 2003). Conscious thoughts, the development of new concepts, the ability of learning and making generalizations about the world have their entire home here in the reflective level (Norman 2003).

Additionally, in parallel to those conscious thoughts, in this level, highest levels of feelings and emotions are established. Both high order cognition and emotions provide to the agent the whole experience of the world. As Norman (2003; 2004) argues, at the visceral and behavioral level we experience only affect without interpretation. The agent interprets, evaluates, understands and makes reasonable thoughts only at the reflective level. Thus, the reflective level '*is the most vulnerable to variability through culture, experience, education, and individual differences*' (p. 38).

This is the reason why Norman (2004) places beauty at this level, where it should be restricted to conscious, reflective judgments. In the primitive levels we can only talk about positive or negative valences which can '*contribute to our perception of beauty and goodness but they can be perceived only after interpretation by the reflective level... Reflective levels provide deep and considered judgments and even superficially ugly items might be judged beautiful.*' (p. 315).

Finally, the three levels have also an extra distinction that governs them. The lower levels, the visceral and the behavioral are about acts that take place 'now' in the present and they are governed by sensory inputs that force the agent to make fast selections, while the reflective is extended in the future. The agent recalls things that he has experienced in the past and uses such experience in order to make plans and choose actions that will take place in the future (Norman 2003).

3.2.2 **Folkmann's phenomenological approach of aesthetics and design**

The theoretical framework that Folkman (2010) proposes discusses the meaning of aesthetics in design and also attempts to inform designers who need to deal practically with the challenges of the aesthetic in design. His dual purpose is to explore how form and appearance can be qualified as means of a type of aesthetic communication that affects experience, and additionally how the form challenges our understanding of things.

The two aspects of aesthetics in design that Folkman's framework puts forward are a) design as a structure of sensual appearance, and b) design as an act of communication that may contain an aesthetic coding that lets an idea or content of meaning be physically manifested and reflected in different ways. In this framework, he considers design both as a meeting point of multiple interests that engages clients, designers, and manufacturers, and as a complex negotiation between '*problem formulation*' and '*solution generation*'. This means that aesthetics in design are not an expression of an artist, but the result of commercial and societal processes. Moreover, they could be considered as an ambition to grasp the potential power of giving shape to our environments in innovative and progressive ways that are appropriate to human needs (Folkmann 2010).

Folkman argues that aesthetics in design are a matter of how design relates to meaning, not only on a conceptual level but on how it performs or reflects this meaning in its physical form, and how it relates to the kind of self-reflective "aesthetic function", where it displays a surplus of meaning. Thus, evaluating aesthetics in design is a matter, according to Folkman, of perception of sensuous qualities rather than distinctive appeals to the senses. However, this aesthetic evaluation in design does not exhaust all the different properties that design encompasses (for example, functionality and sustainability). But it does emphasize the function of design objects as sensually appealing artifacts as well as issues concerning form and surface. In his attempt to explore how form and appearance, as a type of aesthetic communication, challenges the experience and the role of the form to our understanding of things, Folkman uses two powerful frameworks, where issues of form, experience, and understanding in design can be situated.

Following the tendency to loose the connection between art and aesthetic theory, and to revisit Baumgarten's original idea of applying aesthetics to sensual matter, aesthetic theory can be seen in the contextualization of phenomenology as a philosophy that addresses the fundamental premise of the importance of experience and the basic conditions of experience. In this way,

according to Folkman, phenomenology as a theory of experience, can address certain aspects of aesthetics related to sensuous appearance and experience. According to phenomenology, experience is a matter of a concrete and specific subject, whose consciousness is incarnated in a body that is located in a concrete world of things and intersubjective relations. In contrast, the "world" is only a matter of a bodily incarnated subject. This means that it is impossible to separate the subject from the world. They are reciprocally intertwined with each other. The sensing subject cannot be separated from the sensed material, and the viewer cannot be separated from the viewed but he participates in it and is influenced by it, criticizing the traditional dichotomy of subject and object. The concept of *ambience*, atmosphere-*Atmosphäre*, is used to analyze how things, situations, and surroundings appeal to us. Ambience is as a kind of relation between subject and object and can only evolve if there is an experiencing subject (Folkmann 2010).

Folkman accepts that for aesthetics, the ambiences are therefore the first and essential reality. They are the perceptible co-existence of subject and object. Behind the operations of ambience there might be a "real reality" and aesthetics are engaged when such "reality" is mediated through ambience, as surface and form effect the value of staging meaning, making the "reality of appearance". Ambience is experienced and expresses itself as a coherent unit and functions as the perceptual background, upon which things and surroundings present themselves, and where one may look for sensuous differentiation. Moreover, ambience is not only something to be experienced but also something to be made, or manipulated. In aesthetic objects there is an intention of giving things qualities that they are designed and perceived in a certain way. In this way designs can be seen as 'aesthetically calculated', where they are conceived with a high degree of 'aestheticity', i.e. interpreted to be perceived 'aesthetically'. Hence, in this context, design is structuring the appearance and the surface that signifies "the world" in our perception and cognition (Folkmann 2010).

3.2.3 **Hassenzahl's approach on beauty in interaction design**

Hassenzahl (2008) argues that in the context of design, and especially of interaction design a definition of beauty which is related to judgments of artworks can be problematic. There are several examples where the work of art could be good without being necessarily visually pleasant or it can be visually pleasant without much quality. The main differentiation, according to Hassenzahl, between works of art and designs is the goal-oriented nature of the design process and thus most of the interactive products are made to serve purposes. As such, we need to distinguish interactive products from artworks, which per definition do not serve personal goals other than enjoyment or creation of new insights. In contrast, an appealing design could count on functionality or usability. According to Baljko and Tenhaaf (2008), Hassenzahl does not equate aesthetics with beauty. In the context that aesthetics are about an affective or emotional state, subjective judgments and attributions that ground on the physical form of the object, Hassenzahl's

(2004a) model can be viewed as another model of aesthetics in the HCI. According to Hassenzahl (2008) there are three different approaches to study beauty in interactive designs: a normative, an experiential and a judgmental approach.

Briefly, the *normative* approach defines particular descriptive attributes (e.g. symmetry or other aesthetic properties) of the design expressing more or less beauty. For instance, symmetry could be more beautiful than asymmetry and particular properties could be better than others. Counting on the objective configuration of such attributes, the design-participant (user or designer) can then decide whether the designed artifact is beautiful or ugly. This approach is primarily design-oriented and thus, it starts from the materials (e.g. color, layout, form, movements) and attempts to provide a 'recipe' of how to design something beautiful. The *experiential* approach focuses on holistic aesthetic experiences marked by an altered perception of one's environment (objects, persons etc.), which creates and attaches new, yet un-thought meaning to things. The experiential approach is primarily concerned with preserving the complexity and richness of an aesthetic experience. Beauty should rather be thought of as something rare, outstanding – a 'design prize'. Finally, the *judgmental* approach in which Hassenzahl focuses, refers to what users judge to be beautiful or not. This approach is concerned with the consistency of beauty judgments among individuals and how fast and easy those judgments are. In addition, it addresses the question of how beauty relates to other product attributes, such as novelty or usability.

Hassenzahl (2003, 2004a) in his model of user experience, proposes that when individuals come in contact with a design, a process is triggered, by which people perceive the product's features or attributes. This means that product attributes are constructed by users, combining percepts of features and the user's own personal expectations and standards (Baljko and Tenhaaf 2008). In this way, every person that interacts with a design, constructs a personal version of the product character. This character consists of groups of pragmatic and hedonic attributes. Pragmatic attributes relate to action goals (either externally given or internally generated), and resulting tasks and hedonic attributes (e.g. stimulation, identification, evocation) relate to self-advancement and self-presentation (are 'self-referential'). By the term 'hedonic' Hassenzahl expresses his belief that the functions and attributes it subsumes are strong potentials for pleasure.

These attributes lead the user to several consequences: a judgment about the product's appeal (e.g., good or bad), emotional consequences (e.g., pleasure, satisfaction) and behavioral consequences (e.g., increased time spent with the product). However these consequences of a particular product character are not always the same and they are moderated by the specific usage situation. (Hassenzahl 2003; 2008).

Hassenzahl (2003) argues that if we hold expectations about the interactive outcome (e.g. using a particular product) and these expectations are confirmed, we will feel satisfied. In contrast to satisfaction, he argues that joy or pleasure requires no expectations. The more unexpected the event is, the more intense the pleasure will be. Hence, if people use a particular product and

experience desired deviations from expectations, they will be pleased. Satisfaction is linked to the success in using a product to achieve particular desirable behavioral goals. Pleasure is linked to using a product in a particular situation and encountering something desirable but unexpected. Particularly he states that:

> *'if a product is able to trigger positive emotional reactions it is appealing. Appealingness is a group of product attributes such as good, sympathetic, pleasant, attractive, motivating, desirable, and inviting.'* (Hassenzahl 2003, 39)

In his studies (e.g. see Hassenzahl 2004a) a substantial relation between judgments of beauty and hedonic attributes is found. These attributes capture the product's perceived ability to communicate a favorable Self to relevant others. Self-presentation is clearly a 'be goal'. Thus, he argues that beauty is related to, signals, or is even a part of hedonic quality in products, which in turn primarily appeals to self-referential goals, i.e. 'be goals' (Hassenzahl 2008).

Hassenzahl believes that beauty contributes to the hedonic quality of a design rather than to its pragmatic quality. For Hassenzahl (2004b; 2008) *beauty as a judgment* is a source of value of personal constructions attached to an object derived from schemata or actual experience. These values require standards and may vary from person to person, which means that beauty is what people believe beauty to be. '*Beauty judgments are interpretations of initial, diffuse, spontaneous responses of liking and disliking.*' (Hassenzahl 2004b, 381). Hassenzahl argues that a spontaneous positive affective response does not equate with satisfaction or love or other emotional activity and we cannot call these reactions beauty. Studies have shown that beauty can lead to impressions of goal success, without knowing anything about the stimulus person. As Hassenzahl claims, beauty and usability could follow the same logic. Beauty could be a cue for usability, a signal for usability, and hence a usable product may be judged as beautiful.

Finally Hassenzahl proposes a definition of beauty:

> *'A judgment of beauty is a predominantly affect-driven evaluative response to the visual Gestalt of an object. It takes the percept of the object and the integral (i.e. attributed) affective response as input. This input may be further modified by classification and comparison processes. Beauty's relative reliance on integral affect makes it faster and more consistent than complex judgments of goodness.'* (Hassenzahl 2008, 291)

3.2.4 **Aesthetics of interaction**

Petersen et al. (2008) divide the approaches of aesthetics in HCI in two categories mostly related to the main philosophical traditions, which are presented in Chapter 1. The Analytic perspective is related to the study of the aesthetic aspects of HCI, which means that aesthetics are approached as a part of art theory, critical studies, and empirical studies of aesthetic experience in behavioral science. The design perspective, in contrary, is related to the development of expressive methods for interaction design work, which means that aesthetics are approached as a foundational

component of design methodology. As Petersen et al. (2008) argue, the distinction between experience and expression is a key issue here:

> *'From the analytical HCI perspective, there is a natural focus on experience, while the interaction design perspective, on the other hand, naturally has a primary focus on expression; we study someone using computational things or we build computational things to be used by someone. Thus aesthetics of interaction is beyond the appearance of products. It is tightly coupled to the use and to the interactivity enabled by computing. Aesthetics of interaction holds a double focus on experience and expression, making the foundations somewhat different from the aesthetic foundations of traditional product design.' (2008)*

According to Petersen et al. (2004), a Pragmatist tradition of aesthetics as opposed to Analytic aesthetics could be the key to express the concept of aesthetic interaction, giving to aesthetics the needed socio cultural character, aiding designers at the same time to design for mind and body and the instrumentality of aesthetics.

Specifically, aesthetic is not inherent in the designed product itself, but it results from our feeling of appropriation with the product. However, the term 'appropriation' is an extra abstract term in order to understand the 'aesthetic'. From Petersen's et al. (2004) perspective the design is not aesthetic itself but it rather results from the socio-historical appreciation of the material, and the shapes. Consequently, as they claim:

> *'our ability to engage in an aesthetic experience is based on our social context, manifested in a personal bodily and intellectual experience prolonged beyond the immediate experience. According to the thinking in pragmatist aesthetics, aesthetic is not something a priori in the world, but a potential that is released in dialogue as we experience the world; it is based on on valuable use relations influencing the construction of our everyday life.'(Petersen et al. 2004, 271).*

Moreover, following a pragmatist perspective for aesthetics the experience is linked neither to the mind nor to the bodily experience but to both.

> *'According to pragmatist thinking the aesthetic experience encompasses the immediate sensational auditory, visual and tactile qualities of artefacts and the intellectual process of appropriating the artefact, and moreover it points to the fact that past experiences fashion those of the future.*
>
> *In a pragmatist perspective we have to move beyond ideals of meeting human sensor motor skills and somatic sensing, to include among others the human intellectual capacity to grasp and make sense of complex, contradictory and even ambiguous systems and situations [18]. It is the systems capacity to excite imagination that potentially will reward the user an aesthetic experience comprised of both a bodily sensation and an intellectual challenge.'(Petersen et al. 2004, 271).*

Finally, we add values to artifacts according to our needs, desires, fears and hopes. This means that what we understand in a system is not what is necessarily designed. We appropriate things as we use them.

> *'Meaningfulness and aesthetic experiences emerge in use, they are not predefined… In a pragmatist perspective aesthetics is a part of everyday life. Aesthetic Interaction comprises the views that aesthetics are instrumental and that artifacts are appropriated in use… …aesthetics has a purposeful role in the use of interactive systems, aesthetics is not only an adhesive making things attractive, and it is part of the foundation for a purposeful system. Aesthetics cannot be sat aside as an "added value". Emerging in use; it is an integral part of the understanding of an interactive system, and its potential use.' (Petersen et al. 2004, 271).*

Summarizing, the pragmatist approach to aesthetics of interaction proposes a tight connection between aesthetics and context, use and instrumentality. Therefore, when designing for aesthetic experience, designers build products that invite people to actively participate in creating sense and meaning. Aesthetics of interaction trigger people's imagination, provoke and encourage people to think differently about the encountered interactive systems (Petersen et al. 2004).

3.2.4.1 *Aesthetics of use*

Locher Overbeeke and Wensveen (2010), in their recent framework and following the pragmatist approach for aesthetics (see §1.2), attempt to explain the process through which the aesthetic experience emerges in the interaction. Their view, the pragmatic tradition to aesthetic experience, leads on the act of such experience named '*aesthetics of use'*. In this way they claim that what we understand as aesthetics in an artifact emerging out of a dynamic interaction between the user and the designed artifact.

Following the changing scope of design, which moves from human/artifact interaction to a broader approach of functionality that seeks to enhance interpersonal and societal values, including personal, aesthetic, and socio-cultural ones, through the application of intelligence in artifacts, Locher et al. (2010) propose a theoretical framework that aims to provide a better understanding concerning the nature of a user's aesthetic interaction with design products.

Their framework depicts the underlying user-product interaction and the resulting aesthetic experience that is governed by two processes: a bottom-up process, which is driven by the artifact and a top-down process, which is driven by cognition. The structure of the framework is based on the claim that our experience with products is a continuous, dynamic bottom-up/top-down interaction between the properties (form) and functionality of the artifact, the user's sensory-motor-perceptual (i.e., visual, handling or active touch, auditory) processes involved, and the user's cognitive capacity. Therefore, through the aesthetic experience the artifact presents continually changing - '*action driven'* - affordances. The perception of these affordances influence three factors that Djadadiningrat, Wensveen, Frens, and Overbeeke (2004) suggest they play an important role in aesthetics of interaction:

- The first is the interaction pattern that spins out between user and product. The timing, flow and rhythm that link user actions and product reactions, strongly influence the feel of the interaction.
- The second is the richness of motor actions or other cognitive skills.
- The third is the freedom of interaction. This refers to the range of choices the user may have in order to make the best choice with respect to his goals among fixed interactive paths.

The interaction according to Locher's et al. (2010) framework is monitored and directed by a "central executive," which in the present account is conceptualized to be consisted of limited-capacity, effortful, control processes that direct voluntary attention to the artifact in a cognitively driven, top-down fashion. It forms the crucial interface between perception and memory and between attention and action. The central executive, is one of the three components of working memory and performs four important executive processes:

- The focus of attention,
- The division of attention,
- The switch of attention, and
- The ability to link working memory with long-term memory.

As is the case with the claim of Locher et al. (2010), the top-down and bottom-up component processes together create both meaning and the aesthetic quality of the artifact. Aesthetic experience and its resulting affect emerge from the latter. Thus, the aesthetic experience is a product of perceptual-motor, cognitive, and emotional elements that are somehow related in the interaction. In other words, aesthetic experience is a product of the dynamic, ongoing interaction between two driving forces of the system, that is the artifact itself and the user's cognitive structures. Therefore, the appearance of an artifact can convey its aesthetic and symbolic value and provide a quality impression. The artifact can communicate its functionality and how usable it is. In addition to presenting product properties, according to Locher's et al. (2010), interactive artifacts can be designed so that their use contributes to a *dynamic aesthetic interaction* between their form and functionality and the user. Although they discuss the aesthetics of interaction, they also argue that the aesthetics of appearance (of an artifact) must always be taken into consideration as contributing factors to a user's interaction with it.

The second major contributing component to an aesthetic interaction is the user's cognitive structure in which several types of information (semantic, episodic, and strategic) are acquired throughout life. This is the home of one's personality, motivations, and emotional state that create what Locher et al. call the '*person context*' in which the aesthetic experience takes place.

The third type of information that affects the aesthetic experience is related directly to the functionality of the product. It is the actual purpose of the product. This functional information is

generated by the combined output of both bottom-up and top-down processes (i.e., by artifact and central executive processes).

Finally, Locher et al. (2010) propose that a user's experience with a product follows two stages. The first stage of processing involves the simultaneous use of two sense modalities; the visual and the haptic perception. Vision and haptics are functioning in order to extract and encode information about objects (e.g., haptics for texture and vision for spatial location). These two modalities, interact in various ways at the encoding stage of processing and their interaction is mediated by differential attention to an object's features and user's goals. This initial stage of processing is similar to the visceral level, which is the first of three levels of processing that is proposed by Norman (see §3.2.1.1.1).

Once the user forms an initial impression of an artifact in the first stage, the second stage of processing follows as the user focuses on the artifact's form and functionality. The central executive directs this process. The perception and the aesthetic evaluation of the artifact emerge out of the dynamic interaction of input obtained by both looking at and handling this artifact. The information of the artifact in activated memory is acquired by visual and haptic experience while the artifact during the second phase of processing activates subsets of featural and semantic information in the user's knowledge base. The functionality of the central executive corresponds to Norman's reflective level, which, along with the behavioral level they are very sensitive to experience, training, culture, and education (see §3.2.1.1.3 & 3.2.1.1.2).

3.2.5 Grounding attractiveness and beauty in artifact's form

Sutcliffe (2002; 2001; 2010), Hartmann (2006) and Hartmann Sutcliffe and De Angeli (2007), argue that aesthetics are an important factor among others that constitute the attractivennes in interaction design. The perspective of aesthetics that Sutcliffe (2002; 2001; 2010) follows is expanded towards interaction and engagement to propose design treatments, metaphors, and interactive techniques which can promote user interest, excitement and satisfying experiences. As they claim, beauty is placed in the individual's mind, and it depends on who this is and what he is doing. Particurarly, Sutcliffe argues that aesthetics are related to our emotional activity which influnces the way we construct our decisions and judgments. So, for Sutcliffe, excitement, surprise and pleasure could be the most important positive emotions which are closely related to interaction design. Emotions interact with the arousal mechanism, playing an important role on how we alter from the psychological state of calmness to excitement. Arousal is incresed as we interact facing unexpected events, while unusual and unpleasant stimuli and high arousal increases the strength of emotional experience. What we feel is a combination of arousal and emotion that persist as a mood, which may last for hours and possibly days and thus affect our judgement. Pleasing and enjoyable user experience will produce a positive mood; in contrast, poor design, errors and difficulties could leave us in a bad mood, and bad moods may be reflected in future judgement of the product and related products (Sutcliffe 2010). In the same track,

according to Hartmann (2006) aesthetics reflect the format in which the content and services are presented as well as the designed look-and-feel of a system. Aesthetics could be an important determinant of user satisfaction and system acceptability, overcoming poor usability experience and even positively influencing content.

The attractiveness of an interface is influenced not only by the user's attention but also by the aesthetic qualities that characterize the design, the user's motivation, his requirements, and probably the excitement that is invoked by the interface. Hence, as Sutcliffe claims, attractiveness may be considered to be the result of matching user's motivations and requirements with the design features.

In this way, *arousal*, which means how exciting/restful an interface appears to the user, *motivation,* which is reflected in our will to act or hold a belief, and *perceived utility* could be the variables that can measure attractiveness (Sutcliffe 2002; 2001). For what may constitute the aesthetic and thus attractiveness Sutcliffe argues that *'aesthetic attractiveness is a complex variable that is subject to individual differences, as summarized in the saying "beauty lies in the eye of the beholder"* '(Sutcliffe 2001, 187). This shows that what may constitute the aesthetic experience is still a black box in the design of a user interface. However, Sutcliffe combines the aesthetics with some general principles that may form an aesthetic appeal design (Sutcliffe 2010). These generic heuristics for attractiveness and aesthetic design have been partly modified and enhanced from 2001 to 2009. As De Angeli, Sutcliffe and Hartmann (2006) argue:

> *'We have made a small advance in measures of aesthetics by introducing related phenomena of interaction and engagement with a rigorous evaluation methodology. This exposed the conflicting opinions held by our users and indicates that expressive aesthetics have to be assessed in general attitude, which in the metaphor site conflicts with opinion on more detailed aspects of aesthetics. The attractiveness heuristics we used in previous studies, attempt to link more general impressions to assessment of specific aesthetics and interactive design features'*

This is the list of the

- ***Judicious use of color***: color use should be balanced and low saturation pastel colors should be used for backgrounds. Designs should not use more than 2-3 fully saturated intense colors (Sutcliffe 2001, 189).
- ***Gestalt effects***: there are several visual patterns which we recognize and interpret instinctively that are collectively known as 'Gestalt' effects in perceptual psychology:
  - *Closure*: we naturally see the complete object such as a circle, even if it is not complete.
  - *Good continuation*: items organized in a visual sequence or on a curve are perceived to be related or belong to a structure.
  - *Similarity*: objects which share visual attributes (color, size, shape) will be seen as a category or group.

- *Proximity*: objects, which are placed close together and separate from others are perceived as a group.

- *Präganz*: the tendency to ascribe meaning to images based on similarity to images we remember.

- *Symmetry*: symmetrical visual layouts, e.g., bilateral, radial or rotational organization that can be folded over to show the symmetrical match, have pleasing effects.

- *Figure ground*: the juxtaposition of visual features or grouping of shapes causes higher-order structures to emerge from the image. This effect can be used with verbal priming to create surprise when the structure is not immediately apparent. (Sutcliffe 2010, 27–28)

- **Structured and consistent layout**: use of grids to structure image components and portray a consistent order; grids need to be composed of rectangles which do not exceed a 5:3 height to width ratio (Sutcliffe 2001, 189).

- **Visual structure and organization**: dividing an image into thirds (Right, Centre, Left or Top, Middle, Bottom) provides an attractive visual organization while rectangular shapes following the golden ratio (height/width =1.618) are aesthetically pleasing (Sutcliffe 2010, 28).

- **Depth of field**: use of layers in an image stimulates interest and can be attractive by promoting a peaceful effect. Use of background image with low saturated color provides depth for foreground components (Sutcliffe 2010, 28)(Sutcliffe 2001, 189).

- **Use of shape**: use of curved shapes conveys an attractive visual style, in contrast to blocks and rectangles, which portray structure, categories and order in a layout (Sutcliffe 2010, 28).

- **Choice of media to attract attention**: video, speech and audio all have an arousing effect and increase attention. Music can attract by setting the appropriate mood for a website (Sutcliffe 2001, 189).

- **Use of personality in media to attract and persuade**: this principle applies primarily to e-commerce websites when use of human image and speech can help to attract users and persuade them to buy goods by being polite and praising their choices (Sutcliffe 2001, 189).

The question is how safe is to follow these principles in order to build an aesthetically successful design since aesthetic trends are changed dynamically through years? In fact Sutcliffe answers this question in the following lines:

> *'Although guidelines can provide ideas that can improve aesthetic design and the attractiveness of interfaces, they are no guarantee that these effects will be achieved. Design is often a tradeoff between ease of use and aesthetic design; for instance, use of progressive*

disclosure to promote flow may well be perceived as being difficult to learn by others. Visual effects often show considerable individual differences and learning effects, so a well intentioned design might not be successful. The advice, as with most design, is test ideas and preliminary designs with users to check interpretations, critique ideas and evaluate their acceptability.' (Sutcliffe 2010, 29)

3.2.5.1 *Lavie and Tractinsky's aesthetic measures*

Most of the authors that approach the meaning of the aesthetic and its application to interaction design argue that aesthetics should be considered as an emotional or an affective component, that constitutes our whole experience with interactive products (Norman 2003; Sutcliffe 2010). However, according to Sutcliffe (2010), while emotions are a very important component in order to understand User Experience, it is more important to focus on the way people form their judgment about products. Sutcliffe proposes two approaches:

- a quest to understand the deep-seated constructs through which we make judgments about product quality.
- a more process-oriented view to understand how we make quality-related judgments.

Following a process-oriented view for quality-related judgments, Lavie and Tractinsky (2004) attempt to explore how users perceived the aesthetics of web sites beyond attractiveness (Sutcliffe 2010). As they claim, in order to develop such kind of questionnaires they followed the exploratory approach, which is mainly associated with empirical studies that evaluate complete and natural stimuli rather than manipulated, artificial ones. It is also more concerned with people's judgments rather than with the objective aesthetic properties of stimuli. Hence, they attempt to measure user judgments about the aesthetic quality of interactive products, producing measures in a two-dimensional structure of perceived web site aesthetics.

- The first dimension is represented by items that refer to the design attributes such as: aesthetic, pleasant, clean, clear and symmetrical. It corresponds to the ''visual clarity'', a factor which seems to represent qualities embraced by classical notions of aesthetic design and Lavie and Tractinsky name this factor "classical aesthetics".
- The second dimension is represented by design attributes such as: creative, using special effects, original, sophisticated and fascinating. This factor refers to classical and expressive aesthetics, traditional usability and pleasure and captures users' perceptions of the creativity and originality of the design. It corresponds to the dimension of visual richness, which includes ornamentation and expressions of the designers' character, creativity and originality. Lavie and Tractinsky name this factor "expressive aesthetics."

Lavie and Tractinsky argue that the above aesthetic measures (see also Table 2 below) can serve in future empirical research not only for the visual aesthetics of web design but also for the entire user experience.

Table 2 Aesthetics items (a,b) denote items that were retained for the final classical and expressive scales, respectively.

Aesthetics items	a,b		a,b
1. Admirable		21. Enjoyable	
2. Dull		22. Uses special effects	b
3. Original	b	23. Realisticap pearance	
4. Noisy		24. Harmonic	
5. Site has unique character		25. Modern	
6. Complex		26. Beautiful	
7. Intriguing		27. Monotonous	
8. Pleasing		28. Artistic	
9. Colourful		29. Skilfully designed	b
10. Sophisticated	b	30. Symmetrical	a
11. Vulgar		31. Applies good taste	
12. Exciting		32. Energetic	
13. Old fashioned		33. Challenging	
14. Fun		34. Convenient	
15. Clear	a	35. Wretched	
16. Fascinating	b	36. Simple	
17. Lack imagination		37. Pleasant	
18. Standard		38. Overloaded	
19. Organized		39. Clean	
20. Creative	b	40. Professional	
		41. Aesthetic	a

3.3 SUMMARY & CONCLUSIONS

The aim of this chapter is to present the variety of the approaches that attempt to explain the aesthetic experience in interaction design. These approaches show a diversity concerning the usage of the notions that are related to what aesthetics and beauty stand for in interaction design. Over the last few years, the design community has attempted to study the origin of beauty and its appliance to objects mostly by developing several experimental studies. These studies attempt to propose and test factors that are aesthetically perceived by users during their interaction with products. Particularly, in almost all of these works, aesthetics are studied as a multi-dimensional phenomenon that occurs through perception by following the tradition of focusing on the effectiveness and usability. As it was discussed in this chapter these studies do not focus on the nature of aesthetics, but on how the aesthetic phenomenon, whatever this might be, affects or is related to 'known' experiences in our interaction with products. However, these types of experiences might not always be related to aesthetic experience or may go further than its limits. In fact, there is no theoretical background that relates for instance, the 'strong', the 'fun' or the 'cool' etc., to the aesthetic itself but assumptions that hardly can be tested. Therefore, readers of interaction design textbooks can hardly find any reference to aesthetic considerations in design.

From those who attempt to explain theoretically the aesthetic experience and beauty, Norman focuses on cognition and attempts to approach all those complex phenomena that take place through interaction in relation to our cognitive and emotional responses that may influence or form the aesthetic experience. Similarly, Hassenzahl argues that by perceiving an artifact we construct a personal version of the product character that consists of groups of pragmatic and hedonic attributes. Pragmatic attributes relate to action goals (either externally given or internally generated) and resulting tasks and hedonic attributes (e.g. stimulation, identification, evocation) relate to self-advancement and self-presentation (are 'self-referential'). By the term 'hedonic' Hassenzahl expresses his belief that the functions and attributes it subsumes are strong potentials for pleasure. Hassenzahl, finally attempts to define beauty and not the aesthetic experience proposing a relation between affection and the visual Gestalt of the artifact. However, as it is discussed in the first chapter it is not clear how these models are functionally transformed into a model of aesthetic experience and particularly into beauty.

Folkman, from a phenomenological perspective of experience, uses the concept of *ambience*, in order to analyze how things, situations, and surroundings appeal to us. Ambience is a kind of relation between subject and object and can only evolve if there is an experiencing subject. Ambience is experienced and expresses itself as a coherent unit and functions as the perceptual background upon which things and surroundings present themselves, and where one may look for sensuous differentiation. In aesthetic objects there is an intention of giving things qualities that

could be perceived aesthetically in a certain way. However, there is a gap on how ambience is eventually interpreted as aesthetic and how we detect these qualities through interaction.

Finally, for those authors who place themselves in a pragmatist tradition of aesthetics, the aesthetic experience is linked neither to the mind, nor to the bodily experience but to both in relation to environmental conditions. Hence, aesthetic interaction focuses on the user's cognitive structure in which several types of information are acquired throughout life. This is the home of one's personality, motivations, and emotional state that create what Locher et al. call the '*person context*' in which the aesthetic experience takes place.

The concept of aesthetic experience is widely now accepted even from philosophers and scientists as it is presented so far, that it is directly related to emotional functions that emerge through interaction. Focusing and exploring those emotional mechanisms could probably be the key in understanding what aesthetics are for the agent that interacts with his environment. Thus, a deeper understanding of the role of emotions in interaction process will enable us to explain the development of the aesthetic experience and judgment. The main aim of the next chapter is to present such characteristics of the emotional functionality that can enhance our understanding of the role of emotions in aesthetic judgment.

Chapter 4: The role of emotions in interaction

'The biological "purpose" of the emotions is clear, and emotions are not a dispensable luxury. Emotions are curious adaptations that are part and parcel of the machinery with which organisms regulate survival... ...Emotions are inseparable from the idea of reward or punishment, of pleasure or pain, of approach or withdrawal, of personal advantage and disadvantage. Inevitably, emotions are inseparable from the idea of good and evil.' (Damasio 2000b, 60–61)

As we have already discussed in previous chapters, interpretation, learning, action selection or decision making or judgment, are three important processes, which help agents to navigate themselves in the complex world. Interpretation is the process through which meaning is extracted from ambiguous information in order to construct emergent representations. Judgment is the cognitive process by which agents consider and evaluate evidence, and estimate the likelihood of occurrence of different outcomes. This process of selecting the best action (make a judgment) is responsible for the way people choose one out of several options, with a particular focus on how individuals select or avoid options that carry different levels of risk. Learning is the process by which agents use the available information to support the processes of action selection and judgment (Blanchette and Richards 2009).

However, there are other mechanisms that agents use in the service of their autonomy in order to form anticipations about their next interactive steps. An agent, in an attempt to increase his autonomy, always attempts to advance the complexity of the functions it uses, in order to be able to serve his final decisions. According to several experimental and theoretical approaches emotion

is one of these functions. According to those works, emotional activity functions as a monitoring mechanism or a feedback system that regulates the effectiveness of the potential or chosen interaction. As such, emotions are bound by agent's goals and the respective biological needs, but they are also highly related to the behavior of an agent (Brehm, Miron, and Miller 2009; Nelissen, Dijker, and de Vries 2007; Rasmussen et al. 2006; Cupchik 2001; Schwarz 2000).

Considering that the basic emotions of pleasure and pain are the most important components in aesthetic literature from philosophy to interaction design and neuroscience (see Chapter 1 & Chapter 3), the aim of this chapter is to explore the complex functionality of these emotional states in order to understand the role they play in aesthetic experience and judgment. Specifically, by understanding the mental and bodily processes that these basic emotions serve in interaction, the aim is to present those theoretical approaches that make clear i) the biological origin of emotions ii) how they emerge and iii) how their elicitation influence the construction of meaning based actions.

A construction of the aesthetic meaning, that follows a naturalized explanation of emotions, will be useful in order to defend -in the following Chapter 5- a naturalized model of minimal functionality of aesthetic emotions, where the latter are also related to minimal aesthetic decisions or judgments.

4.1 PLEASURE AND PAIN: A FUNDAMENTAL ASPECT OF ANY COGNITIVE FUNCTION

Searching for the role of the aesthetic in cognition, and accepting that emotions of pleasure and pain play an important role to what may be pleasant or unpleasant to us, the investigation of the role of the affective feelings and basic emotions is suggested as a first step, in order to understand the origin of the aesthetic experience. By explaining the 'aesthetic' pleasure and pain through natural processes or mechanisms, the aesthetic experience could be considered as an emergent outcome with particular naturalistic characteristics.

Studying basic emotions and their minimal functionality we could make one step closer to the understanding of these complex mechanisms, by which pleasure and pain are elicited. But most of all, we could understand how these basic mechanisms influence our behavior in general and our aesthetic decisions in particular. Considering the theoretical and experimental evidences which propose that such basic emotional processes i) serve identifiable biological functions related to the survival needs, ii) are universally associated with characteristic bodily expressions, and iii) they exist in most of the cultures, emotions could provide the basis on which a naturalized model that describes the minimal functionality of the aesthetic experience and judgment could be constructed.

4.1.1 **Affects and emotions**

Research on affect and emotion has increased over the last two decades. The distinction between 'affective feelings' and 'emotions' is made, most of the times, in order to denote the degree of arousal that is made within an emotive system (Panksepp 1982). The affect has generally been conceptualized in terms of just two possible states: i) a positive or negative feeling in response to a stimulus and ii) a possible lack of a specific motivational goal. This means that affects are characterized by such feelings that do not have a clear behavioral implication, except for simple tendencies: i) to approach whatever may lead to a positive affect and ii) to avoid whatever may lead to a negative affect, respectively. Affects are genuine subjective feelings and they are primarily defined by a hedonic quality, a valence like positive or negative (Brehm, Miron, and Miller 2009; Russell and Barrett 1999). According to Panksepp (2007), the aim of these basic affective responses is to inform the agent using various life-supportive mechanisms –known as '*comfort and distress zones*'– that signal him for modifications, which happen both in internal (bodily) and external (environmental) conditions. In other words, affects are considered as intrinsic brain processes that help an agent to survive. As Panksepp claims, much of the agent's behavior is guided by the general principle that artifacts and events that activate good feelings in the brain, promoting survival, in contrast to bad feelings that tend to hinder survival. Particularly, he states that: '*it is possible that the classic psychological concepts of reinforcement and punishment are actually summary terms for the way many of the basic affective processes of the brain regulate learning*' (Panksepp 2007, 1819).

