THE DISSOLUTION OF THE FRAME PROBLEM FROM THE PERSPECTIVE OF EMBODIED AND ENACTIVE INTERTWINEMENT OF AFFECT AND COGNITION

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

AYŞE USLU

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY
IN
THE DEPARTMENT OF PHILOSOPHY

JANUARY 2017

Approval of the Graduate School of Social Sciences

_____

Prof. Dr. Tülin Gençöz
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Doctor of Philosophy.

_____

Prof. Dr. Ş.Halil Turan
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Doctor of Philosophy.

_____

Assoc. Prof. Dr. Elif Çırakman
Supervisor

Examining Committee Members

Prof. Dr. David Grünberg	(ODTÜ, PHIL)	_____
Assoc. Prof. Dr. Elif Çırakman	(ODTÜ, PHIL)	_____
Assoc. Prof. Dr. Barış Parkan	(ODTÜ, PHIL)	_____
Asst. Prof. Dr. Erhan Demircioğlu	(Koç Univ., PHIL)	_____
Prof. Dr. Ertuğrul Rufayi Turan	(Ankara Univ., PHIL)	_____

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last name : Ayşe Uslu

Signature :

ABSTRACT

THE DISSOLUTION OF THE FRAME PROBLEM FROM THE PERSPECTIVE OF EMBODIED AND ENACTIVE INTERTWINEMENT OF AFFECT AND COGNITION

Uslu, Ayşe

Ph.D., Department of Philosophy

Supervisor: Assoc. Prof. Dr. Elif Çırakman

January 2017, 257 pages

This dissertation aims to examine whether it is possible to show that there is no emotionless cognition and no emotion without cognition in terms of the meaning-generating role of the body and if this is possible, then how this contributes to dissolution of the frame problem. The main argument of the dissertation is that the dissolution of the frame problem depends on the recognition of the fact that cognition and emotion are embodied processes, and sense-making processes for living-beings are results of the interplay between cognition and affectivity, which are intertwined. In this respect, this dissertation criticizes the cognitivist approaches regarding cognition and emotion as disembodied processes, and correspondingly claiming emotion-cognition dichotomy since any approach based on disembodiment to cognition and emotion and separation of them cannot give account of how the frame problem is not a problem for living beings at all.

Keywords: emotion, cognition, embodied, enactivism, autopoiesis

ÖZ

DUYGU VE BİLİŞİN BEDENLENMİŞ VE ENAKTİF İÇ İÇELİĞİ PERSPEKTİFİNDEN ÇERÇEVE PROBLEMİNİN ORTADAN KALKMASI

Uslu, Ayşe
Doktora, Felsefe Bölümü
Tez Yöneticisi : Doç. Dr. Elif Çırakman

Ocak 2017, 257 sayfa

Bu tez, bedenin anlam üretimine katkısı bakımından duyguların yokluğunda bilişin, bilişin yokluğunda duygunun oluşmadığını göstermenin imkanını sorgulamayı, ve eğer bunun olanağını göstermek mümkünse, bu durumun Çerçeve Problemini aşmaya nasıl katkıda bulunduğu incelemeyi amaçlar. Tezin ana argümanı, Çerçeve Probleminin ortadan kalkışının, bilişin ve duygunun bedenlenmiş süreçler olduğu ve yaşayan canlılar için anlam üretim süreçlerinin iç içe girmiş olan bilişsellik ve duygulanımsallığın arasındaki karşılıklı etkileşimi sonucu olduğu gerçeğinin kabulüne bağlı olduğudur. Bu bakımdan bu tez, biliş ve duyguyu bedenlenmemiş süreçler olarak kabul eden, buna bağlı olarak da biliş-duygu ikiliğini öne süren bilişselci yaklaşımları eleştirmektedir. Çünkü, biliş ve duyguyu konusunda bedenlenmemişliğe ve bunların ayrılığı fikrine dayalı hiç bir yaklaşım, Çerçeve Probleminin yaşayan varlıklar için nasıl bir problem olmaktan çıkmış olduğunu açıklayamaz.

Anahtar Kelimeler: duygu, biliş, bedenlenmiş, enaktivizm, otopoiesis

ACKNOWLEDGMENTS

I would like to gratefully and sincerely thank my supervisor Elif Çırakman for her guidance, understanding, patience and most importantly her friendship during the entire period of my PhD study at METU and in the time of writing of this dissertation. Without her guidance and persistent help this dissertation would not have been possible. Her mentorship was paramount in providing experience that helped me to shape my academic career goals. I would like to express my deepest appreciation to Erhan Demircioğlu for his guidance, encouragement, effort and friendship without which I cannot start this dissertation and make progress in philosophy of mind that was kind of a new area to study for me. He strongly motivated me in all the time of research and writing of this dissertation for taking account of opposite views and accordingly developing better arguments. His guidance helped me to map my philosophical intuitions and clarify my philosophical tendencies in a way that these can also be supported by scientific research.

Besides, I would like to thank Monica Meijsing, who supervised my dissertation during the period of my research in the School of Humanities, Philosophy Department, Tilburg University, for her support, encouragement and cooperation. She reviewed several drafts of chapters of my dissertation and provided me assistance and invaluable comments on my writing and grammar.

In addition, I would like to thank the members of the committees during the research: Barış Parkan, David Grünberg, Hilmi Demir and Ertuğrul Rufayi Turan, for their insightful comments and encouragement.

Last but certainly not least, thanks to all women in my family, who respect my giving priority in my life to quest for knowledge, for their patience and unwavering love, which undeniably fed my life force. Without them, I would be a candle without light.

TABLE OF CONTENTS

LIST OF FIGURES

FIGURES

LIST OF ABBREVIATIONS

EC	Embodied Cognition
SMH	Somatic Marker Hypothesis
AI	Artificial Intelligence
SCI	Strong Conscious Inessentialism
WCI	Weak Conscious Inessentialism

CHAPTER 1

INTRODUCTION

In his dialogue Phaedrus (246a-254e), Plato explains his view of human soul by using the Chariot Allegory. According to this allegory, the intellect in the position of the charioteer guides the soul to truth by controlling the two winged horses that pull the chariot. The charioteer struggles for preventing these two horses from going different directions, and for making them work as a team so that they reach enlightenment. One of these two horses represents rational part of the soul, while the other represents the irrational passions. The challenge of making them work together is the presumption that reasoned thought and emotional response are accepted as distinct, and as difficult to be leagued together when the sense-making or decision-making processes are considered. The idea that emotions and thinking are separate faculties is a belief that has been maintained throughout the history of philosophy of mind and science even today. It has been considered that human beings have central nervous system and developed brain functions with respect to decision-making or producing meaningful actions for the benefit of organismic survival. On the basis of this idea, it has been maintained that this feature gives human beings a privileged position among other non-human living beings in terms of evaluating what matters to them, and even more complex bulk of knowledge so that they produce meaningful responses in accordance with this evaluation processes. Accordingly, human beings have a capacity of thinking that can easily rule out the irrational passions and drives unlike non-human living beings. Moreover, this rationalist insight has led to the idea that robots or computer programs, which do not have the emotional phenomenal experience, can be used as a mean for modelling human mind. Thus, this rationalist tendency has been taken a step further, and it has been claimed that there is almost

no difference between computer and human mentality in terms of their way of functioning. For the cognitivist model of mind grounded on rationalism, also the emotional processes are understood as being dependent on certain cognitive processes bounded by brain functions. Whereas the affective processes as feelings of emotions are related to the body, the contemporary dominant cognitivist views of mind, which ignores the constitutive role of body in cognitive processes, enclose also emotion into the brain by merely isolating it from the entire body. Thus, the body is conceptualized as a passive receiver, and as not active in cognition. This cognitivist understanding of emotion ignores the essential role of the embodied dynamics of the interaction between body and environment in processes of cognition and emotion; hence, emotions also become disembodied by being an element of a computational cognitive process. In other words, the emotions as well, which Plato differs from rationality by referring to their bodily roots, and subordinates to rationality with respect to its capacity for proceeding to the truth, are subsumed under this rationalist tradition. The body is rendered as a passive receiver, or as a passive transmitter of sense data. Accordingly, affects as bodily feelings are conceptualized as mere epiphenomena, or as by-products of cognitive processes. They are not regarded as part of evaluation process, that is, as essential for cognition. The cognitivist and computationalist framework, which rely on a disembodied and brain-bound conception of the cognition, is in tandem with ignoring the role of emotions in the process of sense-making. According to the cognitivist view, decision-making and producing meaningful responses in accordance with the present context is constituted by an evaluation process of the data received from the external world according to some syntactic rules inside the brain. These data are considered to have fundamentally a representational nature in terms of the structure and the mechanism of the brain functions. Hence, both cognition and emotion are defined as the process of evaluation of these representations, and producing meaningful responses in accordance with the needs of the individual. From this perspective, since the brain is separated from and prioritised over the rest of the body in terms of cognitive

evaluation processes, the brain becomes the ultimate centre for the production of mental processes rather than being a part of a complex living entity.

This dissertation tries to conceptualize the dichotomy of emotion and reason from an embodied and enactivist perspective. Enactivism defends the perspective of the embodied cognition and argues that emotions are bodily constitutions just like cognitive processes, and these two already exist interconnectedly. Thanks to this interdependence there is no such a problem of framing the world for all the living beings. Framing the world can be defined as detecting objects and events in our environment, which are relevant and significant to us, and to produce meaningful responses to them. The question is to be able to define the differences between living beings and machine intelligence in terms of their ways of facing the problem of detecting what matters to them in their environment. Enactivism argues that living beings do not suffer from the frame problem due to the fact that the structural coupling between the organism and its environment, which is based on co-emergence of the system and the environment, the organism's skilful coping with the environment, and the organism's affective sensitivity to its environment provide the ground of the dissolution of the frame problem. Enactivism understands emotion and cognition without falling into cognitivism's pitfalls, which are representationalism, formalism and rule-based transformation. For cognitivism, emotions are not different from perception in terms of its way of functioning, but what they understand by perception should be understood *via* these three components above, which makes perception and cognition in general abstract, isolated and language-like processes rather than embodied, embedded and biophysiological processes. Enactivism rejects cognitivist, representationalist and computationalist traditions in terms of the linear sequence of cognitive process, which is "sense/input → Plan (compute)→ Action (output). Enactivism criticizes the understanding of cognition as standing on the "planning" side of this sequential information processing in the form of symbol manipulation. Enactivist perspective suggests that framing the world corresponds to a process of sense-making for all living beings, in which cognitive structures emerge

from the recurrent sensorimotor patterns that enable action to be perceptually guided. From this perspective, sense-making should be understood in its relation to the notions of autopoiesis, organismic autonomy and adaptivity. Living systems continually generate themselves, of which components are dynamically related in a network of ongoing interactions. Living beings are biologically autonomous in the sense that they are organizationally closed systems because of that the network of these organizational processes recursively depend on each other in the generation and realization of the processes themselves so that they constitute the system as a unity. In order to maintain its viability, a living system's organization is in continuous modification of its structure, and in adjusting process to local conditions, which are continuously changing. From this framework, cognition is a vital feature of all living beings since a living system is defined as "an active self-updating collection of structures capable of informing (or shaping) its surrounding medium into a world through a history of structural coupling with it" (Varela, 1987, p. 52). In this respect, a living system defines the world in which it lives in its being, doing and knowing. Foe enactivism, these processes cannot be separated from each other. The affective life of an organism is penetrated into all these processes as part of the evaluation processes of its surrounding medium. According to enactivist perspective, emotional qualia or bodily feeling of an emotional change in the body and the process of appraisal are constitutively interdependent. Our capacity to understand our surroundings is essentially bodily and affective. Being sensitive to what is relevant and significant to us is related to what our body personally needs to maintain and regulate its life, and in order to have the personal aspect of our experience there must be a process of subjective bodily feeling of the way we are interacting with our environment. "Emotional intentionality generates neurobiological processes that cannot be separable from associated feelings", that is, "physiological processes are also related to the experiential character of appraisals" (Maiese, 2014, p. 235). In short, from the perspective of enactivism, appraisals, emotions, and the feelings of these emotional changes in our bodies are not separable. Yet, in order to recognize

this interdependency, one should give up the disembodied understanding of cognition. The feelings that determine the personal significance contribute to form the context boundedness of the structure of our affective and cognitive capacities. The context free structure of functioning mechanisms of cognition and emotion from the perspective of cognitivism is rejected in this respect by appealing to the essential role of feelings for all living organisms unlike any computer program or robotic creature. Therefore, enactivism allows us to conceptualize the frame problem from a perspective that eliminates both mind-body dualism and also emotion-cognition dualism.

In this dissertation, I criticized the views that claim to solve the frame problem by embracing the embodiment thesis about the constitution of emotions, but still have a disembodied understanding of cognition. The main argument of this dissertation is that the frame problem cannot be solved unless one does not give up the disembodied cognitivist understanding of cognition. Even if some embodied theories of emotion seem to be detached from cognitivism since they emphasize on the role of body in the constitution of emotions, they still remain cognitivist by separating cognitive part and bodily dynamics in the process of constitution of emotions. Even if one confirms that the processes of emotion are bodily constituted, and emotions play a role in cognition, as long as one's conceptual framework leans on cognitivism about cognitive processes it is not possible to eliminate the emotion-cognition dichotomy as well as mind-body dualism. Thus, from a cognitivist perspective, it is not possible to argue the dissolution of the frame problem as long as the emotion-cognition dichotomy is maintained. The dissolution of the frame problem requires a properly embodied system where cognition and emotion are both embodied and constitutively interdependent.

In order to clarify this claim, in the first chapter of this dissertation, I introduced the philosophical aspect of the frame problem, and examine how philosophers take it into account from both the epistemological and phenomenological aspects. At the end of this chapter, I claimed that the frame

problem cannot be solved without considering embodied and also embedded being of human body.

In the second chapter, in order to have a better idea about what the embodied mind thesis is, I examined Embodied Cognition, which maintains that cognitive capacities of an agent are strongly influenced by aspects of an agent's body beyond the brain itself. At the end of this chapter, I argued that cognitivist, representationalist and computationalist understandings of cognition reduce the cognitive activity to intra-brain work and ignore the crucial role of the rest of the body in cognitive processes.

In the third chapter, I examined the views that embracing the role of the emotions in cognitive processes, and this role can in fact solve the frame problem. In order to give background information about various theories of emotions, I introduced cognitivist and non-cognitivist theories of emotions, and compare them. Under the light of this comparison, I claim that neither the cognitive theories of emotion nor the feelings theories of emotion can explain the true nature of emotions. Whereas the cognitive theories of emotion ignore the role of bodily events in the constitution of emotions, the feeling theories of emotion cannot give account of intentionality of emotions. Embodied appraisal theory of emotion allows conceptualizing emotions in terms of both bodily processes and also evaluative character of them. However, it fails to account for how these two components of emotions interact, thus its suggestion for a solution of the frame problem fails as well for the same reason. At the end of this chapter, I argued that as long as emotion and cognition are understood as separate processes, they cannot be proposed as a solution for the frame problem.

In the last chapter of the dissertation, I examined enactivist approach in terms of its holistic view of sense-making as a process that is based on the intertwinement between cognition and emotion. I claimed that from the perspective of enactivism, the ability to detect relevance is a biological necessity for an organism's survival and well-being, which seems that any robot cannot have due to its structure following

algorithms that allow for responding only to fixed features of what it has its environment. Thanks to their biological substructure, living organisms can detect what is relevant, which is actually constantly changing in the real time world, so that the frame problem does not even arise. In this respect, the embodied, enactive appraisal theory of emotion provides a framework that affectivity, appraisal and feelings are interconnected in a single combined process without falling into the dichotomy of emotion and cognition. From this framework, the philosophical frame problem namely the problem of relevance dissolves due to the immediate capacity of living organisms for detecting relevance and value, or to put it in another way, thanks to our bodily beings in the world with affective and cognitive capacities we do not suffer from the frame problem.

CHAPTER 2

THE PHILOSOPHICAL FRAME PROBLEM

Philosophy has been appertaining to understand the nature of change throughout its history. Understanding change is to be concerned with the nature of the things that persist without changing as well as with the things that are subjected to change in terms of their being and in terms of their causal relations. Considering our practical life, understanding change is crucial in terms of that it is also to be able to see the effects of our acts in our world of experience and to question conditions of creating a change through our acts. When we try to understand the occurrence of an event, we have to take account of both the components that change and also the components that remain without changing. At this point, one can philosophically argue that everything is actually subjected to change and nothing remains without changing. However, it is also philosophically predicable that in a given situation the possibility of our world of perception depends on the presence of things that remain without changing along with the things changed. In this respect, it is worth to remind David Hume's suggestion about knowledge from experience. The condition of having the capacity to make causal inferences, which allows us practically to survive in a world of experience in which everything is condemned to change, depends on the principle of "custom" or "habit." As Hume puts it, "whenever the repetition of any particular act or operation produces a propensity to renew the same act or operation … we always say, that this propensity is the effect of *Custom*" (Hume, 1975, p. 43). Thus, we can strongly hold on the idea that the future will be conformable to the past as result of the principle of habit, but not of reason. Habit operates as a principle of association and its form of operation is to provide the association that will generate the causal processes. It is the repetitions in experiences that assemble the

components constituting our world of perception. By virtue of associativeness of the principle of habit, a connection among the past, present and future experiences is possible. In a real world of experience, when we enter into an action for the sake of a purpose, it must be taken into account what will remain without changing and what will change. We need this associative knowledge in order for the constitution of the causal relation of my act in accordance with the purpose of this act. This knowledge will provide us both the necessary and sufficient conditions of occurrence of this event and also the information of what will change as a result of this action. Before taking the next step, I have to know that my next step will not simultaneously cause everything around me to move and replaced. Hence, when I feel thirsty in my study room, before taking the step for drinking water, I have to know that my first step toward the water glass will result in picking up the glass but not in all the stuff in the room being moved. Even I have to know that my thirst will disappear with drinking the water from the water glass and this event has nothing to do with the other things in the room e.g. my study desk. However, it has something to do with the water that is in the water glass. A successful accomplishing of an act, a successful carrying out of a plan or achieving a goal depends on this knowledge. If I predict consequences of my act, I come to the proper result that I aimed. However, to argue that habit or repetition provides this prediction or associative knowledge does not give us the adequate knowledge about all the features of this knowledge. What is the nature of this knowledge? How is it constituted? Is it stored as beliefs, or differently? How are repetitions and habits transformed into intelligent behaviours?

This associative knowledge and the capacity of making prediction determine both the processes of decision-making, and detecting significance or relevancy of the things around us in accordance with the purposes and intentionality of our actions. If we do not know what our actions will cause to change and not to change, and we cannot predict the consequences of our acts, then how can we act? When we try to understand change in a given situation and time, we have to consider a huge amount of knowledge in a complex world that is in constant change. There must be a system

to decrease the number of this knowledge into a manageable amount. When we start to think about the existence of such a kind of system, we confront with the "frame problem." In order to have a system to filter the information about what will change and not change as a result of my act, I have to extract the knowledge that is relevant and significant to me out of this huge amount of knowledge. When the problem into a question of making an extraction of only the aspects of the world which are relevant and significant to me for the sake of achieving my goals, I come to understand that the actual problem that I try to overcome is about understanding the nature of making meaningful selections and decisions. As soon as we come into the world as a newborn baby, almost the first thing that we do is to choose, that is, to choose for the sake of survival. We can say that this act of choosing is the moment that we can observe the first glimpse of cognition. It is the first evidence of the existence of a living mind to predict the consequences of its acts through distinguishing what is relevant to it from what is not. Considering the intelligence exhibited by machines, Artificial Intelligence (AI) does not start from a different point. It is the point that a newborn baby's mouth is directed to its mother's breast to be feed. However, at this point, we can ask whether our ways of understanding of the intelligence exhibited by machines should be different from the ways of understanding the newborn baby's way of showing intelligence. A possible answer to this question might be modelling human mind according to machine intelligence. We can even question whether the newborn baby's act can be seen as a sign of intelligence if we assume that what it does is not actually to choose or select relevant aspects of its environment, but an expression of an instinct. In this respect, it should be noted here that there are various approaches that conceptualize differently the conditions of the emergence of intelligence, and how the knowledge that this intelligence used is constituted and stored. There are various conceptualizations based on different epistemological frameworks and ontologies that understand cognition and intelligence such as robot studies, biology, psychology, neurology and philosophy in different levels. The aim of this dissertation consists in examining the

philosophical consequences of these different approaches that conceptualize human and non-human intelligence from different perspectives. This dissertation will be concerned with the "frame problem" in terms of examining mainly the relevancy problem within the approaches that this work agree or disagree with. In this sense, we can say for now, the position this dissertation stands with is the enactivist approach emerging from within phenomenology, neurology and biology. Enactivist approach asserts that this associative knowledge is a result of our bodies, which contributes to generate this knowledge by its whole being. Moreover, this knowledge is stored in the skills of this body within its relationship to its environment, which can be regarded as an attunement between them. Enactivist approach can be understood in terms of its opposition to the cognitivist perspective, which argues that this knowledge is stored and used as representations that correspond to beliefs, judgments and thoughts as constant entities operated only by virtue of the functions of the brain as the manipulation of these symbol-like representations. However, what I shall argue is that emotions or affectivity plays a crucial role in the processes of meaning production and they are intertwined with cognitive processes, which I claim that the dominant views in the literature tend to ignore so far. The ultimate question of the this dissertation can be stated as follows: how the things in our environment become related to us so that we can perceive the environment that we interact within a relation of figure background without being obliged to evaluate huge amount of knowledge, and can act by detecting relevance and significance in accordance with this evaluation. Does the rest of the body beyond the brain play a role? If it does so, what is the significance of the affectivity as our bodily feelings within this role? Does the semantic world that we create get meaning independently from our subjective feelings? Can we have intentionality for the sake of our survival without our feelings? In order to find the plausible answers to these questions, we have to first define and state the "frame problem". Afterwards, we will dwell on the arguments to solve the "frame problem", and try to understand which approach could

satisfy better our need to understand better the first glimpse of intelligence, which is the moment of that a mindful life come into scene.

2.1. What is the Frame Problem?

The original frame problem as appeared within the Situation Calculus[1], which is a logical language for representing change (McCarthy, 1963). It refers to the problem of giving the account of a logical system that can define its axioms to infer the effects of actions and finding a proper way to formally define its axioms at the same time to infer non-effects of those actions other than trying to simply enumerate such non-effects[2] (Shanahan, 2009). From the technical aspect, the frame problem is related to limiting the large number of those accompanying axioms of non-effects. This was actually based on a difficulty for representing a changing world. In a logical system, when some axioms are presented about changes, these axioms are based on prior occurrences of changes. However, since the inferences have to be made only by deduction, there appears a need for some other axioms defining non-changes, namely non-effects of these changes. These axioms can be called "frame axioms" without which a logical system cannot deduce the states that persist (Shanahan, 2009). The problem is that we have to find a general rule to determine which of the given properties of a situation remain unchanged as the result of an action and to avoid dealing with large numbers of frame axioms that relate actions to each of the non-effects of those actions. The solution from logic to this problem requires finding a short way to formalize the assumption that an action does not lead

[1] The situation calculus is defined as a logical language in order for representing changes and for reasoning about dynamical domains. McCarthy introduced the term for the first time in 1963 in an article titled "Situations, actions and causal laws."

[2] For example, when I grasp a glass of water, this action will change the position of the glass but not necessarily its colour. The property that is not changed via grasping the glass such as its colour is defined the non-effect of an action.

to non-effects unless one asserts evidence to the contrary. This assumption is called "the common sense law of inertia" (Shanahan, 2009). According to this law, when an action takes place and if it doesn't affect a particular property of a situation, then we can say that this property doesn't change. According to Shanahan (1997), this problem of formalizing the common sense of law of inertia, which is based on this default assumption, can be labelled as the "technical" frame problem. Yet, this problem is more or less solved by the researchers in logic-based AI. For the solution of the "technical" frame problem by formalizing the common sense of law of inertia, different solutions, which are based on *non-monotonic* reasoning, in logic-based AI have been developed and applied to the frame problem such as *circumscription* (McCarthy, 1986). The common feature of these different solutions is to handle the problem of the "monotonicity" of classical logic. Here "monotonicity" is the property of logical systems that allows for adding further premises to the certain set of premises, which results in extending this set of premises. However, previously reached conclusions from the former set of premises do not change by adding more premises. This "monotonicity" property of classical logic makes it impossible to express a formula that can cover also an open-ended set of unexpected conclusions contrary to the common sense of law of inertia. Marvin Minsky puts it as follows:

> Monotonicity: ... In any logistic system, all the axioms are necessarily "permissive" - they all help to permit new inferences to be drawn. Each added axiom means more theorems, none can disappear. There simply is no direct way to add information to tell such the system about kinds of conclusions that should not be drawn! To put it simply: if we adopt enough axioms to deduce what we need, we deduce far too many other things (Minsky, 1974).

In real time experience an intelligent agent follows a non-monotonic reasoning that involves risks, and allows jumping to conclusions from deductively insufficient premises. For AI, an intelligent decision-making process in realistic situations can be

said to be impossible to represent or formulize as deductive inferences in classical logic. The human mind follows commonsense knowledge, and it is not possible to represent it in the form of a deductive system. For Minsky (1974), a logic system cannot represent common sense reasoning in a realistically large set of propositions since it is not flexible enough to serve as a basis for thinking. Thus, the non-monotonic logic has tried to find a solution that works in the presence of concurrent actions, actions with non-deterministic effects and continuous change. It seems that there are different solutions to the technical frame problem from within logic-based AI research that uses non-monotonic logic.

2.2. Daniel Dennett's Epistemological View

However, the problem of finding a logical representation that can describe what remains without changing when actions occur in a dynamical world has led philosophers to dwell on this problem deeply by relating it to the whole cognitive process. This is also a problem for AI. When human cognition is considered, it is a tricky question, for example, how it is possible to show that there are large numbers of certain exclusion rules in the brain, which determine what remains unchanged when certain actions are performed. This argument pushed the questioning further and led to some claims that the logical approach in AI would not be able to find a solution on its own for this question. Along with other different views of anti-logicians and philosophers that redefine the frame problem and correspondingly offer different solutions to it, Dennett's article "Cognitive Wheels: The Frame Problem of AI" (1984) presented one of the first of these views concerning the philosophical nature of the frame problem. The problem for Dennett is deeper than how AI takes it, that is, how it can be determined which information is relevant to reasoning in a certain situation and which information can be ignored. In his words, the question is how "a cognitive creature … with many beliefs about the world" can update those beliefs when it performs an act so that they can remain "roughly faithful to the

world." (Dennett, 1984, cited in Shanahan, 2009) It seems that how Dennett formalizes the frame problem is formally different from AI researchers who are interested in the logical side of it since Dennett doesn't refer to non-effects of actions. However, when we focus on "relevance", we can see Dennett's point regarding the link between ignoring information obviously irrelevant to one's goals and one's ignoring many obvious non-changes. To avoid examining a large number of databases of non-changes along with the changes for an intelligible agent like a robot is only possible with a system that can limit those databases according to what is relevant for this robot's action at issue. And the logical problem for logic-based AI is to show how this system is possible, and can be representable within a logical language. Dennett insists that what AI asks about the frame problem has introduced a new deep epistemological problem for cognitive science, and broadly for philosophy. In order to have a better understanding of this relevance problem, we can look at Dennett's example of robot RI and a series of different versions of RI, which fail in various situations at a specific task that is to retrieve their own battery in a room containing a time bomb. Three robots that are programmed differently for the same task fail each time. The first robot R1 can take the wagon carrying the battery out of the room but even if it knows that there is a time bomb in the room and also that this bomb is on the wagon, it cannot recognize that getting the wagon together with the bomb can make itself detonated along with the bomb. The second robot R1D1 that is designed to "recognize not just the intended implications of its acts, but also the implications about their side-effects" (Dennett, 1984). is set to consider all the implication of the act of getting the wagon from the room, and it can recognize that moving the wagon carrying the battery also moves the bomb but it gets stuck in deducing all the implications of its act at random, and therefore cannot detect relevance within too many implications. Finally, the time is up, and the bomb explodes and so it fails at the end. The third robot R2D1 too fails since its design is programmed to distinguish between relevant implications and irrelevant ones and to make sure that it takes into consideration all the right things and so must ignore all

other possible and derivable information that is irrelevant. This failure results in a kind of deadlocking that the robot falls in an endless process of consideration of information, and disregarding some of this information as not the right thing. Hence, the third one also fails since it gets stuck in tracking all the non-effects of its action. For Dennett, as this example shows, the frame problem indicates a deeper epistemological problem of determining which information is relevant to reason in a given situation and which of them should be ignored since it is not relevant for the situation at hand. For an intelligent being, to cognize means to deduce the implications of what it knows, but only the relevant ones. This indicates a deep problem not only for robot design but also for epistemology regarding the analysis of how an intelligent agent knows. And it is worth to note that only when AI tried to duplicate common sense in computers, the frame problem became apparent.

It seems that the philosophical challenge of the frame problem should be met, when human cognition is understood in computational and representational terms. Is it possible for a human brain to store this huge database to determine what is relevant and what is not for a specific act? For Dennett, the technical (partial) solution from the common sense law of inertia could not remove the epistemological frame problem in the sense that the epistemological problem is based on questioning the possibility to produce a systematic and complete revision of the aspects of the knowledge foundation that are affected by a given action. When we consider a certain action of a robot using stored sentence-like representations of the external world, which is designed by logic-based AI, and if we are philosophers who rely on the computational theory of mind supposing that mental states are based on propositional attitudes, and that mental processes mean to make inferences over those propositions at hand, we have to give an account of how this robot limits the scope of those propositions it must reevaluate in the light of its actions. Even if a simple robot that is able to go over its entire database of propositions and discover which one needs to be modified can easily overcome this difficulty, then human cognition, given that the amount of her database of experiences to go over and

evaluate every time is more than the robot has, seems to be too much to be tractable computationally. As John McCarthy (1969), who coined the term of the frame problem for the first time, pointed out, the underlying idea of the frame problem is that it is not possible for a knowledge database to describe everything since it can be claimed that knowledge databases cannot describe the entire mass of knowledge. Furthermore, the environment is changing continually and it is not enough just simply to modify some parts of this knowledge database to handle the changing information inputs and to cope with changes in the environment. When we consider a robot in such a case, we can see that it must have a mechanism such as "common sense" to respond to an unexpected situation other than simply modifying its database and we know that a robot doesn't have a common sense. For Dennett, AI wants to establish a system to find out which relevant information a robot needs for its tasks without having a starting point such as "common sense" from the beginning of its design process. He states that humans too suffer from this problem of relevancy sometimes and make mistakes, and are surprised when relevancy is not properly determined. However, humans "engage in swift information-sensitive planning" which has the effect of producing reliable but not foolproof expectations of the effects of their actions in the sense that humans have common sensical expectation of "normal" effects of their actions, and this is why they are surprised when an unexpected effect shows up (Dennett, 1984, p.193). In his own words,

> This suggests a graphic way of characterizing the minimal goal that can spawn the frame problem: we want a [...] robot to be surprised [...]. To be surprised you have to have expected something else, and in order to expect the right something else, you have to have and use a lot of information about the things in the world (Dennett, 1984, p.193).