4.1.1.1 *A taxonomy of affects*

According to Panksepp (2007), there is no generally accepted taxonomy of affective capacities of mammalian brains. So, researchers use the terms of affect and emotion in a variety of ways, which may reflect something more than semantic preferences. Panksepp categorizes affective life into three major categories:

1. *Sensory affects*. These are tightly linked to unconditional stimuli, usually exteroceptive. Most of them are processed in the insula area of the brain. Pleasure and pain, in their various forms, would typically be included in the category of sensory affects. Similarly, the sensory-affect category would obviously also include the pleasantness and unpleasantness of various tastes and smells, as well as a large number of other -sensory driven- affective feelings. Sensory affects could be considered as guidance devices that allow agents:
   a. to find satisfying, comfortable, and pleasurable actions that support their stability
   b. to avoid those actions that may harm such stability.

Sensory affects are typically studied by focusing on simpler responses in contrast to the study of basic emotional systems that has been most effectively pursued by stimulating specific subcortical regions of the brain, and seeing how dramatically people respond within constant environmental circumstances.

2. *Homeostatic affects*. These include a large number of brain-body affective states that are critically important for survival, monitoring both chemo-interoceptively (e.g., hunger and thirst) as well as neuro-interoceptively (e.g., urges to defecate and micturate). Only a few consider such powerful affective states to be emotional as well. These important affective-motivational states of the body lead to strong affective feelings in the brain, and appear to be distinct from the primary emotional processes. Here, it is important to note that all known emotional systems have been mapped by using localized stimulations of specific brain regions that evoke unambiguous emotional-instinctual responses across many mammalian species. However, the sensory and homeostatic affects have never been mapped in those ways.

3. *Emotional affects*. According to Panksepp (2007), this third category of affects arises from complex, evolutionarily dictated action systems of agent's brain, in contrast to sensory affective valences, which seem to derive from sensory-perceptual network functions of the brain. Emotional systems appear as capable of generating affective experiences regardless of the external environment or peripheral body-derived sensory processing, as highlighted by many brain stimulation studies.

Human affects express a subjective experiential-feeling component, which is linked both to bodily events (like hunger and thirst), and to external stimuli (taste, touch, etc.). On the contrary, our emotional affects are closely linked to internal brain action states, triggered typically by environmental events (Panksepp 2005b). Emotions are a very broad class of processes to be a single scientific category (Russell and Barrett 1999). Emotions are generally considered to be relatively specific kinds of affects, exhibiting a motivational character having also behavioral implications.

Traditionally, psychologists have conceptualized the above mental issues in terms of valence (goodness and badness—positive and negative), arousal (how intense the feelings are), and urgency or power (how much a certain feeling fulfills one's mental life). There is a large number of conscious affective states, which presumably reflect different types of global neurodynamics within the brain and body (Panksepp 2005b). Moreover, recent research has shown that affects and emotions have a quite different relationship to each other. Specifically, as Brehm et al. (2009) have mentioned those emotions that give rise to distinctly different feelings and call for different behaviors are mutually exclusive. In this direction, people cannot simultaneously experience two qualitatively different emotions at the same time because when one emotion exists, another does not. As Russell and Barrets's (1999) claim, '*the boundaries to the domain of emotion are so blurry that it sometimes seems that everything is an emotion. The experts do not agree on what is*

an emotion and what is not. ... No one structure of description and assessment can do justice to this heterogeneous class of events without differentiating one type of event from another.' (p 805).

Following Panksepp, the term 'emotion' in this dissertation denotes an 'umbrella' concept that includes affective, cognitive, behavioral, expressive, and a host of physiological changes. Since it is very difficult to agree upon taxonomy of affective states, the focus of this dissertation is upon the emotional action-oriented affects of pleasure and displeasure, to the various background bodily feelings of satisfaction and dissatisfaction, and hardly to sensory pleasures and displeasures.

4.1.2 **Pleasure and pain as basic emotions**

In the emotion-related literature there is a strong emphasis on the consideration of basic (privileged) emotions, which are widely enough considered to express universal biological rules, handed down genetically through evolution. These emotions are usually called primitive, basic, primary, or fundamental (Lazarus 1994; Ortony and Turner 1990) and their number and names vary accordingly.

Following Ortony and Turner's (1990) contribution on basic emotions, we can see that most of the theorists on emotions have proposed from two to eighteen emotional states as basic. For example, pleasure and pain are proposed by Mowrer as basic emotional states, the onset and offset of which are related to hope, fear, disappointment, and relief. Watson proposes fear, love, and rage as basic emotions, Panksepp has proposed expectancy, fear, rage, and panic, Kemper has proposed fear, anger, depression, and satisfaction, and Oatley and Johnson-Laird base their theory on the primacy of happiness, sadness, anxiety, anger, and disgust. Frijda identified eighteen basic emotions, including arrogance, humility, and indifference, as well as more commonplace examples, such as anger, fear, and sorrow. On other occasions he proposed only six basic emotions while in another article he argues for only two. This confusion of what is basic and what is not may be wrong because most of these theorists use different terms (e.g fear and rage), while presumably they refer to the same emotional state.

Theorists are proposing basic emotions in order to provide several categorizations of other experiences (influenced by basic emotions), which also serve biological functions related to survival needs. According to Lazarus (1994), "*primary emotions derive from and express the most important adaptational tasks of animals such as protection from danger, reproduction, orientation, and exploration*" (p. 79). This "felt action tendency" which is a fundamental component of emotions, forms types of 'action readiness', which are the distinguishing features of emotions. Different modes of such readiness form what is often called 'basic emotions' (Frijda 1987a).

Ekman's (1999) explanation on basic emotions distinguishes all these types of emotions in two basic categories: negative emotions like fear, anger, disgust, sadness and contempt and positive

emotions like amusement, pride in achievement and satisfaction. These emotions are fundamentally the same, differing only in terms of intensity or pleasantness.

An interesting distinction that Ortony and Turner (1990) suggest has to do with two different conceptions of basic emotions; one as *biologically primitive* and one as *psychologically primitive*. These are considered to be the two irreducible constituents of other emotions. The perspective corresponding to the biological primitives concerns the problem of emotions that can be dealt with by understanding their evolutionary origin and significance and suggests that this can best be achieved by discovering and examining the biological underpinnings of emotions. Thus, the main theoretical purpose of this view is to contribute to an understanding of the functional significance of emotions for individual organisms and their species. The idea is that the biologically-based basic emotions emerge at birth or at least within the first year of life. They can be found in most human cultures and in most species, whereas other emotions are more likely to vary across cultures and to be species specific (Lazarus 1994). The second conception to basic emotions- that of psychological primitives, starts from the idea that there might be a basic set of emotions out of which all others are built. This approach offers research prospects where one can investigate only the basic emotions, or one can attempt to use the basic emotions as primitives in the study of others. The two conceptions are not independent. Basic emotions as biological primitives can also be psychological primitives and vice versa.

From a related point of view, Panksepp (2007) sees basic emotional systems as basic tools of the nervous system, providing agents "*with sets of intrinsic values that can be elaborated extensively via individual and cultural learning*" (p. 1819). Hence, basic emotional systems are genetically ingrained instinctual tools, which allow agents to generate complex, dynamically flexible action patterns -that could probably be related to emergent representations- in order to learn and cope with specific environmental enticements and threats. What he proposes is that a taxonomic identification of basic emotions does not provide explanations. On the contrary, he claims that basic processes are extremely complex and impose coherence on both neuropsychological and bodily functions. Those basic emotional systems are integrative systems that mediate the primal affective states, which may characterize the basic emotions. Such systems can be mixed, blended, and combined in many possible ways that could address types of *mixed emotions* and other complexities emerging from the interplay of the basic systems (Panksepp 1992; Panksepp 2005a; Panksepp 2007).

As already mentioned in Chapter 1, many aesthetic theorists and neuroscientists have proposed the existence of these basic aesthetic emotional states of pleasure or pain, which are probably connected, some of them *a priori*, with beauty or ugliness (Guyer 2003; Guyer 2008; Matravers and Levinson 2005a; Matravers and Levinson 2005b; Ginsborg 2003; Iseminger 2003; Cupchik 1995; Barry 2006; Jacobsen 2004; Kawabata and Zeki 2004; Ramachandran 2001). However, it is not clear if those emotional responses are related to sensory affects or to emotional affects or to rich emotional outcomes.

William James (1890) was the first to propose a distinguish between primary and a secondary layer of emotional responses to aesthetic stimuli. The primary layer consists of subtle feelings, which is pleasure elicited by harmonious combinations of sensational experiences (lines, colors, and sounds). This level offers an immediate pleasure in certain pure sensations and combinations of them and probably could be related to sensory or homeostatic affects. To this primary layer James adds a secondary layer. The secondary layer of pleasure or pain offers elegance in aesthetic taste and probably demands emotional experiences of a high order, similar to emotional affects or even higher. However, James did not fully define the stimulus properties which elicit the two kinds of emotional responses (Cupchik 1995). Other authors add a value character to pleasure and pain, which is associated with our preferences, including aesthetic ones, giving an explanation to what we like or dislike (Zangwill 1998; Ortony 1991) while others put the emotions that result from experience like great art, music etc. at the top of the emotional pyramid (Denton et al. 2009; Norman 2002; Norman, Ortony, and Russell 2003). Frijda also offers a definition of affect which refers to hedonic experience as an experience of pleasure or pain (Berridge and Winkielman 2003).

Emotions of pleasure and pain appear to be fundamental in the construction of the aesthetic experience and judgment. However, there are two questions that we need to answer. The first concerns how pleasure and pain influence behavior and decision-making through interaction, and the second concerns the possibility to divide the emotional (aesthetic) experience in two levels of processing.

The following two sections (§4.2 and §4.3) attempt to provide answers to those two questions.

4.2 THE ROLE OF EMOTIONS IN INTERACTION

Most theories attribute a central place to the role of emotions in cognitive processes and their affect on behavior. As it is mentioned in Chapter 2, an agent, in an attempt to increase his autonomy (see §2.1.2.1), tries always to advance the complexity of the functions he uses in order to be able to serve his final decisions. Emotions appear to be mechanisms that function in the service of the autonomy of the agent by subserving adaptational tasks (Lazarus 1994; Damasio 2000b) and forming a state of action readiness, which evaluates the presuppositions for a successful or not interaction (Frijda 1987a).

4.2.1 **Emotions and their influence on behavior, decisions and goals**

According to Nelissen et al. (2007) emotions are such processes that signal the agent for opportunities or obstacles in accordance to the attainment of a certain goal. Generally, an emotional state is characterized by a motivational tendency to the attainment or maintenance of a particular, emotion-specific end-state. So it is conceived that an emotion (e.g., fear) signals the implications of a situation (e.g., a stranger approaching in a dark alley) for a particular goal (to

maintain safety or avoid risk). Emotions then motivate action (e.g., run away) to accomplish this goal. However, emotions are related to goal-oriented actions, in the sense that we utilize such processes in order to foresee the outcome of our intentional actions. This means that emotions have a future-oriented nature (Freeman 2000).

According to Freeman, (2000) at a physiological level emotions are about the behavioral expression of internal states of the brain. Our future interactions require adaptations of the body to support the intentional motor activity. Emotions aid the agent to anticipate (predict) future interactive states that could support such adaptations that the organism must make. These are known as *preparations* of the organism and they consist of taking an appropriate postural stance with the musculoskeletal system, and mobilizing the metabolic support systems.

> *'It is the directedness of these preparations in the positioning of the body, the heightening of respiration, the twitching of the tail, and so on, that reveal to observers the emergence of the likelihood of approach, attack or escape.'* (Freeman 2000, 5)

At a more complex level, emotions are experiences. As Freeman (2000) claims, emotions accompany our dynamic actions as feelings that address the anticipated futures of gain or loss in one's attachments to others, one's livelihood and safety, and the perceived possibility or impossibility of changing the world to one's liking or advantage: joy, grief, fear, rage, hope and despair. This is the reason why we associate emotions with objects in the world, *'these feelings, which philosophers call qualia, are internally derived and do not belong to those objects, such as the sweetness of fruit, the repugnance of carrion, the inviting softness of velvet, and so on'* (p. 5). This complex level requires the process of awareness and involves social evaluation and assignment of responsibility for already taken actions. In contrast, acting in an automatic level (without awareness), behavioral actions cannot be distinguished as rational or emotional by judging whether the agent is or is not aware of his behavioral state and action. In both of these levels actions are emotional and intentional and both emerge from the individual and are directed to short- or long-term goals. However, they clearly differ from one another.

The biological basis for that difference lies in the self-organizing properties of our brains, through which actions are constrained or deferred by a global self-organizing process (Freeman 2000). Thus, emotions are considered as a self-organized process that works together with consciousness. Emotional activity functions as a monitoring mechanism or a feedback system that regulates the effectiveness of the potential or chosen interaction. According to Bagozzi, Baumgartner and Pieters (1998), "emotions function to produce action in a way promoting the achievement of goals" (ibid, p. 2). The relationship between emotions and goals are neither automatic nor direct. Emotions emerge from the prospects for goal success or failure and their intensity is a crucial aspect that influences the potential motivation to pursue that goal. Therefore, emotions are bound by the agent's goals and the respective biological needs, but they are also

highly related to the behavior of an agent (Brehm, Miron, and Miller 2009; Nelissen, Dijker, and de Vries 2007; Rasmussen et al. 2006; Cupchik 2001; Schwarz 2000).

As it was mentioned before, there is a strong relation between emotions and goals where the role of the positive and negative anticipated emotions- that are elicited by prospects of goal success or failure-, influence our motivation to pursue that goal. These anticipated emotions (positive or negative) provide a positive value to our intentions to perform a behavior even though this behavior is needed to achieve success or to avoid failure (Bagozzi, Baumgartner, and Pieters 1998). As emotions are a process of self-organization, they are engaged regulating our decisions that related to those actions that will lead us to goal success. Thus, emotions play a major role in decision making and thus they serve important cognitive functions (Leone, Perugini, and Bagozzi 2005; Schwarz 2000; Bagozzi, Baumgartner, and Pieters 1998; Frijda and Swagerman 1987; Johnson-laird and Oatley 1988). Recent studies suggest that the amygdala which is the main brain area that is responsible for emotions may also play an important role in guiding choice (Shiv 2007; Seymour and Dolan 2008; Phelps 2006; Kahn et al. 2002; Leotti, Iyengar, and Ochsner 2010; Bechara et al. 1999). Moreover, as Schwarz (2000) and Carver (2005) claim, the relationship between emotions and decision making is bidirectional: the outcome of the emotional processing can influence the agent's decision as well as the outcome of a decision can influence the agent's feelings. Emotions may influence our cognitive thoughts , which emerge as full experiences while these cognitive actions may influence the elicitation of new emotions.

Emotions are functions that detect opportunities and threats, the existence or not of a solution and, roughly, they answer to what the system should do in a given interaction. Additionally, they signal the outcomes of the respective appraisal processes to the other functions that control the actions and plans of the agent. Emotions are implicitly associated to the representations and, in general, to the transformation of the factual knowledge of an agent. According to Johnson-Laird and Oatley (1987), emotions are a "part of a management system to co-ordinate each individual's multiple plans and goals under constraints of time and other limited resources" (p. 31). Carver (2001) suggests that positive and negative emotions provide the system with information that is functionally useful for the evaluation of the current condition, according to the system's motives and goals.

Hence, emotional activity plays two major roles:

- It notifies the agent to move towards the incentives and away from threats and
- Through the feedback system, emotional activity compares and rates signals that correspond to the progress that the agent is making against a reference rate.

It is the error signal of these processes that is manifested as an emotion. If the rate of the signal is either too low or too high, it produces correspondingly a negative or positive affect. In the case of an acceptable rate, no value occurs as an immediate result of the evaluation of the signal. In other words, emotions with a positive value (euphoric) are associated with the attainment of a goal, leading to decisions that allow an agent to continue with its current plan. In contrast,

emotions with negative value (dysphoric) emerge when the agent faces problems with the ongoing plans and fails to achieve the desired goals.

Those positive and negative values lead to problem-solving mechanisms which reconsider the existing goal structures in order to reconstruct new plans (Bagozzi, Baumgartner, and Pieters 1998). In general, the agent evokes or/and adopts an emotion at a significant juncture of its action plan, when there is a change in the conscious or/and the unconscious evaluation of the possible success of a plan (Johnson-Laird and Oatley 1987). According to Pugh (1979) and from a theoretical decision-theory perspective, emotions must be classified as values. Specifically, Pugh states that "They are evaluative (i.e., scalar) quantities that are associated with "outcomes" for the purpose of guiding a decision process" (ibid, p. 61).

Moreover, it seems that there is a strong relation between memory and emotions. Memories from past emotional experiences allow the agent to navigate between complex webs of choices. Whether an agent seeks out or avoids specific experiences is partly determined by his memories, and specifically, by how pleasant or unpleasant was similar experiences in the past. They generally tend to recall emotional states that are congruent rather than incongruent with their current feelings. Moreover, an agent is motivated to anticipate positive versus negative stimuli. All decisions of an agent involve predictions of future emotions that are anticipated to be more positively valued than those that the agent is already experiencing (Lench and Levine 2010; Schwarz 2000). According to Baumeister et al. (2007), agents learn to anticipate emotional outcomes and behave so as to pursue the emotions they prefer. Additionally, according to Schmidt, Patnaik and Kensinger (2011), although it is evident that emotions can enhance the ability to remember that a specific event has occurred, the memory of that event often involves more than simply remembering its occurrence. This memory includes not only the "*what*" but also the "*where*" and the "*when*" of the respective experience (Clayton and Dickinson 1998).

Agents respond to objects and make judgments about them, according to their emotional states which arise from their interaction with them (Schwarz 2000). Generally, a positive or a negative emotion, such as pleasure or pain, plays a major role in the survival of an agent. Pleasure and pain are not properties of the environment. Our brain generates pleasant or unpleasant emotions in response to those aspects of the environment that are respectively a consistent benefit or threat to gene survival (Johnston 2003). Emotional functions lead individuals to avoid situations that will be harmful to their stability. Johnston (2003) suggests an alternative context that will help us understand the role of emotions. He actually states that: "*... if sensations are considered to be properties that exist in the external world, then conscious experiences are reduced to nonfunctional epiphenomena. But if the external world is viewed as pitch dark, silent, tasteless, and odorless, then our evolved sensations acquire a whole new function*" (p. 174). In other words, the results of an observation do not refer directly to objects in the external world, but instead, they are the results of recurrent cognitive functions in the structural coupling between the agent and the environment (Arnellos, Spyrou, and Darzentas 2010a).

4.3 ABOUT THE CONTENT AND THE ORIGIN OF EMOTIONS

As we discussed in section §4.1.2, when people talk about emotions they think one of the primary or universal emotions: happiness, sadness, fear, anger, surprise, or disgust. This taxonomy of basic emotions may help the discussion of the problem concerning the content and the origin of an emotion but there are numerous other behaviors onto which the label 'emotion' has been attached. For example, people use the term 'emotion' in several other social interactions that seem to have an emotional origin. These are the secondary or social emotions, such as embarrassment, jealousy, guilt, or pride. The label emotion has also been attached to drives and motivations and to the states of pain and pleasure (Damasio 2000b).

4.3.1 **Emotions are bodily reactions**

According to Damasio all those emotional states have a biological core that underlies and it can be outlined as follows:

1. Emotions are set of patterns which contain complicated collections of chemical and neural responses.

2. Emotions are biologically determined processes, depending on innately set brain devices, laid down by a long evolutionary history.

3. The devices which produce emotions occupy a fairly restricted ensemble of subcortical regions, beginning at the level of the brain stem and moving up to the higher brain; the devices are part of a set of structures that both regulate and represent body states.

4. All the devices can be engaged automatically, without conscious deliberation.

5. All emotions use the body as their theater (internal milieu, visceral, vestibular and musculoskeletal systems).

6. They affect the mode of operation of numerous brain circuits: the variety of the emotional responses is responsible for profound changes in both the body and the brain.

7. Their role is to regulate internal states by which the agent creates bodily and mental circumstances advantageous to his goals when the phenomenon appears.

8. Emotions are about life. They are precise, and their role is to assist and serve the self-maintenance of the agent .

9. Learning and culture alter the feeling of emotions and give to these bodily and mental phenomena new meanings.

Although emotions are shaped in each one of us by a unique development, most emotional responses, if not all, have a long evolutionary history. Emotions are part of the bioregulatory functions that are enabled serving survival goals. This is probably the reason why emotional expressions present such similarity in between them. As Damasio claims,

> *'That is why Darwin was able to catalog the emotional expressions of so many species and find consistency in those expressions, and that is why, in different parts of the world and across different cultures, emotions are so easily recognized. Surely enough, there are variable expressions and there are variations in the precise configuration of stimuli that can induce an emotion across cultures and among individuals. But the thing to marvel at, as you fly high above the planet, is the similarity, not the difference. It is that similarity, incidentally, that makes cross-cultural relations possible and that allows for art and literature, music and film, to cross frontiers.' (Damasio 2000b, 59)*

The biological function of emotions is twofold:

- The first function is the production of a specific reaction to the inducing situation.
- The second biological function of emotion is the regulation of the internal state of the agent as a *preparation* for a potential action (Freeman 2000; Damasio 2000b).

According to Bickhard (2000a) and Bickhard & Campbell (1996) this continuous process of *preparation* is a biologically realistic process where the agent is prepared for further interactive processes together with the ability to detect when these preparations fail to be prepared for the actual course of interactive flow. These *'preparations themselves constitute the indications of potentiality, while the failure of preparation to be in fact prepared constitutes the failure of the interactions to yield the outcomes, the interactive flow, for which they were selected'* (p.162). Bickhard calls this continuous process of preparation *microgenesis*.

Hence, what Damasio proposes is that in a basic process of self-regulation (survival kit in Damacio's terminology, or microgenesis in Bickhard's terminology) there are such biological states that can be linked to drives, motivations and to pleasure or pain. Emotions in a higher, more complex level can be induced by the affective states of pleasure or pain, while emotions can also induce such affective states of pleasure or pain. For Damasio (2000b) the biological "purpose" of emotions is clear: *'Emotions are curious adaptations that are part and parcel of the machinery with which organisms regulate survival'* (p. 60). They are linked to evolution as a high-level component of the mechanisms of life regulation. Emotions stand between the basic survival kit (e.g., regulation of metabolism; simple reflexes; motivations; biology of pain and pleasure) and the devices of high reason. They are part of homeostatic regulation which can be improved by learning, where homeostatic regulation and the survival "values" are connected to numerous events and objects in our development. According to Damasio (2000b), *'Emotions are inseparable from the idea of reward or punishment, of pleasure or pain, of approach or withdrawal, of personal advantage and disadvantage. Inevitably, emotions are inseparable from the idea of good and evil.'* (p. 61).

4.3.2 **Eliciting emotions**

Damasio (2000b) argues that emotions can be elicited in two types of conditions:

- The first type of conditions occurs when the agent interacts with certain objects or situations using one of its sensory devices. For instance, when someone is looking at an interesting artifact.

- The second type of conditions occurs when the agent recalls certain objects and situations from his memory and forms such meanings (representations) into his thought. For instance, someone remembers an exciting experience.

Following Damasio's claim, while emotions are largely preset (in a primitive level), the circumstances that could elicit an emotion are not. Through interaction, evolution, and development the stimuli that may cause an emotion could change. An agent could gain factual and emotional experiences with different artifacts and events which are probably associated to other artifacts and events or environmental conditions that they had never elicited emotions before. On the contrary, environmental conditions that usually elicit emotions could easily stop inducing emotional activity. Learning is such a process that directly influences the elicitation of an emotion.

4.3.2.1 *Learning, uncertainty and basic emotions*

As it is already mentioned in section §2.1.3, learning requires a monitoring of ongoing interactive processes. As Bickhard (2000a) claims, learning introduces variation when things are not going well, and stability when they are proceeding according to the prepared action (plan). In this case, these preparations for action (plan) are the anticipations of the *microgenesis* process.

> *'If microgenesis, the set up for the next interactive processing, is destabilized when failure to anticipate occurs, and is stabilized so long as the anticipations are successful, then we have a minimal model of learning: such a system will tend to stabilize on interactive processes that proceed successfully according to the anticipations and goals of the system.'* (Bickhard 2000a, 169)

From an evolutionary perspective, the relation between the emergent conscious experiences and gene survival has already been established by natural selection. In the naturalized perspective of the interactivist model, as introduced by Bickhard (see §2.1.3), the agent, in the flow of interaction, is continuously prepared for further interactive processes, and at the same time, he has the ability to detect when those preparations fail to be prepared for the actual course of interaction. Learning introduces variation, when things are not going well or stability, when they are proceeding according to the anticipation of the preparation process. Although these preparations constitute the indications of interactive potentiality, they would not support clear and dynamically well-organized anticipations of such potentiality. Learning is the only process that could probably regulate the effectiveness of such uncertainty.

However, the agent could develop ways of dealing with several uncertain situations, which are not always identical to situations that the system usually interacts with. In such cases, and according to Bickhard, positive and negative emotions are aroused when the agent tries to resolve

this interactive uncertainty. A positive emotion is elicited from a simple mode of successful interaction, when there is a strong anticipation for the resolution of a particular uncertainty, and when the respective interaction results in the elimination of that uncertainty. Correspondingly, the interaction that results in greater uncertainty, regarding the way of dealing with a particular uncertain situation, will yield a negative emotion. Thus, for Bickhard, dynamic uncertainty with a graded anticipation of resolution is the model for emotions.

According to Bickhard's model of emergent representation and motivation, the agent will seek kinds of interactions that are characterized by expectations that he will be able to master the solution of the current problem of interaction selection. This motivational tendency to explore the object (as the agent's immediate environment) is considered as a creative process that approaches new solutions, and it is called *esthetic motivation* (Bickhard 2003). As such, the agent, as an autonomous and far-from-equilibrium system who must be always in interaction, makes emerge new kinds of esthetic motivations. This comes about through the interrelationship of the outcomes of basic emotional systems (in the appraisal process), that elicit aesthetic emotions, and the process of learning in the course of interaction. Through this process the agent will try to avoid situations where the emotional value-related signals are negative (or aversive), and it will seek situations where the emotional value-related signals are positive (or rewarding) (Pugh 1979).

As it has been already described in Chapter 2, an agent, through his emergent representations, is able to observe and evaluate his boundaries and he is thus differentiated from the environment. According to the neurological perspective, discussed in Chapter 1, emotions are functions that evaluate the stimuli coming from the limbic system, in order to make the agent able to evaluate or form dynamic presuppositions and his anticipation for a stable interaction. This emotional feedback seems to confirm the appraisal theory by which, emotions evaluate the relationship of the agent with the environment according to his motives (Lazarus 1994; Frijda 1987b).

4.3.3 **The appraisal theory and action readiness**

As stated earlier in this chapter, basic emotions of pleasure and pain are considered to be the result of a regulating mechanism by which the agent evaluates the dynamic presupposition of interaction, creating such bodily and mental circumstances in respect to his goals and motives. Following this direction, the notion of appraisal was taken up by Lazarus and his experimental work, in which such cognitive processes are manipulated. Through his experiments, Lazarus shows that such cognitive processes produce variations in the emotions elicited by particular events, and that this holds for the emotions both as subjectively felt and as manifested in physiological reactions. As Scherer (1999) argues, a central tenet of appraisal theory is the claim that emotions are elicited and differentiated on the basis of a person's subjective evaluation or on the basis of the personal significance concerning a situation, an object, an event or a number of dimensions or criteria.

According to Frijda (1993), emotions are considered to be the result of the appraisal of events with respect to their implications for well-being or for the satisfaction of goals, motives, or concerns of the agent. Their cognitive structure represents the agent's appraisals of the dynamic presuppositions of interaction (internal or external conditions or events that afford an interaction) that the agent confronts in the interactive flow. These appraisals, in addition to constituting emotional experience, form the proximal stimuli that elicit emotional response (Frijda 1987a). As Frijda claims:

> *'Different emotions correspond with different patterns of appraisal; there is ample empirical evidence for this assertion. ...Recall of instances of different emotions gives rise to different appraisal ratings and descriptions or recollections of events conducive to different appraisals give rise to different emotion ratings' (Frijda 1993, 358)*

A process of appraisal is considered as a part of the meaning-making process that we form through interaction. Appraisal of events and thus the arousal of emotions is determined by the evaluation between the events, the interactive anticipations that the agent forms in respect to self-maintenance, and the anticipations that he forms in respect to what he is able to effectively deal with or cope with in those environmental conditions (Frijda 1993). In other words, the appraisal process is a continuous process of preparation that evaluates the conditions that will provide to the agent a potentially successful interaction according to his capabilities, goals and motives. Thus an emotional experience according to Frijda (1987a) includes awareness of those responses or 'response tendencies' as a major aspect of emotions. The emotions appraise the dynamic presuppositions of interaction, assigning values to those indications that afford a successful action. This means that emotions influence the dynamic representations of the agent, forming such interactive anticipations that come from those tendencies to act. Such tendencies are preparations for action which form the psychological state that Frijda calls 'action readiness'. It can be argued that different appraisal structures, resulting from how agents perceive and appreciate the environmental conditions (events), will elicit different modes of action readiness, thus emerging different representations. This shows a systematic causal relationship between appraisal structures and modes of action readiness.

According to Lazarus (1994), the appraisal process itself, has a dynamic character and *"...it should be regarded as a tentative and changeable cognitive construction which emerges and reemerges out of ongoing transactions on the basis of conditions in the environment and within the person, and it is more or less subject to modification as conditions and persons change"* (p. 138). The possibility of re-appraising the environment or the perceived events provides also the necessary dynamic character to the respective evaluation as the self-referential system dynamically creates new distinctions based on previous ones in order to reach the appropriate dynamic stability with respect to the dynamically changed conditions. Different stimuli trigger different patterns of appraisal, which correspond to basic emotional systems that lead to different

emotional values, which in turn, appraise the current set of dynamic presuppositions that could probably make the potential interaction appropriate.

4.3.3.1 *The two stages of appraisal*

Lazarus (1994) suggests that there are two stages of appraisal, i.e. the primary and the secondary. In the primary stage the agent has negative or positive presuppositions (true or false) of an event in order to maintain its autonomy. The primary appraisal is concerned as a motivational endorsement directed towards the agent's adaptation. As such, it is goal-related and checks for the appropriateness or not of the respective goal. The secondary stage of appraisal serves the function of coping with the environment and forming future expectations (Scherer 1999; Lazarus 1994). In other words, it serves the function of an internal evaluation mechanism, which gives the system the ability to choose the appropriate interaction according to the current event, while it also provides a future orientation to the potentialities of interaction as the interactive model of representation demands (Bickhard 2004). According to Frijda (2005), the secondary appraisal is what an event allows or prevents one to deal with and includes what Gibson (1986) called affordances.

The appraisal mechanism must be capable of operating in great speed as the interval between stimulus and emotional response is extremely short. According to Ekman (1999) the appraisal is distinguished in two modes; one which operates automatically and without awareness and which is unreflective and unconscious or preconscious, and another, in which the evaluation process is slow, deliberate and conscious. Frijda (1993) claims that there is no necessary incompatibility between cognitive processes and fast emotional reactions, as the first stage of appraisal also suggests. The cognitive process, which is involved in the first stage of appraisal, has a possibility to be unconscious with no reasoning and no rational considerations or conscious deliberations (Frijda 1993; 2009). Processing in the first stage provides possibilities of automatic emotional responses, which can be triggered without any conscious cognitive-evaluative processing at all (Scherer 1999). According to Moors (2009) most of appraisal theorists 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 elicitation of emotion is unconscious or automatic. Unconscious appraisal of stimulus takes place prior to the emotion, whereas conscious attribution of the emotion to a cause and/or labeling of the emotion (e.g., as pleasure or pain) takes place after the emotion (Moors 2009).

Cognition takes place as a parallel activity in an appraisal process. Additionally, emotion and consciousness cannot be equated but they also cannot be separated (Damasio 2000b; 2010). As it already mentioned in Chapter 1 (see §1.2.1.1.1), emotions and consciousness act together, as both of them require the same neural substrates.

4.4 SUMMARY & CONCLUSIONS

The aim of this chapter was to present the fundamental characteristics of the emotional activity and especially of those activities that are related to basic emotional states that are widely known in aesthetic literature as 'pleasure' and 'pain'. Most theories attribute a central place to the role of emotions in cognitive processes and their affect on behavior. Emotions appear to be mechanisms that function in the service of the autonomy of the agent by subserving adaptational tasks and forming a state of action readiness, which evaluates the presuppositions for a successful or not interaction. Emotions assign values to those indications that afford a successful action. This means that emotions influence the dynamic representations of the agent, forming such interactive anticipations that come from those tendencies to act.

Even though pleasure and pain are considered as basic emotional activities, they are extremely complex processes relating neuropsychological with bodily functions. Thus, the term 'basic emotions of pleasure and pain' denotes not only a concept that includes affective, cognitive, behavioral, expressive, but also physiological changes. Basic emotions of pleasure and pain also have a future-oriented nature since they are related to goal-oriented actions in the sense that the agent uses such processes in order to anticipate the outcome of his intentional actions.

At a primitive level of processing, pleasure and pain are considered as self-organized processes that work together with consciousness. Emotions aid the agent to anticipate (predict) future interactive states that could support such adaptations that the organism must make. These basic emotions are *preparations* of the agent and they consist of taking an appropriate postural stance with the musculoskeletal system, and mobilizing the metabolic support systems.

At a more complex level, emotions are experiences. Pleasure and pain accompany our dynamic actions as feelings that address the anticipated futures of gain or loss in one's attachments to others, one's livelihood and safety, and the perceived possibility or impossibility of changing the world to one's liking or advantage. These emotional experiences allow us to associate our emotions with objects and persons in our everyday life.

Considering that the basic emotions of pleasure and pain are the most important components in aesthetic literature from philosophy to interaction design and neuroscience, the aim of the next chapter is to explore the complex functionality of these aesthetic emotional states in order to understand the role they play in aesthetic experience and judgment.

Chapter 5: Naturalizing aesthetics: the aesthetic emotions in aesthetic experience and judgment

'In order to understand the meaning of artistic products, we have to forget them for a time, to turn aside from them and have recourse to the ordinary forces and conditions of experience that we do not usually regard as esthetic.'(Dewey 1980, 4)

Nowadays, in spite of research and the set of theories on aesthetic experience, our knowledge regarding the construction of the aesthetic judgment in agents is minimal. Despite the diversity of approaches, scientific fields and types of studies from philosophy to interaction design and to neuroscience, there is a common ground: the construction of an aesthetic experience and judgment lies mostly in the complex nature of emotions as an internal process, which appraises objects or events that come to attention consciously or non-consciously, inside and/or outside the agent, serving his well-being.