It should be noted here that this problem seems to be a kind of induction problem about having good expectations about any future actions of one's own, or of another agent, or about the situation of another thing. As also Dennett points out, even if the induction problem was solved, that wouldn't affect the frame problem. Thus, even if

an intelligent agent was able to draw infallible conclusions about its environment via the knowledge that it already has, and made good predictions and planning, it would still suffer from the frame problem since it still has to handle the problem of representing and also processing all this huge amount of knowledge it has. This process of representing and processing the knowledge at hand has actually nothing to do with the issue of truth-value or any probabilistic inquiry. It is just a matter of assignment of relevance and also updating of those relevance relations. "Having access to absolutely justified probabilistic knowledge is of little use to a robot who has to make a plan to save its spare battery if it does not know how to apply this knowledge at hand" (Dennett, 1984, p.181).

Dennett (1984) claims that an intelligent being should look or think before it leaps into the next step in the sense that it should be able to use well what it knows for the expected result or its aim for the next step. For what?

> For improving the fidelity of your expectations about what is going to happen next, for planning, for considering courses of action, for framing further hypotheses with the aim of increasing the knowledge you will use in the future, so that you can preserve yourself, by letting your hypotheses die in your stead (Dennett, 1984, p.185).

For Dennett, the process of thinking before leaping into the next step is determined by what an intelligent agent learns from experience. An intelligent agent uses what it learns from experience to guide expectations in the future. However, he states that we should have been in effect born knowing some of the knowledge we need. For example, in order to have a beer from the fridge, I can simply plan to go downstairs and open the fridge and check if there is a beer to drink by using my previous accumulation of experience in the world. However, Dennett states that some of the knowledge that I need might be innate such as knowing that when the beer gets into the glass it is not longer in the bottle, regarding the fact "that if something is in one location it isn't also in another, different location; or the fact that two things cannot be in the same place at the same time; or the fact that situations change as the result

of actions. It is hard to imagine just how one could learn these facts from experience" (Dennett, 1984, p.187). For Dennett, this "innate" knowledge may be "unconsciously" known, or figured out in order to perform an action. The misleading point of AI is to start from "a zero point" to program an intelligent robot that doesn't know anything about this world. The idea is that it is born as a "tabula rasa" contrary to the human mind. What Dennett tries to point out is that we cannot easily differentiate which knowledge is innate and which is developed by cumulative experience via learning, and AI should note that they shouldn't ignore the problem of learning. To create an intelligent robot might not simply to install all the knowledge that an agent has to know to solve a problem, or to plan an action in a changing world; the knowledge must also be in a usable format (Dennett, 1984, p.189). Hence, the issue is to be able to link properly between the semantic level of the knowledge and the syntactic level; in other words, to be able to solve the problem of which knowledge should be installed and also of what system we should use to put that information in.

That brings us to the problem of "language of thought" theory of mental representation where each distinguishable "proposition" is separately inscribed is in the system (Dennett, 1984, p.189). The language of thought hypothesis (LOTH) in cognitive science claims that mental activity in the brain has the form of language. It was J. A. Fodor who developed this idea for the first time in his book *The Language of Thought*. Fodor pointed out that the brain works via a language similar to the language used in our daily life, where some syntactic and semantic rules allow for arraying of "words" and making up the meanings of these words. The constructs of this mental language are processed much like in a computer. However, in this case, the symbolic system of the cognitive processes is physically realized in the brain. The formulation of LOTH is described by "propositional attitudes" e.g. *S* desires that *P*. This means that thoughts have syntax, and semantics as well as syntax plays a causal role in the system of representations. LOTH provides a model for cognition in which structurally complex symbols can be analysed syntactically and also

semantically. However, it has always been a matter of debate as regards the possibility to give account of how mental representations can be the direct objects of attitudes and how they can constitute or structure the "meaning" of these attitudes, and also how this semantic structure is regimented syntactically. These questions respectively refer to how an intelligent agent represents and stores all the information that it needs, and how it organizes this information, namely according to which rule the huge amount of information is organized and structured. In this regard, Dennett finds this the idea of "language of thought", which is supposed to be a model for cognition, problematic; and thus likens an envisaged AI agent to a walking encyclopedia. Even if we assume that there can be a system of representing and storing all the information needed for use as in an encyclopedia, we cannot guarantee that there will also be a system that is able to line up this huge amount of knowledge, and then deduce all the rest of knowledge on demand since "it is clear that there simply are no entailment relations between vast numbers of these facts" (Dennett, 1984, p.189). Dennett accepts that we don't have brains large enough to store all the information needed. Moreover, we also live in a time-pressured world in regard to the fact that we don't have enough time to organize this stored knowledge in the short real-time spans. To be intelligent means to be able to select well the elements from the knowledge storage –if we assume that this information is something to be "stored"– and then operate them in a real-time interaction with the world in order to make swift information-sensitive plans via them. Dennett's idea of cognitive wheels sums up his point on logic-based AI: all the solutions offered so far to the frame problem for the sake of designing an intelligent agent could be grouped under a single term called "cognitive wheels" as similar to the invention of wheel as a solution to the problem of efficient motion (Dennett, 1984, p.201). To model cognitive faculties by means of artificial systems has meant to engineer a cognitive wheel, which has actually no relevance to the real world. Human cognition is not such a kind solution, that is, biology does not solve its problems via a cognitive wheel, which cannot be found in nature. Wheels are a solution to the problem of

locomotion as an engineering product, but nature does not need to be equipped with wheels, and so a natural creature cannot be modelled as having wheels. From this perspective, the existing cognitive models as a collection of various rules and symbols can be seen as cognitive wheels that can be used for technological purposes, but not for modelling the original human mind itself. In other words, the technical solution is not a natural solution as how human cognition works. Thus, from the perspective of the idea of cognitive wheels, to engineer a technical system can help to solve our problems such as the frame problem. However, we cannot claim that this technical solution actually explains and describes how nature in fact produces solution to the frame problem for human cognition. The job of an engineer is different from what nature does. Since nature builds new structure on top of a pre-existing structure, rather than designing from scratch as engineers do (Cohen & Eichenbaum, 1993, p.6). What AI does is to engineer a technological solution for an artificial entity and then try to map this technological model on to a biological entity. In other words, AI invents an artificial product to do a certain cognitive task, and then claims this product also shows us how human beings do the same task. This problem can also be formulized from another side concerning whether it is possible to map a biological process on to an AI model or not. For, it seems that biological processes always occur in a context-based environment in the real world in the sense of both evolutionary level and real-time processes. Therefore, we can ask if it is possible to derive relevance from an absolute (context-free) world model of a robot. Or is it possible for a system even to have such an absolute world model in the first place? “Every representer is necessarily *selective*, and a good representation is thereby oriented toward a particular (sort of) use by a particular (sort of) agent” (Anderson, 2003, p.98). The fundamental problem with any representational system is to be able to determine what should be modelled and what should be ignored. As Anderson (2003) puts it, it doesn’t make sense to think about representing at all unless one knows what one is representing *for*. In other words, the representational model of mind cannot account for the ground of intentionality at least for living

beings even if it tries to explain and simulate the mechanism of the constitution of the "intentional content" via appealing to artificial systems. The problem of cognitive wheels is that technical solutions for the frame problem might not be the way human beings "solve" the frame problem. A representational system falls into the pitfall of not being able to answer the question of context-free versus context-sensitive representations. How does a robot can produce context-sensitive responses to a complex and continuously changing environment? The act of framing the world, namely, detecting relevance and having a selective attention for living systems operate in a different way from representational systems operating on context-free representations in the sense that living systems have biological structures determining the process of framing in a context-based environment, which are immanently context-sensitive by their very nature.

2.3. Hubert Dreyfus' Take on the Relevance Problem

The frame problem indicates a difficulty to explain how an intelligent agent thinks and acts by means of adapting and being sensitive to the relevant context, that is, how this intelligent agent cognizes sensitively to context-dependent relevance. Hubert Dreyfus, who is inspired by Heideggerian philosophy and Maurice Merleau Ponty's phenomenology, has argued that the frame problem is a consequence of dominant view in cognitive science and AI, assuming that cognitive processes are representation-guided. According to Dreyfus' phenomenological analysis, the frame problem disappears if representationalism about cognition and intelligence is rejected. Thus, under the light of phenomenology, human beings experience and cognize the world as always already embedded in a context since they are beings-in-the-world, or they are already thrown into the world.

> The term "thrownness" captures the Heideggerian claim that, in everyday cognition, the intelligent agent always finds herself located in a meaningful world (a context) in which things matter to her… Making sense of

> thrownness means doing away with the Cartesian conception of cognitive intelligence according to which the agent is, to reevoke Varela et al.'s illustrative metaphor, parachuted into each new context and so must find its way by building a detailed map (representation) of that context… the cultural and biological backgrounds that are world determining have always been constituted *in advance* of each cognitive event, by the society into which the agent has been developmentally absorbed, and by the ecological niche that constitutes her evolutionary endowment (Wheeler, 2005, pp.276-7).

From this perspective of embeddedness, the underlying idea of being intelligent seems to be essentially context bound. Dreyfus conceives this embeddedness in its close relation to the embodiment thesis, that is, human intelligence is essentially embodied and the bodily being provides the basis for embedded being in the world. According to Wheeler, the source of frame problem can be located in various aspects of Cartesian psychology as the primacy of the subject-object dichotomy that leaves the Cartesian agent in need of context-specifying representations, which lay bare the distinctive disembeddedness and disembodiment of Cartesian cognition and the reliance on general-purpose reason (Wheeler, 2005, pp.276-7). All these Cartesian ideas for which the intelligent behaviour is a product of representation-based general-purpose reason, contribute to the obstacle of cognitive science, which is called the frame problem. Dreyfus says "any attempt to solve the frame problem by giving any role to any sort of representational states even on-line ones has so far proved to be a dead end" (Dreyfus, 2008, p.357). He directs his critique at AI research that uses formal symbols to represent reality and accepts that intelligent behaviour is based on symbol manipulation. It has been believed that the model of machine intelligence provided by AI, which is based on the "information processing model of the mind" and computationalism reflects also the way in which the human mind works as if an intelligent robot successfully simulates human cognitive processes by means of programs. The information-processing model of the mind was developed within the physical symbol systems hypothesis as the core part of AI, which claims that a symbol system is a necessary condition for intelligence in general. Therefore, machines can also be intelligent only if the necessary symbol

system is provided since a symbol system is the sufficient condition for intelligence. Dreyfus claims that AI conceptualizes the nature of human intelligence by means of these false assumptions, e.g. the correspondence between human intelligence and machine intelligence. He attacks the underlying idea of the physical symbol system hypothesis as the necessary condition by labelling it the psychological assumption, which is "the mind can be viewed as a device operating on bits of information according to formal rules" (Dreyfus, 1972, p.68). What Dreyfus rejects is the foundational idea that the logical operations executed by computers can be structured to imitate human cognition processes. He accuses symbolic AI (or classical AI, which claims that intelligence is symbol manipulation) for being a degenerating research program. The frame problem seems the most challenging obstacle for AI, and with a representational model of intelligence it seems that it is not possible to overcome this obstacle. Before elaborating on how Dreyfus eliminates the frame problem by leaning on the underlying concepts of phenomenology, let me introduce what he rejects about symbolic AI to understand the opponent view better.

2.4. Four Assumptions in AI

In the 1960s, in the very beginning of AI research, Allen Newell and Herbert Simon, would later be well known AI researchers, conducted an AI program in RAND and aimed to make research on modelling of human cognition processes. Dreyfus evaluated this program and came to the conclusion that even if computers can solve certain specific types of problems such as "understanding" language or calculating, there is no evidence that this research program could explain what the phenomenon of intelligence is itself. Furthermore, for him, AI research has been looking for the way of simulating and explaining the human intelligence in the wrong place. However, it is worth to note that even if not all the research areas are trying to simulate human thought, for example, the famous AI researcher Marvin Minsky's approach, it can be said that the main motivation in AI research is to contribute to the

understanding of the phenomenon of human intelligence at least theoretically and to find out what the general properties of intelligent processes are. The foundational assumption of symbolic AI is that intelligence in general is to manipulate symbols under certain formal rules i.e. all intelligent processes such as perceiving, all kinds of reasoning, calculating and using language etc. occur as different forms of information processing. Symbolic AI has not different assumptions from cognitivism that I mentioned above, that is, intelligent agents receive information from the external world around them, manipulate this information according to rules, and then produce a response to their environment. The intelligent agent analyzes the situation at hand and decides what to do for the next move. The main feature of this information supposed to be processed is that it is representational. This is the foundational claim of representationalism i.e. to be a representation means to mediate between the external world and the operating system so that the information can be received from outside. For the case of human cognition processes, information-processing systems use internal mental representations in which thoughts, perceptions and memories are inscribed. These representations are symbolic in nature as the language that we use to communicate. This means that these symbols do not resemble inherently to what they represent in the external world. Furthermore, these symbols can only be processed according to certain formal properties of them, which are independent of its content or meaning. Therefore, the meaning itself does not play a direct role in this formal process for a computer, which processes symbols according to the recognition of their form and not the content of this form. The recognition and evaluation of these symbols is based on certain formal rules without which there would be no explanation for an intelligent system as to how it processes symbols. Hence, intelligence as information processing in general according to certain rules and making use of symbolic representations in the digital computer are used interchangeably. For Dreyfus, this conception of the intelligence is not something new for the history of thought i.e. it corresponds to rationalism which of its roots can be found in Plato's effort to find the objective,

theoretical principles to justify human action so that it can be explained on a rational basis, and it can be extended to the history of rationalism in the history of philosophy.

> They had taken over Hobbes' claim that reasoning was calculating, Descartes' mental representations, Leibniz's idea of a "universal characteristic" – a set of primitives in which all knowledge could be expressed, -- Kant's claim that concepts were rules, Frege's formalization of such rules, and Wittgenstein's postulation of logical atoms in his Tractatus. In short, without realizing it, AI researchers were hard at work turning rationalist philosophy into a research program (Dreyfus, 2008, p.331).

For Dreyfus (1972), since the Greeks invented logic and geometry, the conception of reasoning reduced to calculation has influenced most of the Western thinkers. The epistemological demand for a set of rules in the name of certainty can be said to serve a kind of formalism that reduces all semantic considerations of meanings to techniques of syntactic (formal) manipulation (Dreyfus, 1972, p.xvii). Dreyfus' claim is that symbolic AI embodies at least three characteristics of this rationalism which leads to the idea that human thinking is rule following and these thinking processes can be represented as a set of sentences. He criticizes AI research on the basis of these three assumptions that are directly related to the rationalism. He also adds another assumption to his AI criticisms that is the biological one not directly related to arguments from rationalism. I will present these four assumptions –the biological assumption, the psychological assumption, the epistemological assumption, and the ontological assumption– in relation to Dreyfus' criticisms of them. As the first assumption biological one suggests that the brain and the digital computer function in a similar way in the sense that at the neurophysiologic level, it is assumed that neurons in the brain fire in all-or-nothing pulses in the same vein as digital computer operates on zero and one.

The other three assumptions are the following. The second assumption is the psychological one that defines human intelligence as symbol-manipulation under

certain formal rules i.e. we can see mind as a device that operates on bits of information under certain formal rules. Assuming this idea, we can claim that computers can be programmed to think in a similar way to human beings. The third assumption is the epistemological one claiming that the entire knowledge can be formalized, namely "can be expressed in terms of logical relations, more exactly in terms of Boolean functions, the logical calculus which governs the way the bits are related according to rules" (Dreyfus, 1972, p.68). According to Dreyfus, this means that we can express all we know about reality in context-independent formal rules. Hence, we can reproduce an intelligent act by means of formalizing the knowledge that we have and so an intelligent machine can follow this knowledge. Finally, the fourth one, the ontological assumption, assumes that the reality known by human beings can also be formalized as objective atomic elements or facts that can exist independently from each other. Thus, reality also has a formalizable structure so that we can know it according to context-independent formal rules. In Dreyfus view,

> the psychological, epistemological, and ontological assumptions have this in common: they assume that man must be a device which calculates according to rules on data which take the form of atomic facts. Such a view is the tidal wave produced by the confluence of two powerful streams: first, the Platonic reduction of all reasoning to explicit rules and the world to atomic facts to which alone such rules could be applied without the risks of interpretation; second, the invention of the digital computer, a general-purpose information-processing device, which calculates according to explicit rules and takes in data in terms of atomic elements logically independent of one another (Dreyfus, 1972, p.143).

If we accept intelligence as the manipulation of internal symbols by internal rules, it seems that we can call human intelligent behaviours context free. This makes it easier to do science of these internal structures e.g. a true science of psychology that tries to make these internal rules of the human intelligence "clear" and "distinct" in the same vein as physics deals with the "external" laws of the physical world. Can we understand intelligence by means of objective context-free laws and structures?

For Dreyfus, a context-free science is a kind of contradiction. On the grounds of Heidegger's view that human being is in fact context bound in every aspect, Dreyfus claims that two of the underlying assumptions of AI, the epistemological and the ontological ones, which are shared by all various views in symbolic AI, are based on context-freeness and that they are in fact false.

First of all, Dreyfus refutes the biological assumption by applying to research in neurology which shows that how the neurons fire and when they fire cannot be explained in terms of digital processes but only of analogue ones. In a digital system, the number of states is two, but in nature the range of possibilities for action are infinitely many e.g. neurons act out of various possibilities and they do that continuously. Dreyfus points out that processing information in the brain is rather analogical regarding that the information is processed globally and not by assigning a symbol to every bit of information. In his view, introductory psychology picture of neurons as simple on-off entities is far too simple in terms of that neurons do not fire successively and act on the network of fixed sequential stages as digital computers do. According to recent neurological researches,

> Neurons do not sit there waiting for enough input to fire: they are firing continuously, and what varies based on their interaction with other neurons is their firing rate… Neurons are better understood as oscillators that modulate one another's activity. An oscillator is anything that has repeating behaviour, like the pendulum on a grandfather clock, or ocean tides. The period of an oscillator is the time it takes to get from some point back to the same point. In the case of a neuron, the period is the time from one action potential to the next. Neurons interact with another primarily by altering one another's period. The period of an oscillator rather than digital switches, the brain is not a digital computer (Käufer & Chemero, 2015, p.224).

When the act of neurons is described as digital, it is conceived according to either it fires or not, one or zero as if there is nothing in between. Dreyfus points out that the action of neurons is continuous, simultaneous and based on the interaction among them.

Secondly, he refutes the psychological assumption by pointing out that there is no empirical evidence to prove that human intelligence works via searching, classifying, calculating and storing neutral distinct pieces of information as digital computers do. Thus, in Dreyfus' (1972) view, experience cannot be analyzed into isolable units and atomic choices, and the idea of human cognition as computation is merely conceptual, not empirical, "in terms of an a priori assumption that the mind must work like a heuristically programmed digital computer" (Dreyfus, 1972, p. 99). He leans his view on Gestalt theory and states that human beings process information globally, which cannot be understood in terms of a sequence or even a parallel set of discrete operations. Human beings perform meaningful actions in a context already charged with meaning. Our knowledge about the world is based on complex tendencies that help us to select one interpretation over another. Even if human intelligence used symbols to process information, they would be in need of a background of commonsensical knowledge to associate them; otherwise these symbols would mean anything. In Dreyfus' view, this background is not inserted in the brain as definite atomistic symbols with explicit atomistic meanings. For him (1972), it is not possible for human intelligence to process an indifferent "input" without distinguishing between relevant and irrelevant, significant and insignificant data. No computer can do this "selection" by itself without a programmer to set the network of meanings that are supposed to associate the discrete bits of information in advance.

> Although man is surely a physical object processing physical inputs according to the laws of physics and chemistry, man's behaviour may not be explainable in terms of an information-processing mechanism receiving and processing a set of discrete inputs. Moreover, nothing from physics or experience suggests that man's actions can be so explained, since on the physical level we are confronted with continuously changing patterns of energy, and on the phenomenological level with objects in an already organized field of experience (Dreyfus, 1972, pp.187-8).

To assume that human intelligence is a device, which responds to the inputs coming from its environment according to certain rules, is to ignore the phenomenological level of human experience and credit only the neuronal level. Even if we approach human intelligence from a physical perspective and see it as an information-processing device, we cannot explain its behaviours by applying only to this aspect.

From the perspective of the psychological assumption, it seems that stimulus information is something like snapshots of the reality and perception, for instance, is like to construction of objects from the successive snapshots taken by sense organs. Moreover, for Dreyfus, the concept of snapshots here can be used interchangeably with the term "sensory input" and he asks what these snapshots are. Are they "patterns of energy" or are they momentary pictures of a page? When we consider the phenomenological level of human intelligence, it can be said that the series of snapshots is an abstraction from the continuously presented page and on the phenomenological level the page is steadily seen. Human cognition does not have to integrate distinct snapshots of the external reality or a series of bits of information about this reality.

Thirdly, regarding the epistemological assumption, even if the psychological assumption is rejected, it is still possible to argue that human behaviour can be formalized according to another set of rules in terms of that a symbol processing machine intelligence can be reproduced by representing all knowledge without considering if human intelligence can represent this knowledge in the same way. In order to refute this assumption, Dreyfus applies to natural language processing and claims that a language system based on certain rules is not flexible regarding interpreting statements that break the syntactic rules as usually we do even in our daily discourse. Human language always consists of exceptions that make us to realize that the machine intelligence cannot be successful at acting like human intelligent behaviour. In Dreyfus' (1972) view, apart from grammar rules that can be formalized and also simulated by a computer, there are also linguistic "performance rules" that we cannot formalize since it cannot be said that all linguistic rules have an

objective description, which we can see when we consider that we can understand also vague or ambiguous linguistic expressions independent from any linguistic rules. This is made possible by the context in which a linguistic expression is constructed or the context according to which we construct our sentences regarding the activity that we are involved in. Thus, it is impossible to divide human knowledge such as linguistic constructions into atomic facts if we take into account our daily knowledge, which is always actually based on context-dependent knowledge. Moreover, even if we try to find and use some rules of interpretation to apply for determining relevancy, we still need some other higher-order rules for the correct application of the rules of interpretation. This situation can bring an infinite regress of rules and raise difficulties for interpretation, even make it impossible. Therefore, from the perspective of phenomenology, our epistemological relationship to the world cannot take objects in isolation but can start from the associations between the new objects of knowledge and the knowledge that we have already. This context-boundedness is the necessary condition for knowledge of the world. It is a tricky question if a computer or an intelligent machine can recognize these contexts by detecting the relevant features of this context. Dreyfus says no, since he thinks that a computer cannot process all the relevant features due to its limited capacity, which in fact requires the formalization of the entire human knowledge. Even if we try to make rules sensitive to context, we have to formulate all possible contexts or formulate different rules of application for determining relevancy, both which seem to be endless solutions. Human beings have the capability of interpreting facts from the context without making effort most of the time. We fill in the gaps of meaning in a context automatically when we encounter an ambiguous word by using a kind of common sensical knowledge for the sake of meaningfulness, which a computer obviously does not have.

Fourthly, the ontological assumption suggests that the world is something exhaustively analyzable into context-free atomistic facts. However, can we give the amount of these isolated facts or data enough to produce intelligence in a context-

bounded world? Even if we could provide enough data to implement in a machine for producing intelligence, could we find a way to classify these data according to changing contexts? “In order to understand an utterance, structure a problem, or recognize a pattern, a computer must select and interpret its data in terms of a context. But how are we to impart this context itself to the computer?” (Dreyfus, 1972, p.120) Machines do not exist in a context and so they cannot successfully determine actions independently of a human programmer who in fact does the work of determining the appropriate and relevant context for the present situation. Do computers have enough memory space for storing the contextual data, which in Dreyfus’ view is unworkably large so they cannot determine relevancy? In order to be an intelligent agent, the large database problem needs to be solved and human beings seem to be successful at doing this. We do not go in relation with the world without a background sense of the context that gives the relevant and significant in the given situation, thus the world that we go in relation is already globally a meaningful world rather than a set of atomistic facts and objects.

> Even a chair is not understandable in terms of any set of facts or "elements of knowledge." To recognize an object as a chair, for example, means to understand its relation to other objects and to human beings. This involves a whole context of human activity of which the shape of our body, the institution of furniture, the inevitability of fatigue, constitute only a small part. And these factors in turn are no more isolable than is the chair. They all may get their meaning in the context of human activity of which they form a part (Dreyfus, 1972, p.122).

Human intelligence does not make an effort to combine all the discrete pieces of knowledge to make the world as a whole picture and then interpret this picture according to what it needs. This is what phenomenology saw as a mistake in Descartes’ view of “understanding the world as a set of meaningless facts to which the mind assigned what Descartes called values” (Dreyfus, 2008, p.332). Phenomenologically, human beings directly perceive the physical world without the need of mediation of rules or systems to make the world a unified picture for the sake

of acting in a meaningful world. This is related to the holistic character of knowledge but also to the holistic character of phenomenological structure of how we experience the world. Therefore, if AI wants to understand human intelligence, it should start from understanding phenomenological structures that consists the knowledge of how we relate to the world. Moreover, the way of understanding our relation to the world is not to start from logical structures but from what opens access to the world i.e. the body.

2.5. The Phenomenological Solution to the Frame Problem

In Dreyfus' view, to refute these four false assumptions in AI indicates why it does not seem possible to solve the frame problem by AI researchers. That is to say, the underlying ideas that are problematic and give rise to the obstacles for solving the frame problem are in fact also the assumptions of the rationalist tradition. He (2008) argues that the commonsense knowledge problem related to the frame problem cannot be solved by appealing to the ability of representing and storing a few million facts about objects including their functions but by knowing which facts are relevant in any given situation. In Dreyfus' words, "If the computer is running a representation of the current state of the world and something in the world changes, how does the program determine which of its represented facts can be assumed to have stayed the same, and which might have to be updated?" (Dreyfus, 2008, p.332). Or in Wheeler's words,

> [G]iven a dynamically changing world, how is a nonmagical system ... to take account of those state changes in that world ... that matter, and those unchanged states in that world that matter, while ignoring those that do not? And how is that system to retrieve and (if necessary) to revise, out of all the beliefs that it possesses, just those beliefs that are relevant in some particular context of action? (Wheeler, 2005, p.179)

In Dreyfus's (2008) view, any AI program that uses frames to organize millions of meaningless facts in order to retrieve the currently relevant ones is caught in a regress of frames for recognizing the relevant facts. Therefore, the commonsense knowledge storage and retrieval problem cannot be solved when we maintain the idea that intelligence works via manipulation of the representations or processing of atomic bits of information about the world, which exist as context-free. Dreyfus accuses the rationalist tradition for ignoring the role of the body in cognition and human experience in general. Taking the brain to be a computer and the mind to be the controller of the activities in the brain as a program can be seen as the reason for ignoring the body. The body becomes merely a vehicle of transmission of sense data like keyboards or monitors. Instead of following this rationalist tradition, he points out what Merleau Ponty's work offers;

> [A] non-representational account of the way the body and the world are coupled that suggests a way of avoiding the frame problem. According to Merleau Ponty, as an agent acquires skills, those skills are stored not as representations in the mind, but as a bodily readiness to respond to the solicitations of situations in the world. What the learner acquires through experience is not *represented* at all but is *presented* to the learner as more and more finely discriminated situations, and, if the situation does not clearly solicit a single response or if the response does not produce a satisfactory result, the learner is led to further refine his discriminations, which, in turn, solicit more refined responses (Dreyfus, 2008, p.336).

Merleau Ponty defines a feedback loop between the body, or the learner, and the perceptual world, which is based on the skills acquired by dealing repeatedly with situations that then require more and more selective responses. "The life of consciousness – cognitive life, the life of desire or perceptual life – is subtended by an 'intentional arc' which projects round about us our past, our future, our human setting, our physical, ideological and moral situation" (Merleau Ponty, 1962, p.136). Merleau Ponty states that this feedback system is a circular relation of environment and action: "the relations between the organism and its milieu are not relations of

linear causality but of circular causality" (Merleau Ponty, 1963, p.15). The underlying idea of this circular feedback system is that our past experiences feed our present perceptions of the world, in other words, they are projected back into our perceptual world so that affordances come up to make progress in our actions. In Merleau Ponty's words, a "person's projects polarize the world, bringing magically to view a host of signs which guide action, as notices in a museum guide the visitor" (Merleau Ponty, 1962, pp.129-30). In this case, in Merleau Ponty's view, there is no need for representations to mediate between the past experience and the given present situation i.e. we don't need representations for practical skilful coping, we have the world itself. In Dreyfus's words, "the meaningful objects ... among which we live are not a *model* of the world stored in our mind or brain; *they are the world itself"* (Dreyfus, 1992, pp.265-6). Merleau Ponty and Dreyfus suggest that the representationalist models of human experience and human mind or brain function cannot explain how past experiences are manifested in present experience in order to guide the next action in the future. How do cognitivist and rationalist traditions of AI or cognitive science can explain skilled behaviour? As an explanation for skilled behaviour from the perspective of phenomenology, Merleau Ponty's suggestion is to focus on the perception-action loop.