Considering the neurological evidence regarding emotions and aesthetics as it is presented in Chapter 1 (see §1.2.1), aesthetic experience appears to engage more than one brain areas and it does not exhibit a serial pattern of information processing. Particularly, the aesthetic experience is dynamically composed by a complex web structure of neurons in conjunction with emotional reinforcement of continual feedback looping with the limbic system. According to neurological findings, in a basic perceptual process the production of aesthetic meaning results in the elicitation of the emotional state of pleasure or pain, as everything related to the respective functionality comes together into a unified concept serving the stability of the agent.

The proposed explanation of aesthetic experience and judgment is based on the functional character of these basic emotional values of pleasure and pain, as they were already presented in Chapter 4 (see §4.1 & §4.3.3). According to the theoretical approach of emotions as an outcome of the appraisal of events, aesthetic experience is considered as an inner dynamic function that assign values to dynamic presuppositions of interaction influencing the anticipatory system of the agent. The appraisal theory of emotions is used as a vehicle to explain the functions by which this evaluation mechanism is related to the elicitation of an aesthetic meaning. The argument is that this biological and mental function emerges a basic level of aesthetic experience upon which the whole theoretical contribution of this dissertation is built. From now on, we will refer to these emotional values as '*aesthetic values*', to the basic emotions of pleasure and pain as '*aesthetically-oriented emotions*' and to the respective meaning constructed through them as '*aesthetic meaning*'.

Following this widely accepted relation between aesthetic experience and emotions of pleasure and pain, this chapter aims to propose a naturalized explanation of the aesthetic in respect to experience, and meaning (judgment), which is not limited to art, appearance, beauty, taste, etc. but to bio-cognitive phenomena that comprise several other processes. This perspective of aesthetics could provide the possibility to offer further explanations and conceptual models concerning the role and the content of the aesthetic in terms of our basic vital needs and their satisfaction. Specifically, following a naturalized explanation for the aesthetic this chapter intends to propose two theoretical interactive models concerning the aesthetic experience and judgment:

The first theoretical model of emotions intends to explain more analytically the content of the aesthetically-oriented emotional activity, mostly based on the interactivist model of emergent representation (see §2.1.3) and the appraisal theory of emotions (see §4.3.3). The suggested model of aesthetic experience and judgment proposes two fundamental levels of emotional processing. The first level is responsible for a non-conscious automatic aesthetically-oriented emotional response giving possibilities of 'unconscious' aesthetically-oriented emotional responses, which may imply the possibility for the consideration of fundamental aesthetic habits and can be triggered without any conscious cognitive-evaluative processing at all. The second level is conscious and it is constructed upon two basic processes: the Cognitive Variables Subsystem (CVS), which is fundamental for the accomplishment of the function of heuristic learning and the Aesthetic Appraisal Subsystem (AAS), which primarily affects the elicitation of aesthetic emotional meanings. These two subsystems (CVS and AAS) are organizationally connected and affect the action readiness of the agent. More specifically, it is proposed that the aesthetically-oriented emotional outcome of these two subsystems is a functional indication that strengthens or weakens the anticipation for the resolution of the dynamic uncertainty that emerges in the particular interaction. A more detailed analysis of this model can be found in Xenakis Arnellos and Darzentas (2011) and Xenakis, Arnellos and Darzentas (2012).

The second three-level interactive model attempts to underline and indicate the functions that provide the operations of aesthetic experience and, by extension, of aesthetic judgment. Through this model, an integration of the fundamental Peircean semiotic parameters is suggested (see §2.2.1) as well as their related levels of semiotic organization with the three levels of processing that Norman proposed (see §3.2.1). This model aims to provide a further theoretical consideration with respect to the perception of aesthetics and to enrich our understanding regarding the role of aesthetic interpretation, using the theoretical interpretive richness provided by the semiotic framework. Particularly, based on the underlying cognitive processes as they were suggested in the first interactive model, on the Peircean semiotic parameters and the ways these processes lead to an aesthetic interpretation or to an aesthetic judgment, it is proposed that the formation of aesthetic judgment is related to the transposition from the icon and the index to the symbol, which might be 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 three-level interactive model with one of the three Peircean categories and the various semiotic triads. A more detailed analysis of this model can be found in Xenakis, et al. (2012).

5.1 SHIFTING FROM ABSTRACT BEAUTY TO AESTHETIC EMOTIONS

5.1.1 **Naturalizing the aesthetic experience and the meaning of beauty**

The argument that emotions and consciousness are not separable in cognition (Damasio 2000a) aids us to rethink all those philosophical traditions that for centuries have been conceived as two distinct and opposed forces. As it is mentioned in Chapter 1 (see §1.1), the experience of beauty is based on this dualism between emotions and cognition. The agent, in order to experience the aesthetic, must keep his mind free from conscious thoughts allowing only emotions to feel the pure sense of the artifact. This special form of relationship with the artifact is possible only when the agent gazes it without any intention or purpose (no-interest) in respect to its existence. The term stands between positive aesthetic experience and positive aesthetic judgment without being particularly any of these cognitive states. Beauty demands a universal acceptance that makes it 'subjectively objective', while the agent who experiences beauty must not show any kind of interest that may relate him with the artifact itself. The latter perspective is known from Kant as 'disinterestedness' and according to many aestheticians a non goal-oriented interaction is a condition in order to experience beauty in objects. This approach to beauty makes difficult any attempt to ground its functionality to cognition and by extension to interaction.

In contrary to this argument, neuroaesthetics can confirm now that through the aesthetic experience and judgment, basic aesthetically-oriented emotions and cognition do not conflict but they work together. As it is already mentioned in Chapter 1, the neurological evidence shows (see §1.2.1.1.1) that the aesthetic experience and judgment is a phenomenon that emerges from several complex emotional and cognitive overlapping processes, which in part, share the same neural substrates. Hence, the outcome of this complex process, which could be the construction of the aesthetic meaning is not limited to aesthetically-oriented emotional activities but involves a branch of other complex cognitive processes, which are interrelated in the course of interaction (Xenakis, Arnellos, and Darzentas 2011). Some of them are presented in the following list:

- Object recognition, which is enhanced by learning processes, (use of knowledge that is based on previous visual experiences of similar objects) (Fukushima 2003; Tanaka 1996)
- Context development, which is also enhanced by learning processes mostly based on past emotional experiences (Jacobsen et al. 2006),
- Emotional evaluation, the agent assigns values to the stimuli (Damasio 1995; van Reekum and Scherer 1997; Kawabata and Zeki 2004),
- Evaluation of internally generated information such as thoughts and feelings. A self-reference process (Jacobsen et al. 2006).
- Anticipation of future interactive outcomes with respect to positive or negative values (Jacobsen et al. 2006).
- The aesthetic outcome is correlated to anticipation concerning the aesthetic meaning (representation) of the object rather than its sensory properties. (Kirk, Skov, Hulme, et al. 2009; Schulkin 2009).
- Aesthetic judgments are developed under uncertainty (Jacobsen et al. 2006).

Therefore the experience of beauty through a non-intentional process appears to be elusive. A naturalized perspective of aesthetics may challenge most of the arguments that constitute the aesthetic tradition, making all those claims for pure beauty really unsteady. In this direction aesthetics can be explained as a consequence of natural processes that are revealed by science, without the need of resorting to supernatural transcendental explanations. This naturalized conception of aesthetics stands in contrast to the disinterestedness of beauty, which analytic aesthetics inherited from the Kantian tradition.

Hence, considering the aesthetic experience in a wider sense than that of application to the beautiful and ugly, a naturalized explanation of aesthetics provides such a quality that could characterize natural situations as they occur through interaction. In other words, aesthetic experience should serve the same scope as all other activities; to fulfill our goals.

5.1.2 **Mental image, representation and aesthetic meaning**

According to Damasio (2000b; 2010; 2000a), when we perceive an artifact we do not know the real object. We form mental images or mental patterns in any of the sensory modalities according to our complexity and capabilities (mental and bodily). These mental images, conscious or unconscious, are not facsimiles of the environment, but rather *images* of the interaction potentialities between the agent and the specific environment. This is what Bickhard (2004; 2009b) calls emergent representations (see §2.1.3). All those mental images or representations are about the conditions that are internal or external to the agent which constitute the dynamic presuppositions of interaction and they are not about the object itself. Dynamic presuppositions implicitly presuppose that the environment exhibits the appropriate conditions for the success of the indicated interaction. This means that there is an emergence of a primitive truth value, a value that denotes that the specific conditions afford a specific interaction. However, they can be false and the interaction finally will fail (false affordances). This is a crucial point of normative functionality.

According to Bickhard (2006) there are two kinds of normativity emergent in living systems. One is that of biological function. For instance, an action is functional for the living system in the sense that it makes a contribution to the stability, the continued existence, of the far from equilibrium system. Such systems if they do not act they cannot stay alive. Thus action is not purposeless. We are motivated to select biological and meaning based actions that will serve a specific goal in respect to our self-maintenance. As we already mentioned in Chapter 3 (see §2.1.3), *"the problem of motivation is often construed as the problem of what makes the system do something rather than nothing, what energizes or stimulates the organism into activity"* (Bickhard 2006, 66). Motivation is responsible for the function of selecting the processes and representation is responsible for the anticipation in the service of such selection. Thus, image (representation) and motivation emerge as differentiated aspects of one single underlying function. They both serve the process of action selection. Therefore, *image or meaning* should link to agent's organization guiding the constructive and interactive processes of his functional components (e.g. emotional activity) in such a way that these processes maintain and enhance its autonomy. The enhancement of autonomy is linked to intentionality since the agent forms certain goals for itself guiding its behavior through meaning. Thus the normative function of meaning should have an interactive and a goal-oriented character, which results from the interactivity and the intentionality of the respective cognitive system (Arnellos, Spyrou, and Darzentas 2010a).

The second kind of normativity is the emergence of a primitive kind of truth value. If the processes in the living system select an action, there is a functional presupposition that this action is functional useful for the system and contribute to its (far from equilibrium) stability. The truth value, according to Bickhard, emergences as a primitive representation and is the fundamental normative aspect of mental image or representation. This means that mental images or

representations can also be dysfunctional and the respective activity can also be inappropriate or wrong (Bickhard 2011).

According to Damasio, the emergence of an image is the first problem of consciousness. Images or representations are responsible for the conveyance of the physical characteristics of the artifact as well as for the conveyance of the reaction of like or dislike preference that an agent may have for this artifact. This means that we are motivated to assign values to artifacts in the sense that we evaluate those indications that denote that there are such presuppositions of successful interaction or not. *This could be a primitive explanation of what we like or not.* In that sense all these mental images carry a value of preference, which is developed through other processes that evaluate these interactive potentialities.

Additionally, for Damasio, conscious meaning presupposes two facts: the formation of mental images of interaction potentialities with the environment, and a *change* - detectable by the agent - in its inner structure that is associated with its relation to the environment. The perceived image is based on dynamic changes, which can be detected by the inner structure of the agent when the physical structure of the artifact interacts with its senses. Aesthetically-oriented emotional activity is proposed to be such a mechanism of detection and evaluation.

Aesthetic experience engages such emotional processes by which the agent appreciates (appraises, evaluates) things or events aiding the agent to detect future interactive potentialities (see §4.2). This means that aesthetic experience appears to function as a signal mechanism, which detects those differentiations (changes) of the environmental conditions and warns the agent for possible failures of those conditions. These signaling devices, according to neurological evidence are already located in agent's structure and they are accessible by the agent when the respective internal or external conditions call them. This infrastructure aids the construction of neural patterns, which result also in aesthetically-oriented emotional responses of pleasure and pain (Damasio 2000b). This is a normative function of aesthetic experience.

Therefore a first conclusion concerning the aesthetic judgment is that every mental image, representation, which is influenced by an emotional experience, could be a primitive form of aesthetic judgment (appreciation/preference) or meaning. Therefore, the investigation of the content of mental images or representations in relation to aesthetically-oriented emotional activity is crucial aiming at a dipper understanding of the development of the aesthetic meaning.

This perspective of aesthetic meaning exhibits all the normative functionality that was described in the beginning of this section. We are motivated to use our aesthetically-oriented emotions, which are already located in our structure (as functional components) and they are accessible by our organism when we are about to evaluate future interactive plans. This first of all is an intentional biological function that emerges through the activation of complex structures of neural patterns, which neurologists relate to aesthetically-oriented emotional activities of pleasure and pain and the formation of the respective aesthetic meanings (images). For neurologists, mental images in general are neuron clusters of meaning. Such neuron clusters allow the

connection between sensory experience and specific neural patterns of past meanings, experiences, and emotions. Considering now that each neuron could be a part of different patterns of meaning, a potential activation of a neuron may activate brunches of networks resulting in a widening circuitry and spiraling of high order aesthetic meanings (Barry 2006).

When the conditions are proper, the agent selects among others the available biological function in order to appraise a particular situation of uncertainty. As it is already mentioned in §4.3.2.1, these situations exhibit interactive uncertainty mostly when the biological function of learning is not accessible to the agent. Learning is the only process that could probably regulate the effectiveness of such uncertainty. Hence, this appraisal process emerges an aesthetically-oriented emotional value signaling the agent to anticipate or not a goal success. However, this aesthetic value is based on the emergence of a primitive kind of truth value. Therefore, every aesthetic value and by extension every aesthetic meaning, could fail in the course of action, meaning that the agent will finally fail to contribute to his (far from equilibrium) stability.

In this direction, aesthetic meanings and judgments are considered from now on as normative functions that engaged in interaction, affecting the future plans that an agent may formulate in respect to an artifact. Thus, aesthetic meaning plays a major role in life regulation representing things and events, which exist inside and outside to the agent. As it is already mentioned, aesthetic meanings could equally influenced by present aesthetic values or existing structures of past aesthetic knowledge or by both of them.
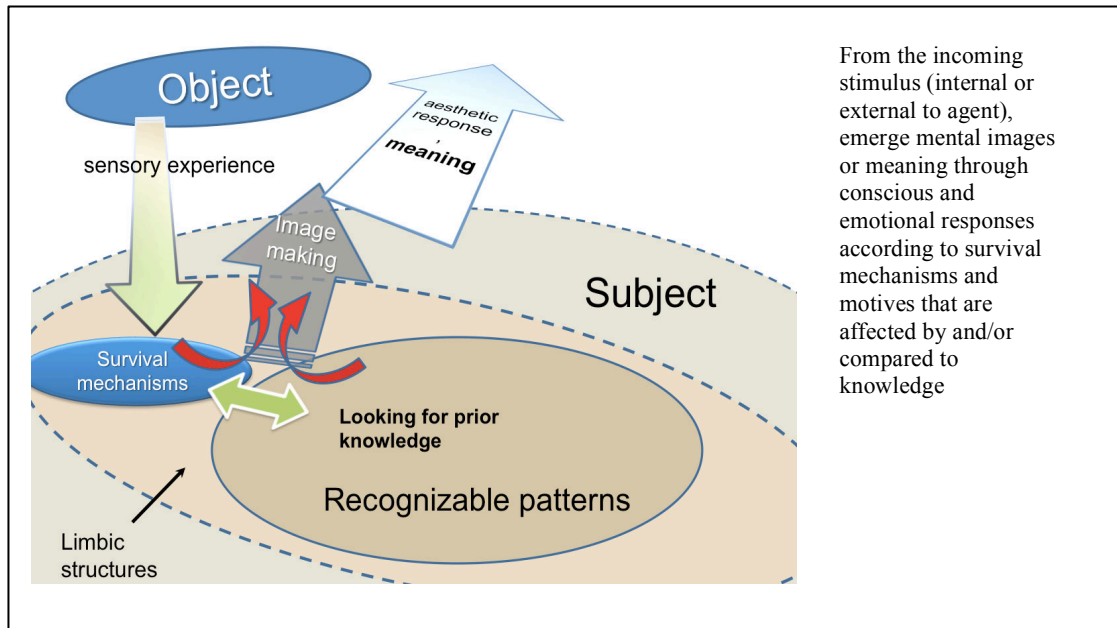
Figure 9 Aesthetic appreciation can be seen as a neurological function based on evolutionary cognitive development.

Considering this naturalized perspective for the 'aesthetic meaning' an aesthetic judgment is defined *as an action that follows an aesthetic experience or a sequence of them* (Mitias 1982). An aesthetic judgment is built upon the aesthetic experience or a sequence of them regarding an interaction with an artifact, which may also be combined with our prior aesthetic or non-aesthetic knowledge for this artifact. In general, an aesthetic experience is always future-oriented, while an aesthetic judgment concerns the past or the present.

Hence, aesthetically-oriented emotional activity could be considered as a fundamental part of the interaction process that, overall, is implicitly associated to the representational content and aesthetic meaning. As such, the formation of aesthetic meaning could also be ascribed not only to the purely conscious part of the respective interactive process, but also to the respective emotional mechanism. For Damasio (2000a) consciousness and emotion are not separable. Emotions and *core consciousness*[9] tend to go together, they are present or absent together. Emotions and *core consciousness* require, in part, the same neural substrates. There is a contiguity of the neural systems that supports consciousness and emotion and this suggests several anatomical and functional connections between them. Probably those connections are fundamental in *extended consciousness*[10] by which an agent acquires awareness of the living past and the anticipated future

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[9] Core consciousness, according to Damasio, is the simplest kind of consciousness. It provides the organism with a sense of itself about the here and now. This is the main scope of core consciousness. Core consciousness does not support future anticipation and refers only to the immediate and most recent past. There is no elsewhere, there is no before, there is no after with core consciousness.

[10] Extended consciousness, according to Damasio, is the complex kind of consciousness with many levels and grades. It provides the organism with high-order self-reference including a strong awareness of the lived past and of the

regarding the current situation that takes place here and now (Damasio 2000a). From the incoming stimulus (internal or external to agent), emerge mental images or meaning through conscious and emotional responses according to survival mechanisms and motives that are affected by and/or compared to knowledge (Figure 9).

It should be noted that this proposal for the 'aesthetic meaning' considers aesthetics, aesthetic experience and judgment as not being limited to art, appearance, form, beauty, taste, goodness, etc., but as involving dynamically complex cognitive phenomena that comprise several other processes. All those processes emerge through interaction and could trigger branches of other processes (e.g. meaning-making, semiotic chains, complex emotions, etc.) which in turn, and in a higher level of processing could be considered and/or experimentally detected as satisfaction, feeling of control, fun, trustfulness, etc.

Following the above naturalized explanation for aesthetic meaning, in the next section we attempt a more detailed analysis of the constructive parts that may constitute the aesthetically-oriented emotional activity. The aim is to provide a better understanding of the processes and the basic emotional values that form an aesthetic experience and judgment.

5.2 AESTHETICALLY-ORIENTED EMOTIONAL ACTIVITY

5.2.1 Defining the aesthetically-oriented emotions of pleasure and pain

Considering that the outcome of the appraisal process is an emotional (aesthetic) value, according to the most authors who study emotions (Frijda 1993; Bagozzi, Baumgartner, and Pieters 1998; Damasio 2000a; Schwarz 2000; Jacobsen et al. 2006; Kirk, Skov, Christensen, et al. 2009; Schulkin 2009; Lench and Levine 2010), this value is organizationally connected with the interactive anticipations according to the agent's motives. Therefore, if the dynamic presuppositions in an uncertain interaction, according to a current event, are true, and the respective interaction is anticipated to be successful, then the outcome of the appraisal process is that which we use to designate as *aesthetically-oriented emotion of pleasure*. If the dynamic presuppositions do not hold (false presuppositions) the current uncertainty creates anticipation of more uncertainty, which finally leads the agent to the elicitation of negative emotional states that we use to designate as *aesthetically-oriented emotion of pain*. As such, every aesthetically-oriented emotional state of pleasure (the same goes for pain too) has qualitative differentiations according to the dynamic structure of its underlying neural patterns. Furthermore, as it is discussed in section §5.1.2, anticipation of pleasure or pain has a possibility of error in its underlying functionality, which can be witnessed only when the system decides to act

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anticipated future. The extended consciousness can be achieved by assessing recognition, recall, working memory, emotion and feeling, reasoning and decision making over large intervals of time.

accordingly. Through the learning process, this outcome causally affects the next emotional response, particularly, when the agent is in front of the same or a similar condition. In this context, a positive feedback promotes the endurance of such affective states (Lewis and Granic 1999) and gives more favorable evaluations than the negative ones (Leone, Perugini, and Bagozzi 2005).

In other words, and this is something that I intend to strongly suggest in this dissertation, aesthetically-oriented emotional states are considered as a functional indication that strengthens or weakens the anticipation for the resolution of the dynamic uncertainty emerged in the specific interaction. Therefore, the aesthetically-oriented emotional states affect the dynamic and flexible action patterns of the agent, namely, its emergent representations and aesthetic meanings.

Additionally, processing in the first stage of appraisal there are possibilities of automatic aesthetically-oriented emotional responses, which can be triggered without any conscious cognitive-evaluative processing at all (Scherer 1999). This may imply the possibility for the consideration of a fundamental aesthetic habit (sensory or homeostatic affects see §4.1.1.1), which is activated when the proper event triggers the proper patterns of appraisal causing a basic or primary emotional response. According to Moors (2009) most of appraisal theorists 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 elicitation of emotion is unconscious or automatic. As a result, conscious cognition may be unnecessary for an aesthetically-oriented emotion but unconscious cognition is necessary. Cognition takes place as a parallel activity in an appraisal process. Additionally, emotion and consciousness cannot be equated but they also cannot be separated (Damasio 2000a; 2010). As it discussed in section §5.1.2, emotions and consciousness act together, as both of them require the same neural substrates. Unconscious appraisal of stimulus takes place prior to the emotion, whereas conscious attribution of the emotion to a cause and/or labeling of the emotion (e.g., as pleasure or pain) takes place after the emotion (Moors 2009).

This provides the ability to enhance the prior definitions of aesthetically-oriented emotions of pleasure and pain, arguing that the labeling of an aesthetic emotion is not an *a priori* mysterious process and probably, it does not refer to names like pleasure, happiness, joy etc., but to processes/mechanisms which result in emergent outcomes with particular characteristics. This means that there is a range of aesthetically-oriented emotions with particular characteristics could be labeled as states of pleasure or pain respectively.

The consideration of the aesthetically-oriented emotional state as a result of an appraisal process implies a dynamic organizational linkage of the aesthetics with the appraisal process. Certain patterns of appraisal cause particular aesthetically-oriented emotions that fuse agent's motivation and cognition. These aesthetically-oriented emotions, in turn, influence later appraisals. Since an appraisal process is required for an emotion to occur, knowledge is not sufficient to produce an emotion. Most probably, emotions depend on facts that are apprehended

in the past, but they also depend on an internal evaluation mechanism related to the way these facts affect the dynamic presupposition pertaining to the system's self-maintenance (Lazarus 1994).

This means that autonomy is a precondition for the system to produce aesthetically-oriented emotions according to its motives. However, since degrees of autonomy are organizationally and functionally connected with agent's design, (using Damasio's terms in order to talk for agent's organizational structure) emotional activity is not a precondition for the autonomy of the system. In high order autonomous systems, like humans for instance, aesthetically-oriented emotional activity is relatively advanced and possibly unique among animals and, as such, it aids representational content in many different ways than it does in a system with no such cognitive capacities. In low degrees of autonomy (e.g. a bacterium) the system's behavioral decisions are most probably based on other, simpler forms of information use (Baumeister et al. 2007) than aesthetically-oriented emotional activity. In any case, at the moment, this dissertation has no epistemic justification to argue in favor of the existence of such aesthetically-oriented emotional mechanisms in an autonomous system at the level of a bacterium.

Thus when an autonomous system has no capacities to enable the appraisal functionality, there will be no emergence of aesthetically-oriented emotions. Additionally, since the elicitation of an aesthetically-oriented emotion is organizationally dependent on an appraisal process, when such a process takes place, the emergence of an emotion of some kind is inevitable (Lazarus 1994). Therefore, every autonomous system that elicits emotions, in the way as it is have been argued so far, also has the possibility to experience a level of aesthetically-oriented emotional responses according to its functionality. However, what a primitive organism, according to its functionality, may eventually evaluate as good or bad regarding its goals, is probably analogous and equivalent but not equal to, an aesthetic primitive judgment of mammals or higher-order mammals such as humans.

The primary and the secondary stages of appraisal and their functional characteristics form the background for the synthesis of the proposed model for the elicitation of the aesthetically-oriented emotion. This minimal explanatory model regarding the formation of the complex aesthetic preference is presented in the following section.

5.2.2 Modeling the appraisal structure of the aesthetically-oriented emotional activity

As previously discussed (see also §4.3.3.1), the perception of an event starts with a non-cognitive step of primary appraisal. When an event is perceived from the agent, the question to be answered is 'what the living system will select to do next?'. Motivation is responsible for selecting the process that will lead to further activity, and representation is responsible for anticipation in the service of such selection. According to Brehm et al. (2009) and Panksepp (2007), basic affective

responses have underlying motivational substrates. Motives affect behavior and prepare the agent for action by directing it to select courses of interaction over others (Reeve 2008).

According to the model suggested in this dissertation, and considering emotion as a function that serves the evaluation of the current event, it could be argued that motivation is interrelated with the primary stage of appraisal process. According to Fridja (1993), in the primary stage of appraisal all emotional values derive from the anticipation of the agent or the presence of primary satisfiers or annoyers. Satisfiers and annoyers are responsible for a non-conscious comparison and a mismatch of the current event with an expectancy formed by the goals/motives of the system. It is suggested that all those emotional appraised events point back to events that are intrinsically pleasant or unpleasant, without the possibility of a further cognitive justification.

This implies the possibility of habitual aesthetic evaluations. In other words, the agent has evolved a capacity to form primary appraisals based on historically appropriated habits and actions according to its dynamic architecture and capacity. Therefore, in order to elicit emotions with a pleasurable aesthetic value (e.g. pleasure) a primary satisfier must be initially triggered. Using this perspective, it is possible that the primary appraisal phase compares the current event with a habitual preference and in this way, initiates the fundamental process of distinction and observation. Satisfiers have an innate positive (true) outcome, which refers to successful forms of emotional interactions.

The secondary appraisal phase is the conscious part of the process and refers to the second stage, where the evaluation is much slower. The cognitive variables involved in emotional arousal do not represent additional cognitive conditions for a given emotion, but mostly, they represent additional meanings of the eliciting event. According to the suggested model, in the secondary stage of appraisal, representations lead to richer aesthetic meanings (mental images) through the process of distinction and observation as the agent tries to reduce the interactive uncertainty. As Frijda (1993) argues, the secondary appraisal presupposes some comparison with stored information, schemata and expectations of the agent even for the simplest stimuli that elicits emotion. In this phase, past emotions pertaining to successful or unsuccessful interactions, are recalled from agents memory. This knowledge is functionally useful for the agent as it attempts to solve the current interaction problem and to reduce the uncertainty according to its motivation. This process is fundamental also for the accomplishment of the function of heuristic learning. In this perspective, it is proposed that this part of the overall cognitive process in the secondary appraisal phase corresponds to a subsystem that involves cognitive variables, which affect the action readiness of the system and not merely the resulting emotional state. This is called as the Cognitive Variables Subsystem (CVS) (Figure 10).

The management of stored information in CVS is not sufficient to elicit an aesthetic emotional meaning. Most possibly, emotions depend on facts related to stored knowledge and past experience, but they also depend on an internal appraisal mechanism of the way these facts affect the set of dynamic presuppositions for the corresponding interaction. Accordingly, it is proposed,

in the secondary appraisal stage, the existence of another internal appraisal subsystem, the Aesthetic Appraisal Subsystem (AAS), which primarily affects the elicitation of aesthetic emotional meanings. The emergence of the aesthetic meaning, which could be useful for a solution of the current interactive situation, takes place even when the agent does not know anything about the current appraised event. Through the AAS the agent evaluates the implications of satisfiers or annoyers from the primary appraisal stage according to motives and anticipations
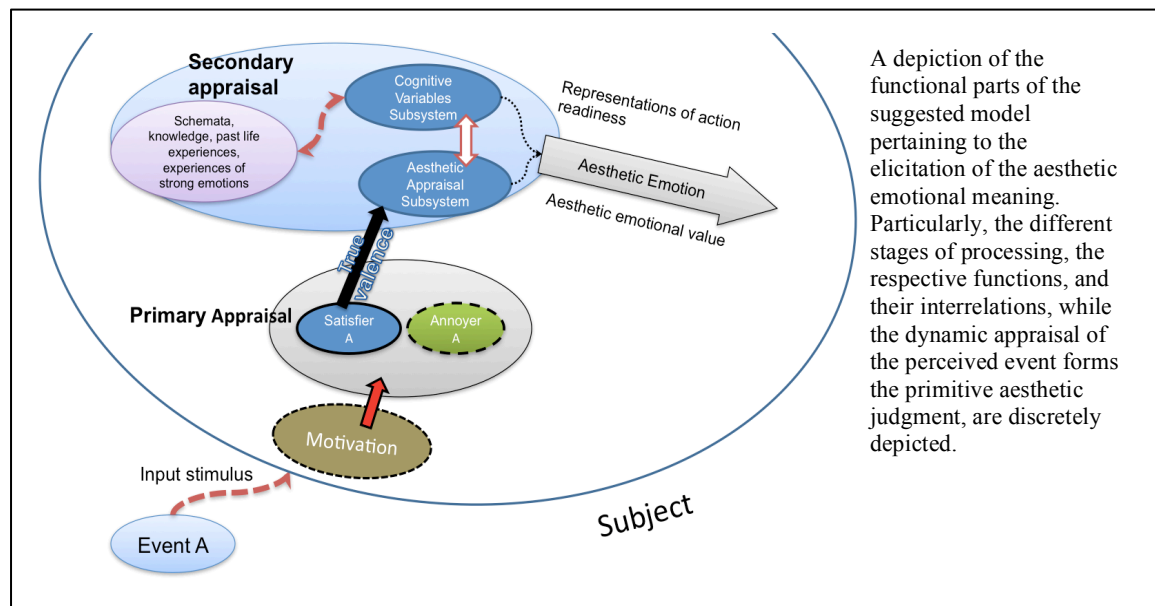
A depiction of the functional parts of the suggested model pertaining to the elicitation of the aesthetic emotional meaning. Particularly, the different stages of processing, the respective functions, and their interrelations, while the dynamic appraisal of the perceived event forms the primitive aesthetic judgment, are discretely depicted.

Figure 10 The two stages of the appraisal of events concerning the aesthetically-oriented emotional activity

with respect to the current event.

These two subsystems (CVS and AAS) are causally connected with the elicitation of the aesthetic emotional meaning. Additionally, action readiness is possibly affected by the whole internal mechanism in the secondary appraisal stage, enabling the agent to evaluate the situation and help it choose the appropriate interaction (action planning). The agent perceives and appreciates events through the construction of complex and dynamic appraisals, which support the respective dynamic representations in the formation of action selection. Our aesthetically-oriented emotions serve as an aspect of interactive anticipation permitting the agent to select among all possibilities those that are most suited to its current internal conditions (Bickhard 1997a; 1997b). The result of the secondary appraisal stage is a primitive construction of the emotional aesthetic meaning, which, based on the suggested model, is considered as a minimal form of aesthetic preference or judgment.

Overall, it could be said that what we perceive as pleasurable is causally connected with recognizable patterns of stored information linked to appraisal subsystems and making our aesthetic response a result of utilizing those basic mechanisms of appraisal. On the other hand, a negative aesthetic emotion can be evoked when interactive uncertainty is caused by an unfamiliar

event, which is localized in space and time, and which is being monitored as unfamiliar by the learning process itself. Uncertainty may cause more uncertainty leading the system to confirm a negative emotion and leave or alter the current situation (Bickhard 2000a). Pleasurable or painful values could be a part of a central control system, by which the agent benefits from selecting the best-valued alternative according to its emergent motives (T. Brown 1990; Pugh 1979). This is further witnessed in empirical tests of the motivational underpinnings of positive and negative emotional responses. Specifically, it has been found that negative evaluations produced avoidance tendencies, whereas both conscious and non-conscious positive evaluations of stimuli produced immediate approach tendencies (Brehm, Miron, and Miller 2009). The distinction between pleasure and pain as it results from the appraisal process is probably a problem based on the complex formation of anticipation and expectations of the system, which probably affects the primary and secondary appraisals thus changing the potentialities to resolve the uncertainty for a future interaction.

Aesthetic emotions, as cognitive responses, have also a role that provides emergent motivation (Brehm, Miron, and Miller 2009; Bickhard 2000a) and new knowledge. The knowledge of new aesthetic meanings and new aesthetic judgments form the basis for further aesthetic emotions, judgments and actions. This is a presupposition for a future-oriented model of aesthetic judgment, which confirms the subjectivity of the aesthetic preference based on motivation and learning. In the suggested model, an object can be considered as an unlimited list of events that elicit dynamic appraisal patterns of emotional responses. Therefore, the ideally ultimate aesthetic verdict is a much more complex process than the one described and analyzed in the minimal model suggested in this paper. According to this model, the aesthetic judgment has to resolve also qualitative aspects of the emergent aesthetically-oriented emotions, which in turn construct more complex appraisal structures. Aesthetically-oriented emotions are more than what it is have been named herein as pleasurable or painful; they have qualitative differentiations (e.g. intensity), which are causally dependent on the dynamic character of appraisal. This gives us the ability to suggest that, although an emotion of pleasure, associated with a specific object, will have the same values for different moments of its elicitation, the respective emotional states could be experienced in totally different ways from the agent itself. Time is also an untouched topic in emotion studies, as Frijda (2009) notes. Additionally, attention is another aspect that connects time and appraisal, and which affects the elicitation of aesthetic emotions. These two last elements are not studied in the present framework, but it is suggested that this model could be a starting point for their naturalized examination and analysis in further studies.

In the next section it is proposed a three-level interactive model that attempts to underline and indicate the functions that provides the operations of aesthetic experience and judgment from another theoretical perspective. Following the basic structure of the above explanation of the emergence of the aesthetic meaning, in this model, is suggested an integration of the fundamental Peircean semiotic parameters (see §2.2.1) and their related levels of semiotic organization with

the three levels of processing that Norman proposed (see §3.2.1). This model aims to provide a further theoretical understanding with respect to the perception of the aesthetic.

5.3 MODELING THE AESTHETIC JUDGMENT: AN INTERACTIVE-SEMIOTIC PERSPECTIVE [CHKJ]

5.3.1 **Structuring the interactive semiotic model of aesthetic judgment**

As it presented so far, the *aesthetic* in general, and aesthetic experience and judgment, in particular, are not an a priori mysterious process and most probably it does not necessarily refer to notions like pleasure, beauty, taste, etc., but to processes/mechanisms, which result in emergent outcomes with particular characteristics. Based on the normative functions that constitute the interaction process, the 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 (see §2.1.2). The proposed model of aesthetic judgment is structured upon these dynamic interactive characteristics of an agent able to make aesthetic interpretations of the environment, to construct complex aesthetic meanings and thus aesthetic judgments.

In order to reach our theoretical goals, certain semiotic perspectives of aesthetic experience[11] and functional notions of cognitive psychology, such as schema[12], are fundamentally important for the construction of the interactive model of aesthetic judgment.

5.3.1.1 *The three levels of processing*

The suggested interactive model divides the interaction process into three levels of processing defined as: the visceral, the behavioral and the reflective level. These three levels are based in Norman's initial idea[13] of modeling human behavior (Norman, Ortony, and Russell 2003; Norman 2003) and 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 model.