Appealing to neurodynamics, Dreyfus claims that the model of a simulated neural network can exhibit crucial structural features of *the intentional arc*, and Walter Freeman's (1999c) account of the brain dynamics underlying perception and action is structurally parallel to Merleau Ponty's account of the way a skilled agent moves towards obtaining a maximum grip (Dreyfus, 1998, p.1). This model is called feed forward simulated neural networks, which enables the brain not to store memories of the past but associate them with current experience. "Rather, if given any input, the connections between "neurons" are modified by a trainer so that that input is paired with what the trainer holds to be the appropriate output. Thereafter, similar inputs will produce the same or similar output" (Dreyfus, 1998, p.5). In Dreyfus view, the feed-forward neural network shows how past can influence the

present perception and action without the brain's act of storing memories of past in terms of the past experiences modify the connection strengths between the simulated neurons:

> New input can then produce output based on past experience without the net having to, or even being able to, retrieve any specific memories. The point is not that neural networks provide an explanation of association. Rather they allow us to give up seeking an associationist explanation of the way past experience affects present perception and action… If the input corresponds to the experience of the current situation, the activation of the hidden nodes, determined by inputs leading up to the current situation, might be said to correspond to the expectations and perspective that the expert brings to the situation, in terms of which the situation solicits a specific response (Dreyfus, 1998, p.5).

In the case of the feed-forward neural network, in addition to the present input the initial states determine the action of the agent. This model would explain how the brain without representations determining relevance. This does not mean that all the work is done inside the brain, the function of the brain here is to refresh the past memories namely neural networks fed by initial experiences. Dreyfus points out that Freeman's work confirms what Merleau Ponty states about the relevance problem in terms of that relevance is not a question of comparing representations e.g. comparing the current input with a remembered previous one. According to Dreyfus and Freeman, the current input is perceived as already absorbed in a particular way, that is, the perceiver already knows what would count as a better version of it. For Freeman, current input does not represent what the object is or what to do with this object. Rather, the brain's current state is the result of the sum of the perceiver's past experiences with the present object, and this state is directly coupled with or resonates to the affordances offered by the current object. Freeman tells us that the patterns in the brain do not relate to the stimulus directly but instead to *the significance* of the stimulus shaped by the past experiences. Hence, the cognitive systems that have the function of detecting relevance are organized through the feed-

forward neural network, which allow the system to determine the significance of the stimulus depend on the past experiences of a lived body. The past experiences are preserved in the body as bodily skills, which depend on know-how or tacit knowledge but not on know-that or explicit knowledge. The intentional aspect of the agent's action is determined by skilful interaction or attunement of the body with its environment. At this point, it should be noted that the motives of this interaction are continuously modified through the goals of a particular body determined by its personal needs for the sake of coping with its environment.

In this respect, the other concept Merleau Ponty suggested is "getting a maximal grip", which defines the body's tendency to respond to the solicitations in such a way as to bring the current situation closer to the agent's sense of an optimal gestalt (Dreyfus, 1998, p.1). This ability also doesn't need mental or brain representations either. Moreover, when the issue comes to whether the intentional content that governs an action must be represented in the brain or not, Dreyfus (1998) emphasizes on Merleau Ponty's claim that an action can conform to the intentional content without the agent having these conditions in mind as a goal. A goal doesn't have to be represented in the mind. In Dreyfus words;

> According to Merleau-Ponty, higher animals and human beings are always tending towards getting a *maximum grip* on their situation. Merleau-Ponty's notion of maximal grip comes from perception and manipulation. When we are looking at something, we tend, without thinking about it, to find the best distance for taking in both the thing as a whole and its different parts. When grasping something, we tend to grab it in such a way as to get the best grip on it… My body is geared into the world when my perception presents me with a spectacle as varied and as clearly articulated as possible, and when my motor intentions, as they unfold, receive the responses they expect from the world (Dreyfus, 1998, p.8).

Merleau Ponty explains action experienced as a steady flow of skilful activity in response to one's sense of the situation. The body's essential tendency is to shape intentional arcs and to reach equilibrium with the world.

> Part of that experience is a sense that when one's situation deviates from some optimal body-environment relationship, one's activity takes one closer to that optimum and thereby relieves the "tension" of the deviation. One does not need to know, nor can one normally express, what that optimum is. One's body is simply solicited by the situation to get into equilibrium with it. As Merleau-Ponty puts it: Whether a system of motor or perceptual powers, our body is not an object for an 'I think', it is a grouping of lived-through meanings which moves towards its equilibrium (Dreyfus, 1998, pp.8-9).

For Merleau Ponty, skilful coping does not require the mental representation of its goal. In fact, it can be purposive without the agent entertaining a purpose. In Merleau Ponty's words, "To move one's body is to aim at things through it; it is to allow oneself to respond to their call, which is made upon it independently of any representation" (cited in Dreyfus, 1998, 9). This dynamic relation between the body and the environment is called coping i.e. the phenomenon of coping as being "geared into" the world and moving towards equilibrium refers to this dynamic relation between the body and the environment. Therefore, it is not the representation of the world but the fundamental interaction with the world that enables the body to cope with the world and move towards equilibrium. The existence of the maximum grip correlates with the intentionality formulated by Heidegger, which does not need to have an intentional content as a representation. The task of intentional states is not to achieve a goal according to what is represented in the content of intentional states but to achieve the maximum grip on the world. This tendency toward maximum grip, which is based on the body's skilful coping with present situations, is in relation to the intentional arc in the meaning of bodily skills coping with the changing world.

Heidegger (1962 [1927]) before Merleau Ponty describes this idea of skilful coping as the dynamic relation between the body and the environment. He claims that action-oriented coping is not representational at all and also does not involve any problem solving. What we call as human problem solving in fact leans on our background sense of the context. What is important or what is needed for the present situation depend on this background sense rather than on the process of searching

through possibilities to determine what is needed. In Heidegger's view, this refers to the difference between "knowing-that" and "knowing-how", which is based on Heidegger's distinction between present-at-hand and ready-to-hand. Knowing-that refers to our conscious problem solving abilities progressing step-by-step, which can be based on context-free logical calculations and manipulation of language. Dreyfus thinks that AI simulated this kind of thinking skills successfully. On the other hand, there is also knowing-how that is the pre-theoretical and pre-conceptual sense of the the current situation at hand without calculating alternatives by enabling us to drawn into the specific perception of the current situation by means of background capacities. According to Dreyfus, this spontaneous sense depends on our needs and goals, the structure of our bodies, cultural and biological background, which are all our unconscious intuitions, tendencies and background information. This is what Heidegger calls "being-in-the-world" regarding that we are already situated in the world i.e. human beings relate to the perceptual world by means of their actions, and structures the situation around them according to their concerns and interests. Thus, the meaning is already given to them so that they can act in a context. This means that they don't have to reflect on or mirror the reality as if they are neutral entities. On the contrary, the reality around us is already contained in a semantic network that is based on its holistic interpretations. As a conclusion, when we consider Merleau Ponty and Heidegger together, all skilful coping based on know-how occurs on the background of intentionality, which is not representational. Hence, "our present concerns and past know-how always already determines what will be ignored, what will remain on the outer horizon of experience as possibly relevant, and what will be immediately taken into account as essential…Relevance is already built-in" (Dreyfus, 1972, p.175). Thanks to the direct engagement of human beings in a situation by means of skilful coping, there is no need for mediating knowledge for the human body, unlike computer software, has already the knowledge that is relevant to the context. In this regard, Dreyfus states that you cannot simulate human body in a computer program because of its three functions:

> (i) the inner horizon, that is, the partially indeterminate, predelineated anticipation of partially indeterminate data (this does not mean the anticipation of some completely determinates alternatives, or the anticipation of completely unspecified alternatives, which would be the only possible digital implementation); (ii) the global character of this anticipation which determines the meaning of the details it assimilates and is determined by them; (iii) the transferability of this anticipation from one sense modality and one organ of action to another (Dreyfus, 1972, p.167).

Thus, intelligence and intentionality can no longer be understood as calculating or processing representations or bits of information without applying to human's embodied being, which can be defined by the bodily skills enabling us to couple dynamically with the world. The problem of relevance cannot be a problem of knowing-that. Unlike Dennett's concern about the biological dimension of human experience that prevents AI from simulating human intelligence, this time it is the phenomenological dimension, which indicates why human intelligence cannot be reduced to handling representations. Thus, it can be a natural solution to the frame problem; thus, human beings as beings-in-the-world act according to their concerns and interests and so they always act in a context in which the meanings are already shaped in their interaction with the world.

> Thanks to our embodied coping and the intentional arc it makes possible, our skill in sensing and responding to relevant changes in the world is constantly improved… In general, given our experience in the world, whenever there is a change in the current context we respond to it only if in the past it has turned out to be significant, and when we sense a significant change we treat everything else as unchanged except what our familiarity with the world suggests might also have changed and so needs to be checked out. Thus the frame problem does not arise (Dreyfus, 2008, pp.27-8).

Dreyfus invites us to see where computational cognitivism and underlying rationalist ideas can be seen as deadlocks for explaining and also simulating human intelligence. He suggests the idea that human beings are basically coupled copers in

order to see how the frame problem can be dissolved by an appeal to phenomenology. Learning our way in the world, gaining experience and being embodied modify our brain and build significance and relevance into our structural coupling with the world, and thus the relevance is directly experienced in the way tasks summon us.

In this chapter, I presented the philosophical frame problem defined as the problem of detecting which information is relevant to the agent's cognitive processes in a given situation and which is not. For Dennett, the biological systems of human beings differ from AI systems in solving the frame problem. Whereas human beings have common sensical expectations of the effects of their action, which allow them to adapt to continually changing complex environment, AI machines do not have common sense due to their nature and so they might fail to detect relevance in every case unless the necessary amount of information is stored and deduced proper to the given situation. On the one hand, the common sensical knowledge of human beings is developed through experience in the progress of time. Thus, the cognitive agent acts on the ground of what she learns from experience to guide expectations in the future, through which she detects significance and relevance. On the other hand, along with cumulative knowledge gained from learning, human beings also have innate knowledge in the service of common sensical expectations about future and relevancy. Human beings are not walking encyclopedia where all the information needed is stored as representations. Even so, it would be necessary to store immense amount of information and to have a proper system to organize this information mess on demand in a time-pressured and continually changing complex world. The biological and learning processes always occur in a context-based environment rather than being operated through context-free nature of representations. According to Dreyfus, the conditions of a context-sensitive cognitive system are provided by essentially embodied and embedded cognitive system of living beings. Rather than having an information processing system operating on bits of information as objective atomic elements according to context-independent formal rules, human

cognition has the commonsense knowledge to produce context-sensitive responses. This knowledge is developed through repeated actions of the cognitive agent and so the skills acquired by dealing repeatedly with situations serve to generate selective responses. Thanks to circular feedback system, which is also supported by the research in neurodynamics regarding to the feed-forward neural network, the body tend to shape its intentional arcs and to reach equilibrium with the world through its skillful coping and structural coupling with the world. Therefore, the system for detecting relevance in living beings is already built-in in their body appearing in their interaction with the world. I will elaborate on the notions of skilful coping and coupling between the body and its environment in regard to the relationship between phenomenology and neurodynamics later in the chapter on enactivism. In the following chapter, I shall examine this embodiment thesis argued by Dreyfus through dwelling on its philosophical source in phenomenology and cognitive science by also making a comparison between the opposite views on cognition in order to have a better understanding of the role of the body in framing the world. By this way, we will also have a conceptual toolbox to develop an enactivist perspective on the relationship between cognition and affectivity in terms of the frame problem.

CHAPTER 3

EMBODIED COGNITION

The first predominant movement of twentieth century cognitive science and philosophy of mind has been the project of substantiating, which is to conceive cognition as materialized in the brain, and its area of activity as limited to the brain. However, a new movement has been rising from this dominant area of research, which attempts to prove that cognition is something embodied rather than only "embrained" (Damasio, 2000, p.118). The main idea of embodied cognition (EC) is that cognition cannot be explained without referring to extra-cerebral structure namely the dynamics of the body and to the fact that the body is embedded in its natural and social environment. This new wave of understanding cognition can be seen as a sign of a paradigm shift in the content of scientific and also philosophical works on cognition. EC arose as a research area in cognitive science as a result of many recent experiments. And also the engineering of robotics based on the conception of embodied cognition in studies of AI and the studies of animal cognition contributed to the idea of embodiment. The phenomenological tradition in philosophy has a significant effect on cognitive science in respect of raising new conceptual problems and uncovering some foundational underlying concepts within the contemporary ways of philosophizing on mind and body[3].

In this part of my dissertation, I will not elaborate on the history of EC or try to trace the origins of EC; I will also not dwell on different approaches within EC and their distinctive features. I will rather focus on describing what EC is basically in terms of its general features, and what the main underlying arguments in it are.

[3] See, e.g. Varela 1996, 1999; Gallagher 1997, 2005; Thompson 2007; Petit 2003; Borrett et al. 2000.

3.1. Phenomenological Background

The phenomenological tradition initiated by Husserl and developed by Maurice Merleau Ponty has an impact on cognitive science, which has given rise to new wave empirical results. The most important impact of this tradition on cognitive science is to create a crisis in scientific work that fits empirical data into existing conceptual frameworks without questioning the most basic concepts of it. The phenomenological method of reduction has contributed to the paradigm shift first via putting the most basic conceptual framework in science into question such as body-mind distinction. The method of reduction has allowed lying emphasis directly on lived experience. It suggested to bracket (*epoché*) or suspend the concepts presupposed by cognitive science, such as conceptualizing the mind as an inner unit separated from the outer world, and focus on the analysis of experience rather than on given conceptions of the philosophy of mind. Edmund Husserl rejected the neglect of the facticity of life and the subordination of sensuality, facticity and practicality to a strict rationalism that is based on the perfection of abstract cognition by this separate inner unit. In this respect, the highly disputed philosophical issue in contemporary thought is Cartesianism. The Cartesian body/mind dualism has influenced the modern understanding of the subject as an isolated rational being, and phenomenology has rejected the isolated being of human mind.

3.1.1. Merleau Ponty's Philosophy

Descartes' understanding of the world as made up of two separate substances, the thinking thing and the extensional thing, has placed the mind as a separate entity from its object in the outer world. This distinction has problematized the status of body and mind, and troubled the relationship between them. Maurice Merleau Ponty took Husserl's phenomenology much further and against Descartes. He claimed that

the relation between mind and body is not a relationship between two substances. In his book *Phenomenology of Perception*, he suggested the concept of "body-subject" which is against the Cartesian cogito. According to Merleau Pont's philosophy of perception, consciousness, the world and the human body as a perceiving thing were understood as intricately intertwined and mutually engaged. This was a challenge to the distinction between the 'external world' as the unchanging phenomenal object of science and the 'internal' world of the subject. Against this distinction, Merleau-Ponty argued that the phenomenal world is a correlate of the human body and its sensory-motor functions. According to Merleau Ponty, the phenomenological world is not a state of consciousness, not a psychic phenomenon; that is, it is not a kind of reflection of the external world in the internal world, but it is on the contrary a state of intertwining of the two. This is the intertwining and reversibility of the sensate and the sensible.

> Visible and mobile, my body is a thing among things; it is one of them. It is caught in the fabric of the world, and its cohesion is that of a thing. But because it moves itself and sees, it holds things in a circle around itself. Things are an annex or prolongation of itself; they are incrusted in its flesh, they are part of its full definition; the world is made of the very stuff of the body (Merleau Ponty, 1964, p.163).

Merleau Ponty saw the body as the site of knowing and in the last period of his writings he gave primacy to the concept of embodiment toward the ontology of "flesh of the world." According to his view, we experience things at certain distances but both inside and outside ourselves at the same time and the possibility of this claim takes him to a new ontology, which is of the flesh. Merleau Ponty, by taking Husserl's view of the engagement of consciousness with the world a step further, separates the existence and the thought of existence from each other, and says that the existence itself is just the totality which incarnates consciousness. The pre-reflective state, which is related to "the existence" rather than "the thought of existence" is the experience's embodied inseparability and unity with the world

before consciousness reflects by turning on its own act and questions the 'how's and 'why's. Reflection, which gives us the thought of existence, always comes secondarily since it is actually founded on this pre-reflective experience of Being. Merleau Ponty states that if this unity did not exist, nothing would be knowable and thinkable. In other words, he describes a state of consciousness that exists before language without the language, which cannot be represented. This state refers to the unmediated relationship of the body with the world. The ontology of flesh suggests the unity of the relationship between body and the world, which makes bodies to live in a multidimensional world here and now, and gives the being a thickness. For him, sensation provides a good example of this unity. My hand touching the things is itself touched. "Through this crisscrossing within it of the touching and the tangible, its own movements incorporate themselves in the universe that they interrogate, are recorded on the same map as it" (Merleau Ponty, 1968, p.133). Body as an "exemplar sensible" is the site of experience being both sensible and sensate. He suggests speaking about "visibility" or "tangibility" itself rather than about the act of seeing or touching, Thus, the flesh expresses the intertwining of the sensate and the sensible, their intertwining and their reversibility. This concept of reversibility puts the concept of intentionality into question as well, that is, rather than a division between act and object, it suggests the body as the place of a *fold* by which the sensible reveals itself. The state of unity raised in the fold, which blurs the distinction between the touch and the thing that is touched, or the internal feeling and the external effect of it, does not reveal only the intertwining between sensible and sensate but also the body and the world. This project undermines not only body-mind dualism but also the opposition between subject and object. The embodiment of the subject can be related to the idea of "being-in-the-world", that is, to be human is to be an existent in the middle of a world amongst other things (Heidegger, 1962). Thus, human as a bodily being is fixed, embedded and immersed in the physical, literal and tangible world. This is the idea of "*Lebenswelt*" (life-world) that Husserl had previously put forward in order to emphasize the solid fact of human

encapsulation within reality. From this standpoint, Merleau Ponty claims that our perceptions and sensations occur in the context of the engagement of our bodies with the world. Representations are therefore sublimations of bodily experience, which are already possessing content, but are not given content or form by an autonomous mind. The employment of such representations "is controlled by the acting body itself, by an 'I can', but not an 'I think that'" (Anderson, 2003, p.104). The important point derived from this understanding is that it rejects the idea that content and relations of concepts —that is the structure of our conceptual schema— depend on abstract or logical criteria. Merleau Ponty rather claims that they are determined by practical criteria, that is, through our practical orientation to the world, which unifies ongoing inputs from many different sources into a single object of consciousness. Therefore, as Anderson puts it; "the subject which controls the integration or synthesis of the contents of experience is not a detached spectator consciousness, an 'I think that', but rather the body-subject in its ongoing active engagement with [the world]" (Anderson, 2003, p.104). This presents a radical critique of Cartesian representationalism.

3.1.2. Intentionality

The phenomenological tradition emphasized the fact that cognitive processes including learning and skillful actions can be described without appealing to mental representations. Thus, the body acquires skills or it perceives the outer world but these skills or perceptions are not stored as representations, they rather manifest themselves by responding to certain stimuli from the outer world. Our perception does not correspond to the outer world; it rather emerges by way of the interaction between our body and the world, and this interaction is done by the biological system. When we perceive, choose, imagine, feel, think etc. we construct anticipations about the world rather than passively representing the outer world external to us. The dispositions of these anticipations always accompany our

perceiving, acting and cognizing. This is the intentional side of our relation to the world. The idea of intentionality originates from Franz Brentano's claim that all mental states (perception, memory etc.) are "of" or "about" something, in other words, mental states necessarily have "reference to a content" or "direction toward an object" (Brentano, cited in Varela, Thompson & Rosch, 1992, p.2). The cognitivist claim assumes that intentionality can only be explained on the basis of representations that are physically realized in the form of a symbolic code in the brain. For them, the problem is to show how the ascription of the intentional states is correlated with the physical changes in our action, that is, we have to show how the intentional states have a causal role in action and how they are possible physically. Varela et al. say that here is the notion of symbolic computation comes in (Varela et al. 1992, p.41). According to this notion, symbols have a physical nature and also semantic values. On the other hand, computations operate on these symbols and these computational operations are determined by these semantic values, that is, if there are no semantic relations among the symbolic expressions, a computation does not make any sense (Varela et al. 1992, p.41). Varela et al. emphasize the fact that the operations of a digital computer however are performed only on the physical form of the symbols without accessing to their semantic value. The semantic value of a computational operation is given by the syntax encoded in the system of symbolic language. Thus, when we consider how a computer produces meaningful actions, we see that the syntax works in parallel with semantics both encoded by programmers. The cognitivist approach claims that the brain also works in a similar way to a digital computer. The relationship between syntax and semantics is thus explained as a mirroring process, that is, "the syntax of the symbolic code mirrors or encodes its semantics" (Varela et al. 1992, p.41). When we consider an intended act for a computer in this respect, we can see that the explanation or meaning of this act is already mirrored syntactically. However, it is argued by EC that it is difficult to say the same for the human brain in the sense that we can not explain where the semantic level of a human brain comes from or how "the symbolic expressions supposed by

the cognitivist to be encoded in the brain get their meaning" without referring to how body interacts with the external world (Varela et al. 1992, p.42). The cognitivist approach should explain the relation between the semantic level and the syntax, that is, how the semantic explanation of a behavior can be mirrored syntactically in the brain. EC argues that the intentional dimension of this act, but not the syntactical encoding of representations of the external world in the brain determine the meaning of a human act. The intentional dimension of an act is provided by the dynamic relationship between the body and the external world but not by a representational process. For the cognitivist approach, the mind's activity is what gives these representations their intentions but for EC there are only intended acts of body without a secondary process of representing the outer world. To bridge mind and body, and also an action and its meaning, cognitivist approach need to use representations and their syntactical encoding system in the brain. By denying the representational process itself, EC conversely asserts that as a matter of fact there is no distinction between mind and body.

3. 2. Cartesianism

What Descartes presented in his writings is a substance dualism, which asserts mind as a separate substance from matter or the physical world. These are two opposite kinds of foundations respectively corresponding to disembodied mental life and material body. Cartesian substance dualism is important historically for having given rise to the body-mind problem in contemporary philosophy. In order to generate intelligent action that is guided by sensory perception, Descartes had to give an account of how the mind interacts with the body. He suggested that the causal interaction between body and mind is constituted bidirectionally, that is, the body conveys a message within perception to the mind, and the mind evaluates this message and accordingly directs the action. He thought that a specific organ in the brain called the pineal gland maintains the organization of this interaction. However,

as Michael Wheeler states, this kind of substance dualism is not a concern for contemporary cognitive science since the accusation of cognitivism for thinking of mind as a disembodied entity has nothing to do with substance dualism at all. The part of Cartesian dualism that continues to shape the bulk of the work going on today in cognitive science is "Cartesian psychology" as Wheeler has named it (Wheeler, 2005, p.22). For Wheeler, a cognitive theorist with a physicalist ontology, which sees the mind as part of the material world, does not rely on Cartesian substance dualism, however, may adhere to Cartesian subject-object dichotomy. The dichotomy between the thinking subject and the objects in the outer world, which generate the beliefs in this subject's mind, is another dichotomy asserted by Descartes. From this perspective, there is an epistemic gap between subject and object, and Descartes tried to overcome this gap by indicating a connection between mind and matter or body. This epistemic gap expresses the existence of an objective world outside of the thinking mind, which can be explained independently of any subject that experiences it. Therefore, in order to constitute an epistemic bridge between the thinking subject and the objective reality out there, Descartes postulated ideas (or representations as a more contemporary term) which reside in the subject's mind to stand in for or substitute for the things in the objective reality. The metaphor given by Varela et al. points out that Descartes' thinking or knowing subject has been "parachuted into a pregiven world… will survive only to the extent that it is endowed with a map [i.e., a representation of that world] and learns to act on the basis of this map" (Varela et al. 1992, p.135). Thus, the function of representations is to provide a link between the mind and the world. Even if Descartes was not the originator of representationalism, it is the central idea of the Cartesian theory of mind-world relations. What is expected from the thinking subject is to represent the outer objective world as it is to reach the Truth. Wheeler points out that a Cartesian brand of representationalism has survived within mainstream thinking in cognitive science except some features like "the demand that mental representations be conscious states of the cognizer, and the idea that the specific contents (meanings) carried by mental representations are

intrinsic properties of those states" (Wheeler, 2005, p.25). The feature that has survived is that these representations are context independent, that is, they exist independently from the needs, projects and previous experiences of an intelligent agent acting in and on the world (Wheeler, 2005, p.25). This ignorance of context in the constitution of representations goes hand in hand with Cartesian metaphysical realism that accepts an objective world existing independently of all observers. Descartes maintains that this outer material work has a mechanistic nature, and the physical laws of mechanism identify inorganic and also organic bodily life, or human and nonhuman animal bodies. According to this view, the body with a mechanistic nature and the context that is expected to be determined by this body does not have an effect on how the mind thinks except conveying the information generated within the perception of this objective outer world. What matters in the relationship between the knowing mind and its bodily surrounding seems the correspondence between these two separate entities. It has been believed that the mind's correspondence to reality can be sustained without considering the role of the body in mental constitution, and since the mind has a transparent relationship with its outside world, it can provide the Truth. Thinking thing as being free of mechanical explanation by virtue of its non-physical ontological status has given rise to an "explanatory divide or dualism" between the mind and the rest of the nature. As Wheeler stated, "for the Cartesian psychologist, the cognitive- scientific explanation of the agent's mind must be theoretically independent of the scientific explanation of the agent's physical embodiment" (Wheeler, 2005, p.27). The explanatory dualism fits in the program of contemporary physicalist metaphysics in the sense that a Cartesian physicalist who believes in explanatory dualism "can claim that whether we engage in a distinctively physical or a distinctively psychological style of explanation will depend on the mode of description under which, given our current explanatory goals, we are taking the events of interest to fall" (Wheeler, 2005, p.28). This means that scientific inquiry and research on the subject's mind is required to be independent from the scientific explanation of this subject's physical embodiment. Wheeler emphasizes the

fact that the scientific inquiry of mind, which is mainly based on the explanatory dualism, will exclude the body from the research on human mental life.

The crucial point related to the subject of this dissertation comes with the discussion of what Descartes stated about certain distinctive psychological phenomena such as feelings and appetites. Descartes identifies psychological phenomena as the passions, which are totally dependent on the body. For him, there are three types of passions; certain perceptual representations such as perception of color and taste, bodily sensations such as hunger and pain and the emotions such as love and hate (Descartes, pp.325-404 cited in Wheeler, 2005, p.29). Although Descartes paid attention to classify passions to explain what sort of behavioral profile the Cartesian body has, for him, the body as a machine does not have the power to generate human-level behavior different from other animal organisms, which means "general-purpose reasoning processes" (Wheeler, 2005, p.36). The mechanistic systems of the body are not enough to construct and explain intelligent action that operates according to some intrinsically general purpose in certain general contexts apart from the specific context of survival-oriented behaviors that belong to the bodily orientation of human. The difference between human and non-human for Descartes then is to have the mind that is able to operate on the intellectual level in virtue of having epistemic access to the pregiven world (Wheeler, 2005, p.37). In short, for Descartes, to have a mind means to have the reasoning processes that make human beings distinctive in the animal nature and to be able to find and then use knowledge that is appropriate to the context, which are actually located in the mind as being representational in form (Wheeler, 2005, p.37). Thus, distinctive mental activity of human beings is the result of "general-purpose reasoning processes that work by retrieving just those mental representations that are relevant to the present behavioral context, and then manipulating and transforming those representations in appropriate ways so as to determine what to do" (Wheeler, 2005, p.38). In this picture of the human mind, the body has the function of constructing accurate representations of the world from sensory inputs. Cartesian systems of a bodily

machine and of a mind work together in a causal chain, which begins with a physical object in the outer world and moves to the brain by means of the subject's sensory systems, and then goes through to the mind via the pineal gland, where finally perceptual representation is generated. This representation is also the starting point of the sequences of actions, that is, by operating as a bidirectional interface, the pineal gland transmits what the mind designed for the next action of the agent to the muscles that control bodily motion. In this respect, the mind operates not only on the representations that are gathered by the perception of present objects as the input information but also on the mental representations that are already in the mind to be used in general-purpose reasoning processes. This picture of body and mind indicates a sort of gap between perception and action, which is constituted by reason[4]. Furthermore, the mind operates as a kind of third party by organizing the sequential relationship between perception and action, and transforming perception into action. This gap is filled by representations in the Cartesian approach.

3. 3. Representationalism

The Cartesian epistemic gap between subject and object puts the status of mental representations into question. Moreover, this gap is deepened by another gap between perception and action. How does a representation stand in for external entities and exist in the cognizer's mind? For the Cartesian understanding of mind, it seems that the mind functions as a mirror of the external world by producing representations of it. Representationalism assumes that due to the possibility of illusions and hallucinations, we are not directly aware of external objects in perception but only of representations of them. This approach brought the idea that

[4] See these thinkers who criticize the distinction between action-perception-cognition since it is conceptually and empirically wrong: Dewey (1972), Merleau-Ponty (1962), Varela (1991; Varela et al. 1993), Hurley (1998), Berthoz (2000), O'Regan and Noe (O'Regan and Noë 2001a; 2001b; Noë, 2004), Wheeler (2005), Thompson (2007), and D. Morris and Turvey (2007).

cognition is something that occurs only inside of the brain and so it is a brain-bound process. On the other hand, the external world is supposed to be a pregiven reality so the mind can reflect on it, that is, the features of this reality can be identified prior to any cognitive activity. The epistemological and also ontological baggage of this statement is heavy. When we assert this statement, we assume that there are some mental representations, which constitute the relation between cognitive activity and a pregiven world. Varela et al. state that in the contemporary cognitivist version of this kind of understanding it is an innately specified system of representations – sometimes called a language of thought– that makes the cognizer to act in a pregiven world (Varela et al. 1992, p.136). In respect of this, the commitment of the standard cognitive science today is: "cognition involves algorithmic processes upon symbolic representations" (Shapiro & Lawrence, 2011, p.2). Cartesian representationalism and representational theory of mind in general is inherited by cognitivism as the basic foundation of standard cognitive science today. The argument of cognitivism consists in claiming that the central function of mind or cognition is to manipulate symbols or representations according to explicit rules. Contemporary cognitivism consists of three basic elements: representation, formalism and rule-based transformation (Anderson, 2003, p.93). These three elements are connected to each other. The symbols as distinct, identifiable inner states stand in for specific states of affairs and "just as is the case in modern logic, it is the form of the symbol (or the proposition of which the symbol is a part) and not its meaning that is the basis of its rule-based transformation" (Anderson, 2003, p.93). This formal abstraction is a necessary condition for representation since the mental symbol and its meaning are different things, and their relationship is arbitrary. In addition to Cartesian epistemic gap between subject and object or the gap between action and perception, there is a gap between the inner process of representations and the external world of meaning and action. This results in a kind of formal abstractness that is also a problem about cognitivism. The third element of cognitivism arises from two former elements; since the symbol is disconnected from its meaning, cognitivism requires some formal rules

to govern the transformation from one cognitive state to another rather than being committed to the possibility of content-sensitive processing (Anderson, 2003, p.94). The dominant research program in Artificial Intelligence reflects this Cartesian and cognitivist approach, for example, Cyc[5] as the project of creating a general-purpose common sense cognizer can illustrate the influence of this approach on cognitive science.