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[11] A semiotic view of the aesthetic experience is analyzed in §2.2.1

[12] For more about schema and its semiotic perspective see §2.2.3

[13] For more about Norman's levels of processing see §3.2.1

Using the theoretical background for agency 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. In this model, the three levels of processing will be analyzed from a different perspective. Specifically, it is suggested an integration between the fundamental Peircean semiotic parameters and their related levels of semiotic organization and the proposed levels of the interactive model of aesthetic judgment.

5.3.2 Three levels of processing focused on aesthetic judgment

5.3.2.1 *Exploring the semiotic functions in the Visceral level*

The visceral level is the simplest level of processing where the agent establishes functions that are explicitly and directly related to its maintenance. The agent 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 agent 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 agent acts almost automatically, almost unconsciously and in a very superficial manner. When the process of interest has as an outcome a positive value (satisfaction) then the aesthetic judgment has also a positive value claiming that 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 2000a). What it is suggested, regarding the current level, is that conscious cognition may be unnecessary for aesthetic values 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, and Darzentas 2012; Zangwill

1998). Since, at this level, the agent 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, 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 agent 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 agent 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 aesthetic emotions 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, 24). As Smith 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).

Considering the characteristics of the visceral level, the agent detects all those interactive potentialities that are related to the physical attributes of the object. The aesthetically-oriented emotional activity is limited mostly in the primary stage of appraisal process (see §5.2.2). In the primary stage of appraisal all emotional values derive from a non-conscious comparison and a mismatch of the current event with an expectancy formed by the goals/motives of the system. It is suggested that all those emotional appraised events point back to events that are intrinsically pleasant or unpleasant, without the possibility of a further cognitive justification.

Finally, interpreting a sign at this level is not a matter of decoding, but a matter of what Gibson calls direct perception. 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" (Quality) (Peirce 1931, CP 1.422), which has the nature of Firstness as being essentially indeterminate and vague (Queiroz and Merrell 2009) 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 the interactive potentialities of the semiotic structural components (R: representamen, O: Object, I: Interpretant) involved at this level. This combination is depicted in the following Figure 11.
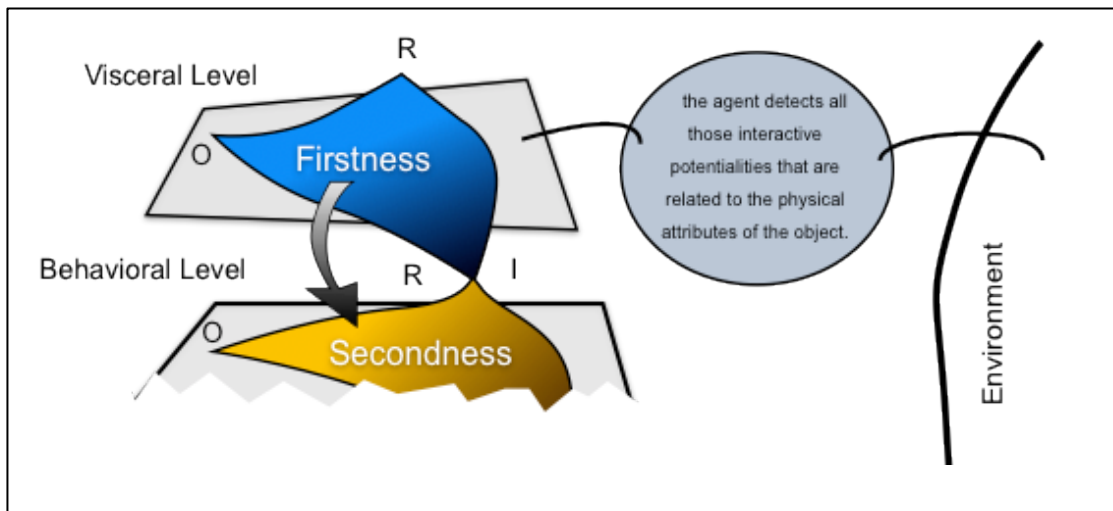
Figure 11 The visceral level

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 and Merrell 2009). Aesthetic evaluation is probably a superficial judgment at the visceral level but it will become full-fledged at the reflective level.

5.3.2.2 *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 agent to differentiate from its environment and especially from the observing object itself (Arnellos, Spyrou, and Darzentas 2007a). 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 agent 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 agent, 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 agent attempts to get the whole impression of the artifact considering each detail of it (Lavie and 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"* (this is the total object of perception) (p. 138). 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 agent 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 cited in Queiroz & Merrell, 2006) *"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"* (p. 38). 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, 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 §2.1.3, 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 agent is able to confront new interactive potentialities no matter how 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 2009b; Piaget 2001). It should be noted that the new meaning for the perceived object arises as the 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). 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 (2000), this is a fundamental presupposition in order to call the object a 'good' one.

The aim depends on the needs of the agent and creates an intention of use. Our environment is understood by identifying those interactive potentialities because of our desire to act according to our motives. Every time a new meaning of a potential action has been created (by inference in the current level) 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 aesthetic emotion of pleasure 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 new interactive potentialities appear carrying all relevant cultural history, the sign links with its object indexically giving new information about its physical attributes and the social context. 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 the following Figure 12.
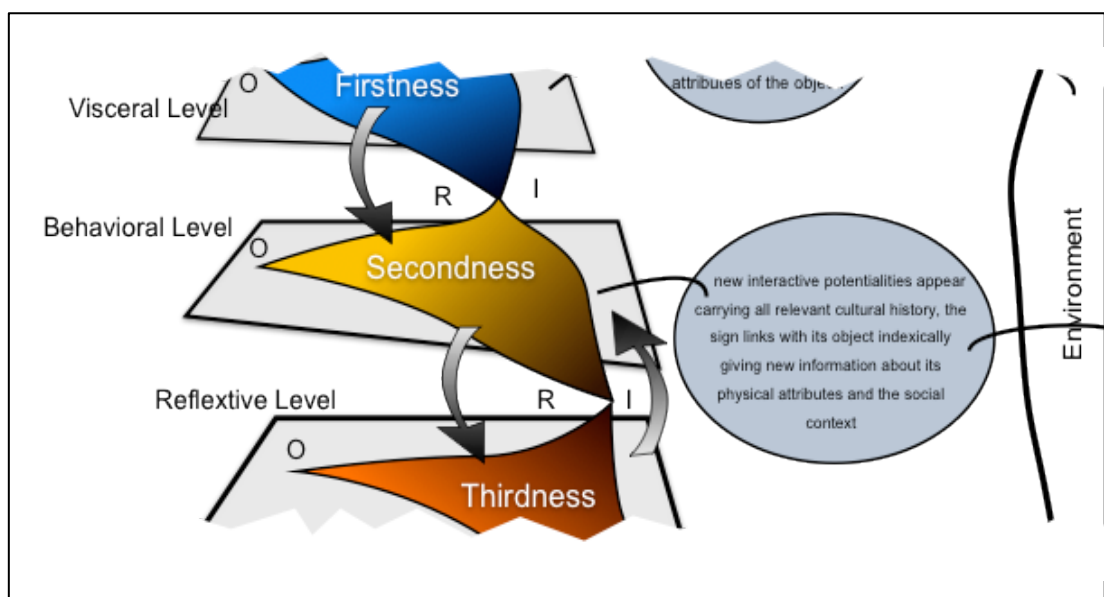
Figure 12 The behavior level

5.3.2.3 *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 and 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 aesthetic 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, etc. However, this is not the whole truth about the painting.

As it was already mentioned (see §5.2.2), at this high level of cognition, the secondary appraisal presupposes some comparison with stored information, schemata, expectations and similar experiences of the agent even for the simplest stimuli that could elicit an aesthetic emotion. The result of the secondary appraisal is a primitive construction of the aesthetic meaning, which is considered as a minimal form of aesthetic preference or judgment.

Thus an object can be perceived as an unlimited list of events that elicit dynamic appraisal patterns of aesthetically-oriented emotional responses supporting the construction of an unlimited list of aesthetic meanings and judgments. This means, that the process of understanding may successfully apply concepts and aesthetic meanings 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
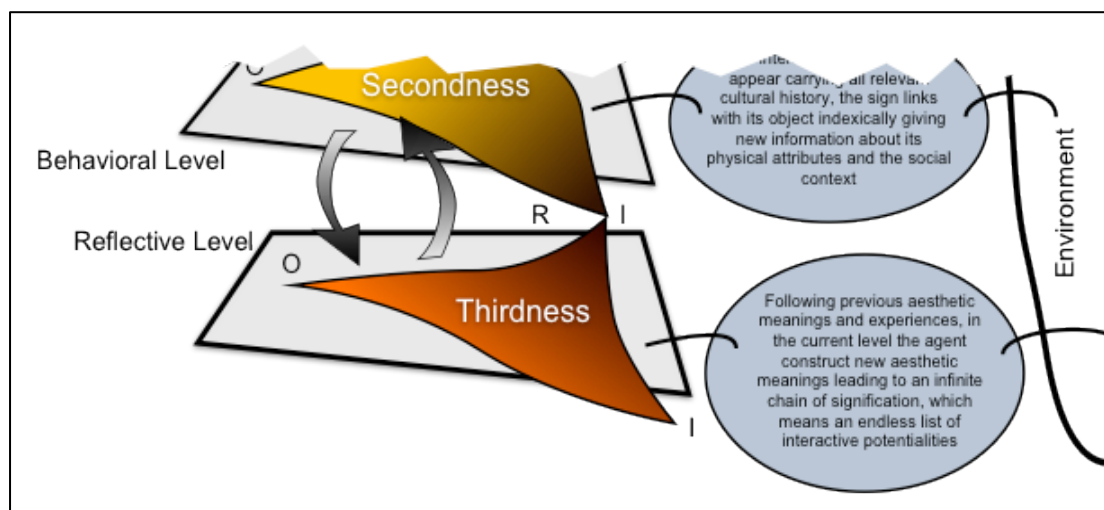

Figure 13 The reflective level

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, connecting the reflective level with the previous one, the behavioral. This 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 (Figure 13)

At the behavioral level, the 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.

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 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, 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, 3:53). 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) 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 and the process of semiosis is depicted in the following Figure 14.
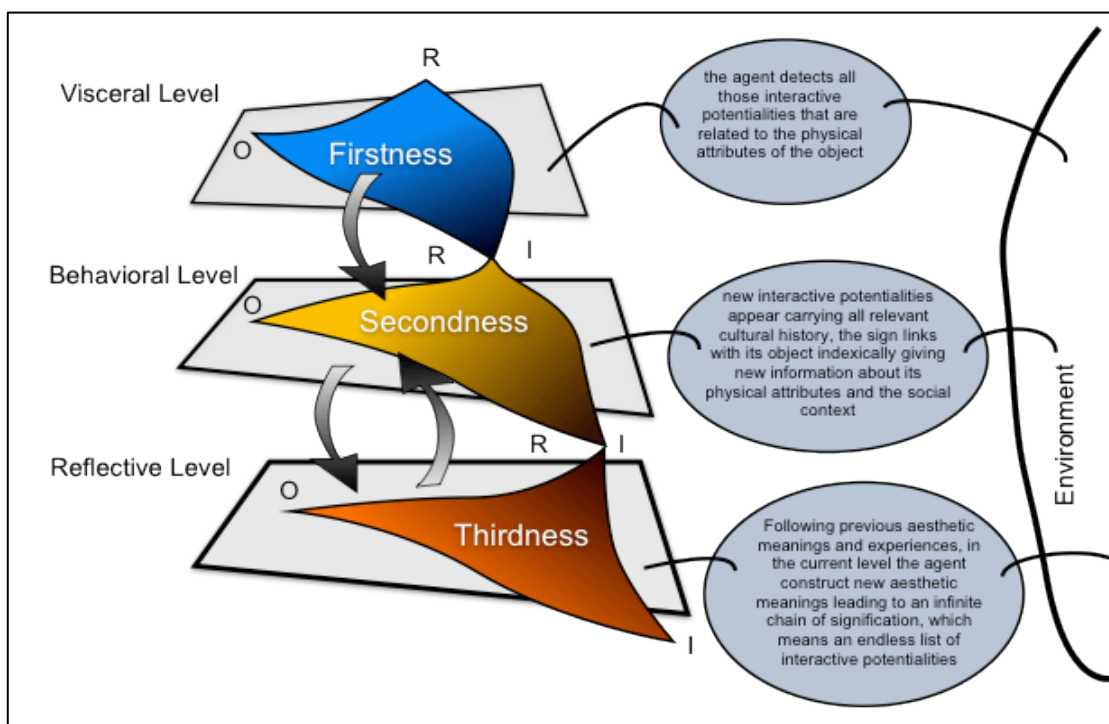

Figure 24 The process of semiosis

5.3.2.3.1 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 15). 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-centered design changes the whole interaction experience in most artifacts and consequently their meaning in everyday life) offering unlimited meanings and ways of interaction.
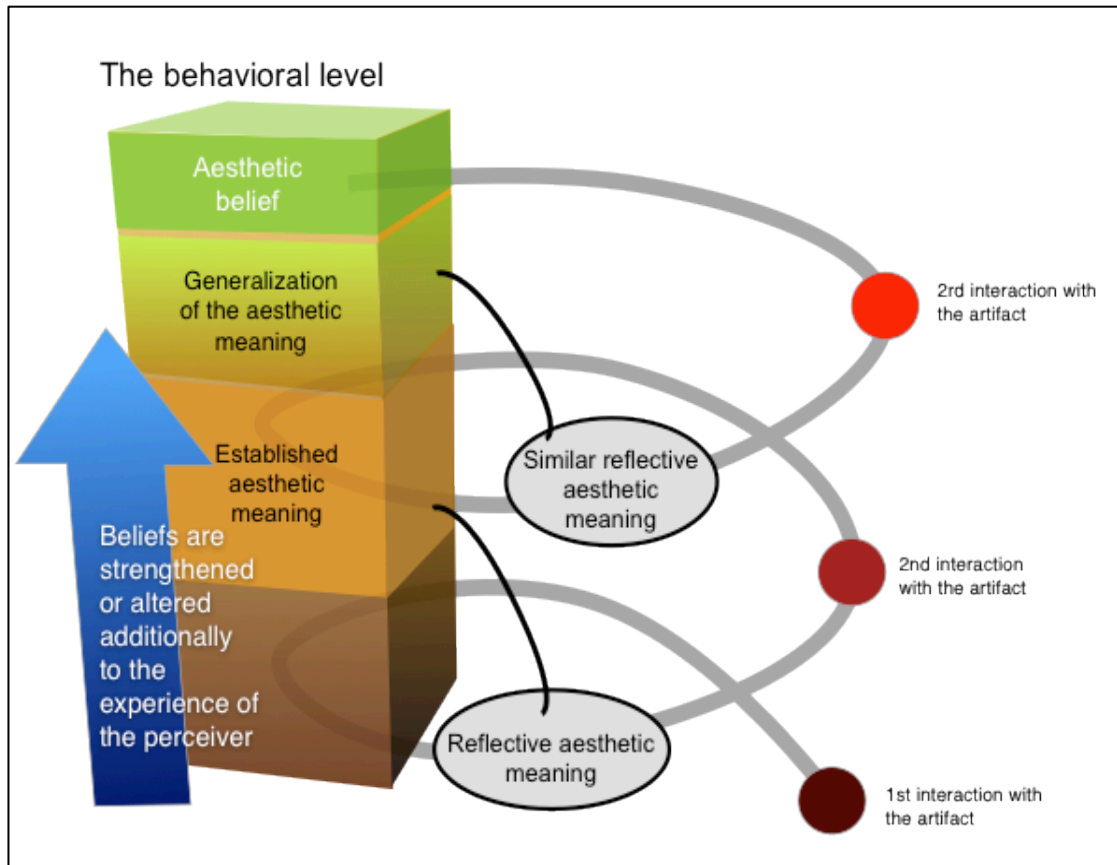
Figure 3 The course of aesthetic experience

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 1996, 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 agent produces new content for known and unknown observations (Arnellos, Spyrou, and Darzentas 2007a).

5.4   SUMMARY & CONCLUSIONS

Emotions are functions that detect opportunities or threats and accordingly, lead individuals to engage with situations that will be advantageous for them, or otherwise, to avoid harmful situations. In general, a positive or a negative emotional state plays a major role in the survival of an agent. According to the interactive model of representation, emotions are implicitly associated to the representations and in general, to the transformation of the factual knowledge of an agent. In this chapter two models are presented that describe, explain and analyze the process by which emotions are elicited affecting the agent's aesthetic judgment. The illumination of the mystery of aesthetic behavior demands explanations based on the concept of normative functionality. This aspect is supported in the interactive framework of representation.

Considering the neurological evidence regarding emotions and aesthetics, it is argued that aesthetic judgment seems to involve more than one brain area and of course, it does not exhibit a serial pattern of information processing. Particularly, aesthetic meaning is dynamically composed by a complex web of neurons in conjunction with emotional reinforcement by the limbic system. According to neurological findings, in a basic perceptual process the production of aesthetic meaning results in the elicitation of the emotional state of pleasure or pain, as everything related to the respective functionality comes together into a unified concept serving the stability of the agent.

Therefore, in this chapter we suggested, firstly, a minimal model of aesthetic judgment arguing also in favor of a dynamically organizational connection between the aesthetic judgment and the respective emotional values (i.e. pleasure or pain), as these are emergent in the interaction of the system with its environment. Particularly, in this first suggested model, aesthetic emotions are considered as functions that serve an evaluation mechanism, as the agent tries to resolve the interactive uncertainty in a given interaction. Consequently, the aesthetic emotional states of pleasure and pain are considered as a functional indication that strengthens or weakens the anticipation for the resolution of the dynamic uncertainty emerged in the specific interaction. Overall, this process serves the maintenance of the autonomy and the stability of the agent, since it functions as a detecting mechanism that could prevent the interactive error.

Specifically, in the suggested model, the appraisal theory of emotions is used as a vehicle to detect the functions by which the evaluation mechanism is related to the elicitation of the aesthetic emotional meaning. Therefore, according to the suggested model:

•   The aesthetic elicitation is always a goal-related attribution, in contrast with the more dominant and philosophical approach to aesthetic theory that claims for disinterestedness of pleasure (free of satisfaction), when the agent is about to call something Beautiful (Shusterman and Tomlin 2008; Wicks 2009; Kant 2000).

- When an agent is operating in the first stage of appraisal, the ability of automatic emotional aesthetic responses implies the strong possibility of the consideration of fundamental aesthetic habits.

- Considering that the appraisal of an event takes place prior to the outcome of the aesthetic emotion, it could be concluded that aesthetics, in general, and aesthetic judgment, in particular, is not an a priori mysterious process and most probably, it does not refer to names like pleasurable, beautiful, tasty, etc., but to processes/mechanisms, which result in emergent outcomes with particular characteristics.

- Autonomy is a precondition for the system to produce aesthetic emotions. The contrary is not true.

- It is specifically suggested that the functional realization of two parts/processes in the overall cognitive process of the secondary stage of appraisal. The first process (CVS) corresponds to a subsystem that involves cognitive variables and it is fundamental for the accomplishment of the function of heuristic learning. The second process (AAS) primarily affects the elicitation of aesthetic emotional meanings. These two subsystems (CVS and AAS) are organizationally connected, thus affecting the action readiness or the action planning of the autonomous agent.

- Aesthetic emotions have also a role that provides new motivations and new knowledge. The knowledge of new aesthetic meanings and new aesthetic judgments form the basis for further aesthetic emotions, judgments and actions.

- The dynamic character of the appraisal process confirms the philosophical claim for the subjectivity of the aesthetic judgment. In particular, the same agent in different instants of the same interaction process could elicit different aesthetic judgments even if we consider the environment as static.

Searching for other naturalized explanations on how the agent may interprets his environment aesthetically in the course of interaction, Peircean semiotics is ambitious and encompassing enough to illuminate any development in cognitive psychology. They offer a better understanding in functionality from the simple nervous activity to the full-fledged higher level behavior of an organism.

In this direction, considering the semiotic dimension of the aesthetic a second model of aesthetic experience and judgment is suggested. In this three-level interactive-semiotic model, it is indicated and described the relation between the characteristic aspects of each cognitive/perceptual level of interaction and the respective type of semiotic processes. Additionally, the suggested interactive-semiotic model appears to explain aesthetic experience of an agent 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.

Chapter 6: The role of aesthetic emotions in the design process

'Art and aesthetic meaning mark the fulfillment of nature in experience and of experience in meaning. It is there that the capacities of the world to achieve the interpenetration of sense and value in human life are realized.' Thomas M. Alexander

As it is already mentioned from the beginning of this dissertation, the attempt to investigate the origin and the role of the aesthetic does not characterize any longer a research domain limited solely to art and philosophy. We see researchers from several areas, such as psychology, neuroscience, design, Human Computer Interaction and marketing, attempting to provide useful explanations concerning the role of aesthetics in our everyday lives. Over the last ten years of research in the field of design several approaches have been formed on how the aesthetic experience is involved in our interaction with artifacts. Most of them view aesthetics by studying the outcome of the respective experience, relating aesthetics to attractiveness, satisfaction, enjoyment, fun, surprise, delight, etc., that users feel when they seek for a "good" design (see Chapter 3:).

Almost everybody agrees that the aesthetic experience with products is a multi-dimensional phenomenon (Park, Choi, and Kim 2004) that usually refers to non-quantifiable, subjective, and affect-based experience before (perceived or pre-aesthetics), during or after (post-aesthetics) the actual use (Tractinsky, Katz, and Ikar 2000). Lavie and Tractinsky (2004), for example, suggest that aesthetics in web design consist of two main dimensions of aesthetics: the classical and the

expressive aesthetics according to the physical or the conceptual characteristics of the respective design.

In most of the works that theoretically study the aesthetic experience and its origin, it is a common conclusion that aesthetic experience shifts from the philosophical accounts that attempt to explain art to cognitive phenomena that affect the dynamic relations between us (as agents and users) and our environment. In those studies aesthetic experience is highly related to emotional or affective processes that emerge in the interaction. These processes are directly affected by other cognitive processes that use our prior experience and knowledge, (Norman 2003; Leder et al. 2004; Locher, Overbeeke, and Wensveen 2010; Hassenzahl and Monk 2010; Reimann and Schilke 2010; Xenakis, Arnellos, and Darzentas 2012) and which result in the formation of an aesthetic judgment.

As it is already argued in Chapter 5, the aesthetic experience is a highly complex phenomenon grounded in bio-cognitive processes, whose emotionally-related activity is fundamental for the development of our whole interactive experience. Thus, the aesthetic experience has an interactive nature, which is not limited to the works of art, but it is extended to further types of activity thus increasing our motivation to use artifacts.

Moreover, as design thinking grows, adopting findings from several research areas that approach and study the design process as a bio-cognitive construction, an explanation of aesthetic experience under such a perspective is essential. Such explanation could offer new perspectives to our understanding of the design process and of aesthetics as a fundamental part of it. However, little research has been done, which explores the cognitive processes that constitute an aesthetic experience while a person is engaging in the design process (Reimann and Schilke 2010).

In this direction, adopting a theoretical perspective of design where design is considered a cognitive process that supports anticipatory and purposeful (goal-directed) actions of the design-participants (user and designer) (Bonnardel 2000; Friedman 2003; Arnellos, Spyrou, and Darzentas 2007a; 2007b; 2010a; Glanville 2007), the first objective of this chapter is to propose a better understanding of how aesthetics are involved in the design process and how they affect the content of the design. Particularly, it is suggested that an aesthetic experience, through its cognitive and especially, its emotional dimension, functions as an evaluative process that affects our anticipation for stable interactions or in other words, for successful design decisions. Accordingly, aesthetics are considered to be a crucial aspect of interaction, aiming to reduce the uncertainty of the design process. This is a situation in which, design-participants make design decisions that are uncertain with respect to the fulfillment of their goals. A more detailed explanation of the above argument can be found in Xenakis and Arnellos (2012; 2013).

In addition, for most of the design thinkers aiming to explore how users form and decide ways of interaction through products, the notion of affordance (considered as a range of action possibilities) is proved to be a very useful cognitive tool linking perception with action (Albrechtsen et al. 2001; Norman 1990). However, affordances are more than a cognitive element

in the design process. The concept of affordance affects how designers think that action possibilities are perceived by users in their effort to choose the 'proper' functionality for their artifacts (Smets and Overbeeke 1994).

Both aesthetics and affordances are considered to be measures of product success, each one for the role it plays in the design process. Therefore, designers always want to know how they could use these two ostensibly distinct theoretical elements in order to provide effective ways of interaction through their products. Hence, the second objective of this chapter is to propose a new orientation concerning the underlying functionality that supports the detection of affordances. The argument is that aesthetics are one among other factors in the design process that recommends users to anticipate a successful (or not) interaction through the artifact, thus enhancing the detection of affordances. A more detailed explanation concerning the above argument can be found in Xenakis and Arnellos (2013).

6.1 REDUCING UNCERTAINTY IN THE DESIGN PROCESS: THE ROLE OF AESTHETICS

Everyday life problems make us stand in front of many complex decisions, for most of which we are not aware of their direct consequences. In fact, we live and act only by knowing something about the future; while the problems of life and its manipulation arise from the fact that we know so little about them (Knight 1964). Living in such uncertain environments we develop ways to minimize the risks of such decisions. As such, we use functions that aid us in anticipating the implications of our future actions and in choosing the best alternative that will bring us one step closer to our goals, always with respect to the current conditions. Hence, we view the uncertainty as an aversive state that we are motivated to interact with in order to reduce it, most of the times by anticipating or learning (Bar-Anan, Wilson, and Gilbert 2009; Bickhard 2000a; Osman 2010). Generally, the best way to eliminate this uncertainty is to "act-and-learn by your failure" (Bickhard and Campbell 1996), making the next same or similar interactive step much safer.

The interactive uncertainty is a common path that designers and users have to pass through in their road towards fulfilling their goals in the design process. From the designer's perspective, there is uncertainty with respect to deciding the ways to better offer/provide the ways of interaction with the environment, through the artifact, and according to his goals. From the user's point of view, there is uncertainty with respect to deciding which are the available ways of interaction with the artifact, according to his personal goals (Beheshti 1993). Therefore, design-participants (designers and users) should develop ways that they allow them to choose the best action before learning and prevent the interactive failure.

In this direction, considering design as a cognitive process that supports anticipatory and purposeful (goal-directed) actions of the design-participants, our aim in this paper is to argue that aesthetic experience, through its emotional dimension, functions as an evaluative process that

affects our anticipation for stable interactions or in other words, for successful design decisions. What it is proposed is that aesthetics are a crucial aspect of interaction, and as such, they reduce the uncertainty of the design process.

6.1.1 **The uncertainty of the design process**

6.1.1.1 *Design process and meaning-making*

Generally, in the evolution of human beings, design process is considered the central activity through which we attempt to change the existing situation into one that better serves our aims and goals. According to Banathy (1998), *"design is a creative, decision-oriented, disciplined inquiry that aims to: formulate expectations, aspirations and requirements of the system to be designed; clarify ideas and images of alternative representations of the future system; devise criteria by which to evaluate those alternatives; select and describe or 'model' the most promising alternative; and prepare a plan for the development of the selected model"* (p. 169). In this way, the term 'design' is usually referred to a goal-oriented process, in which the designer forms a web of representations concerning the design problem space (e.g. understanding needs) and the design solution space (e.g. solving problems and improving situations) (Bonnardel 2000; Friedman 2003). Almost all the theoretical approaches for the design process share a common aspect; the design process exhibits an interactive nature and it supports the meaning-based actions of the design-participants, thus design should primarily be considered as a process of cognitive construction (Arnellos, Spyrou, and Darzentas 2007a; 2007b; 2010a).
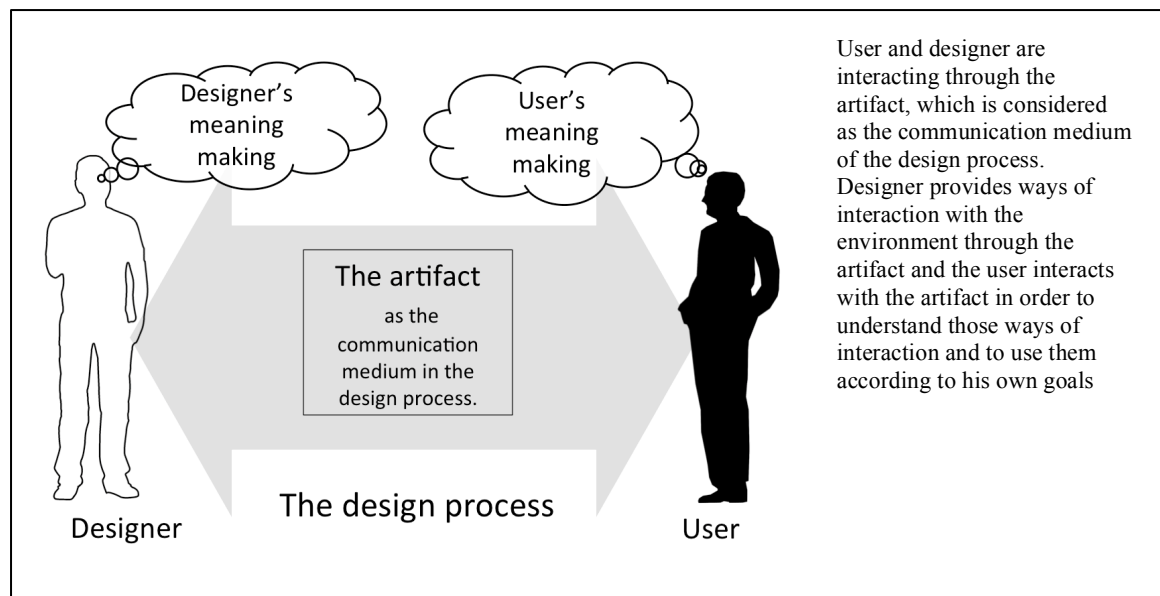
Figure 4 Meaning–making is considered as the process of constructing ways of interaction that is available as a function to both systems (users and designers) that participate in the design process

Accordingly, any analysis and modeling of the design process needs to shift from the perspective

of problem framing or/and solving, to the perspective of meaning-making. In a dynamic context of design, the process of meaning-making is interactive and future-anticipatory, and is explicitly related to the construction and/or choice of appropriate functions for a specific interaction with the environment. In other words, meaning-making is considered as the process of constructing ways of interaction with the environment. These ways of interaction are constructed as functions (the functional substratum) of each system (i.e. designer and user) participating in the design process (Figure 16).

In particular, the designer aims to communicate its meaning (range of possible ways of interacting with the environment) to the user, through the artifact. The designer offers/provides ways of interaction with the environment through the artifact, and according to his goals. In parallel, the user interacts with the artifact in order to understand those ways of interaction and in order to select and to use them according to his personal goals. In other words, users and designers are interacting through the artifacts. Therefore, the artifact is the medium of the design process.

6.1.1.2 *Design representations as anticipation*

Design is an interactive and constructive (cognitive) process by which, each of the design-participants select among a range of available ways of interaction (Arnellos, Spyrou, and Darzentas 2007b), which are indicated by the environment (artifact) in connection to the design-participants' inner capabilities. The problem of action selection −all those ways of interaction, which make us aware for the appropriateness of a function or a combination of them for a specific interaction with respect to our goals−, is related to the construction of a design representation. Accordingly, design representations are the content of the design process (Arnellos, Spyrou, and Darzentas 2007a; 2010b). It is important to note that those design representations are directed towards the future, where successful outcomes of interactions are anticipated, always with respect to the goals of the design-participants. Therefore, and considering the interactive and future-anticipatory nature of the design process, it is suggested that the awareness of the interactive alternatives is explicitly related to design representations, which are constituted as anticipation of the design-participants.

Therefore, the design-participants anticipate those design representations; hence, design representations become anticipations. In other words, design representations, are emergent in anticipation of what further actions and interactions are indicated as possible in the particular environment through the artifact. Moreover, those anticipations have a positive or a negative value, which is dynamically determined based on the presuppositions of interaction (i.e. the conditions under which the interaction will succeed, that is, it will bring a design-participant closer to his goal). Those presuppositions are consisted of the conditions of the environment, of the properties of the artifact, and of the design-participants' past experiences, overall cognitive capacities, and physical capabilities (what is usually reduced to what is called as 'target group'

with respect to users). Therefore, presuppositions of interaction exhibit a dynamic nature that came from the properties of the design-participant and the environment he acts.

To summarize, design-participants try to communicate and to use their design representations, which provide a complex of ways of interaction with the environment, through the artifact. The artifact is the medium of the design process. The designer provides a range of actions with the artifact, and as such, he provides ways of interaction with the environment. Accordingly, the user selects from that range of actions with the artifact and, in this way, he selects his own ways of interaction with the environment. The provision and selection of actions, and consequently, the realization of the respective interactions, is related to the functional substratum (already existing or/and dynamically constructed and modified through interaction with the artifact) of the design-participants. The design representations are the content of the design process. Those representations are formed as anticipation, which has a value. This value is related to the presuppositions (conditions) of each interaction, whose dynamic nature implies that the anticipation can also be false. Therefore, the deeper understanding of the functionality of such anticipation, how it is created and how it contributes to the design problem of action selection should be an essential component in any theory of design (Arnellos, Spyrou, and Darzentas 2007a; 2010b; Zamenopoulos and Alexiou 2007).

6.1.1.3 *The virtual falsification of the anticipation introduces design-uncertainty*

Anticipation can be false in the sense that the respective representation that is formed by this anticipation could recommend the design-participant to choose an action that will be proved unsuccessful for his goals. This virtual falsification of the anticipation introduces uncertainty in the design process. As it is already mentioned, from the designer's perspective, there is uncertainty with respect to deciding the ways of interaction with the environment, through the artifact, and according to his goals. From the user's point of view, there is uncertainty with respect to deciding which of the available ways of interaction with the artifact would be the best according to his goals. Therefore, there is uncertainty in the design process, a situation that it is called as design-uncertainty.

More specifically, design-uncertainty is considered a situation in which, design-participants are engaging in a design process by making decisions (i.e. provision and selection of actions with the artifact) that are uncertain with respect to the (degree of) fulfillment of their goals. Therefore, design-participants need to develop ways that will handle and reduce their design-uncertainty. A very important process resulting in the reduction of uncertainty, as it is already mentioned, is learning. Through learning the designer could develop ways to anticipate the result of his decisions, by for example, structuring and following, design methodologies or specific methods (Cross 2006). Additionally users learn to avoid all those interactions that will lead them to failure.

However, most of the times, design participants do not experience situations that are familiar with or already known. This means that most of the design-decisions need to be taken in uncertainty, and design-participants have to act before learning. What it is suggested in the next section is that aesthetics (aesthetic experiences or what it is considered in the next section as aesthetically-oriented emotional reactions) is another aspect/process that reduces design-uncertainty before and/or during learning.

## 6.1.2 **Aesthetics reduce the design-uncertainty**

So, the question is what aesthetic pleasure or pain stands for in the design process, and what then, an aesthetic experience provides to the communication between the design-participants?

Following the conception of aesthetics that introduced in Chapter 5, the term 'aesthetic pleasure' refers to a range of basic emotional outcomes of an appraisal that are positively valued, that is, that are associated with a positively valued anticipation of the plans (provision and selection of actions with the artifact) of the design-participants, with respect to the fulfillment of their goals. In contrast, the term 'aesthetic pain', refers to those emotional outcomes, which are characterized by a negative value, which emerge when designer and user are anticipating problems with their plans regarding the fulfillment of their goals. Consequently, these basic aesthetic values of pleasure and pain influence design-participants towards creating, communicating and using those design representations that will bring them closer to their goals.

As it is already mentioned in the beginning of the section 6.1, those representations are formed as anticipation of ways of action with the artifact, and consequently, of ways of interaction with the environment. Furthermore, that anticipation has a value related to the conditions (dynamic presuppositions) under which the respective ways of interaction will succeed or not. As previously explained, it is the dynamic nature of the conditions in which the selected interaction will take place that introduces design-uncertainty. Hence, it is when design-participants attempt to resolve and reduce their design-uncertainty that positive and negative emotions with aesthetic values are elicited. Specifically, when a positive aesthetic value is elicited the respective anticipation for the resolution of a particular design-uncertainty is positively valued. In that case, an aesthetic experience functions as a recommendation based on which, the respective interaction could result, if selected and if successful, in the elimination of the design-uncertainty. Correspondingly, when a negative aesthetic value (pain) is elicited the anticipation for the resolution of the design-uncertainty is negatively valued. Now, the outcome of aesthetic experience recommends the avoidance of the interaction, thus again, reducing design-uncertainty.

At this point, it is important to consider that aesthetic values could differ from the pleasure or pain that we feel in our senses. Someone could ascribe a positive aesthetic value in a painful (sensual) experience that recommends a goal fulfillment. This painful experience (with positive aesthetic value) could strengthen our anticipation for goals success. This means that pain (acquiring in this context a positive aesthetic value) could also signal our anticipatory system that

there are the appropriate conditions for a successful interaction, thus forming a positive aesthetic experience. However, there are other cognitive aspects (e.g. past experiences, other related meanings) that also affect our anticipatory system in the formation of the final design representation. This means that the aesthetic experience only partly affect the design representation and not entirely.
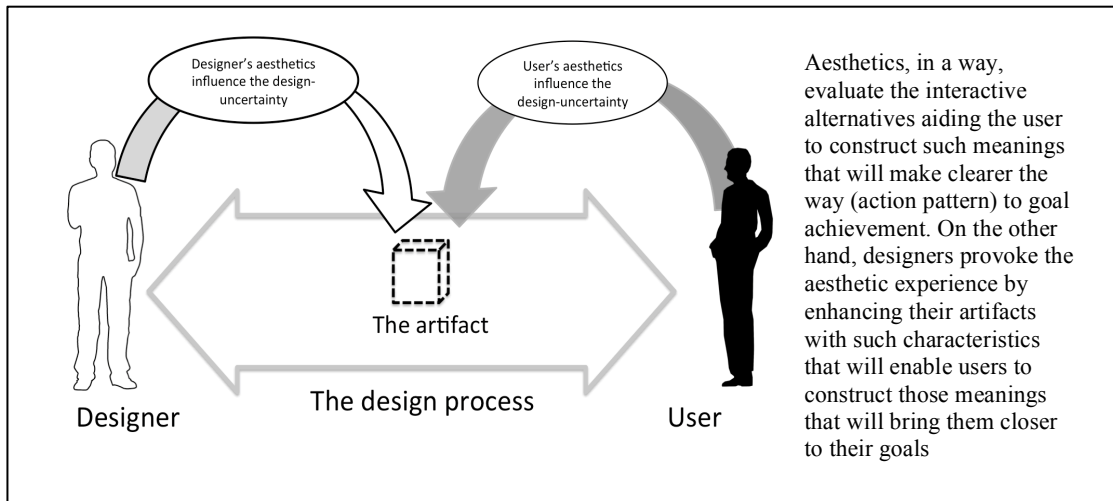
Figure 5 The role of aesthetics in the design process

In general, based on the account sketched above, aesthetic emotional values are elicited in the design process and particularly, in action selection. Therefore, it is suggested that an aesthetic experience resulting in the values of pleasure and pain, functions as a recommendation mechanism, providing the design-participants with the ability to resolve the design-uncertainty regarding the success or failure of an anticipated interaction. Hence, the feeling of anticipation for a successful resolution or not of a design-uncertainty is suggested as a model of minimal aesthetic experience (Figure 17).

Through aesthetic experience the designer evaluates the interactive alternatives in order to form the proper design representation and to incorporate them in the artifact as indications or affordances that confirm the presuppositions of interaction and reduce the design-uncertainty. In parallel, the user through his personal aesthetic experience reduces the design-uncertainty by assigning values to those affordances that support or not the presuppositions of interaction that are indicated to him. These aesthetic values will be functionally useful to the user in order to form his design representation. Finally, this design representation aids him to select the proper actions that will lead him (safely) in a goal fulfillment.

Aesthetics provide the design-participants with a recommendation of a future interactive outcome regarding an action they are about to provide or/and select on an artifact. As such, aesthetics, among other things, provide values to the design representations affecting the whole design process. Hence, every time a design-participant is in front of an uncertain situation and has

to decide which action is the best with respect to his goals, aesthetics are there to aid him in making such selection by reducing design-uncertainty. This means that a design-uncertainty could be reduced by both positive and negative aesthetic experiences. A negative experience, for instance, may reduce the design-uncertainty by protecting the user from a harmful interaction making clear that the best action is to seek for safer or better alternatives, always according to his goal. However, even though an aesthetic experience reduces the design-uncertainty, this does not imply that the design-participant will choose the proper action for his goal. This is because aesthetic experiences and the respective anticipation have always the possibility of failure in the design process.

Based on the argument presented above regarding the role of aesthetics in the design process, according to which it is through the aesthetic experience that design-participants appraise the interactive potentialities in order to reduce the design-uncertainty and to form the proper design representation, an interesting relation appears between aesthetics and the respective interactive potentialities or action possibilities, which is widely known in design literature as affordances. However, even though aesthetics and affordances are two important factors based on which designers provide effective ways of interaction through their artifacts, there is no study or theoretical model that relates these two aspects of design. In the next section 6.2, we suggest a theoretical explanation that relates the underlying functionality of aesthetics and of affordances in the design process. The argument is that aesthetics are one among other factors that allow users to enhance the detection of action possibilities and consequently, the detection of affordances.

6.2 THE RELATION BETWEEN AESTHETICS AND AFFORDANCES

Even though Norman has a long history on theoretical contributions in both aesthetics and affordances, he did not mention directly a type of processing that may link them in interaction process. However, in his book *The Design of Everyday Things* he claims that an aesthetically pleasing appearance is only a part of a successful product. The other part is understandability and usability, which are more important than attractiveness. His suggestion is that these two parts of design should go 'hand in hand' because focusing on aesthetics could blind the designer to the lack of usability (Norman 1990). The question here is whether those two elements of design are so distinct to each other. Why should an aspect of the design process that is related to aesthetics be distinct from successful or unsuccessful ways of interaction? The fascination that a product may hold to users implies the development of such meanings that we 'see and feel' in a product that are equally accessible as the meanings that are related to action possibilities (affordances). Years later Norman (2003) enhances the 'hand in hand' argument by introducing the emotionally or aesthetically pleasurable side of design. As he argues, *"the surprise is that we now have evidence that aesthetically pleasing objects enable you to work better"* (p. 10). In these words we can see a latent relation between aesthetics and the anticipation regarding what an object affords.

As it is suggested in the next section, aesthetics seems to play an important role in design by enhancing our ability to detect such action possibilities (affordances) that allow us to form anticipations of successful interactions.

6.2.1 **Affordances and the design process**

It is a common conclusion from those who study the role of affordances in design that the term refers to action possibilities or opportunities that a user "directly" perceives in environmental conditions during his interaction (Auke J.K. 2012; Kannengiesser and Gero 2011; Norman 1999; Gaver 1996). These conditions denote not only artifacts but also events that exhibit those possibilities (Bingham 2000). Particularly, following Gibson's (1986) initial claim, the concept of affordance derives from theories of value and meaning, and its detection is strongly related to these two concepts. As Gibson claims, *"the perceiving of an affordance is not a process of perceiving a value-free physical object to which meaning is somehow added in a way that no one has been able to agree upon; it is a process of perceiving a value-rich ecological object."* (p. 140). Affordances[14] are not properties of the objective physical world. Their detection emerges as a consequence of interaction, and particularly of such mental and bodily processes that assign values to objects, whenever the existing conditions support their activation. In other words, affordances could be detected only when the artifact is somehow valued by appraising the information that is available with respect to those dynamic conditions (i.e. affordances are emerging during an interactive event). The conditions of interaction are dynamic since the context where the interaction takes place is always altered both internally (bodily and behavioral) and externally (environmental) with respect to the design-participant. These dynamically altered conditions give rise to different interpretations of what those artifacts may afford (Hirose 2002; Kannengiesser and Gero 2011) at the present time (the time of action) or in the future, where the designer should construct/offer those conditions in a way that the interaction will be successful. This conception gives to the way affordances come in our attention a dynamic nature that originates from the dynamic nature of the design process by which the design-participants can develop multiple ways of interaction through the same artifact.

Hence, even considering that the physical properties of an artifact stay invariant in the design process, the values and the meanings (design representations) that a design-participant forms in every interaction with this artifact are dynamically altered, constructing at the same time new action possibilities or new affordances. Therefore, the crucial question is not if the affordances pre-exist or not, if they are perceptible or hidden, but how are they 'perceived' or detected as action possibilities in the design process. On the same track, Norman (1990) calls these affordances as 'perceived affordances' and he claims that *"they result from the mental*

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[14] The concept of 'affordance' is explained more analytically in section §2.2.2

interpretation of things, based on our past knowledge and experience applied to our perception of the things about us" (p. 219).

From our perspective regarding the design process, every artifact (environmental condition or event) may afford a range of interpretations that have their origin in our goal-oriented behavior. Moving towards those goals, we select potential actions and make plans in order to accomplish a successful interaction with respect to the environmental conditions, our past experiences, and our mental and bodily capabilities. Since environmental conditions or events afford a range of interpretation which, at least in humans, are entrained by goal-oriented behavior, we cannot understand purpose and interpretation without the consideration of the socio-historical context in which the respective goal is formed and the respective affordances are interpreted (Noble 1981). The artifact is a communication medium in the design process and its interpretation depends partly on our social conventions, whether such communication was intended or not (Norman 2008). The artifact should support the emergent development of design representations equally for designers and users. For instance, the design of a mailbox is based on the idea of posting a letter, which is formed from social conventions of the 'act of posting a letter'. A mailbox cannot support action without requiring users' memory, inference, and further interpretation. Metaphors in design are a familiar example of the implementation of social cognition in affordances (You and Chen 2007). Such interpretation demands equally indirect perception in addition to the Gibsonian claim for direct perception, which rejects every engagement of memory and inference (Xenakis et al. 2012).

With a goal to 'post a letter', design-participants form design representations, which are based on a future anticipation that the medium of the design process (e.g. the mailbox) will support or afford a successful posting. This anticipation emerges only when the dynamic presuppositions of interaction denote that the conditions, under which the interaction will succeed, exist; the letter will be properly placed inside the mailbox in order to be collected by the postman. Posting a letter is supported only in certain conditions where, for instance, the box has a slot where letters can get in and the user has the capacity to detect and reach the slot. However, these presuppositions can be wrong. For example, i) the perceived 'slot' in this box is only a black marked line and no letter could get in ii) the mailbox has the appropriate design and the environmental conditions are the appropriate ones too, but the user cannot detect the slot, iii) although the mailbox has the proper design and the user have all the capacities to reach the slot, the user is confused on how a letter could be posted, and so on. This means that all those dynamic presuppositions of interaction are not merely properties of the artifact but instead, they emerge as the design-participant decides to interact with it according to his goal.

In particular, what it is suggested is that the affordances in the design process are about future action possibilities, or rather, future interactive potentialities through which the design-participant anticipates that he will result to goal fulfillment. Following (Bickhard and Richie 1983) the content of design representations regarding these interactive potentialities is called 'interactive

affordances'. More specifically, interactive affordances are all those interactive potentialities that the dynamic presuppositions afford for a further action. In order for the design-participant to detect them, those dynamic presuppositions of interaction (at least a part of them) that will convince him to anticipate a successful interaction must be fulfilled. However, as it is already mentioned those dynamic presuppositions can be false denoting a false design representation, a false interactive potentiality that it is called as false interactive affordance. In other words, the interactive affordances emerge when all those internal and external conditions to the design-participant that indicate the appropriateness of a potential action, exist. This claim focuses on the dynamic presuppositions of interaction that support the interactive potentialities and not merely to an environment that either is a neutral manifold of action possibilities or invite a user to do certain actions. The artifact can prompt a user to certain actions only when the user is and acts within conditions that support that invitation (Withagen et al. 2012). The design-participant has such mechanisms that appraise all those conditions for their appropriateness and he may then set himself in the service of such invitation. Aesthetic experience as it will be argued in the next section is such an evaluative/recommendatory process.

Despite Norman's argument concerning the interpretation of perceived affordances and their relation to past knowledge and experience, there are courses of interaction where the design-participant should form a design representation in which there is no actual or similar experience to recollect. When there is not available information that will possibly support the design-participant in confirming the appropriateness of an action, the process of action selection is getting more complex and uncertain. As it is already argued in section §6.1.2, in cases of design-uncertainty aesthetics is one factor among others that aid the design-participant to reduce such uncertainty and finally form positively or negatively-valued anticipation of interaction. Consequently, as it is argued in the next section, aesthetics is a crucial aspect that affects the process by which we detect interactive affordances.

6.2.2 **Aesthetic experience enhances our ability to detect the interactive affordances**

As mentioned before, the role of aesthetics in design process is considered as one of assigning values (of pleasure and pain) to interactive situations in order for the design-participant to resolve the virtual falsification of the anticipated outcomes of the design process. An aesthetic experience through the aesthetic emotional values influence the anticipatory system of the design-participants, and consequently it affects the formation of the respective design representations regarding their goals. Particularly, aesthetically-oriented emotions with positive values function as a recommendation mechanism to the design-participant suggesting that the current conditions afford future interactive potentialities and a successful course of action.

These conditions are about the environment in connection to internal states of the design-participant (e.g. bodily and psychological states). Both internal and external conditions are

responsible for the formation of the dynamic presuppositions of interaction. What it is argued here, in particular, is that aesthetically-oriented emotions appraise all those conditions and indicate to design-participants the existence (or not) of the dynamic presuppositions of interaction. This means that our aesthetic experience affects only our anticipation for interaction and thus our interactive potentialities with artifacts. This means that aesthetic experience does not form design representations but it only influences them by recommending values for their content. Aesthetics will not inform the design-participant for the specific type of action that could
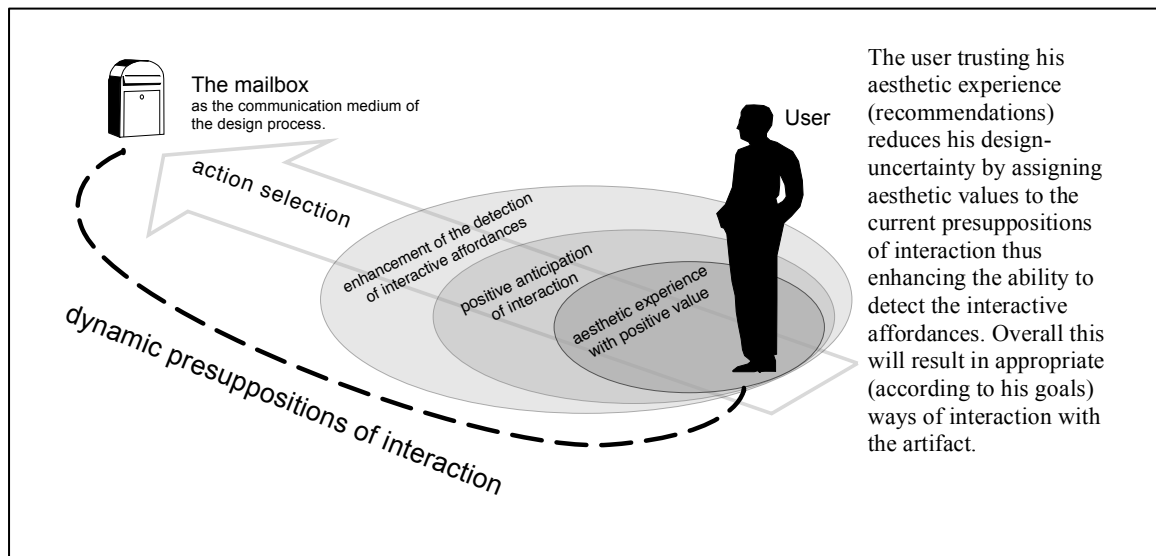
Figure 18 Meaning-making in the design process

probably result to goal success, in contrast to interactive affordances that share the same content with design representations; the appropriateness of a specific potential action (Figure 18).

Aesthetics, in a way, support the process of selecting the best action by assigning values to those conditions that indicate the appropriateness of interaction. Specifically, the aesthetically-oriented emotions signal the design-participant that the dynamic presuppositions of interaction afford a further interactive step. In other words, aesthetics enhance our ability to detect interactive potentialities in order to form the respective design representation. What it is suggested is that, aesthetic experience enhances our ability to detect interactive affordances. However, both aesthetically-oriented emotions and interactive affordances are about projections of future interactive outcomes, which are anticipated to result in goal success. Since the anticipation could fail, both aesthetically-oriented emotions and interactive affordances could also fail when the outcome of the selected action is not the one anticipated.

As previously explained, aesthetically-oriented emotions could make us aware for those interactive potentialities, even before learning. This means that interactive affordances need not count on past experience and knowledge of the design-participant in order to be perceived, as Norman demands. We have the ability to assign ways of interaction through objects even though

we know nothing about them. Objects or events in the course of interaction have such meaning only if the dynamic presuppositions of interaction are indicating the achievement of a goal.

One more crucial aspect regarding the relation between aesthetics and interactive affordances is that they both belong to the content of the design, and simultaneously are interpreted in the design process from two perspectives: the designer's and the user's perspective, making design a process of mediated communication (Arnellos, Spyrou, and Darzentas 2007a; Crilly et al. 2008; Arnellos, Spyrou, and Darzentas 2010b). In particular, the designer aims to communicate his meanings (ways of interaction) to the user through the artifact. Therefore, every modification in the form of the artifact is another added value (positive or negative) in this communication, which may modify (expand, reduce or even alter) the range of those ways of interaction. This means that besides the aesthetically-oriented emotional reaction that the designer evokes in users through a specific modification, he also enhances the detection of new interactive affordances. Those new interactive affordances are new interactive potentialities, and thus they can trigger the emergence of new design representations.

For instance, when the designer is about to decide how the 'slot' may appear in his concepts of a mailbox, he triggers his aesthetically-oriented emotions that evaluate the designed presuppositions of interaction. Considering the elicited aesthetic values the designer incorporates those interactive potentialities (interactive affordances) in the 'slot' that can easily be detected by the chosen target group in order to reduce their design-uncertainty or the possibility of an interactive failure (false interactive affordances, false design representations). In turn, a user trusting his aesthetic experience (recommendations) reduces his personal design-uncertainty by assigning aesthetic values to the current presuppositions of interaction thus enhancing the ability to detect the interactive affordances (Figure). If the 'slot' is supported by positive aesthetic values with respect to an anticipated goal fulfillment, then the mailbox may afford the 'act of posting a letter'. In other words, when those interactive affordances that the user detects are similar to those that the designer designs the product may attain 'its goal'.

Summarizing, in the dynamic context of the design process interactive affordances are more than static aspects that are determined in the physical world. They are all those interactive potentialities for a further action that can be afforded based on the dynamic presuppositions present at the interaction. Which means that their detection depends on other dynamic processes that constitute our experience with the environment. The claim is that aesthetically-oriented emotions, which are the content of aesthetic experience, provide us the ability to assign values to those dynamic presuppositions of interaction enhancing the detection of interactive affordances.

Therefore, designers should have in mind that when they 'design functions based on affordances' (see e.g. Smets and Overbeeke 1994; Norman 1999; Maier, Fadel, and Battisto 2009; Nathan 2010; Hsiao, Hsu, and Lee 2012) they build a range of interactive potentialities in their artifacts that triggers the aesthetic experience of their users. As users form their design representations several aesthetically-related emotional reactions assign values to the already

designed interactive potentialities that the artifact indicates, thus affecting the whole aesthetic experience with it. If then the user, affected by his aesthetic experience, detects a range of interactive affordances that are similar to those designed by the designer the product may attain "its goal". In this way, aesthetics and interactive affordances are functionally related in the design process.

Finally, what it is argued here is that affordances are an important design tool but it is not the only available that aids designers to introduce effective functions in their products, i.e. functions that could lead users to a rich and successful interaction. The aim of this chapter was to provide such an explanation that takes advantage of the dynamic nature of aesthetics and the respective processes that constitute the aesthetic experience, and to propose a possible relation on how we detect affordances through interaction. This explanation will enhance our understanding of the potential usage for aesthetics and affordances in design decisions, and would provide a new orientation on how affordances and interactive aesthetics are both affect the perception of artifacts and product in design.

6.3 SUMMARY & CONCLUSIONS

Since the anticipation of goal success is related to the ways of interaction that design-participants choose independently, it follows that aesthetics are not properties of the artifact but they belong to the content of design, that is, they are part of design representations. Therefore, aesthetic experience and its values are emerging in the design process and in particular, in the interaction of each design-participant with the artifact. In general, aesthetics are constructed in the design-participant's cognitive and emotional realm, and they are not pertaining to the artifact but to the whole interaction with the environment. Overall, it is suggested in this chapter that aesthetic experience serves our well-being, since it functions as a feedback system in order to prevent the interactive error. This feedback system, by affecting the values of future anticipation, is directly engaged in the formation of our design representations. Hence, aesthetic experience is implicitly associated with the design process. Aesthetics are about action by promoting the achievements of goals in the design process.

Finally, regarding the role an aesthetic experience serves in the respective communication between design-participants, the argument is that aesthetics evaluate the interactive alternatives aiding the user to construct such meanings that will make clearer the way (action pattern) to goal achievement. So, designers should try to provoke the aesthetic experience by enhancing their artifacts with such characteristics that will enable users to construct easily those meanings, which will bring them closer to their goals. Therefore, the claim is that aesthetics enhance the communication between the design-participants by reducing design-uncertainty. Accordingly, every modification in a product that aims at the reduction of the design-uncertainty has always implications to our aesthetic experiences with products.

Moreover, in the design process every artifact, environmental condition, or event may afford a range of interactive potentialities that have their origin in goal-oriented behavior. The design-participants make plans, they assign meanings to objects and events, and finally they both select potential actions that fulfill their goals. This process of action selection presupposes that the design-participants use a range of functions that enable them to distinguish those conditions that support action possibilities. In other words, the design-participants exhibit a functionality that supports them in being aware of the dynamic presupposition of interaction and in detecting the interactive affordances.

Another claim of this chapter is that the content of interactive affordances is not to be found merely on the environmental conditions that presuppose a range of action, but to all those mental and bodily capabilities in relation to environmental conditions that support or afford a specific action. Therefore, in the dynamic context of the design process interactive affordances are more than static aspects, determined in the physical world, which are detected directly by the design-participants. It is argued that affordances are all those interactive potentialities for a further action that can be afforded based on the dynamic presuppositions present at the interaction. This means that their detection depends on other dynamic processes that constitute our experience with the

environment. Aesthetic emotions are such dynamic processes that function as a recommendation mechanism in the design process, which in a way evaluates, even before learning, all those internal and external conditions anticipated to support a successful interaction. In other words, the aesthetic experience evaluating all those interactive potentialities (aiding the design-participant to form the appropriate design representation) enhances the detection of interactive affordances. The claim is that aesthetically-oriented emotions, which are the content of aesthetic experience, provide the agent with the ability to assign values to those dynamic presuppositions of interaction enhancing the detection of affordances.

Designers incorporate interactive potentialities to artifacts as interactive affordances that confirm the dynamic presuppositions of interaction and reduce the design-uncertainty. Users, through their personal aesthetic experience, reduce the design-uncertainty by assigning values to those interactive potentialities, thus enhancing their ability to detect the interactive affordances. Overall, aesthetics aid the design-participant to enhance the process through which the interactive affordances are detected.

Chapter 7: Recapitulation and conclusions

7.1 EXTENDED SCHEMATIC SUMMARY: FROM AESTHETIC PHILOSOPHY TO NORMATIVE AESTHETICALLY-ORIENTED EMOTIONAL EXPERIENCE AND JUDGMENT

In what follows an extended summary of the previous chapters is provided in the form of a schematic recapitulation of the main claims and concepts:

Thesis: Even though aesthetics in the fields of philosophy, psychology, neuroscience, and interaction design are mostly considered as an emotional or an affective component of human behavior, it is still not clear what is the origin and the role of an aesthetic emotion, how it is elicited and why or how it influences our behavior when we interact with artifacts. What it is proposed in this dissertation is a naturalized conception of aesthetic emotions that emerge in interactive uncertainty as normative functions, which are available to the agent in order to assign values to the dynamic presuppositions of interaction. These values influence the anticipatory system of the agent aiding the fulfillment of his goal. Aesthetic values are considered as functional indications that strengthen or weaken the anticipation for the resolution of the dynamic uncertainty emerged in the specific interaction. Such values are proposed to lead to problem-solving mechanisms, which help the agent to reconstruct new interactive plans. This means that aesthetic emotions influence the process of action selection through which the agent forms such interactive anticipations that come from those tendencies to act. Therefore, the aesthetic emotions affect the dynamic and flexible action patterns of the agent, namely, its emergent representations and aesthetic meanings.

Therefore, aesthetic emotions are involved in interaction, regulating our decisions that are related to those actions that will lead us to goal success. Moreover, aesthetic emotions play a major role in decision making, hence they serve important cognitive processes.

> ➢ **Chapter 1: Investigating the nature of aesthetic experience**

In this chapter the main explanations concerning the origin and the meaning of the 'aesthetic' in philosophy are presented, mostly in terms of experience that is related to emotion and cognition . However, in these explanations the role and the content of an aesthetic emotion in experience

appears to be puzzling and elusively vague since thinkers differentiate the aesthetic from the ordinary experience as two distinct states of mind. This is because in recent aesthetic theory emotions are undervalued since the respective analysis is mainly concentrated on the role of cognition in aesthetic experience and not on exploring how emotions operate and affect cognition. For centuries, emotion and cognition have been conceived as distinct and opposed forces that guide our perception and action. Falsely, most of the thinkers presume that emotions and cognition conflict rather than work together, leading in to puzzling conclusions concerning the nature of aesthetic experience and the real meaning of beauty. Their main argument is that emotions could result to aesthetic experience and beauty only when this process is characterized by *disinterestedness* (a non-purposive action).

This argument was gradually abandoned, as thinkers moved forward from philosophical assumptions to scientific conclusions that came from the tendency to ground aesthetics to natural processes that govern the human nature. On this perspective, John Dewey, along with other Pragmatists, reconsidered the Kantian constrain for disinterestedness in aesthetic experience and attempted to ground aesthetics in terms of natural needs and embodied processes that take place as humans interact with their environment. According to a Naturalistic perspective:

- o *The aesthetic has exactly the same scope as all other activities that agents select in the service of their well-being.*

Despite the diversity about the meaning of the aesthetic, there is a common conclusion concerning the role of aesthetic emotions:

- o *Aesthetic emotions assign values and allow the development of meanings with respect to objects or events.*

For the Western tradition philosophers, the assignment of a value expresses a choice or a preference. For them value is a principle that the agent chooses in the attempt to determine the worth of a particular situation in order to act properly. For Pragmatists, the origin of the assignment of value is linked to adaptivity, as we interact with insecurity, instability and uncertainty. Our environment comes to our interest or we assign meanings to it, not as mere combination of artifacts, but as conditions that support potentialities of harmony or stability. Neuroscience recently has shown interest in exploring the nature of our aesthetic responses. The exploration starts by understanding how the brain discards the inessential information from the visual world in order to represent the proper character of the objects. These studies observe the way information from the senses becomes meaningful in the brain and the way emotion and cognition governs the experience of both life and art. As the work of many researchers in neurology shows, the aesthetic experience is correlated with several emotional and cognitive phenomena. Some of them are presented in the following list:

o *Object recognition, which is enhanced by learning processes, (use of knowledge that is based on previous visual experiences of similar objects).*

o *Context development, which is also enhanced by learning processes mostly based on past emotional experiences.*

o *Emotional evaluation, the agent assigns values to the stimuli.*

o *Evaluation of internally generated information such as thoughts and feelings. A self-reference process.*

o *Anticipation of future interactive outcomes with respect to positive or negative values.*

o *The aesthetic outcome is correlated to anticipation concerning the aesthetic meaning (representation) of the object rather than its sensory properties.*

o *The aesthetic experience and judgment is formed under uncertainty*

➢ **Chapter 2: Cognition and interaction**

Abandoning traditions and prior aesthetic theories which are proved too speculative and unclear, this chapter attempts to explore those natural phenomena by means of the respective functionality which governs human behavior and characterizes agency. In this direction, agents as complex systems that interact with dynamic environments should exhibit properties, which characterize the strong notion of agency. These fundamental properties are interactivity, intentionality and autonomy.

Additionally, agency exhibits a goal-oriented nature in order to support intentional and meaningful interactions that will enhance the autonomy of the agent. However, there are fundamental facts that also characterize those meaningful interactions:

o *The agents interact continuously in order to determine the appropriate conditions and construct meaning-based actions, for the success of their functional processes.*

o *The agents are continuously preparing themselves for further interaction on the basis of prior interactive flow.*

o *Given the need for self-maintenance, agents have access to functional systems that enable them to evaluate environmental conditions and detect which is the best action in respect to such conditions.*

o *Action selection is the fundamental problem of what an agent must do in his next interactive step, i.e. the problem of choosing the appropriate action.*

The *interactivist model*, as introduced by Mark Bickhard, provides the right functionality for explanations concerning normative phenomena as representation, motivation and learning that emerge during the (inter)action selection. The interactivist model is a naturalized model that has multiple convergences with the Pragmatist tradition. They share the concept of processing and

action as the proper framework for modeling mental phenomena, while they also focus on the consequences of action and interaction. The interactivist model is more akin to Peirce's model of meaning, Dewey's discussion of language, Piaget's genetic epistemology and constructivism, Gibson's theory of perception and action, and other models with pragmatic aspects.

According to the *interactivist model,* the indication of potential interactions emerges crucial properties of aboutness, truth value, and content. These indications are about the environment, and concern the appropriateness of an action. Hence, all these internal processes, pertaining to what the agent can expect from an interaction, play a major role in action selection. In this way, representations emerge naturally in the evolution of agents as a solution to the problem of interaction selection and as such, they function as an aspect of indicating further interactive potentialities. The indication of an interactive potentiality will be conditional on agent's motives as well as the outcomes of particular prior interactions. Those functions provide the agent with the appropriate conditions in order to anticipate its future courses of interaction. However, those functional systems should exhibit the possibility of failure (representational error) when such selection fails to provide the anticipated results. Eventually, some patterns of environmental properties will support an interactive indication and some will not. These patterns of properties constitute the content of the representation. All these meaning-based actions are functionally useful to the agent in his attempt to understand and appreciate the environment he interacts with.

Meaning is an emergent outcome of the agent's attempt to interpret the environmental conditions in order to improve his current level of understanding, discovering in it the significance of those conditions. The notion of interpretation of signs, in respect to the meanings they furnish to the agent, mostly in relation to the other objects or events, is a crucial aspect of a semiotic process.

This semiotic process is functionally linked to aesthetic experience. The aesthetic interpretation is an intentional process by which the agent tries to link the Object to the Sign. Particularly, Icons and Indexes are related to a Symbolic meaning and aesthetic emotions. This means that aesthetics are related to symbolic representations, which denote the intentions of the creator (designer or artist). A semiotic conception of aesthetics related to symbolic representations of interactive potentialities or meanings enhanced in artifacts provides new possibilities to understand the notion of affordances and their potential relation to aesthetics. These conceptions and the respective proposals that relate aesthetics with semiotic functions and aesthetics with affordances in interaction are further examined in Chapter 5 and Chapter 6 of this dissertation.

➢ **Chapter 3: Aesthetics in interaction design**
The aim of this chapter was to present the variety of the approaches that attempt to explain the aesthetic experience in interaction design. These approaches show a diversity concerning the usage of the notions that are related to what aesthetics and beauty stand for in interaction design. Probably this could be a reason why the reader can approach a variety of interpretations of what

the aesthetic stands for in design. These studies attempt to propose and test factors that are aesthetically perceived by users during their interaction with products. Particularly, in almost all of these works, aesthetics are studied as a multi-dimensional phenomenon that occurs through perception by following the tradition of focusing on the effectiveness and usability. These studies do not focus on the nature of aesthetics, but on how the aesthetic phenomenon, whatever this might be, affects or is related to 'known' experiences in our interaction with products. However, these types of experiences might not always be related to aesthetic experience or may go further than its limits. Additionally, empirical studies which test several abstract notions that their meaning vary over cultures, social contexts, and historical periods, encounter difficulties to generalize their experimental conclusions to design guidelines in respect to aesthetic decisions.

For those authors who consider emotions as an important component of the aesthetic experience, the role of aesthetic emotions in the design process is not clearly described. They propose that aesthetics of interaction focus on the enjoyment of an experience that may challenge, seduce, surprise, reward etc., users.

According to the pragmatist perspective of aesthetics, there is a tight connection between aesthetics and context, use and instrumentality. For those who follow this perspective of aesthetics:

o   *The aesthetic is not inherent in the designed product itself but results from our feeling of appropriation with the product.*

o   *Meaningfulness and aesthetic experiences emerge in use, they are not predefined… In a pragmatist perspective aesthetics is a part of everyday life. Aesthetic interaction comprises the views that aesthetics are instrumental and that artifacts are appropriated in use…*

 The term 'appropriation' is also an abstract notion that enhances the vagueness of aesthetics. However, these authors propose a dynamic explanation for the aesthetic that is not limited in appearance but to the meaning-making process:

o   *Designing for aesthetic experience means that designers will invite people to actively participate in creating sense and meaning. Aesthetics of interaction trigger people's imagination to provoke and encourage people to 'think differently' about the encountered interactive systems.*

From those who attempt to explain theoretically the aesthetic experience and beauty, Norman focuses on cognition and attempts to approach all those complex phenomena that take place through interaction in relation to our cognitive and emotional responses that may influence or form the aesthetic experience. In Chapter 5 the three-level model that Norman proposes is used as a vehicle to analyze the levels through which the agent develops his aesthetic experience and judgment.

Taking advantage of the variety of explanations, concerning the role and the meaning of aesthetics in design, this third chapter aims to show that the development of a naturalized model of aesthetic experience is essential for a deeper understanding of aesthetics that can offer a new orientation to empirical studies. Focusing and exploring those emotional mechanisms could probably be the key in understanding what aesthetics are for the agent that interacts with his environment. Thus, a deeper understanding of the role of emotions in interaction process will enable us to explain the development of the aesthetic experience and judgment. The main aim of the next chapter is to present such characteristics of the emotional functionality that can enhance our understanding of the role of emotions in aesthetic judgment.