> The Cyc knowledge base (KB) is a formalized representation of a vast quantity of fundamental human knowledge: facts, rules of thumb, and heuristics for reasoning about the objects and events of everyday life. The medium of representation is the formal language CycL… The KB consists of terms—which constitute the vocabulary of CycL—and assertions which relate those terms (Cycorp, cited in Anderson, 2003, p.94).

According to the cognitivist approach, cognitive processes occur in accordance with some specifiable rules of thought. Thinking is accepted as a process of symbol manipulation where symbols lead both a syntactic and semantic life (Shapiro, 2007, p.338). These rules of thought can be conceptualized as an interface for the translation of symbols to a form that causes bodily motions. The nervous system operates similar to the function of a CPU in a computer and the mind translates what it gets from sense data. This is why the cognitivist view in cognitive science accepts that cognition is computation and minds work as programs within the brain as the hardware of the system. Therefore, cognition begins with inputs to the nervous system and ends with outputs from the nervous system, so it does not need to interact with the environment outside of this system.

3. 4. Computationalism

Varela et al. see cybernetics as the historical roots of present-day cognitivism. The cybernetics phase of cognitive science has shaped the movement of creating a

[5] See Cycorp, The cycorp website, 2002, http://www.cyc.com/products2.html.

science of mind by taking this job from philosophers and psychologists. The underlying main ideas of the cybernetics movement were that logic is the proper discipline with which to understand the brain and mental activity and secondly, that the brain is a device that embodies logical principles in its component elements or neurons (Varela et al. 1992, p.38). For them, neurons are devices that can be either active or inactive and they can be connected to each other so that this connection can perform the role of logical operations and finally the entire brain could be regarded as a deductive machine (Varela et al. 1992, p.39). Varela et al. points out that these ideas played a central role in the invention of digital computers. The idea of the mind as a logical calculation lies behind the computationalism in standard cognitive science today. Computationalist approach in cognitive science defines human intelligence as similar to computer in its essential characteristics and computations of symbolic representations. Under the light of these ideas, cognition is defined as the information processing as symbolic computation –rule based manipulation of symbols (Varela et al. 1992, p.42). According to this model, cognition works through devices that can support and manipulate discrete functional elements namely symbols, but that interacts only with the physical form of symbols not their meaning (Varela et al. 1992, p.42). If this cognitive system works well, that is, if these symbols appropriately represent the reality out there, and the problem given to the system can be successfully solved. Therefore, the human brain works like a computer that is a symbol manipulating device and neurons singly or in a group represent or stand in for things in the outside reality –they have the functional characteristic of symbols– by means of the stimulation of the body's sensory organs. In the study of AI, mental activity is regarded as computational and functional, that is, cognitive processes are understood in terms of logical processes that operate them. In this respect, to study the human brain is not different from studying silicon chips. The mind functions by manipulating symbols that are registered by sensations so as to produce representations of the external world. Thus, for this view, sense organs or the body are accepted as mere input devices that translate stimulation taken from the

environment into a syntactic code that nervous system can then manipulate according to various rules that are either innate or learned (Shapiro, 2007, p.339). They call this manipulation process as cognition. The computational model of cognition operates only on symbolic deliverances from the sense organs, that is, it begins with inputs to and ends with outputs from the nervous system, and therefore, it has no need for interaction with the real world outside it (Shapiro, 2007, p.339). The problems with this model arise in various ways; first, cognition is cut off from the world outside it; second, it lacks the explanation for the origin of mental content, that is, the question of how symbols in the head acquire their semantics; third, it isolates the brain from the body and limits the mental activity to the brain.

3. 5. The Main Arguments of Embodied Cognition

The cognitivist model of cognition has been criticized and gradually challenged in the cognitive sciences by various approaches of embodied cognition that claim the interdependency of mind, body and environment. EC makes a shift in cognitive science by suggesting that we have to leave the idea of the world as independent and extrinsic represented by the brain, but instead pay attention to the fact that the brain does not represent the external world but that it makes continuous self-modifications in itself. The autonomy of the brain as a self-organizing system means that brain uses processes that change themselves, and the world is not separable from the structure of these processes of self-modification (Varela et al. 1992, p.139). In other words, we have to understand cognition not in terms of the relations of input and output mechanisms but on the basis of its operational circle, that is, cognition is the process itself rather than a result of these mechanisms. Thus, the system of cognition does not operate by representations, on the contrary, as an autonomous self-organizing system it rather "enacts a world as a domain of distinctions that is inseparable from the structure embodied by the cognitive system" (Varela et al. 1992, p.140). Perception is not the recovery of the properties of the external world or the projection

onto it of the categories of the perceiver but rather a production of mutual relationship between perceiver and perceived as Merleau Ponty (1962) argued in his work on perception. From the perspective of EC, cognition is defined as embodied action occurring as a result of having a body with various sensorimotor capacities, which are embedded in and interact with an environment with which they have co-evolved. EC defines perception as an active process, "not simply embedded in and constrained by the surrounding world" but contributing to "the enactment of this surrounding world" (Thompson, 1996, p.132). For them, the mind is not limited to the brain: "it resides in the embodied organism embedded in the world" and even it goes beyond the body as Andy Clark states: "it doesn't stay neatly in the brain," or even in the biological body: much cognition goes on in "hybrid ensembles of neural, bodily, and environmental elements" (Thompson, 1996, p.132) (Clark, 2008, p.xxviii). The brain does not act as a storehouse for skills and information coming from sensory input and internally represented knowledge, which "makes the content of internal cognitive representations the most important determinant of the structure of our behavior" (Wilson, 2013, p.2). Instead of leaning on representationalism, EC features our direct access to the world, which helps to shape, limit and ground cognition in accordance with four aspects of embodiment; physiology, evolutionary history, practical activity and socio-cultural situatedness (Anderson, 2003, p.104). This is the point of EC that actually demolishes the claim of Cartesian type of realism, the explanatory gap between subject and the object, and finally the gap between action and perception. There is no need of representations as mediating mechanisms between these dualisms, since in the model of cognition in EC, there is no gap between the inner and the outer world of cognizers, perception and cognition are all generated in one continuing action. EC argues that we have evolved from creatures "whose neural resources were devoted primarily to perceptual and motoric processing, and whose cognitive activity consisted largely of immediate, on-line interaction with the environment" (Wilson, 2002, p.625). Thus, human cognition is defined as being based on sensorimotor processing rather than being centralized,

abstract and sharply distinct from peripheral input and output modules (Wilson, 2002, p.625). EC rejects the traditional view on cognition that claims consciousness as strictly correlated with brain and central nervous system activity by assuming that the brain provides the necessary and sufficient conditions for mental life. Beyond the brain-bound model of mental life, EC stresses the power of perception and action in the constitution of the embodied mind. Thus, consciousness as a living activity is "something that we do with and through our living bodies and brains, rather than a something that has a locus somewhere deep inside us, in the brain and central nervous system alone" (Maiese, 2011, p.17). EC argues that the subjectively lived body underlies the perceptual and motor abilities of the body as the basis of proprioceptive and kinesthetic experience. This is the point conjoining phenomenology and cognitive science in the terms of taking account of the bodily lived experience rather than some abstract structures and mechanisms operating between action and perception, which are separated from the semantics of experiencing a real world in action.

From the perspective of EC, the proprioceptive and kinesthetic information, which feeds the state and position of the body through its feedback systems, operates preconsciously[6]. These feedback systems operate without being available to our attention, that is, these actions occur in the pre-reflective state. According to Gallagher, this state is "a prenoetic performance of the body, a fitting of the body to its actions and its world without the need for a reflexive conscious monitoring directed at the body" (Gallagher, 2005, p.32). The pre-reflective awareness is non-

[6] Brian Massumi makes a list of these feedback systems as proprioceptive, tactile, and visceral systems, where tactility is "exteroceptive," visceral sensation is "interoceptive," and proprioception, which "folds tactility into the body, enveloping the skin's contact with the external world in a dimension of medium depth: between epidermis and viscera," has the task of translating "the exertions and ease of the body's encounters with objects into a muscular memory of relationality. This constitutes the cumulative memory of skill, habit, posture," a kind of "sixth sense directly attuned to the movement of the body," These systems are central to our experience of spatial position and motion and so to our mapping of and interaction with the world around us (Massumi, 2002, pp.58-9).

perspectival, but it constitutes space and spatial perspective in virtue of the prenoetic performance of the body in enactive perception. Although it involves neurological operations, it cannot be reduced to them. Thus, it functions as a sense-making process but at a pre-reflective level, which combines motor space, proprioceptive space and perceptual space.

There are different approaches in EC and it shouldn't be expected that all different claims within it could be presented as a single point of view. However, some general features can be derived from EC research program[7] to be familiar with this way of conceptualizing cognition. Margaret Wilson (Wilson, 2002, p. 626) groups the most prominent claims within the diversity in EC studies in six elements, the quoted parts belong to her and I will elaborate on these general features:

1. "Cognition is situated." "Cognitive activity takes place in the context of a real-world environment, and it inherently involves perception and action." The central idea of EC literature is that cognition is a situated activity, which takes place in the context of task-relevant inputs and outputs. This is to say during a cognitive process, the flow of perceptual information does not stop and continues to affect this process. On the other hand, motor activity also continues to affect its environment according to the task. Off-line cognition can be claimed to be excluded from this processing since cognition can also be decoupled from any immediate interaction with the environment. However, in any case, situated cognition is based on our evolutionary history in which cognition has been adapted to the conditions of survival and "take advantage of stable environmental structures to simplify and speed cognitive processing" (Anderson, 2007, p.5). It shapes nevertheless the fundamental architectonic of cognition. This feature shows the similarity between human and non-human animal bodies in terms of the situated nature of embodied cognition that is shared by whole organisms. According to evolutionary theory, the shaping force that

[7] Lawrence Shapiro suggests calling EC as a research program rather than a well-defined theory. See Shapiro, Lawrence, 2011, *Embodied Cognition*, London and New York: Routledge, p. 2.

sets human beings apart from earlier hominid species and non-human animals has developed off-line mental activities as species-defining features of human cognition. The underlying activities giving rise to the change in human cognition can be listed as obtaining food from gathering which requires reflective thought, remembering, coordinating with one's fellow gatherers, considering the conditions in future and the past; avoiding being chased by predators to survive thus developing social abilities; tool-making; language; showing the ability to mentally represent what is not present etc (Wilson, 2002, p.627). In short, situated cognition means that cognition is situation-bound for both human and non-human animals.

2. "Cognition is time pressured." This feature refers to the fact that "cognition must be understood in terms of how it functions under the pressures of real-time interaction with the environment" (Anderson, 2007, p.5). When traditional AI models is considered, it can be said that a system based on manipulation of internal representations of a situation at its leisure is totally different from a real situated creature dealing with real time or runtime that has no leisure at all. The traditional models are weak in this respect. The principle of time pressure is the underlying feature of situated cognition.

> When situations demand fast and continuously evolving responses, there may simply not be time to build up a full-blown mental model of the environment, from which to derive a plan of action. Instead, it is argued, being a situated cognizer requires the use of cheap and efficient tricks for generating situation-appropriate action on the fly (Wilson, 2002, p.628).

Wilson emphasizes the fact that even if human beings do not always cognize under the pressure of time in a real time interaction with the environment e.g. planning something to do and then doing it still continuious updating of plans in response to rapidly changing conditions involves time pressure principle likewise perceptuomotor coordination of the body.

3. "We off-load cognitive work onto the environment." "Because of limits on our information-processing abilities (e.g., limits on attention and working memory), we

exploit the environment to reduce the cognitive workload" or to simplify cognitive tasks. According to this principle, we make the environment hold or even manipulate information for us, and we harvest that information only on a need-to-know basis. To use a pencil to store complex results in a long math problem or that elephants know the approaching rain via seeing lightening can be given as examples of this feature of cognition as taking advantage of an organism's abilities to interact with and change its environment for the sake of simplifying tasks.

4. "The environment is part of the cognitive system." "The information flow between mind and world is so dense and continuous that, for scientists studying the nature of cognitive activity, the mind alone is not a meaningful unit of analysis." Anderson gives a good example to explain this feature from Merleau Ponty's example for using tools as a part of the body to interact with the environment. Merleau Ponty points out that a blind man feels not with his hand holding the cane, but with the cane itself. Thus, "the locus of the sensation is extended to the tip of the cane" (Anderson, 2007, p.8). This feature argues that cognition can be seen as performed by an extended system that may be composed of things or actions outside of the physical body. Therefore, it refers to the fact that thinking is not a process that begins and ends with (in) the brain, it rather includes the whole body and also the environment of this body.

5. "Cognition is for action." "The function of the mind is to guide action, and cognitive mechanisms such as perception and memory must be understood in terms of their ultimate contribution to situation-appropriate behavior." This feature has been generated in virtue of work and experiments particularly on perception and memory. For instance, it is claimed that vision has evolved via the improvements of motor control (Churchland, Ramachandran, and Sejnowski, 1994). "Memory, evolved in service of perception and action in a three-dimensional environment" (Glenberg, 1997, p.1). When we consider vision as a product of motor control, and given that its function is not to internally to represent the perceived external world, we have to take into account the role of action in the constitution of visual

perception. The visual pathways in the brain are accepted to be "how" pathways in virtue of serving visually guided actions such as reaching and grasping a cup of coffee rather than being "what" and "where" pathways for the sake of identifying object structure and spatial relationships. Thus, cognition as a process that is realized to solve problems arise for the sake of action and so it is "to do something" rather than "to describe" things in the world. On the other hand, when we consider memory, it is observed in the experiments[8] on memory that we conceptualize things in terms of their functional relevance to us rather than memorizing them as they really are. As Glenberg claims, memory is not based on a kind of "memorizing", that is, the process of recalling the information from the "storage" in the brain. It is rather a process of "encoding of patterns of possible physical interaction with a three-dimensional world" (Glenberg, 1997, p.1).

6. "Off-line cognition is body based." "Even when de-coupled from the environment, the activity of the mind is grounded in mechanisms that evolved for interaction with the environment—that is, mechanisms of sensory processing and motor control." This feature argues that the structure of all the procedures of thinking including logical rules depend on or are grounded in the bodily experience (Lakoff and Johnson, 1980; 1999). For Lakoff and Johnson, for instance, many different domains of thinking are grounded in some basic spatial concepts (up, down, forward, back etc.) due to cross-domain "mappings" which are internally based on metaphors. "These mapped domains thereby inherit a kind of reasoning –a sense of how concepts connect and flow, of what follows from what– which has its origin in, and retains the structure of, our bodily coping with space" (Anderson, 2007, p.11). Furthermore, when thinking is also out of temporal sync or decoupled from the environment, namely without a physical interaction with the environment, it is body-based. This feature of EC emphasizes the fact that even abstract cognition utilizes the sensory- motor system in its procedure via reactivating neural circuitry that is always already active in perception and action.