➢ **Chapter 4: The role of emotions in interaction process**

The aim of this chapter was to present the fundamental characteristics of the emotional activity and especially of those activities that are related to basic emotional states that are widely known in aesthetic literature as 'pleasure' and 'pain'. All these emotional phenomena have a biological core that underlies them and it can be outlined as follows:

o *Emotions are sets of patterns, which contain complicated collections of chemical and neural responses.*

o *Emotions are biologically determined processes, depending on innately set brain devices, laid down by a long evolutionary history.*

o *The devices which produce emotions occupy a fairly restricted ensemble of subcortical regions, beginning at the level of the brain stem and moving up to the higher brain; the devices are part of a set of structures that both regulate and represent body states.*

o *All the devices can be engaged automatically, without conscious deliberation.*

o *All emotions use the body as their theater (internal milieu, visceral, vestibular and musculoskeletal systems).*

o *They affect the mode of operation of numerous brain circuits: the variety of the emotional responses is responsible for profound changes in both the body and the brain.*

o *Their role is to regulate internal states by which the agent creates bodily and mental circumstances advantageous to his goals when the phenomenon exhibits.*

o *Emotions are about life. They are precise, and their role is to assist, serve the agent in self-maintenance.*

o *Learning and culture alter the feeling of emotions and give these emergent bodily and mental phenomena new meanings.*

Hence, emotions of pleasure and pain as bodily reactions can play a crucial role in cognitive functions that the agents use to navigate themselves in a complex world:

o *Basic emotions are important mechanisms that agents have access to in the service of their autonomy.*

o *Emotions are such processes that signal opportunities or obstacles to the attainment of a certain, goal.*

o *An emotion signals the implications of a situation for a particular goal.*

o *Emotions then motivate action to realize a goal.*

Hence, emotional activity plays two major roles:

o *Emotional activity notifies the agent to move towards the incentives and away from threats and,*

o *Through the feedback system, emotional activity compares and rates signals that correspond to the progress that the agent is making against a reference rate.*

Thus,

o *Emotions are aroused when the agent tries to resolve this interactive uncertainty.*

o *Through emotions agents form anticipations about their interactive outcomes aiding the selection of the best available action that will bring them close to their dynamic goals.*

o *Basic emotions of pleasure and pain have a future-oriented nature since they are related to goal-oriented actions in the sense that the agent utilizes such processes in order to foresee the outcome of his intentional actions.*

o *Basic emotional mechanisms are genetically ingrained instinctual tools allowing agents to generate complex, dynamically flexible action patterns in order to learn and cope with specific environmental enticements and threats.*

Even though pleasure and pain are considered as basic emotional activities, they are extremely complex processes relating neuropsychological with bodily functions. Thus, the term 'basic emotions of pleasure and pain' denotes not only a concept that includes affective, cognitive, behavioral, expressive, but also physiological changes.

Theorists propose two levels of emotional processing:

At a primitive level of processing, primary appraisal,

o *Pleasure and pain are considered as self-organized processes that work together with consciousness.*

Since our future interactions require adaptations of the body to support the intentional activity,

o *Emotions aid the agent to anticipate (predict) future interactive states that could support such adaptations that the organism must make. .*

These basic emotions are *preparations* of the agent and they consist of taking an appropriate postural stance with the musculoskeletal system, and mobilizing the metabolic support systems.

At a more complex level, secondary appraisal,

    o *Emotions of pleasure and pain are experiences*.

These conclusions set a new orientation for the role that emotions of pleasure and pain play in interaction. The proposed models of aesthetic emotions that follow in the next chapter aim to integrate all this functionality in accordance to naturalized models of meaning-making, providing an explanation in the whole attempt to naturalize and model the aesthetic experience and judgment.

➢ **Chapter 5: Naturalizing aesthetics: the aesthetic emotions in aesthetic experience and judgment**

Following a normative approach for meaning-making (see Chapter 2), the three-level model of interaction (see Chapter 3), the experimental and theoretical evidence regarding the nature of emotions (see Chapter 4) and the neurological evidence regarding the aesthetic experience (see Chapter 1), this chapter proposes two normative models that aim to explain the development of the aesthetic meaning, the emergence of the aesthetic emotions of pleasure and pain and their role in the development of the aesthetic experience and judgment in interaction:

- The first theoretical model of emotions intends to explain more analytically the content of the aesthetically-oriented emotional activity, mostly based on the interactivist model of emergent representation and the appraisal theory of emotions. The suggested model of aesthetic experience and judgment proposes two fundamental levels of emotional processing. The first level is responsible for a non-conscious automatic aesthetically-oriented emotional response giving possibilities of 'unconscious' aesthetically-oriented emotional responses, which may imply the possibility for the consideration of fundamental aesthetic habits and can be triggered without any conscious cognitive-evaluative processing at all. The second level is conscious and it is constructed upon two basic processes: the Cognitive Variables Subsystem (CVS), which is fundamental for the accomplishment of the function of heuristic learning and the Aesthetic Appraisal Subsystem (AAS), which primarily affects the elicitation of aesthetic emotional meanings. These two subsystems (CVS and AAS) are organizationally connected and affect the action readiness of the agent. More specifically, it is proposed that the aesthetically-oriented emotional outcome of these two subsystems is a functional indication that strengthens or weakens the anticipation for the resolution of the dynamic uncertainty that emerges in the particular interaction. A more detailed analysis of this model can be found in Xenakis Arnellos and Darzentas (2011) and Xenakis, Arnellos and Darzentas (2012).

- The second three-level interactive model attempts to underline and indicate the functions that provide the operations of aesthetic experience and, by extension, of aesthetic judgment. Through this model, an integration of the fundamental Peircean semiotic parameters is suggested as well as their related levels of semiotic organization with the three levels of processing that Norman proposed. This model aims to provide a further theoretical consideration with respect to the perception of aesthetics and to enrich our understanding regarding the role of aesthetic interpretation, using the theoretical interpretive richness provided by the semiotic framework. Particularly, based on the underlying cognitive processes as they were suggested in the first interactive model, on the Peircean semiotic parameters and the ways these processes lead to an aesthetic interpretation or to an aesthetic judgment, it is proposed that the formation of aesthetic judgment is related to the transposition from the icon and the index to the symbol, which might be 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 three-level interactive model with one of the three Peircean categories and the various semiotic triads. A more detailed analysis of this model can be found in Xenakis, et al. (2012).

The proposed explanation of the aesthetic meaning is based upon the normative functionality of the basic emotional values of pleasure and pain, as a dynamic function that is available to the agent in order to assign values to the dynamic presuppositions of interaction. .

Particularly, it is proposed that:

o *The aesthetic experience and the respective aesthetic meaning are functionally related to the outcome of aesthetic emotions as the agent detects future interactive potentialities.*

o *Aesthetic emotions and thus aesthetic experience function as a signal mechanism, which detects those differentiations (changes) of the environmental conditions and warns the agent for possible failures of those conditions. These signaling devices, according to neurological evidence are already located in the agent's structure and they are available by the agent when the respective internal or external conditions call them.*

o *When the conditions are proper, the agent selects among others the available biological function (signal devices) in order to appraise a particular situation that exhibits interactive uncertainty.*

o *This infrastructure aids the construction of neural patterns, which results also in aesthetically-oriented emotional responses (of pleasure and pain) that influence the development of the respective aesthetic meaning.*

o *This appraisal process emerges an aesthetically-oriented emotional value signaling the agent to anticipate or not a goal success. However, all aesthetic values (pleasure and pain) are based on the emergence of a primitive kind of truth value.*

o *Therefore, every aesthetic value and by extension every aesthetic emotion and meaning, could fail in the course of action. This means that the agent will finally fail to contribute to his (far from equilibrium) stability.*

This perspective of the aesthetic meaning exhibits all the normative functionality that is described in Chapters 2 and Chapter 3. This normative biological and mental function emerges a basic level of aesthetic meaning upon which the whole theoretical contribution of this dissertation is built. This argument concerning the aesthetic meaning is not limited to art, form, appearance, or abstract notions like beauty, taste, goodness, etc., but to dynamically complex cognitive phenomena that comprise several other normative processes. Therefore a normative definition of aesthetic judgment is proposed as:

o *The aesthetic judgment is every mental image or emergent representation, which is influenced by an aesthetic experience or a sequence of them. This is proposed to be a primitive form of a new aesthetic judgment (appreciation/preference), which is related to aesthetic meaning and refers to the present. However, an aesthetic judgment could be constructed upon prior (similar or not) aesthetic or non-aesthetic knowledge concerning the respective interaction and it refers to the past.*

o *Thus, in general, an aesthetic experience is always future-oriented, while an aesthetic judgment concerns the past or the present.*

This naturalized perspective of aesthetics and the proposed conceptual interactive models of aesthetic emotions and aesthetic judgment provide the body of knowledge of the *aesthetic* several other findings that characterize a naturalized conception of aesthetics:

o *Autonomy is a precondition for the system to produce aesthetic emotions and have an aesthetic experience. The contrary is not true.*

o *The aesthetic emotions and thus the aesthetic experience are always goal-related attributions, in contrast with the more dominant and philosophical approach to aesthetic theory.*

o *Aesthetic emotions and thus aesthetic experience serves the resolution of the interactive uncertainty emerged in the specific interaction.*

o *There is a strong possibility for the consideration of fundamental aesthetic habits in the first stage of the elicitation of the aesthetic emotions.*

o *Aesthetic emotions and thus aesthetic experience can function even before learning.*

o *Aesthetics are not properties of the environment out there but a cognitive phenomenon that emerges through meaning-making processes as the agent develops ways to choose the best interactive step according to his dynamic goals and motives. This conception of*

aesthetics stands in sharp contrast to the claim for disinterestedness in aesthetic experience, which analytic aesthetics inherited from the Kantian tradition.

o *Aesthetics could emerge only in relation to environmental conditions or events (e.g. objects of nature, designed artifacts, social events, etc.) and never alone.*

➢ **Chapter 6: Aesthetic emotions, design process and affordances**

The first objective of this chapter is to examine how the above interactive models are implemented in the design process and how they affect the content of the design representations. Considering design as a goal-oriented process, which exhibits an interactive and future anticipatory nature supporting meaning-based actions of the design-participants, it is suggested that aesthetics are emerge in the design process, aiming to support designers and users in reducing their design-uncertainty. The term 'design-uncertainty' is introduced in this dissertation to describe a situation in which, design-participants are engaging in a design process by making decisions (i.e. provision and selection of actions with the artifact) that are uncertain with respect to the (degree of) fulfillment of their goals.

Specifically, based on the theoretical arguments of Chapter 5, where aesthetic experience is elicited in action selection as a factor among others that reduces the interactive uncertainty, it is suggested that,

o *Aesthetic experience resulting in the values of pleasure and pain, functions as a recommendation mechanism, providing the design-participants with the ability to resolve the design-uncertainty regarding the success or failure of an anticipated interaction.*

Particularly it is suggested that,

o *When a positive aesthetic value (pleasure) is elicited, the respective anticipation for the resolution of a particular design-uncertainty is positively valued, while*

o *When a negative aesthetic value (pain) is elicited, the anticipation for the resolution of the design-uncertainty is also negatively valued.*

Hence, concerning the role of aesthetic experience in the design process it is proposed that

o *The feeling of anticipation for a successful resolution or not of a design-uncertainty is suggested as a model of minimal aesthetic experience. This means that a design-uncertainty could be reduced by both positive and negative aesthetic experiences.*

Following the above argument for the role of aesthetics in the design process it is proposed a strong relation between aesthetics and action possibilities, which are widely known in design literature as affordances. Considering a semiotic perspective of affordances (see Chapter 2), where affordances are not limited in direct perception as initially defined, in this chapter it is suggested that,

o *Affordances in the design process are about future action possibilities, or rather, future interactive potentialities through which the design-participant anticipates that he will result to goal fulfillment.*

The content of design-representations regarding these interactive potentialities is called 'interactive affordances'. More specifically,

o *Interactive affordances are all those interactive potentialities that the dynamic presuppositions afford for a further action.*

As it is already argued in cases of design-uncertainty, aesthetics are one factor among others that aid the design-participant to reduce their design-uncertainty and thus their anticipation for goal fulfillment. What it is proposed is that aesthetic experience serves the communication between design-participants by aesthetics evaluating the interactive alternatives aiding the user and the designer to construct such meanings that will make clearer their way to goal achievement. This means that the aesthetic experience affects only the anticipation of the design-participants for a stable or not interactive outcome and it does not aware them for the specific design decision that could result to goal success. This functionality of aesthetic experience is in contrast to interactive affordances that share the same content with design-representations; the appropriateness of a specific potential action.

What is finally suggested is that,

o *Aesthetic experience enhances our ability to detect interactive affordances.*

o *Both aesthetically-oriented emotions and interactive affordances are about projections of future interactive outcomes, which are anticipated to result in goal success.*

o *Since the anticipation could fail, both aesthetically-oriented emotions and interactive affordances could also fail when the outcome of the selected action is not the anticipated one.*

o *Both aesthetics and interactive affordances belong to the content of the design, and simultaneously are interpreted in the design process from two perspectives: the designer's and the user's perspective, making design a process of mediated communication.*

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Figures & Tables

Ο ρόλος της αισθητικών συναισθημάτων κατά την αλληλεπίδραση ανθρώπου τεχνουργήματος

Η κατανόηση της έννοιας της αισθητικής προσέλκυσε την ανθρώπινη δραστηριότητα πολύ πριν ακόμη οι φιλόσοφοι, κατά κάποιο αόριστο τρόπο, διαχωρίσουν το αισθητικό αντικείμενο ή τις δράσεις που το παράγουν από άλλα τεχνουργήματα και δράσεις. Όπως ο Beardsley (1975) θεωρεί, πριν ακόμα η αισθητική αναδυθεί ως στοιχείο πολιτισμού, δεν υπήρχε κάποια διαφοροποίηση μεταξύ αυτών των τεχνουργημάτων που εμφάνιζαν κάποια ιδιαιτερότητα βάσει της οποία ένας παρατηρητής θα μπορούσε να τα κατηγοριοποιήσει ως 'αισθητικά' ενώ κάποια άλλα όχι. Παρ' όλα αυτά, πάντα υπήρχε ένα αισθητικό ενδιαφέρον που κατευθυνόταν προς κάποια αντικείμενα ενώ δεν αφορούσε κάποια άλλα.

Η φιλοσοφία ήταν η πρώτη που προσπάθησε να διαλευκάνει τη φύση αυτού του ενδιαφέροντος το οποίο φαινόταν να αναδύεται σε κάποιες δραστηριότητες καθώς έκανε κάποια τεχνουργήματα με έναν παράξενο τρόπο να μοιάζουν περισσότερο ενδιαφέροντα από κάποια άλλα. Από την εποχή του Πλάτωνα και του Αριστοτέλη μέχρι σήμερα, η κατανόηση της αισθητικής παραμένει ένας φιλόδοξος και περίπλοκος στόχος που χαρακτηρίζει ένα μεγάλο μέρος της ανθρώπινης συμπεριφοράς.

Η αισθητική εμπειρία για τον Πλάτωνα αφορά μια διεργασία κατά την οποία αντιλαμβανόμαστε το *καλό στην φύση*. Η πηγή αυτής της αντίληψης, ενώ αποτελεί αποτέλεσμα της σκέψης μιας *ιδανικής μορφής* ενός φυσικού αντικειμένου ή ενός τεχνουργήματος, βασίζεται στο συναίσθημα της ευχαρίστησης το οποίο όμως δεν προέρχεται από τις αισθήσεις. Το επιχείρημα είναι πως τα συναισθήματα υποσκάπτουν τη λογική και η λογική πρέπει να υπερισχύει των συναισθημάτων. Ο μαθητής του Πλάτωνα, Αριστοτέλης, αντέδρασε σε αυτούς τους ισχυρισμούς. Ο Αριστοτέλης δεν αντιτάσσει τα συναισθήματα με τη λογική. Στην πραγματικότητα υποστηρίζει ότι τα αισθητικά συναισθήματα της ευχαρίστησης και της δυσαρέσκειας στηρίζονται στη λογική και επομένως προϋποθέτουν σύνθετες γνωστικές διεργασίες. Τα αισθητικά συναισθήματα παράγονται δυναμικά όταν εμφανίζονται στους γνωστικούς πράκτορες ξαφνικά γεγονότα και ειδικά στους ανθρώπινους πράκτορες κατά την αλληλεπίδρασή τους με το περιβάλλον, και δεν είναι εκβάσεις που αναδύονται όταν τελειώνει η εμπειρία με το τεχνούργημα. Με άλλα λόγια, οι άνθρωποι έχουν την αίσθηση ενός αισθητικού συναισθήματος μόνο όταν ένα νέο γεγονός αλλάζει τις υπάρχουσες συνθήκες και εμφανίζεται να διαδραματίζει έναν σημαντικό ρόλο στον αρχικό ή δυναμικά εξελισσόμενο σκοπό τους.

Για χρόνια, οι φιλόσοφοι θεώρησαν ότι η αισθητική εμπειρία ήταν μια αντανάκλαση της αιώνιας ομορφιάς του Θεού και η ιδανική μορφή συνδέθηκε με την έκφραση της αγάπης του Θεού προς τα τεχνουργήματα που τους δίνει η θεία τελειότητα. Μόνο στο 18° αιώνα οι φιλόσοφοι άρχισαν να θεωρούν την αισθητική εμπειρία ως ένα ψυχολογικό φαινόμενο. Οι Hume και Kant ήταν οι πρώτοι που προσπάθησαν να εξηγήσουν το περιεχόμενο της αισθητικής εμπειρίας μέσα από όρους ψυχολογίας. Σύμφωνα με τους Davies et al. (2009), αυτή η περίοδος χαρακτηρίζεται από την παραδοχή ό,τι η αισθητική εμπειρία βασίζεται στην έννοια της ανιδιοτελούς αντίληψης της μορφής των αντικειμένων, είτε προέρχονται από την φύση είτε από το χώρο των καλών τεχνών.

Αυτή η εμπειρία μπορεί να παραγάγει το συναίσθημα της ευχαρίστησης που προϋποθέτει μια ιδιαίτερη μορφή σχέσης με το τεχνούργημα στο οποίο ο γνωστικός πράκτορας πρέπει γευτεί χωρίς προκατάληψη. Δηλαδή, όταν η αναπαράσταση του αντικειμένου συνδέεται άμεσα με τα αισθητικά συναισθήματα, η αναπαράσταση αυτή προηγείται της γνώσης και έτσι επίσης η σκοπιμότητά της προηγείται και αυτής της γνώσης. Η σκοπιμότητα ενός τεχνουργήματος, στο μέτρο που αναπαρίσταται στην αντίληψη, δεν είναι μια ιδιότητα του ίδιου του τεχνουργήματος,

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αλλά προέρχεται από την τάση του πράκτορα για να κατανοήσει το τεχνούργημα αυτό. Στην περίπτωση που η σκοπιμότητα του τεχνουργήματος προέρχεται από το αισθητικό συναίσθημα της ευχαρίστησης ή της δυσαρέσκειας, αυτά τα συναισθήματα ορίζουν την αξία του τεχνουργήματος χωρίς την εμπλοκή οποιαδήποτε γνωστικής αιτιολόγησης. Έτσι, το τεχνούργημα καλείται σκόπιμο και η ίδια του η αναπαράστασή του είναι μια αισθητική αναπαράσταση της σκοπιμότητάς του (Kant 2000). Ως εκ τούτου, κατά τον Kant το αντικείμενο εμφανίζει «σκοπιμότητα χωρίς σκοπό» δεδομένου ότι ο πράκτορας δεν έχει καμία ένσκοπη τάση να αναλύσει/κατανοήσει γνωστικά το τεχνούργημα.

Μέσα από μια εξήγηση για την αισθητική που προέρχεται από μια μη-σκόπιμη φύση της συναισθηματικής δραστηριότητας, οι περισσότεροι από τους αισθητικούς φιλοσόφους δίνουν στην εμπειρία της ομορφιάς έναν ακόμα πιο ασαφή χαρακτήρα που καθιστά την έννοια της ομορφιάς πραγματικά ασταθή. Για παράδειγμα, η αντίληψη της ομορφιάς είναι αδύνατο να συμβεί όταν τα αισθητικά συναισθήματα δεν έχουν παγκόσμια ισχύ και δεν είναι αποδεκτά ευρέως στον κόσμο μας. Η ερώτηση που τίθεται είναι εδώ πώς μπορούμε να είμαστε βέβαιοι ότι το αισθητικό μας κριτήριο θα μπορούσε να ισχύσει παγκοσμίως σε έναν κόσμο ότι τα διαφορετικά κοινωνικοπολιτικά πλαίσια παράγουν διαφορετικές ερμηνείες εννοιών, διαφορετικά συναισθήματα και, επομένως, διαφορετικές αισθητικές ερμηνείες; Επιπλέον, σύμφωνα πάντα με αυτή την ερμηνεία για την αισθητική, η ομορφιά προκύπτει μόνο όταν η φαντασία και η κατανόηση βρίσκονται σε ένα «ελεύθερο και αρμονικό παιχνίδι». Η «ελεύθερη αρμονία» είναι μια βαθιά παράδοξη έννοια που δεν μπορεί να εξηγηθεί επαρκώς κάτω από τις συνήθεις ερμηνείες (Rogerson 2008). Τέλος, το τρίτο πρόβλημα της ομορφιάς προέρχεται από το δεύτερο και αφορά την αξίωση για το «μη ενδιαφέρον» στην αισθητική αντίληψη. Σύμφωνα με μια νατουραλιστική οπτική των έμβιων συστημάτων, είναι αδύνατο να γίνουν κατανοητές και να εξηγηθούν βιολογικές και διανοητικές λειτουργίες, όπως τα συναισθήματα, μετά από μια μη-σκόπιμη οπτική της αλληλεπίδρασης.

Σε αυτήν την κατεύθυνση, υπάρχει μια ομάδα φιλοσόφων του $20^{ου}$ αιώνα, γνωστοί ως Νατουραλιστές ή Πραγματιστές, οι οποίοι στοχεύουν να συνδέσουν την αισθητική εμπειρία με τις φυσικές διεργασίες και με την ελλοχεύουσα λειτουργία που διέπει την ανθρώπινη φύση. Αυτή η οπτική δεν θεωρεί την αισθητική εμπειρία ως ένα αυτόνομο τύπο εμπειρίας, αλλά ως τμήμα οποιασδήποτε άλλης εμπειρίας που ο πράκτορας έχει, καθώς αλληλεπιδρά με το περιβάλλον του (Beardsley 1975). Ο Dewey (1980) υποστηρίζει ότι η προέλευση της αισθητικής εμπειρίας συνδέεται με διεργασίες μέσω των οποίων ο γνωστικός πράκτορας προσαρμόζεται σε επισφαλή περιβάλλοντα δηλαδή σε αυτά που χαρακτηρίζονται από αβεβαιότητα. Τα συναισθήματά μας είναι συνειδητές ειδοποιήσεις των αλλαγών που συμβαίνουν σε μια εμπειρία καθώς ο πράκτορας βρίσκεται μεταξύ αστάθειας και σταθερότητας. Αυτή η εσωτερική τάση για σταθερότητα και αποκατάσταση της αρμονίας είναι αυτό που μετατρέπει μια συναισθηματική εμπειρία σε ενδιαφέρον για τα τεχνουργήματα και βοηθά τους ανθρώπους να τα αντιλαμβάνονται ως ευκαιρίες για επιτυχείς αλληλεπιδράσεις. Κατά συνέπεια, η προσδοκία (anticipation) της ευχάριστης συναισθηματικής αντίληψης της αρμονίας είναι για το Dewey η πραγματική έννοια της αισθητικής εμπειρίας. Ομοίως, ο William James (1890) ήταν ο πρώτος ποιος διέκρινε την αισθητική εμπειρία σε δύο συναισθηματικά επίπεδα: το αρχικό και δευτεροβάθμιο επίπεδο της συναισθηματικής απόκρισης στα αισθητικά ερεθίσματα. Το αρχικό επίπεδο αποτελείται από τα ανεπαίσθητα συναισθήματα, τα οποία είναι ευχαρίστηση που προκύπτει από τους αρμονικούς συνδυασμούς από εμπειρίες που προέρχονται από τις αισθήσεις (γραμμές, χρώματα, και ήχοι). Το δευτεροβάθμιο επίπεδο προσφέρει την κομψότητα στο αισθητικό γούστο. Στις περισσότερες περιπτώσεις, μια απλή και άμεση αισθητήρια ευχαρίστηση εμπλουτίζεται από τη δευτεροβάθμια ευχαρίστηση, οδηγώντας τελικά τον πράκτορα σε μια αισθητική εμπειρία.

Εκτός από εκείνους τους φιλοσόφους που στοχεύουν να εξηγήσουν την αισθητική σε ένα νατουραλιστικό πλαίσιο όσο αφορά την ανθρώπινη δραστηριότητα, διάφορες άλλες ερευνητικές περιοχές που δεν θεωρούνται ως σχετικές με το χώρο της αισθητικής εμπλέκονται στην κατανόηση και εξήγηση της αισθητικής εμπειρίας και κρίσης. Νευρολόγοι, ψυχολόγοι και οι ερευνητές από τη διαδραστική σχεδίαση προσπαθούν πια να ανιχνεύσουν πιθανές διανοητικές και σωματικές δραστηριότητες που αναδύονται στους πράκτορες κατά τη διάρκεια της αισθητικής εμπειρίας και κρίσης. Ακόμα κι αν σε αυτές τις μελέτες η αισθητική γίνεται κατανοητή με μικρές ή με μεγαλύτερες διαφορές, είναι κοινά αποδεκτό ότι τα συναισθήματα διαδραματίζουν έναν σημαντικό ρόλο σε αυτό που ζούμε ως αισθητικά ευχάριστο ή δυσάρεστο, και λειτουργεί ως αποτέλεσμα της εξελικτικής διεργασίας κατά την οποία τα γονίδιά μας καθορίζουν τι είναι αυτό που εξυπηρετεί τους στόχους μας για μια επιτυχημένη δράση (Rolls 2011). Εντούτοις, κάθε επιστημονική περιοχή προτείνει και τον δικό της ορισμό για το τι είναι αισθητικό και τι όμορφο.

Οι επιστήμονες στον χώρο της νευρολογίας αρνούνται τον διαχωρισμό της εμπειρίας σε αντικείμενα τέχνης και μη, προτείνοντας ότι η αισθητική εμπειρία είναι μια διεργασία που συσχετίζεται με βιολογικές και προσαρμοστικές λειτουργίες στα ανθρώπινα όντα (Brown et al. 2011). Γενικά, οι νευρολόγοι υποστηρίζουν ό,τι *«καμία θεωρία της αισθητικής δεν είναι πιθανό να είναι πλήρης, πόσο μάλλον βαθιά, αν δεν βασίζεται στην κατανόηση των εγκεφαλικών λειτουργιών»* (Zeki 1999, 17). Αυτή η ιδέα οδηγεί τους επιστήμονες σε διάφορες πειραματικές μελέτες με μερικές φορές αλληλοεξαρτώμενα συμπεράσματα παρέχοντας διάφορες εξηγήσεις που συνδέουν την αισθητική εμπειρία με συγκεκριμένες περιοχές του εγκεφάλου, οι οποίες είναι αρμόδιες για τις σύνθετες συναισθηματικές και γνωστικές διεργασίες που οι άνθρωποι κάνουν χρήση κατά την αισθητική εμπειρία.

Επιπλέον, κατά τη διάρκεια των τελευταίων ετών, η μελέτη της αισθητικής και της ομορφιάς γίνεται μια πολύ σημαντική περιοχή στον τομέα της έρευνας της εμπειρίας του χρήστη (Hassenzahl 2008; Lindgaard et al 2006). Ωστόσο, οι μελέτες αυτές δεν επικεντρώνονται στην φύση της αισθητικής εμπειρίας, όπως για παράδειγμα κάνουν οι μελέτες στη νευροεπιστήμη, αλλά επικεντρώνονται στο πώς η αισθητική ως φαινόμενο, ό, τι κι αν αυτό θα μπορούσε να σημαίνει, επηρεάζει ή σχετίζεται με την «γνωστούς» τύπους εμπειριών που έχουν ως συνήθως δοκιμαστεί καθώς οι άνθρωποι αλληλεπιδρούν με τα προϊόντα. Επιπλέον, ο ασαφής όρος της ομορφιάς εμφανίζεται ξανά σε πολλά θεωρητικά πλαίσια και μελέτες, όσον αφορά την οπτική ελκυστικότητα, οπτική εμφάνιση, ή ως μια ιδιότητα που συνδέεται κυρίως με τη μορφή του τεχνουργήματος (Tractinsky, Katz, και Ikar 2000; Lavie και Tractinsky 2004; Tractinsky και Zmiri 2006; Hassenzahl 2008; Baljko και Tenhaaf 2008; Norman 2004).

Ως εκ τούτου, ένα σημαντικό βήμα προς την κατεύθυνση που εξηγεί το ρόλο της αισθητικής στην αλληλεπίδραση ανθρώπου-τεχνουργήματος είναι να κατανοήσουμε τον σκοπό και το ρόλο των αντίστοιχων συναισθηματικών δραστηριοτήτων που διαμορφώνει την αισθητική εμπειρία στους ανθρώπους.

Περιγραφή του προβλήματος

Ακόμα κι αν η αισθητική θεωρείται μια συναισθηματική πτυχή της ανθρώπινης συμπεριφοράς όπως αναφέρουν οι αισθητικοί φιλόσοφοι (βλ. Bahm 1947; Budd 2008; Carroll 2002; Hagman 2005; Iseminger 2003; Matravers 2003? Καντ 2000; Dewey 1980), οι ψυχολόγοι (βλ. FRIGG και Howard 2011; Guyer 2008; Prinz 2011; Rolls 2011; Schellekens & Goldie 2011; Zaidel 2011) οι νευροεπιστήμονες (Barry 2006; S. Brown et al 2011; Cela-Conde et al 2011; Chatterjee 2003; Jacobsen 2006; Jacobsen 2010; Jacobsen και Höfel 2003; Jacobsen et al 2006; Rolls 2011; Schulkin 2009; Zeki 1999) και οι ερευνητές στη διαδραστική σχεδίαση (Norman 2003;

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Hassenzahl 2004a; Rafaeli και Vilnai-Yavetz 2004? Tractinsky και Hassenzahl 2005? Hartmann, Sutcliffe, και Angeli 2007; Lindgaard 2007; Baljko και Tenhaaf 2008; Locher, Overbeeke, και Wensveen 2010), δεν είναι ακόμη σαφές ποιο είναι το περιεχόμενο ενός αισθητικού συναισθήματος, πώς και γιατί προκαλεί ή πώς πιθανών επηρεάζει τις προτιμήσεις μας, κατά την αλληλεπίδραση (Huh, Ackerman , και Douglas 2007).

Αντίθετα, στην αισθητική βιβλιογραφία η ασάφεια για το τι θα μπορούσε να θεωρηθεί ως αισθητική ή όχι, έχει αυξηθεί θεωρώντας σχεδόν ότι η αισθητική σχετίζεσαι με τα πάντα, από μια μεταφυσική πλατωνική ιδέα ως συγκεκριμένα φυσικά χαρακτηριστικά, καθιστώντας το υπάρχον μακρύ κατάλογο των τύπων της αισθητικής ακόμη μεγαλύτερο και πιο περίπλοκο. Για παράδειγμα, οι Lavie και Trandisky (2004) υποστηρίζουν ότι μετά από 2000 χρόνια προσπάθειας να κατανοηθεί η αισθητική (βλέπε Beardsley 1975), οι αναγνώστες των βιβλίων σχεδιασμού δύσκολα μπορούν να βρουν κάποια αναφορά για την αισθητική στον σχεδιασμό.

Αντιληπτή, μεταγενέστερη, κλασική, εκφραστική, κ.λπ., η οποία συσχετίζεται με ιδιότητες που θα μπορούσαν να χαρακτηρίσουν ένα τεχνούργημα ή σε άλλα είδη εμπειριών, όπως η ελκυστικότητα, η διασκέδαση, κ.λπ. είναι μόνο ένα μικρό τμήμα των αισθητικών περιγραφών. Μια τέτοια πολυπλοκότητα, κυρίως για εκείνους των οποίων το έργο σχετίζεται με την αισθητική απόφαση (π.χ. καλλιτέχνες, αρχιτέκτονες, σχεδιαστές, κλπ.), καθιστά την κατανόηση και τη χρήση της αισθητικής ένα ακόμη πιο δύσκολο έργο. Οι Hassenzahl και Monk (2010) διαπίστωσαν ότι οι ετικέτες για τις αντίστοιχες αισθητικές αντιλήψεις που εξετάζονται στις περισσότερες από τις εμπειρικές μελέτες διαφέρουν ακόμη και όταν έχουν διερευνήσει παρόμοιες ή ακόμα και τις ίδια παραμέτρους που αφορούν την αισθητική εμπειρία και την αισθητική κρίση. Οι περισσότερες από αυτές τις εμπειρικές μελέτες που αναδεικνύουν κατά πάσα πιθανότητα αρκετά θεωρητικά και μεθοδολογικά ζητήματα σχετικά με τι οι συμμετέχοντες πραγματικά αντιλήφθηκαν όταν τους ζητήθηκε να αναγνωρίσουν και να βαθμολογήσουν την αισθητική ομορφιά σε ένα τεχνούργημα. Σύμφωνα με τον Frohlich (2004), ένα σημαντικό πρόβλημα σε αυτές τις μελέτες είναι ότι οι συμμετέχοντες δεν αντιλαμβάνονται πάντα αν είναι σε θέση να "δουν" την ομορφιά, το οποίο επίσης σημαίνει ότι οι χρήστες μπορεί να μην είναι εξίσου ευαίσθητοι σε αυτή την αισθητική που οι μελέτες τους ζήτησαν να αντιληφθούν (Tractinsky και Hassenzahl 2005).

Τι λοιπόν η αισθητική και η ομορφιά αναπαριστούν στη μορφή ενός τεχνουργήματος εξακολουθεί να είναι ένα θεμελιώδες ζήτημα, το οποίο δεν περιορίζεται στην τέχνη, τους καλλιτέχνες και το κοινό τους. Οι τρέχουσες προσεγγίσεις εγείρουν πολλά ερωτήματα σχετικά με τη φύση και την ύπαρξη της αισθητικής στην αλληλεπίδραση εν γένη μερικά από τα οποία επιχειρείται να διευκρινιστούν σε αυτή τη διατριβή:

• Η αισθητική υπάρχει στη μορφή ενός αντικειμένου μόνο αν κάποιος είναι σε θέση να την "δει" και τι συμβαίνει με την ύπαρξή της όταν αυτός δεν μπορεί;

• Στην περίπτωση της ύπαρξης της αισθητικής, τι συμβαίνει στον παρατηρητή όταν την αντιληφθεί;

• Τι είναι η αισθητική και πού αναφέρεται;

• Αναφέρεται στον παρατηρητή, στο τεχνούργημα ή και στους δύο;

• Είναι όλοι οι άνθρωποι είναι σε θέση (ευαίσθητοι) για να "δουν" τα ίδια αισθητική σε ένα αντικείμενο ή το αισθητικό κριτήριο είναι προσωπικό και υποκειμενικό;

• Αν το τελευταίο είναι αλήθεια, θα μπορούσε ο καθένας μας να «βλέπει» τη δική του αισθητική;

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Όπως ο Hassenzahl (2004a) υποστηρίζει, εκλείπουν από την επιστημονική κοινότητα τα θεωρητικά μοντέλα που να εξηγούν την αισθητική και να παρέχουν νατουραλιστικές περιγραφές των αντίστοιχων διεργασιών οι οποίες λαμβάνουν χώρα κατά την αισθητική εμπειρία. Η σχεδίαση χρειάζεται επιστημονικές εξηγήσεις και περιγραφές που θα μπορούσαν να αξιολογηθούν από εμπειρικές μελέτες και με ασφάλεια να γενικεύσουν πειραματικά συμπεράσματα. Επεξηγήσεις που δεν περιέχουν ασαφής φιλοσοφικούς όρους, όπως η ομορφιά, το γούστο, το θεσπέσιο, κλπ., αλλά και κανονιστικές διεργασίες που πιθανότητα λαμβάνουν χώρα κατά την γνωστική διεργασία.

Ως εκ τούτου, ο στόχος της παρούσας διατριβής δεν είναι να ορίσει το ωραίο, αλλά να εδραιώσει θεωρητικά ένα πλαίσιο που θα επεξηγεί και θα περιγράφει τη δομή και τον ρόλο του αισθητικού συναισθήματος μέσα από νατουραλιστικές περιγραφές των κανονιστικών διεργασιών που να εξηγούν την ανάδυση των συναισθημάτων και του νοήματος κατά την αλληλεπίδραση. Ειδικά, στόχος της διατριβής είναι να προταθεί μια κανονιστική εξήγηση για την αισθητική εμπειρία που βασίζεται και θα ενσωματώνει επιστημονικά στοιχεία τόσο για τα συναισθηματικά όσο και για τα γνωστικά και φαινόμενα που λαμβάνουν χώρα κατά την αισθητική εμπειρία ώστε:

a) να βελτιώσει την κατανόησή μας για το περιεχόμενο και το ρόλο της αισθητικής στην αλληλεπίδραση, και
b) να αναδείξει την άρρηκτη σχέση μεταξύ της αισθητικής εμπειρίας και τη διαμόρφωση των σχεδιαστικών αναπαραστάσεων των εμπλεκομένων στη σχεδίαση.

Ένα νατουραλιστικό μοντέλο της αισθητικής εμπειρίας και κρίσης αποτελεί ένα χρήσιμο εργαλείο που θα μπορούσε να αξιολογήσει εμπειρικές μελέτες σε διάφορα επιστημονικά πεδία και με ασφάλεια να γενικεύσει πειραματικά συμπεράσματα. Πλουσιότερα θεωρητικά μοντέλα θα μπορούσαν να οδηγήσουν σε πιο τεκμηριωμένες εμπειρικές μελέτες, οι οποίες με τη σειρά τους θα μπορούσαν να προσφέρουν στην πρόοδο των διαδραστικών αποφάσεων σχεδίασης σε κάθε τομέα.

Προσέγγιση και μεθοδολογία της έρευνας

Για να προσεγγιστεί η έννοια της αισθητικής εμπειρίας που ένας πράκτορας αναπτύσσει κατά την αλληλεπίδραση, η δημιουργία ενός αλληλεπιδραστικού μοντέλου που έχει ως στόχο να εξηγήσει και να περιγράψει τις γνωστικές και συναισθηματικές διεργασίες που τους οδηγούν να κάνουν αισθητικές επιλογές, είναι κρίσιμη. Σε αυτή την κατεύθυνση, στοχεύοντας σε ένα νατουραλιστικό μοντέλο για την αισθητική, η κατανόηση της δυναμικής φύσης των συναισθηματικών και των γνωστικών φαινομένων που εμπλέκονται κατά την αλληλεπίδραση απαιτεί την υποστήριξη ενός πλαισίου που θα περιγράφει τις κανονιστικές αυτές λειτουργίες παρέχοντας περαιτέρω κατανόηση και καλύτερη εξήγηση σχετικά με την ανάδυση της αισθητικής εμπειρίας στην αλληλεπίδραση.

Ένα νατουραλιστικό μοντέλο της αισθητικής εμπειρίας μπορεί να μας δώσει τη δυνατότητα να διερευνήσουμε περαιτέρω τα φυσικά φαινόμενα (τις σχέσεις ή τις αλληλεπιδράσεις) που θα μπορούσαν να σχετίζονται με τις αντίστοιχες συναισθηματικές και γνωστικές διεργασίες που αποτελούν την αισθητική. Ενώ την ίδια στιγμή να εγκαταλειφθούν παραδόσεις και προηγούμενες θεωρίες σχετικά με την αισθητική, οι οποίες κρίνονται υποθετικές και ασαφής. Ως εκ τούτου, η πιο έγκυρη στρατηγική για μια νατουραλιστική εξήγηση της αισθητικής είναι να κοιτάξουμε στο εσωτερικό του έμβιου συστήματος και να προσπαθήσουμε να κατανοήσουμε και να εξηγήσουμε πώς αυτό λειτουργεί. Η στρατηγική αυτή δεν βασίζεται στις ερμηνείες του παρατηρητή της

αντίστοιχης συμπεριφοράς, αλλά κυρίως θα πρέπει να υποστηρίζεται από τις εξηγήσεις που μπορούν αντικειμενικά να ελέγχεται από την επιστήμη (Arnellos, Spyrou, and Darzentas 2010a).

Σε αυτήν την κατεύθυνση, με βάση τις δυναμικές ιδιότητες των οργανισμών, όπως αυτές περιγράφονται στο έργο των Maturana και Varela (1973), Kampis (1999), Collier (1999), Bickhard (2004; 1997a), και Arnellos, Spyrou, και Darzentas (2010a; 2007a; 2007b) ο γνωστικός πράκτορας θεωρείται ένα αυτόνομο πολύπλοκο σύστημα το οποίο είναι ανοικτό στο περιβάλλον του ως ζήτημα της οντολογικής του αναγκαιότητας (Bickhard 2004). Αυτό σημαίνει ότι υπηρετώντας τη θεμελιώδη ανάγκη του για αυτο-διατήρηση, ο πράκτορας έχει πρόσβαση σε εσωτερικά λειτουργικά συστήματα που του επιτρέπουν να αξιολογήσει τις περιβαλλοντικές συνθήκες και να εντοπίσει ποια είναι η καλύτερη δράση στις συνθήκες αυτές. Αυτή είναι μία ρεαλιστική βιολογική διεργασία που αφορά την επιλογή δράσης και περιλαμβάνει μια συνεχή διεργασία προετοιμασίας μέσω της οποίας ο πράκτορας προετοιμάζεται για περαιτέρω αλληλεπιδράσεις. Ωστόσο, είναι μάλλον σημαντικό να σημειωθεί ότι οι προετοιμασίες αυτές παρουσιάζουν πάντα το ενδεχόμενο της αποτυχίας (Bickhard 2000a), βοηθώντας τον πράκτορα να κερδίσει από την αποτυχία και να μάθει μελλοντικά μοντέλα αλληλεπίδρασης.

Συνοψίζοντας, ο γνωστικός πράκτορας θεωρείται ένα αυτόνομο σύστημα που προετοιμάζεται συνεχώς για να αλληλεπιδράσει με το περιβάλλον του, προκειμένου να προσδιορίσει τις κατάλληλες συνθήκες για την επιτυχία των λειτουργικών του διεργασιών. Ωστόσο όπως αναφέρθηκε, αυτές οι προετοιμασίες έχουν πάντοτε τη πιθανότητα της αποτυχίας. Αυτό είναι ένα κρίσιμο σημείο της κανονιστικής λειτουργικότητας όπου βασίζονται οι προτεινόμενες εξηγήσεις και τα μοντέλα της αισθητικής συναισθηματικής δραστηριότητας και κρίσης.

Η μεθοδολογία της έρευνας που υιοθετήθηκε και τα αντίστοιχα μοντέλα που προτείνονται στην παρούσα διατριβή περιγράφονται στα ακόλουθα στάδια:

- Με βάση τα αλληλεπιδραστικά μοντέλα που εξηγούν την έννοια λήψης αποφάσεων σε γνωστικούς πράκτορες, καθώς και την υιοθέτηση των επιστημονικών εξηγήσεων από πειραματικές μελέτες σχετικά με τα βασικά συναισθήματα της ευχαρίστησης και της δυσαρέσκειας, προτείνεται ένα μοντέλο που έχει στόχο να εξηγήσει:
    i. τη βιολογική προέλευση των αισθητικών συναισθημάτων
    ii. πώς τα συναισθήματα αναδύονται κατά την αλληλεπίδραση και
    iii. πως η ανάδυσή τους επηρεάζει τη δημιουργία του αισθητικού νοήματος.

    o Επιπλέον, όπως απαιτεί ο νατουραλισμός, το προτεινόμενο μοντέλο επαληθεύει σύγχρονες πειραματικές μελέτες νευρωνικών ενεργοποιήσεων κατά τη διάρκεια της διαμόρφωσης της αισθητικής εμπειρίας. Σύμφωνα με τους νευρολόγους, οι ενεργοποιήσεις αυτές αντιστοιχούν σε μείζονες συναισθηματικές και γνωστικές διεργασίες που περιγράφονται από το προτεινόμενο μοντέλο.

- Βάσει της παραπάνω σχέσης μεταξύ συναισθημάτων και της αισθητικής εμπειρίας, ένα δεύτερο διαδραστικό μοντέλο προτείνεται βασιζόμενο στα επίπεδα που αφορούν την ανθρώπινη συμπεριφορά όπως προτείνεται από τον Norman, με στόχο να αναλύσει και να εξηγήσει τη δημιουργία της αισθητικής εμπειρίας και κρίσης σε κάθε ένα από τα επίπεδα αυτά.
    o Το δεύτερο μοντέλο υπερασπίζεται την ενσωμάτωση των θεμελιωδών παραμέτρων της σημειωτικής όπως παρουσιάζονται από τον Peirce και των αντίστοιχων

κανονιστικών επίπεδων της σημειωτικής οργάνωσης με τα επίπεδα της αισθητικής εμπειρίας.

- Τέλος, τα παραπάνω μοντέλα που περιγράφουν το ρόλο των συναισθημάτων στην αισθητική αλληλεπίδραση χρησιμοποιούνται για να εξηγηθεί ο ρόλος της αισθητικής και ιδιαίτερα της αισθητικής εμπειρίας κατά τη σχεδιαστική διεργασία.
    - o Ως εκ τούτου, θεωρώντας τη σχεδίαση σαν μια γνωστική διεργασία που περιλαμβάνει ένσκοπες και προσδοκούμενες εκβάσεις δράσεων, προτείνεται εξήγηση για το πώς τα αισθητικά συναισθήματα εμπλέκονται στη σχεδιαστική διεργασία και πώς αυτά επηρεάζουν το περιεχόμενο των σχεδιαστικών αναπαραστάσεων.
    - o Λαμβάνοντας υπόψη τη δυναμική φύση της αισθητικής στο σχεδιασμό, τη διευρυμένη έννοια των προσφερόμενων δυνατοτήτων (affordances), προτείνεται μια θεωρητική εξήγηση που αφορά συσχέτιση της αισθητικής και των προσφερόμενων δυνατοτήτων κατά τη σχεδιαστική διεργασία.

Η δομή της διατριβής

Ακολουθεί μια εκτεταμένη σύνοψη των κεφαλαίων παρέχεται υπό τη μορφή μιας σχηματικής ανακεφαλαίωση των κύριων ισχυρισμών και εννοιών:

Η θέση της Διατριβής: Ακόμα κι αν η αισθητική στις ερευνητικές περιοχές της φιλοσοφίας, της ψυχολογίας, της νευροεπιστήμης, και της σχεδίασης ως επί το πλείστον θεωρείται μια συναισθηματική συνιστώσα της ανθρώπινης συμπεριφοράς, δεν είναι ακόμα σαφές ποια είναι η προέλευση και ο ρόλος του αισθητικού συναισθήματος, πώς αυτό αναδύεται και γιατί ή πώς επηρεάζει τη συμπεριφορά μας καθώς αλληλεπιδρούμε με τα τεχνουργήματα. Αυτό που προτείνεται στην παρούσα διατριβή είναι μια νατουραλιστική εξήγηση των αισθητικών συναισθημάτων που αναδύονται σαν κανονιστικές λειτουργίες σε συνθήκες αβεβαιότητας κατά την αλληλεπίδραση, οι οποίες είναι διαθέσιμες στον γνωστικό πράκτορα προκειμένου να προσδώσει αξία στις δυναμικές προϋποθέσεις της αλληλεπίδρασης. Αυτές οι τιμές επηρεάζουν το σύστημα προσδοκίας του γνωστικού πράκτορα συμβάλλοντας στην εκπλήρωση του στόχου του. Οι αισθητικές αξίες θεωρούνται λειτουργικές ενδείξεις που ενισχύουν ή αποδυναμώνουν την προσδοκία του πράκτορα για επίλυση της δυναμικής αβεβαιότητας που αναδύθηκε κατά συγκεκριμένη αλληλεπίδραση. Οι εν λόγω αξίες προτείνεται ότι οδηγούν σε μηχανισμούς επίλυσης προβλημάτων, οι οποίοι βοηθούν τον πράκτορα να αναδιαμορφώσει τους αλληλεπιδραστικούς του στόχους. Αυτό σημαίνει ότι τα αισθητικά συναισθήματα επηρεάζουν τη διεργασία κατά την οποία ο πράκτορας επιλέγει δράση μέσω της διαμόρφωσης των προσδοκιών αλληλεπίδρασης ενδυναμώνοντας ή όχι τις αποφάσεις του να ενεργήσει. Ως εκ τούτου, τα αισθητικά συναισθήματα επηρεάζουν τις δυναμικές μορφές δράσης του πράκτορα, δηλαδή, τις αναδυόμενες αναπαραστάσεις του καθώς και τα αισθητικά του νοήματα. Έτσι, τα αισθητικά συναισθήματα παίζουν σημαντικό ρόλο στη διαδικασία λήψης αποφάσεων, εξυπηρετώντας σημαντικές γνωστικές διεργασίες.

- ➢ **Κεφάλαιο 1:   Μελετώντας την φύση της αισθητικής εμπειρίας**
Σε αυτό το κεφάλαιο παρουσιάζονται οι σημαντικότερες εξηγήσεις σχετικά με την προέλευση και την έννοια της αισθητικής στη φιλοσοφία, κυρίως όσον αφορά την εν λόγω εμπειρία που συνδέεται με συναισθηματικές και γνωστικές λειτουργίες. Ωστόσο, σε αυτές τις εξηγήσεις, ο ρόλος και το περιεχόμενο του αισθητικού συναισθήματος, φαίνεται να είναι αινιγματικός και

ασαφής καθώς οι στοχαστές διαφοροποιούν την αισθητική από μια οποιαδήποτε άλλη εμπειρία ως δύο ξεχωριστές νοητικές καταστάσεις. Αυτό οφείλεται στο γεγονός ότι η αισθητική θεωρία υποτιμά ή τις περισσότερες φορές παρερμηνεύει το λειτουργικό ρόλο των συναισθημάτων. Η ανάλυση επικεντρώνεται κυρίως σε θέματα που αφορούν το ρόλο της γνώσης στην αισθητική εμπειρία και όχι πώς τα συναισθήματα επηρεάζουν τη νοητική λειτουργία.

Για αιώνες, το συναίσθημα και η νόηση έχουν αντιμετωπισθεί ως δύο διακριτά αντίθετες δυνάμεις που καθοδηγούν την αντίληψη και τη δράση των γνωστικών πρακτόρων. Λανθασμένα σύμφωνα πάντα με τις σύγχρονες μελέτες, οι περισσότεροι από τους στοχαστές θεωρούν ότι τα συναισθήματα και η νόηση συγκρούονται παρά λειτουργούν μαζί, οδηγώντας πολλές φορές σε αινιγματικά συμπεράσματα σχετικά με τη φύση της αισθητικής εμπειρίας και την πραγματική έννοια της ομορφιάς. Το κύριο επιχείρημα είναι ότι τα συναισθήματα θα μπορούσαν να οδηγήσουν στην αισθητική εμπειρία και την ομορφιά μόνο όταν η διαδικασία αυτή χαρακτηρίζεται από ανιδιοτέλεια (μη-σκόπιμη δράση).

Αυτό το επιχείρημα σταδιακά εγκαταλείφθηκε, καθώς οι στοχαστές κινήθηκαν από φιλοσοφικές παραδοχές σε επιστημονικά συμπεράσματα που προέκυψαν από την τάση να κατεβάσουν την αισθητική στις φυσικές διεργασίες που διέπουν την ανθρώπινη φύση. Με αυτή την προοπτική, ο John Dewey, μαζί με τους Πραγματιστές, επανεξέτασαν τον καντιανό περιορισμό για ανιδιοτέλεια κατά την αισθητική εμπειρία και προσπάθησαν εξηγήσουν την αισθητική στο πλαίσιο των φυσικών αναγκών και των ενσωματωμένων διεργασιών που λαμβάνουν χώρα καθώς οι άνθρωποι αλληλεπιδρούν με το περιβάλλον τους. Σύμφωνα με τη νατουραλιστική οπτική:

- o Η αισθητική έχει ακριβώς το ίδιο περιεχόμενο με όλες τις άλλες δραστηριότητες που επιλέγει ο πράκτορας για να εξυπηρετήσει την ευημερία του.

Παρά τις διαφορές σχετικά με την έννοια της αισθητικής, υπάρχει ένα κοινό συμπέρασμα σχετικά με το ρόλο των αισθητικών συναισθημάτων:

- o Τα αισθητικά συναισθήματα αποδίδουν αξίες και επιτρέπουν την ανάπτυξη του νοήματος.

Για τους φιλοσόφους της Δυτικής παράδοσης, η απόδοση της αξίας εκφράζει επιλογή ή προτίμηση. Για αυτούς η αξία είναι ένας γνώμονας που ο πράκτορας επιλέγει στην προσπάθειά του να προσδιορίσει την αξία μιας συγκεκριμένης κατάστασης, ώστε να ενεργήσει σωστά. Για τους Πραγματιστές, η προέλευση της απόδοση της αξίας συνδέεται με την προσαρμοστικότητα του γνωστικού πράκτορα, καθώς αλληλεπιδρά με την ανασφάλεια, την αβεβαιότητα και την αστάθεια. Το περιβάλλον αποσπά το ενδιαφέρον μας ή δίνουνε νοήματα σε αυτό, όχι ως ένα σύνολο από αντικείμενα, αλλά ως συνθήκες που υποστηρίζουν τις δυνατότητες μας για αρμονία ή σταθερότητα.

Η νευροεπιστήμη έδειξε πρόσφατα ενδιαφέρον για την εξερεύνηση της φύσης των αισθητικών αποκρίσεων. Η μελέτη ξεκινά από την κατανόηση του πώς ο εγκέφαλος απορρίπτει τις επουσιώδες πληροφορίες από τον κόσμο, προκειμένου να αναπαραστήσει τα αντικείμενα. Οι μελέτες αυτές παρατηρούν τον τρόπο που οι εισερχόμενες πληροφορίες από τις αισθήσεις μας αποκτούν νόημα στον εγκέφαλο και τον τρόπο που το συναίσθημα και η νόηση διέπουν την εμπειρία τόσο στην καθημερινή ζωή όσο και στην τέχνη. Όπως το έργο πολλών ερευνητών δείχνει, η αισθητική εμπειρία συσχετίζεται με πολλά συναισθηματικά και γνωστικά φαινόμενα, μερικά από τα οποία παρουσιάζονται στη λίστα που ακολουθεί:

- o Αναγνώριση αντικειμένων, η οποία ενισχύεται από διαδικασίες μάθησης, (χρήση της γνώσης που βασίζεται σε προηγούμενη οπτική εμπειρία παρόμοιων αντικειμένων).

o Δόμηση του πλαισίου που γίνεται η αλληλεπίδραση, το οποίο επίσης ενισχύεται από τις διαδικασίες μάθησης και ως επί το πλείστον βασίζονται σε προηγούμενες συναισθηματικές εμπειρίες.

o Συναισθηματική αξιολόγηση, ο γνωστικός πράκτορας αποδίδει αξίες στα ερεθίσματα.

o Αξιολόγηση των παραγόμενων πληροφοριών, όπως οι σκέψεις και τα συναισθήματα. Ως μια αυτοαναφορική διεργασία.

o Προσδοκία των μελλοντικών εκβάσεων των αλληλεπιδράσεων αποδίδοντας σε αυτές θετικές ή αρνητικές αξίες.

o Το αισθητικό αποτέλεσμα συσχετίζεται με την προσδοκία σε σχέση με το αισθητικό νόημα (αναπαράσταση) του αντικειμένου πέρα από τις αισθητικές του ιδιότητες.

o Η αισθητική εμπειρία και κρίση εντοπίζονται υπό συνθήκες αλληλεπιδραστικής αβεβαιότητας.

➢ **Κεφάλαιο 2:   Νόηση και αλληλεπίδραση**

Εγκαταλείποντας παραδόσεις και παλαιότερες αισθητικές θεωρίες οι οποίες αποδείχθηκαν ασαφείς, το κεφάλαιο αυτό επιχειρεί να διερευνήσει τα φυσικά φαινόμενα με τη βοήθεια των αντίστοιχων λειτουργιών που διέπουν την ανθρώπινη συμπεριφορά και χαρακτηρίζουν έναν αυτόνομο οργανισμό. Σε αυτή την κατεύθυνση, οι γνωστικοί πράκτορες ως πολύπλοκα συστήματα που αλληλεπιδρούν με δυναμικά περιβάλλοντα θα πρέπει να παρουσιάζουν ιδιότητες, οι οποίες χαρακτηρίζουν την ισχυρή έννοια του πρακτορεύειν δηλαδή του να δρουν στο περιβάλλον προς επίτευξη στόχων. Αυτές οι θεμελιώδεις ιδιότητες είναι:

o Η αλληλεπιδραστικότητα (interactivity): η ικανότητα του πράκτορα να αντιλαμβάνεται το περιβάλλον του και να δρα μέσα σε αυτό, όντας παράλληλα υπεύθυνος για την εκκίνηση της αλληλεπίδρασης όποτε αυτός κρίνει αναγκαίο,

o Η πρόθεση (intentionality): η ικανότητα του πράκτορα να προβαίνει σε μια αλληλεπίδραση με κατευθυντικότητα σε τελικό σκοπό, μέσω της απόδοσης πεποιθήσεων, έμμεσων στόχων και επιθυμιών στις δράσεις του,

o Η αυτονομία (autonomy): η ικανότητα του πράκτορα να λειτουργεί εκ προθέσεως και αλληλεπιδραστικά μέσω μόνο των δικών του πόρων.

Επιπλέον, φαίνεται να υπάρχει μια πολύ ενδιαφέρουσα αλληλεξάρτηση μεταξύ των τριών αυτών ιδιοτήτων. Συγκεκριμένα, ο Collier (1999) προτείνει ότι δεν μπορεί να υπάρξει λειτουργία χωρίς αυτονομία, πρόθεση χωρίς λειτουργία και νόημα χωρίς πρόθεση. Ο κύκλος κλείνει θεωρώντας το νόημα ως προϋπόθεση για τη διατήρηση της αυτονομίας ενός συστήματος κατά τη διάρκεια της αλληλεπίδρασής του με το περιβάλλον. Αυτό σημαίνει πως ο πράκτορας παρουσιάζει μια ορμώμενη από το στόχο φύση (πρόθεση), προκειμένου να υποστηρίξει νοητικές αλληλεπιδράσεις που θα του ενισχύσουν την αυτονομία. Ωστόσο, υπάρχουν θεμελιώδη δεδομένα που χαρακτηρίζουν επίσης τις νοητικές αλληλεπιδράσεις:

o Οι πράκτορες αλληλεπιδρούν συνεχώς, προκειμένου να προσδιοριστούν οι κατάλληλες συνθήκες και να παράξουν νοήματα με βάση τη δράση που αποβλέπουν στην επιτυχία των λειτουργικών διεργασιών τους.

o Οι πράκτορες προετοιμάζονται συνεχώς για περαιτέρω αλληλεπίδραση.

o Με δεδομένη την ανάγκη για αυτοδιατήρηση, οι πράκτορες έχουν πρόσβαση σε λειτουργικά συστήματα που τους επιτρέπουν να αξιολογήσουν τις περιβαλλοντικές συνθήκες και να εντοπίζουν ποια είναι η καλύτερη δράση σε σχέση με τις συνθήκες αυτές.

o Η επιλογή δράσης είναι το βασικό πρόβλημα του τι ένας πράκτορας πρέπει να κάνει σε επόμενό του αλληλεπιδραστικό βήμα, δηλαδή να αντιμετωπίσει το πρόβλημα της επιλογής της κατάλληλης διαθέσιμης δράσης.

Η interactivist μοντέλο, όπως εισήχθη από τον Mark Bickhard, παρέχει την απαιτούμενη λειτουργικότητα για εξηγήσεις σχετικά με τα κανονιστικά φαινόμενα όπως η αναπαράσταση, τα κίνητρα και η μάθηση που αναδύονται κατά την επιλογής δράσης. Το interactivist μοντέλο είναι ένα νατουραλιστικό μοντέλο που έχει πολλαπλές συγκλίσεις με την πραγματιστική παράδοση. Μοιράζονται την έννοια της διεργασίας και της δράσης ως το κατάλληλο πλαίσιο για τη μοντελοποίηση νοητικών φαινόμενων, ενώ επίσης επικεντρώνονται στις συνέπειες των δράσεων και των αλληλεπιδράσεων. Το interactivist μοντέλο είναι θεωρητικά συμβατό με το μοντέλο του Peirce για την ανάδυση νοήματος, τη θέση του Dewey για την γλώσσα, του Piaget για την γενετική επιστημολογία και τον κονστρουκτιβισμό, τη θεωρία του Gibson για την αντίληψη και τη δράση, και άλλα μοντέλα με πραγματιστικές πτυχές.

Σύμφωνα με το interactivist μοντέλο, η ένδειξη (indication) των πιθανών αλληλεπιδράσεων αναδύει ιδιαίτερης σημασίας ιδιότητες για το νόημα όπως είναι η αναφορικότητα (aboutness), η θετική αξία (truth-value), και το περιεχόμενό. Οι ενδείξεις αυτές δεν αφορούν μόνο το περιβάλλον αλλά την καταλληλότητα δράσης σε αυτό. Ως εκ τούτου, όλες αυτές οι εσωτερικές διεργασίες, που εστιάζουν στο τι μπορεί να περιμένει ο πράκτορας από μια αλληλεπίδραση, διαδραματίζουν ένα πολύ σημαντικό ρόλο στη διαδικασία όσο και στην τελική επιλογή δράσης. Με τον τρόπο αυτό, οι αναπαραστάσεις αναδύονται φυσικά κατά εξέλιξη των πρακτόρων ως λύση στο πρόβλημα της επιλογής δράσης και έτσι λειτουργούν σαν μια πτυχή που υποδεικνύουν περαιτέρω δυνατότητες αλληλεπίδρασης. Η ένδειξη μιας δυνατότητας αλληλεπίδρασης θα εξαρτηθεί από τα κίνητρα του πράκτορα, καθώς και τα αποτελέσματα των προηγούμενων αλληλεπιδράσεων. Αυτές οι λειτουργίες παρέχουν στον πράκτορα τις κατάλληλες συνθήκες, προκειμένου να προσδοκά μελλοντικές εκβάσεις. Ωστόσο, αυτά τα λειτουργικά συστήματα θα πρέπει να παρουσιάζουν το ενδεχόμενο της αποτυχίας (representational error) το οποίο αφορά την περίπτωση που η τελική έκβαση της αλληλεπίδρασης δεν παρέχει τα αναμενόμενα αποτελέσματα. Έτσι, συσχετίσεις των ιδιοτήτων που παρουσιάζει το περιβάλλον μπορούν να υποστηρίξουν μια ένδειξη κατά την οποία ο πράκτορας βρίσκει πιθανή μία δράση και κάποιες όχι. Αυτές οι συσχετίσεις των ιδιοτήτων αποτελούν και το περιεχόμενο της αναπαράστασης. Όλα αυτές οι δράσεις βασισμένες στο νόημα είναι λειτουργικά χρήσιμες στον πράκτορα στην προσπάθειά του να κατανοήσει και να εκτιμήσει το περιβάλλον που αλληλεπιδρά.

Το νόημα είναι ένα αναδυόμενο αποτέλεσμα της προσπάθειας του πράκτορα να ερμηνεύσει τις περιβαλλοντικές συνθήκες, προκειμένου να βελτιωθεί το υπάρχον επίπεδο κατανόησης, ανακαλύπτοντας τη σημασία έχουν οι συνθήκες αυτές για τους προσωπικούς του στόχους. Η έννοια της ερμηνείας των σημείων (signs), σε σχέση με τα νοήματα που παρέχουν στον πράκτορα βασισμένα με αντικείμενα ή γεγονότα, είναι μια κρίσιμη πτυχή της σημειωτικής διεργασίας.

Η σημειωτική διεργασία συνδέεται λειτουργικά με την αισθητική εμπειρία. Η αισθητική ερμηνεία είναι μια σκόπιμη διεργασία κατά την οποία ο πράκτορας προσπαθεί να συνδέσει το αντικείμενο με το σημείο (sign). Ιδιαίτερα, τα Εικονίδια (Icons) και οι Δείκτες (Indexes) συσχετίζονται με το Συμβολικό (Symbolic) νόημα και τα αισθητικά συναισθήματα. Αυτό σημαίνει ότι η αισθητική σχετίζεται με τις συμβολικές αναπαραστάσεις, οι οποίες δηλώνουν τις προθέσεις του δημιουργού (σχεδιαστής ή καλλιτέχνης). Μια σημειωτική κατανόηση της αισθητικής που σχετίζεται με τις συμβολικές αναπαραστάσεις των δυνατοτήτων αλληλεπίδρασης που ενσωματώνεται στα τεχνουργήματα μπορεί να μας παράξει νέες δυνατότητες για να κατανοήσουμε την έννοια των προσφερόμενων δυνατοτήτων (affordances) και την πιθανή σχέση τους με την αισθητική. Οι σκέψεις και οι αντίστοιχες προτάσεις που αφορούν τη σχέση της αισθητικής με τις σημειωτικές λειτουργίες και την αισθητική με τα affordances εξετάζονται περαιτέρω στο κεφάλαιο 5 και στο κεφάλαιο 6 της παρούσας διατριβής.

➤ **Κεφάλαιο 3: Η Αισθητική στη διαδραστική σχεδίαση**
Ο σκοπός αυτού του κεφαλαίου είναι να παρουσιάσει την ποικιλία των προσεγγίσεων που επιχειρούν να εξηγήσουν την αισθητική εμπειρία στο διαδραστικό σχεδιασμό. Οι προσεγγίσεις ποικίλουν κυρίως με τη χρήση των εννοιών που αφορούν την αισθητική, την ομορφιά και τη θέση τους στο διαδραστικό τεχνούργημα. Πιθανόν αυτός είναι ένας λόγος που ο αναγνώστης στην βιβλιογραφία του διαδραστικού σχεδιασμού μπορεί να προσεγγίσει μια μεγάλη σειρά από ερμηνείες σε αντίστοιχες μελέτες για το τι σημαίνει αισθητική για τη σχεδίαση. Αυτές οι μελέτες επιχειρούν να προτείνουν και να δοκιμάσουν παράγοντες που ενδεχομένως γίνονται αισθητικά αντιληπτοί από τους χρήστες κατά την αλληλεπίδρασή τους με τα διαδραστικά τεχνουργήματα. Συγκεκριμένα, σχεδόν σε όλες αυτές τις εργασίες, η αισθητική μελετάται ως ένα πολυδιάστατο φαινόμενο που λαμβάνει χώρα κατά την αντίληψη, τις περισσότερες φορές ακολουθώντας την παράδοση των πειραματικών μελετών που εστιάζουν στην αποτελεσματικότητα και την ευχρηστία. Οι μελέτες αυτές δεν επικεντρώνονται στη μελέτη της φύσης και του περιεχομένου της αισθητικής, αλλά στο πώς το αισθητικό φαινόμενο, ό, τι αυτό θα μπορούσε να είναι, επηρεάζει ή σχετίζεται με μια σειρά από «γνωστές» εμπειρίες που έχουν παρατηρηθεί κατά την αλληλεπίδραση με τα τεχνουργήματα αυτά. Έτσι, οι τύποι των εμπειριών αυτών μπορεί να μην είναι πάντα να σχετικοί με την αισθητική εμπειρία ή μπορεί να ξεπερνούν τα όριά της. Επιπλέον, πολλές εμπειρικές μελέτες εξετάζουν αφηρημένες έννοιες που το νόημά τους μεταβάλλεται ανά πολιτισμούς, κοινωνικά πλαίσια, και ιστορικές περιόδους. Έτσι οι μελέτες αυτές αντιμετωπίζουν δυσκολίες να γενικεύσουν τα πειραματικά συμπεράσματά τους σε σχεδιαστικές απαιτήσεις και προδιαγραφές που ενισχύουν τις αισθητικές αποφάσεις.

Όσο αφορά τους ερευνητές που θεωρούν τα συναισθήματα ως ένα σημαντικό στοιχείο της αισθητικής εμπειρίας, ο ρόλος των αισθητικών συναισθημάτων στη σχεδιαστική διεργασία δεν περιγράφεται με σαφήνεια. Προτείνουν ότι η αισθητική της αλληλεπίδρασης επικεντρώνεται στην απόλαυση μιας εμπειρίας που μπορεί να προκαλέσει, να αποπλανήσει, να προκαλέσει έκπληξη, επιβράβευση, κλπ. τους χρήστες.

Σύμφωνα με την αισθητική των πραγματιστών, υπάρχει μια στενή σχέση ανάμεσα στην αισθητική και το περιεχόμενο και τη χρήση. Σύμφωνα με αυτούς που ακολουθούν αυτή την οπτική:

o   Η αισθητική δεν είναι εγγενής στο σχεδιασμένο προϊόν, αλλά έρχεται ως αποτέλεσμα της αίσθησης της οικειοποίησής του.

o   Το νόημα και οι αισθητικές εμπειρίες δεν είναι προκαθορισμένα αλλά εμφανίζονται κατά τη χρήση. Σύμφωνα με την πραγματιστική οπτική, η αισθητική είναι μέρος της

καθημερινής ζωής. Η αισθητική αλληλεπίδραση είναι μέσο επίτευξης στόχου και έτσι τα αντικείμενα οικειοποιούνται κατά τη χρήση.

Ο όρος 'οικειοποίηση' είναι επίσης μια αφηρημένη έννοια που ενισχύει την ασάφεια της αισθητικής. Ωστόσο, αυτοί οι συγγραφείς προτείνουν μια δυναμική εξήγηση για την αισθητική που δεν περιορίζεται στην εμφάνιση αλλά συνδέεται με την παραγωγή νοήματος:

o Σχεδιάζοντας για την αισθητική εμπειρία σημαίνει ότι οι σχεδιαστές θα καλέσουν τους ανθρώπους να συμμετέχουν ενεργά στη δημιουργία αισθήσεων και νοήματος. Η αισθητική της αλληλεπίδρασης ενεργοποιεί την φαντασία ώστε να προκαλέσει και να ενθαρρύνει τους ανθρώπους να «σκέφτονται διαφορετικά» για τα διαδραστικά συστήματα που χρησιμοποιούν.

Ανάμεσα σε εκείνους τους ερευνητές που προσπαθούν να εξηγήσουν θεωρητικά την αισθητική εμπειρία και την ομορφιά, ο Norman επικεντρώνεται στη γνωστική λειτουργία και επιχειρεί να προσεγγίσει όλα αυτά τα περίπλοκα φαινόμενα που λαμβάνουν χώρα μέσω της αλληλεπίδρασης σε σχέση με τις γνωστικές και συναισθηματικές μας αποκρίσεις, και μπορεί να επηρεάσουν ή να διαμορφώσουν την αισθητική εμπειρία. Στο κεφάλαιο 5, το τριών επιπέδων μοντέλο που προτείνεται από τον Norman χρησιμοποιείται ως μέσο για να αναλυθούν τα γνωστικά και συναισθηματικά επίπεδα μέσω των οποίων ο πράκτορας αναπτύσσει την αισθητική εμπειρία και την κρίση του.

Αξιοποιώντας την ποικιλία των εξηγήσεων, σχετικά με το ρόλο και τη σημασία της αισθητικής στο σχεδιασμό, το 3° κεφάλαιο έχει ως στόχο να δείξει ότι η ανάπτυξη ενός νατουραλιστικού μοντέλου για την αισθητική εμπειρία είναι απαραίτητο για μια βαθύτερη κατανόηση της αισθητικής και μπορεί να προσφέρει ένα νέο προσανατολισμό για εμπειρικές μελέτες. Η εστίαση και η διερεύνηση των συναισθηματικών μηχανισμών θα μπορούσε πιθανότατα να είναι το κλειδί στην κατανόηση του τι είναι αισθητική για τον πράκτορα που αλληλεπιδρά με το περιβάλλον του. Έτσι, μια βαθύτερη κατανόηση του ρόλου των συναισθημάτων στη διαδικασία αλληλεπίδρασης θα δώσει τη δυνατότητα να εξηγηθεί η διαμόρφωση της αισθητικής εμπειρίας. Ο κύριος στόχος του επόμενου κεφαλαίου είναι να παρουσιάσει το ρόλο και τη λειτουργικότητα της συναισθηματικής εμπειρίας με σκοπό να ενισχύσει την κατανόηση για τον αντίστοιχο ρόλο των συναισθημάτων στην αισθητική.

➢ **Κεφάλαιο 4:   Ο ρόλος των συναισθημάτων στην αλληλεπίδραση**
Ο σκοπός αυτού του κεφαλαίου είναι να παρουσιάσει τα θεμελιώδη χαρακτηριστικά της συναισθηματικής δραστηριότητας και ιδιαίτερα εκείνων των δραστηριοτήτων που σχετίζονται με τις βασικές συναισθηματικές καταστάσεις που είναι ευρέως γνωστές στην αισθητική βιβλιογραφία ως «ευχαρίστηση» και «δυσαρέσκεια». Όλα αυτά τα συναισθηματικά φαινόμενα έχουν ένα βιολογικό πυρήνα τα διέπει και θα μπορούσε να περιγραφεί ως εξής:

o Τα συναισθήματα είναι σύνολα δομών-συστημάτων, τα οποία περιλαμβάνουν πολύπλοκες συσχετίσεις χημικών και νευρωνικών αντιδράσεων.

o Τα συναισθήματα είναι βιολογικά καθοριζόμενες διεργασίες, οι οποίες δύναται να εντοπιστούν σε εγκεφαλικές περιοχές, που εμφανίζουν μια μακρά εξελικτική ιστορία.

o Οι περιοχές/συστήματα που παράγουν συναισθήματα καταλαμβάνουν έναν αρκετά περιορισμένο σύνολο περιοχών του εγκεφάλου, αρχίζοντας από το χαμηλό επίπεδο του

εγκεφαλικού στελέχους (brain stem) προς υψηλότερες περιοχές της υποφλοιώδους (subcortical) και φλοιώδους (cortical) δομής. Οι περιοχές/συστήματα αυτές είναι μέρος του συνόλου των δομών που ρυθμίζουν και αναπαριστούν καταστάσεις του σώματος στον εγκέφαλο.

- o Όλες οι περιοχές/συστήματα μπορούν και ενεργοποιούνται αυτόματα, χωρίς συνειδητή σκέψη.

- o Όλα τα συναισθήματα χρησιμοποιούν το σώμα ως θέατρο (της γνωστικής ομοιόστασης[15], του ένστικτου, του προθάλαμου, και του μυοσκελετικού συστήματος).

- o Επηρεάζουν τον τρόπο λειτουργίας πολυάριθμων κυκλωμάτων του εγκεφάλου: έτσι η ποικιλία των συναισθηματικών αποκρίσεων είναι υπεύθυνη για βαθιές αλλαγές τόσο στο σώμα όσο και τον εγκέφαλο του πράκτορα.

- o Ο ρόλος τους είναι να ρυθμίζουν εσωτερικές καταστάσεις με τις οποίες ο πράκτορας δημιουργεί σωματικές και ψυχικές συνθήκες ικανές να εξυπηρετήσουν τους στόχους του.

- o Τα συναισθήματα αφορούν τη ζωή. Είναι ακριβή, και ο ρόλος τους είναι να βοηθήσουν, και να εξυπηρετήσουν τον εγγενή στόχο της αυτο-διατήρησης στον πράκτορα.

- o Η εκπαίδευση και πολιτισμός μεταβάλλουν την αντίληψη και ερμηνεία των συναισθημάτων δίνοντας σε αυτά τα αναδυόμενα σωματικά και νοητικά φαινόμενα νέα νοήματα.

Ως εκ τούτου, τα συναισθήματα της ευχαρίστησης και της δυσαρέσκειας, ως σωματικές αντιδράσεις μπορούν να διαδραματίσουν σημαντικό ρόλο στις γνωστικές λειτουργίες που οι πράκτορες χρησιμοποιούν για να πλοηγηθούν σε ένα πολύπλοκο κόσμο:

- o Τα βασικά συναισθήματα αποτελούν σημαντικούς μηχανισμούς που οι πράκτορες έχουν πρόσβαση ώστε να εξυπηρετήσουν την υπηρεσία της αυτονομίας τους.

- o Τα συναισθήματα είναι ότι τέτοιες διεργασίες που σηματοδοτούν ευκαιρίες ή εμπόδια που αφορούν την επίτευξη ενός συγκεκριμένου στόχου.

- o Ένα συναίσθημα σηματοδοτεί τις συνέπειες μιας κατάστασης για ένα συγκεκριμένο στόχο.

- o Τα συναισθήματα έτσι αποτελούν κίνητρα δράσης για τη συνειδητοποίηση ενός στόχου και κατ΄ επέκταση δημιουργούν κίνητρο για δράση.

Ως εκ τούτου, η συναισθηματική δραστηριότητα παίζει δύο βασικούς ρόλους:

- o Η συναισθηματική δραστηριότητα ενημερώνει τον πράκτορα να κινηθεί προς τα κίνητρα και μακριά από απειλές και,

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[15] Γνωστική ομοιόσταση: Το νευρικό σύστημα οργανώνεται (ή οργανώνει τον εαυτό του) έτσι ώστε να υπολογίζει μια σταθερή πραγματικότητα.

o Μέσα από το σύστημα ανάδρασης, η συναισθηματική δραστηριότητα συγκρίνει και δίνει αξία στα σήματα που αντιστοιχούν στην πρόοδο που πράκτορας κάνει σε σχέση με ένα σημείο αναφοράς.

Επιπλέον,

o Τα συναισθήματα αναδύονται όταν ο πράκτορας προσπαθεί να αλληλεπιδράσει με την αβεβαιότητα (uncertainty).

o Μέσα από τα συναισθήματα οι πράκτορες διαμορφώνουν προσδοκίες για το αποτέλεσμα μιας μελλοντικής αλληλεπίδρασης στηρίζοντας έτσι την επιλογή της καλύτερης διαθέσιμης δράσης που θα τον οδηγήσει πιο κοντά στο δυναμικό του στόχο.

o Τα βασικά συναισθήματα της ευχαρίστησης και της δυσαρέσκειας είναι προσανατολισμένα στο μέλλον, δεδομένου ότι σχετίζονται με το στόχο, υπό την έννοια ότι ο πράκτορας χρησιμοποιεί τέτοιες μεθόδους, προκειμένου να προβλέψει την έκβαση των δράσεών του.

o Οι βασικοί συναισθηματικοί μηχανισμοί είναι γενετικά ενστικτώδης εργαλεία του οργανισμού που επιτρέπουν στους πράκτορες να δημιουργήσουν πολύπλοκες, δυναμικά ευέλικτες μορφές δράσης προκειμένου να μάθουν και να αντιμετωπίσουν συγκεκριμένα περιβαλλοντικά θέλγητρα ή απειλές.

Ακόμα κι αν η ευχαρίστηση και η δυσαρέσκεια θεωρούνται ως δυο βασικές συναισθηματικές δραστηριότητες, είναι εξαιρετικά πολύπλοκες διεργασίες που σχετίζονται με νευροψυχολογικές λειτουργίες του σώματος. Έτσι, ο όρος «βασικά συναισθήματα ευχαρίστησης και δυσαρέσκειας», δείχνει όχι μόνο μια έννοια που περιλαμβάνει τη συναισθηματικές, γνωστικές, συμπεριφορικές, εκφραστικές, αλλά και φυσιολογικές μεταβολές.

Οι θεωρητικοί προτείνουν δύο επίπεδα συναισθηματικών διεργασιών:

Σε ένα βασικό επίπεδο της λειτουργιών, πρωτογενούς αξιολόγησης (primary appraisal),

o Η ευχαρίστηση και η δυσαρέσκεια θεωρούνται ως διεργασίες αυτοργάνωσης που συνεργάζονται με το συνειδητό (consciousness).

Από τη στιγμή που οι μελλοντικές αλληλεπιδράσεις μας απαιτούν προσαρμογές του σώματος ώστε να υποστηρίξουν ένσκοπες δραστηριότητες,

o Τα συναισθήματα βοηθούν τον πράκτορα να διαμορφώσει προσδοκίες (να προβλέψει) σχετικά με εκβάσεις μελλοντικών αλληλεπιδραστικών καταστάσεων που θα μπορούσαν να υποστηρίξουν αυτές τις προσαρμογές τις οποίες ο οργανισμός πρέπει να κάνει.

Αυτά τα βασικά συναισθήματα είναι προετοιμασίες του πράκτορα και αφορούν τόσο τη λήψη της κατάλληλης στάσης του σώματος με τη στάση του μυοσκελετικού συστήματος, όσο και την κινητοποίηση των μεταβολικών συστημάτων υποστήριξης. Και οι δύο αυτές περιπτώσεις αποτελούν δράση για το βιολογικό σύστημα.

Σε ένα πιο σύνθετο επίπεδο, δευτεροβάθμιας αξιολόγησης (secondary appraisal),

o Τα συναισθήματα της ευχαρίστησης και της δυσαρέσκειας είναι εμπειρίες.

Τα συμπεράσματα αυτά θέτουν ένα νέο προσανατολισμό για τον ρόλο που τα βασικά συναισθήματα της ευχαρίστησης και της δυσαρέσκειας παίζουν στην αλληλεπίδραση. Τα

προτεινόμενα μοντέλα των αισθητικών συναισθημάτων που ακολουθούν στο επόμενο κεφάλαιο επιδιώκουν να ενσωματώσουν όλες αυτές τις λειτουργίες σύμφωνα με το νατουραλιστικά μοντέλα παραγωγής νοήματος, παρέχοντας μια εξήγηση στην όλη προσπάθεια να μοντελοποιηθεί η αισθητική εμπειρία και κρίση.

> **Κεφάλαιο 5:   Μια νατουραλιστική πρόταση για την αισθητική: τα αισθητικά συναισθήματα στην αισθητική εμπειρία και κρίση**

Ακολουθώντας μια κανονιστική προσέγγιση για την παραγωγή νοήματος (βλ. κεφάλαιο 2), το μοντέλο των τριών επίπεδων αλληλεπίδρασης (βλέπε κεφάλαιο 3), τα πειραματικά και θεωρητικά ευρήματα σχετικά με τη φύση των συναισθημάτων (βλ. κεφάλαιο 4) και τα νευρολογικά στοιχεία σχετικά με την αισθητική εμπειρία (βλέπε κεφάλαιο 1), το κεφάλαιο αυτό προτείνει δύο κανονιστικά μοντέλα που στοχεύουν να εξηγήσουν τη διαμόρφωση του αισθητικού νοήματος, την ανάδυση των αισθητικών συναισθημάτων καθώς και το ρόλο που διαδραματίζει η ανάπτυξη της αισθητικής εμπειρίας και απόφασης στην αλληλεπίδραση εν γένη:

- Το πρώτο θεωρητικό μοντέλο των συναισθημάτων προτίθεται να εξηγήσει πιο αναλυτικά το περιεχόμενο της αισθητικά προσανατολισμένης συναισθηματικής δραστηριότητας, ως επί το πλείστον βασιζόμενο στο interactivist μοντέλο της αναδυόμενης αναπαράστασης και τη θεωρία αξιολόγησης για τα συναισθήματα (appraisal theory). Το προτεινόμενο μοντέλο της αισθητικής προτείνει δύο βασικά επίπεδα συναισθηματικών διεργασιών:

  - Το πρώτο επίπεδο είναι υπεύθυνο για μια μη συνειδητή αυτόματη αισθητικά προσανατολισμένη συναισθηματική απόκριση, δίνοντας τη δυνατότητα για «ασυνείδητες», αισθητικά προσανατολισμένες συναισθηματικές αποκρίσεις. Οι αποκρίσεις αυτές δίνουν μεγάλη πιθανότητα να θεωρηθεί πιθανή η ύπαρξη θεμελιωδών αισθητικών συνηθειών/έξεων (habits) οι οποίες μπορεί να ενεργοποιηθούν χωρίς τη συνειδητή γνωστική αξιολόγηση και επεξεργασία.

  - Το δεύτερο επίπεδο είναι συνειδητό και έχει δομηθεί πάνω σε δύο βασικές διεργασίες: α) το Υποσύστημα των Γνωστικών Μεταβλητών (Cognitive Variables Subsystem, CVS), το οποίο είναι θεμελιώδες για την επίτευξη της λειτουργίας της ευρετικής μάθησης (αυτοδιδαχής) των συναισθημάτων και β) το Υποσύστημα Αισθητικής Αξιολόγησης (Aesthetic Appraisal Subsystem, AAS), το οποίο επηρεάζει κυρίως την ανάδυση του αισθητικά προσανατολισμένου συναισθηματικού νοήματος.

  Αυτά τα δύο υποσυστήματα (CVS και AAS) είναι οργανωσιακά συνδεδεμένα και επηρεάζουν λειτουργικά την ετοιμότητα δράσης του πράκτορα. Πιο συγκεκριμένα, προτείνεται ότι η αισθητικά προσανατολισμένη συναισθηματική έκβαση αυτών των δύο υποσυστημάτων είναι μια λειτουργική ένδειξη που ενισχύει ή αποδυναμώνει την προσδοκία για την επίλυση της δυναμικής αβεβαιότητας που προκύπτει στις συγκεκριμένες συνθήκες αλληλεπίδρασης. Μια πιο λεπτομερής ανάλυση αυτού του μοντέλου μπορεί να βρεθεί στα Xenakis Arnellos and Darzentas (2011) και Xenakis, Arnellos and Darzentas (2012).

- Το δεύτερο μοντέλο επιχειρεί να υπογραμμίσει τις γνωστικές λειτουργίες που ενισχύει η αισθητική εμπειρία και κρίση κατά την αλληλεπίδραση μέσα από τρία επίπεδα γνωστικών και

συναισθηματικών διεργασιών. Το μοντέλο αυτό προτείνει την ενσωμάτωση των θεμελιωδών παραμέτρων της σημειωτικής του Peirce, και ιδιαίτερα την ενσωμάτωση των τριών επίπεδων της σημειωτικής οργάνωσης με κάθε ένα από τα τρία επίπεδα διεργασιών που προτείνονται από τον Norman :

- o Το 1ο επίπεδο της ακαθόριστης δυνητικότητας (firstness) συνδέεται με το ενστικτώδες (visceral) ως μια πρωτόγονη μορφή αλληλεπίδρασης με αυτόματες αποκρίσεις. Ο πράκτορας βασίζεται στη συνήθεια/έξη και η αισθητική αξιολόγηση είναι σχεδόν ανεξάρτητη από κοινωνικοπολιτιστικά στοιχεία. Ο πράκτορας προσδίδει αισθητική αξία σε όλες εκείνες δυνατότητες αλληλεπίδρασης που σχετίζονται με τις φυσικές ιδιότητες του αντικειμένου, συνδέοντας το Σημείο (Sign) με το αντικείμενο μεσώ του Εικονιδίου (Icon).

- o Το δεύτερο επίπεδο, αυτό της διαφοροποίησης μεταξύ συστήματος και περιβάλλοντος (secondness), συνδέεται με το συμπεριφοριστικό (behavioral). Ο πράκτορας προσπαθεί να λάβει τη συνολική εντύπωση του τεχνουργήματος εξετάζει κάθε λεπτομέρεια ανακαλώντας δεδομένα από τις μαθημένες εμπειρίες και γνώσεις. Αυτό είναι το σημείο όπου η σημείωση αρχίζει δεδομένου περιλαμβάνοντας τη συνεχή ανάπτυξη των τριάδων (Sign-Object-Interpretant). Οι δυνατότητες αλληλεπίδρασης είναι πολιτιστικά εξαρτώμενες. Το Σημείο (Sign) συνδέεται με το αντικείμενο (Object) μέσω των Δεικτών (Index) δίνοντας νέες πληροφορίες σχετικά με τα φυσικά χαρακτηριστικά του και το κοινωνικό πλαίσιο εντάσσεται.

- o Το τρίτο επίπεδο (thirdness) που περιλαμβάνει ερμηνευτικές και σημειωτικές διεργασίες αλληλεπίδρασης συνδέεται με το στοχαστικό επίπεδο (reflective).

- Το μοντέλο αυτό έχει ως στόχο να παρέχει μια περαιτέρω και σε βάθος θεωρητική ανάλυση που αφορά την αισθητική αντίληψη και να εμπλουτίσει την κατανόησή μας σχετικά με το ρόλο της αισθητικής ερμηνείας, χρησιμοποιώντας το θεωρητικό ερμηνευτικό πλούτο που παρέχεται από το σημειωτική πλαίσιο. Ιδιαίτερα, με βάση α) τις γνωστικές διεργασίες όπως αυτές προτείνονται στο πρώτο μοντέλο, β) τις σημειωτικές παραμέτρους του Peirce και γ) τους τρόπους που αυτές οι διεργασίες οδηγούν σε μια αισθητική ερμηνεία ή την αισθητική κρίση, προτείνεται ότι: η διαμόρφωση της αισθητικής απόφασης σχετίζεται για τη μεταφορά από τα Εικονίδια (Icons) και τους Δείκτες (Indexes) στα Σύμβολα (Symbols), το οποία πιθανόν είναι υπεύθυνα για ανώτερου επιπέδου αισθητικές ερμηνείες. Αυτή η προσέγγιση παρέχει στη αλληλεπιδραστική θεωρία της αντίληψης και της δράσης μια ευρύτερη κατανόηση, υποδηλώνοντας τη σύγκλιση κάθε ενός από τα τρία αντιληπτικά επίπεδα με κάθε μία από τις τρεις κατηγορίες του Peirce και τις εκάστοτε σημειωτικές τριάδες. Μια πιο λεπτομερής ανάλυση του μοντέλου αυτού μπορεί να βρεθεί στο Xenakis, et al. (2012).

Η προτεινόμενη εξήγηση του αισθητικού νοήματος βασίζεται στην κανονιστική λειτουργικότητα των βασικών συναισθημάτων της ευχαρίστησης και της δυσαρέσκειας, ως μία δυναμική λειτουργία που είναι διαθέσιμη στον πράκτορα, που τον βοηθά να προσδίδει αξίες στις δυναμικές προϋποθέσεις της αλληλεπίδρασης.

Ιδιαίτερα, προτείνεται ότι:

o Η αισθητική εμπειρία και το αντίστοιχο αισθητικό νόημα συνδέονται λειτουργικά με την έκβαση των αισθητικών συναισθημάτων καθώς ο πράκτορας διερευνά μελλοντικές δυνατότητες αλληλεπίδρασης.

o Τα αισθητικά συναισθήματα και έτσι η αισθητική εμπειρία λειτουργεί ως ένας μηχανισμός σημάτων ο οποίος ανιχνεύει διαφοροποιήσεις στις εσωτερικές και εξωτερικές συνθήκες και προειδοποιεί τον πράκτορα για πιθανές αποτυχίες των συνθηκών αυτών να υποστηρίξουν μια δράση. Αυτές οι συσκευές σηματοδότησης, σύμφωνα με νευρολογικές ενδείξεις ήδη βρίσκεται στη δομή του πράκτορα και είναι διαθέσιμες όταν οι αντίστοιχες εσωτερικές ή/και εξωτερικές συνθήκες το απαιτούν.

o Όταν οι συνθήκες είναι κατάλληλες, ο πράκτορας επιλέγει, μεταξύ άλλων, τη διαθέσιμη βιολογική λειτουργία (πχ. συσκευές σηματοδότησης), προκειμένου να αξιολογήσει την ιδιαίτερη κατάσταση που παρουσιάζει η εκάστοτε αλληλεπιδραστική αβεβαιότητα.

o Αυτή η υποδομή υποβοηθά την οργάνωση των νευρικών δομών, οι οποίοι οδηγούν επίσης σε αισθητικά προσανατολισμένες συναισθηματικές αποκρίσεις που επηρεάζουν την ανάπτυξη του αντίστοιχου αισθητικού νοήματος.

o Από αυτή τη διαδικασία αξιολόγησης προκύπτει μια αισθητικά προσανατολισμένη συναισθηματική αξία σηματοδοτώντας τον πράκτορα με τέτοιο τρόπο ώστε να προβλέψει την πιθανή επιτυχία ή την αποτυχία σε σχέση με το στόχο του. Ωστόσο, όλες οι αισθητικές αξίες βασίζονται στην ανάδυση της αρχέγονης τιμής αλήθειας (primitive truth value).

o Ως εκ τούτου, κάθε αισθητική αξία και κατ 'επέκταση κάθε αισθητικό συναίσθημα και νόημα, θα μπορούσε να αποτύχει κατά τη διάρκεια της δράσης. Αυτό σημαίνει ότι ο πράκτορας τελικά θα αποτύχει να συμβάλει στη σταθερότητά του.

Αυτή η οπτική του αισθητικού νοήματος παρουσιάζει όλες τις κανονιστικές λειτουργίες που περιγράφονται στα κεφάλαια 2 και 3. Αυτή η κανονιστική βιολογική και νοητική λειτουργία αναδύει ένα βασικό επίπεδο του αισθητικού νοήματος πάνω στο οποίο ολόκληρη η θεωρητική συμβολή της παρούσας διατριβής είναι βασισμένη. Αυτό το επιχείρημα σχετικά με το αισθητικό νόημα δεν περιορίζεται στην τέχνη, τη μορφή, την εμφάνιση, ή αφηρημένες έννοιες όπως η ομορφιά, το γούστο, την καλοσύνη, κλπ., αλλά και για σε δυναμικά σύνθετα γνωστικά φαινόμενα που περιλαμβάνουν πολλές άλλες κανονιστικές διεργασίες. Ως εκ τούτου ένας κανονιστικός ορισμός της αισθητικής κρίσης προτείνεται ως εξής:

Η αισθητική κρίση είναι κάθε νοητική εικόνα ή αναδυόμενη αναπαράσταση, η οποία επηρεάζεται από μια αισθητική εμπειρία ή μια ακολουθία από αυτές. Αυτό προτείνεται ό,τι είναι μια βασική μορφή μιας νέας αισθητικής απόφασης (εκτίμησης/προτίμησης), η οποία σχετίζεται με το αισθητικό νόημα και αναφέρεται στο παρόν. Ωστόσο, μια αισθητική κρίση θα μπορούσε να δομηθεί πάνω σε προηγούμενη (παρόμοια ή όχι) αισθητική ή μη γνώση και αναφέρεται στο παρελθόν.

Έτσι, γενικά, μια αισθητική εμπειρία είναι πάντα προσανατολισμένη στο μέλλον, ενώ μια αισθητική κρίση αφορά το παρελθόν ή το παρόν.

Αυτή η νατουραλιστική οπτική της αισθητικής και τα προτεινόμενα εννοιολογικά μοντέλα των αισθητικών συναισθημάτων παρέχουν στο σώμα της γνώσης της αισθητικής επιπλέον ευρήματα που χαρακτηρίζουν μια νατουραλιστική αντίληψη της αισθητικής:

o Η αυτονομία είναι προϋπόθεση για το σύστημα ώστε να παράγει αισθητικά συναισθήματα και να έχει αισθητικές εμπειρίες. Το αντίθετο δεν ισχύει. Η αισθητική εμπειρία δεν είναι προϋπόθεση για είναι ένα σύστημα αυτόνομο.

o Τα αισθητικά συναισθήματα και έτσι η αισθητική εμπειρία είναι μία ένσκοπη διεργασία, σε αντίθεση με την κυρίαρχη φιλοσοφική προσέγγιση για την αισθητική.

o Η αισθητική εμπειρία εξυπηρετεί την επίλυση της αλληλεπιδραστικής αβεβαιότητα που αναδύεται υπό συγκεκριμένες συνθήκες.

o Υπάρχει μια ισχυρή πιθανότητα για την ύπαρξη βασικών αισθητικών συνηθειών/έξεων κατά το πρώτο στάδιο της ανάδυσης των αισθητικών συναισθημάτων.

o Τα αισθητικά συναισθήματα και έτσι η αισθητική εμπειρία μπορεί να λειτουργήσουν ακόμη και πριν τη μάθηση.

o Η αισθητική δεν είναι ιδιότητα του περιβάλλοντος εκεί έξω, αλλά ένα γνωστικό φαινόμενο που αναδύεται μέσα από την παραγωγή νοήματος (δράσης) καθώς ο πράκτορας αναπτύσσει τρόπους για να επιλέξετε το καλύτερο αλληλεπιδραστικό βήμα σύμφωνα με τους δυναμικούς στόχους και κίνητρά του. Αυτή η αντίληψη της αισθητικής έρχεται σε έντονη αντίθεση με την απαίτηση για ανιδιοτέλεια στην αισθητική εμπειρία, που η αναλυτική αισθητική κληρονόμησε από την καντιανή παράδοση.

o Άρα η αισθητική είναι αναδυόμενη από τη δομική σύζευξη του πράκτορά με το περιβάλλον του και ποτέ δεν υφίσταται μόνη.

➢ **Κεφάλαιο 6:   Τα αισθητικά συναισθήματα, η σχεδιαστική διεργασία, και οι προσφερόμενες δυνατότητες (affordances)**
Ο στόχος του 5ου κεφαλαίου είναι να εξετάσει πώς τα παραπάνω διαδραστικά μοντέλα εφαρμόζονται στη σχεδιαστική διεργασία και πώς τα αισθητικά συναισθήματα επηρεάζουν το περιεχόμενο των σχεδιαστικών αναπαραστάσεων (design representations). Λαμβάνοντας υπόψη το σχεδιασμό ως μια ένσκοπη διεργασία, η οποία εμφανίζει έναν αλληλεπιδραστικό χαρακτήρα βασισμένο στη μελλοντική προσδοκία των σχεδιαστικών εκβάσεων, ο οποίος υποστηρίζει δράσεις βασισμένες στο νόημα μεταξύ των συμμετεχόντων στη σχεδίαση, προτείνεται ότι η αισθητική αναδύεται κατά τη σχεδιαστική διεργασία, με στόχο να στηρίξει τόσο τους σχεδιαστές όσο και τους χρήστες στη μείωση της σχεδιαστικής αβεβαιότητας (design-uncertainty). Ο όρος «σχεδιαστική αβεβαιότητα» εισάγεται σε αυτή τη διατριβή για να περιγράψει μια κατάσταση στην οποία, οι συμμετέχοντες εμπλέκονται στη σχεδίαση λαμβάνοντας αποφάσεις (δηλαδή παρέχουν και επιλέγουν δράσεις με το τεχνούργημα) που είναι αβέβαιες σε σχέση με το βαθμό εκπλήρωσης των εκάστοτε στόχων τους.

Συγκεκριμένα, με βάση τα θεωρητικά επιχειρήματα του κεφαλαίου 5, όπου αισθητική εμπειρία αναδύεται κατά την επιλογή δράσης ως ένας παράγοντας, μεταξύ άλλων, που μειώνει τη αβεβαιότητα της αλληλεπίδρασης, προτείνεται ότι:

- o Η αισθητική εμπειρία που έχοντας ως έκβαση αισθητικά προσανατολισμένες συναισθηματικές αξίες, λειτουργεί ως συμβουλευτικός μηχανισμός στους συμμετέχοντες στη σχεδίαση, παρέχοντάς τους την ικανότητα να επιλύσουν ή να μειώσουν την εσωτερική τους αβεβαιότητα άρα και τη σχεδιαστική αβεβαιότητα σχετικά με την επιτυχία ή την αποτυχία της προσδοκούμενης έκβασης της σχεδίασης.

Ιδιαίτερα προτείνεται ότι,

- o Όταν μια θετική αισθητική αξία (ευχαρίστηση) αναδύεται, η αντίστοιχη πρόβλεψη για την επίλυση της συγκεκριμένης σχεδιαστικής αβεβαιότητας αποτιμάται θετικά, ενώ

- o Όταν μια αρνητική αισθητική αξία (δυσαρέσκεια) αναδύεται, η αναμονή για την επίλυση της συγκεκριμένης σχεδιαστικής αβεβαιότητας επιφορτίζεται με αρνητικά αξία.

Ως εκ τούτου, σχετικά με τον ρόλο της αισθητικής εμπειρίας στη σχεδίαση προτείνεται ότι:

- o Το (συν)αίσθημα που επηρεάζει την προσδοκία για την επιτυχή επίλυση ή όχι της σχεδιαστικής αβεβαιότητας προτείνεται ως το μοντέλο της ελάχιστης αισθητικής εμπειρίας στη σχεδίαση. Αυτό σημαίνει ότι η σχεδιαστική αβεβαιότητα μπορεί να μειωθεί ακολουθώντας και τις δύο (θετικές ή αρνητικές) αισθητικές εμπειρίες.

Ακολουθώντας το παραπάνω επιχείρημα για το ρόλο της αισθητικής στη σχεδιαστική διεργασία, προτείνεται μια ισχυρή σχέση ανάμεσα στην αισθητική και τις προσφερόμενες δυνατότητες δράσης, οι οποίες είναι ευρέως γνωστές στη βιβλιογραφία ως affordances. Λαμβάνοντας υπόψη τη σημειωτική οπτική των προσφερόμενων δυνατοτήτων δράσης (βλ. κεφάλαιο 2), όπου αυτές δεν περιορίζονται στην άμεση αντίληψη, όπως είχαν αρχικά οριστεί, στο κεφάλαιο αυτό, προτείνεται ότι:

- o Το τι επιδέχεται το περιβάλλον ως προσφερόμενες δυνατότητες δράσης στη σχεδιαστική διεργασία είναι άρρηκτα συνδεδεμένο με το μέλλον όπου οι συμμετέχοντες στη σχεδίαση προσδοκούν ότι θα οδηγηθούν στην εκπλήρωση ή μη των στόχων τους.

Το περιεχόμενο των σχεδιαστικών αναπαραστάσεων σχετικά με αυτές τις δυνατότητες αλληλεπίδρασης ονομάζεται στη διατριβή αυτή ως «προσφερόμενες δυνατότητες αλληλεπίδρασης» (interactive affordances). Πιο συγκεκριμένα:

- Οι προσφερόμενες δυνατότητες αλληλεπίδρασης (interactive affordances) αναδύονται στην κατά την αλληλεπίδραση όταν όλες οι εσωτερικές και εξωτερικές συνθήκες υποδεικνύουν στον πράκτορα την καταλληλότητα μιας πιθανής δράσης, δηλαδή την ύπαρξη των δυναμικών προϋποθέσεων αλληλεπίδρασης.
- Αναδύονται, όχι από το αντικείμενο ή τον πράκτορα μεμονωμένα, αλλά από τη δομική συσχέτιση του πράκτορα με το τεχνούργημα και
- αφορούν μια μελλοντική δράση.

Αυτό σημαίνει ότι

- Οι προσφερόμενες δυνατότητες αλληλεπίδρασης βασίζονται στην προσδοκία,
- Μπορούν να αποβούν ψευδείς (false affordances)

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Όπως έχει ήδη υποστηριχθεί, σε περιπτώσεις σχεδιαστικής αβεβαιότητας, η αισθητική είναι ένας παράγοντας μεταξύ άλλων, που ενισχύει τους συμμετέχοντες να μειώσουν την προσωπική τους αβεβαιότητα και έτσι να ενισχύσουν την προσδοκία τους για την εκπλήρωση των στόχων τους. Αυτό που προτείνεται είναι ότι η αισθητική εμπειρία εξυπηρετεί την επικοινωνία μεταξύ των συμμετεχόντων στη σχεδίαση οι οποίοι μέσω της αισθητικής αξιολόγησης των εκάστοτε συνθηκών αλληλεπίδρασης βοηθούνται να παράξουν αλλά και να εφαρμόσουν στο σχεδιασμένο αντικείμενο τέτοια νοήματα που θα κάνουν πιο σαφή τον δρόμο προς την επίτευξη των στόχου τους.

Αυτό σημαίνει ότι η αισθητική εμπειρία επηρεάζει μόνο την προσδοκία των συμμετεχόντων για μια επιτυχημένη ή μη έκβαση και δεν προτείνει τη συγκεκριμένη σχεδιαστική απόφαση (ή δράση) που θα μπορούσε να οδηγήσει στην επιτυχία του στόχου. Έτσι η αισθητική εμπειρία δεν ταυτίζεται με τις «προσφερόμενες δυνατότητες αλληλεπίδρασης» (interactive affordances) οι οποίες μοιράζονται το ίδιο περιεχόμενο με τις σχεδιαστικές αναπαραστάσεις: την καταλληλότητα της συγκεκριμένης πιθανής δράσης.

Αυτό που τελικά προτείνεται είναι ότι,

o Αισθητική εμπειρία ενισχύει την ικανότητά μας να εντοπίζουμε τις «προσφερόμενες δυνατότητες αλληλεπίδρασης» (interactive affordances).

o Και τα αισθητικά προσανατολισμένα συναισθήματα και οι «προσφερόμενες δυνατότητες αλληλεπίδρασης» (interactive affordances) αφορούν προσδοκίες μελλοντικών αλληλεπιδραστικών εκβάσεων τα οποία αναμένεται να οδηγήσει τους εμπλεκόμενους στη σχεδίαση, στην επιτυχία ή αποτυχία του στόχου τους.

o Επειδή οι προσδοκίες μπορούσαν να αποτύχουν, τόσο τα αισθητικά προσανατολισμένα συναισθήματα όσο και οι «προσφερόμενες δυνατότητες αλληλεπίδρασης» (interactive affordances) θα μπορούσαν επίσης να αποτύχουν όταν το αποτέλεσμα της επιλεγμένης δράσης δεν είναι το αναμενόμενο.

o Και η αισθητική και οι «προσφερόμενες δυνατότητες αλληλεπίδρασης» (interactive affordances) ανήκουν στο περιεχόμενο της σχεδίασης, και ταυτόχρονα ερμηνεύονται κατά τη σχεδιαστική διεργασία από δύο οπτικές γωνίες: του σχεδιαστή και του χρήστη, καθιστώντας το σχεδιασμό μια διεργασία διαμεσολαβούμενης επικοινωνίας.

Μια πιο λεπτομερής ανάλυση των παραπάνω ισχυρισμών, διαπιστώσεων και προτάσεων μπορεί να βρεθεί στα Xenakis & Arnellos 2012 και Xenakis & Arnellos 2013.