[8] See Glenberg (1997)

This chapter shows that contrary to the dominant cognitivist views within the theories of mind the body beyond the brain namely the extra-cerebral structure of the body, which is embedded in natural and social environment, plays a crucial role in cognitive processes. Cognitive processes do not depend on Cartesian body/mind dualism which find a support from cognitivist, computational and representationalist approaches to mind. When cognition is understood on the basis of the distinction between the external world and the subjective internal world of subject, who is supposed to objectively represent the external reality, an epistemological gap between these two aspects of experience arise. Phenomenology helps to conceptualize the intertwined relationship between internal and external worlds by virtue of the structural coupling between them instead of context-independent representations as mediators between those presumed poles of experience. For EC, in Cognitivist views there is a lack of explanation regarding the ways in which the semantic level of human cognition is the intentional aspect of experience, and how this semantic level is mirrored syntactically in the brain. EC argues that the relationship between semantics and syntax is provided by the intentionality of the human body. The intentional content of the human cognition does not result from an intra brainwork that is based on logical calculation leading the manipulations of symbolic representations, which operates independently from the dynamic embodied and also embedded interaction between the body and its environment. In this sense, computationalism cannot explain how representations in the brain acquire their semantics namely the origin of mental content and the role of the body beyond the brain in this problem. EC suggests an understanding of cognition based on operational circle or processing instead of the relations of input and output mechanisms. This operational circle is defined as result of embodied coping and the intentional arc of the whole body as I examined in the previous chapter within Dreyfus' take on the relevance problem. The contribution of this chapter to the previous discussion in the dissertation is as follows. After arguing that the frame problem is applicable to intelligent machines but not to biological living beings, we

can add to this argument that the cognitivist model of mind, which is constituted by being abstracted out of the cognitive mechanisms of intelligent machines, is not applicable to biological cognitive systems. Such kinds of models claim that human cognition depends on computational processes that are based on representational operations and so they present a cognitivist approaches. Understanding cognition from such a cognitivist perspective does not contribute to the solution of the frame problem. Dreyfus' suggestion conforms to the perspective of EC. For both Dreyfus and EC, the emergence of the frame problem arises from that the cognitivist theory of mind which imposes its epistemological framework originating from the ontology of machines to ways of understanding the ontology of human experience. Thanks to its bodily being beyond the brain and its structural coupling with the environment, human cognition does not suffer from the frame problem due to its intentional interaction with the world, which rests in its bodily skills.

At this point, one can criticize EC by claiming that it conceptualizes cognition only on the basis of perception and reduces all the processes to sensorimotor coupling. Are not there any feedback systems other than sensorimotor systems that constitute the feedback relation between action and perception? Does the cognitive activity consist of only sensorimotor interaction? If we think so, the interaction between the body and its environment is understood only morphologically. If we think that cognitive system depends on only sensorimotor interactions, we ignore the interaction of this perception system with the dynamics of internal body, and that also the internal body matters to cognitive processes. In order to have a properly embodied theory of cognition, we have to recognize that it is not only the sensorimotor skills that determine intentionality within the interaction between the body and its environment, but also affective information that feeds action selection, perception and anticipation. Where do the affective states stand within those interactions, of which cognitivists tend to ignore in their theories of mind? Do not our emotions and feelings matter to the act of framing the world for the sake of producing meaningful responses? Do not our bodily feelings, which

cannot be reduced to sensorimotor skills, play a role in detecting the things that are relevant and significant to us in our environment? Do not the chemical dynamics and changes in our body have an effect on the operations of the brain of making selections? Or, does not my subjective feeling of these chemical changes, e.g. a change in hormonal balance, affect the processes of selecting and decision-making? Therefore, while we think on the frame problem, the question of whether we should take account of affective and emotional changes or not becomes important. However, even attributing this role to affectivity requires a clarification of how we define the nature of emotions and affectivity. If we are cognitivist, we see affective states as a result of a cognitive process that depends on an intra brainwork but not being a cause of it. For this reason, in the next chapter of this dissertation, I will discuss the views that argue for the role of affectivity in the solution of the frame problem. This discussion will take place also by presenting the theories of emotion. The next chapter will dwell on both the nature of emotions and how they matter to cognition in detecting relevance.

CHAPTER 4

EMOTIONS AS A SOLUTION FOR THE FRAME PROBLEM

In his book *The Rationality of Emotion* (1987), Ronald de Sousa invites us for a thought experiment in which we try to imagine ourselves to be without emotions. He argues that to be a creature without emotions would be for us like neither to be without "functional wants" of the sort attributed to "emotional" people nor to be emotionless due to a lack of concern for other people. However, it would turn out to be a deeper and more abstract problem for us (de Sousa, 1987, p.190). He speculates for two forms that an emotionless being could take: "A truly emotionless being would be either some kind of Kantian monster with a computer brain and a pure rational will, or else a Cartesian animal-machine, an ant, perhaps, in which every "want" is preprogrammed and every "belief" simply a releasing cue for a specific response" (de Sousa, 1987, p.191). However, for de Sousa, human beings are neither beast nor angel, that is, we are none of them by having emotions as well as beliefs and desires. Thanks to our biological existence, we do not have "complete determinacy" in our life in the sense that we don't have "complete determinacy" as the common character that animal machine and Kantian monster share in the first by mechanism and in the second by reason (de Sousa, 1987, p.191). Due to the lack of complete determinacy or determinate rationality with full predictability, creatures like us need to "read the motional configuration of another's body or face in order for having a guide to what she is likely to believe, attend to and therefore want and do" (de Sousa, 1987, p.191). However, this reading activity requires tracking relevant changes, and "bearing in mind" what does not change for possible future reference since all the things around us occur in a changing environment and even if we had a determinate rationality that can see the future clearly, it couldn't have

managed to filter unmanageable large data of the number of facts that change and stay the same in the environment. Furthermore, it is not only to limit and to decrease the amount of large data but also accordingly detecting the relevant information by ignoring irrelevant ones. According to de Sousa however, emotions as this reading activity are bodily responses, and they cannot be reduced to articulated propositions as cognitive artefacts.

> [E]motions are neither judgments nor desires… Emotions set the agenda for beliefs and desires: we might say they ask the questions that judgment answers with beliefs and evaluate the prospects to which, desire may or may not respond. As every committee chairman knows, questions have much to do with the determination of answers: the rest can be done with innocuous facts. In this way emotions can be said to be judgments, in the sense that they are what we see the world "in terms of." But they need not consist in articulated propositions (de Sousa, 1987, p.196).

De Sousa argues that emotions are one of the nature's ways of dealing with the philosophical frame problem, which refers to the problem of limiting the range of information that the organism will take into account. Emotions limit "the inferences actually drawn from a potential infinity and the set of live options among which it will choose" (de Sousa, 1987, p.195). For de Sousa, reason cannot help us to sort out which information we need from which we do not need, there must be a system of detecting the information that may or may not be relevant to us and also this system must provide us an ability to filter unnecessary information that distract us from arriving at a sensible decision for the sake of our well being. This system is explained through the function of emotions as the capacity to make certain features of the situation in question appear more salient and seem more relevant to our concern, than other features of the same situation (de Sousa, 1987, p.195). de Sousa calls this process of highlighting certain information and connections and neglecting others as "establishing salience" (de Sousa, 1987, p.200). The process of establishing salience directs the rest of the cognitive work to commit in one direction over another without examining first the extensive repertory of information and abilities

that are needed for accessing in a given situation for relevance. Therefore, emotions solve the frame problem for biological organisms via directing patterns of salience and attention and so contribute to cognitive processes.

4.1. Theories of Emotion

When we consider de Sousa's view of emotion, we can say that emotions operate as a filtering system in order to ease the work of cognitive processes. Emotions seem, in fact, to correspond to a process of evaluation. However, when we consider the conventional dominant view of mind, what we call an evaluation process is defined as a cognitive process. de Sousa describes emotions as an interface in service of reason. By virtue of this interface, cognitive systems operate more efficiently. Emotions as the subcontractor of reason thus fulfil the function of screening out the huge amount of data, which reason cannot handle to evaluate under the time-pressured conditions of experience. What de Sousa defines as emotional rationality is far from including the body beyond the brain within the process of constitution of emotions. For him, emotional processes are computational processes conducted only inside the brain. The constitution of emotions is a product of intra brain neural connections, which will provide basis for cognitive processes. Emotions are like perceptions, but they are not simply operate as judgements that has propositional attitudes. Before the cognitive centre subjects the things in our environment to a deeper and refined evaluation process, emotions specify the patterns of salience among objects of attention and inferential strategies. They are cognitive processes that give weight to the stimuli received at the brain. Even if de Sousa's connectivist understanding of emotion has not been drawn attention much in the literature, it presents us an example of a cognitivist approach to emotion.

The idea that frame problem cannot be solved only by appealing to reason lead to regard emotions as a solution for the frame problem. By this way, it seems possible to save the cognitivist thesis about mind and cognition in the sense that

emotions become a minor change in the cognitivist understanding to overcome the frame problem via adding emotions as a filtering mechanism. Thus, this solution can be liken to making minor modification in the "protective belt" of auxiliary propositions as emotional filtering system so that they can protect the "hard core" of the research program as cognitivist theory of mind (Lakatos, 1970). Emotions as a solution for the frame problem provide a way to save cognitivist understanding of cognition and emotion without getting rid of the core theory, which is based on mind-body dualism. In order not to abandon the notion of cognition as an information processing, cognitivists have to separate emotions from cognition, and put them in service of cognition as being interface between bodily processes and cognitive processes. Yet, the prominent question here is to be able to see if this modification, which is to add emotional processes as an interface to filter the received information to the cognitive processes as the core of cognitive activity itself, will be progressive and save the research program from degenerating. About this point, we can argue that the biggest problem the cognitivist theory of mind has to face can be stated as follows: even if they claim that emotions contribute to cognitive processes and so they collaborate via proposing a cognitivist understanding of emotion, they ignore the bodily dynamics beyond the brain in the constitution of emotions and separate emotions operating as filtering systems serving –before or after cognition –for cognitive processes from reasoning as the central control system. Hence, both the dualisms of mind-body and also emotion-cognition are kept within these views. This leads to ignore the role of the internal body in the constitution of emotions and also cognitive processes. Under the light of this emphasis on the problems of cognitivist perspective, the claim that I shall raise in this chapter is as follows: the problem I will dwell on in this chapter is even if it is proclaimed that emotions solve the frame problem, as long as the dualisms of mind-body and also emotion-cognition are kept this will not be a genuine solution for the frame problem since it would fall into the pits of cognitivist theory of mind. Cognitivism brings along a disembodied approach regarding the intentional aspect of experience namely

the system of detecting relevance and significance, and as I argued above, the solution for the frame problem does not seem possible with the help of this perspective. For the purpose of the clarification of this argument, I will present first cognitivist and non-cognitivist understandings of emotion in this chapter. After examining the differences between them, it will be easier to understand the views that assert emotions as having a role in the solution of the frame problem without being able to avoid from cognitivism. By the end of this chapter, we will have an idea of how emotive and cognitive processes interact with each other from different perspectives in the literature of theories of emotion.

4.1.1. The Cognitivist Approaches

4.1.1.1. Judgement Theories

The Stoic philosophy of mind denies the existence of an irrational faculty of mind contrary to Plato maintaining the idea that the soul has both rational and irrational parts (Sedley, 1993). According to the Stoics, mental conflicts arise from the fact that passions are based on mistaken thinking processes or on some false opinions. Thus, they are mistakes of the rational faculty like linguistic errors. From this perspective, emotions like fear can be defined as depending on false value judgements unless they do not depend on virtues. Even if the physical sensations accompany emotions, it is the rational faculty that basically produces emotions and the physical changes in the body come secondarily. The cognitivist theories of emotion share the idea of emotion as "judgement" with the Stoics' intellectualist theory of emotion. The separation of the cognitive theories of emotion[9] and non-cognitive ones depends on how they place

[9] The prominent names within the area of the cognitivist approach can be listed as Robert Solomon, Joel Marks, Robert Roberts, Ronald Alan Nash, Claire Armon-Jones, O. Harvey Green, Jennifer Wilkinson, Peter Goldie, and Martha Nussbaum.

feelings. Although non-cognitive theories maintains that the domain of feelings takes place prior to and, for some of them, independent of conscious cognitive processes namely before reflecting on what a body feels, cognitivist theories regard emotions as results of information processing characterized by value judgements or propositional-like states namely beliefs, thoughts and evaluative judgements etc., and yet feelings are not regarded as necessary conditions of having an emotion. “One can have an emotion without feeling anything, and one can feel anything (including all the “symptoms” of emotionality, for example, flushing, pulsing) without having any emotion whatever” (Solomon, 1993, p.99). Thus, for the cognitivist view, the cognitive processes as evaluative judgements determine what kind of emotion will be experienced. As Robert Solomon maintains, an emotion is "a basic judgment about our selves and our place in our world, the projection of the values and ideals, structures and mythologies, according to which we live and through which we experience our lives" (Solomon, 1993, p.126). As Martha Nussbaum states, the evaluation process takes place on the basis of a set of beliefs; "that there has been some damage to me or to something or someone close to me; that the damage is not trivial but significant; that it was done by someone; that it was done willingly; that it would be right for the perpetrator of the damage to be punished" (Nussbaum, 2004, p.188). Nussbaum uses beliefs interchangeably with judgments. In that respect, emotions are composed of series of judgments, and each element of this set of judgments is necessary in order for an emotion to be generated (Nussbaum, 2004, p.188). The core idea of judgment theory is that a physiological account of emotion cannot explain the nature of emotions that is based on beliefs, or in other words, what we know and believe about the world. This also means that if someone’s beliefs about something are changed, then this causes also a change in emotions. The determination of an emotion depends on the judging process that a cognitive agent makes actively, that is, emotions are not things that happen to us rather we actively evaluate, judge and determine what kind of emotion we will have. For Solomon, our

emotional atmosphere is determined by the judgments that are especially important to us, meaningful to us concerning matters in which we have invested our selves (Solomon, 1993, p.127). The judgment theory of emotion accepts emotion as a cognitive process, yet it does not have to be a conscious one. Solomon states "by judgment, I do not necessarily mean deliberative judgment... One might call such judgments spontaneous as long as spontaneity isn't confused with passivity" (Solomon, 1977, p.46). In this respect, a cognitive agent does not have to be deliberate in her judgment in order for "having" emotions but this non-conscious evaluation process is not defined as a bodily process in the sense that even if some judgment theoreticians acknowledge the role of bodily response in the constitution of emotions (Lyons, 1980) by defining emotion first as a psychosomatic state, strong judgment theoreticians do no consider bodily response as an essential part of the emotion. However, in William Lyons' view, bodily responses are seen as results of the judgments made by cognition. He defines the causal order of an emotional process as follows;

> the causal-evaluative theory gets its name from advocating that *X* is to be deemed an emotional state if and only if it is a physiologically abnormal state caused by the subject of that state's evaluation of his or her situation. The causal order is important, emotion is a psychosomatic state, a bodily state caused by an attitude, in this case an evaluative attitude (Lyons, 1980, pp.57-8).

Thus, there appears a gap between the mind and the body in respect of the constitution of emotions; emotion is generated first by the cognitive process in the brain, and then the body responses to the judgment of the brain. Even if Lyon acknowledges bodily response as a component of the emotional process, emotion is still determined by the cognitive process or the evaluation. Cognition here refers to an intellectual process rather than a bodily process. And, cognition here does nothing to do with the body apart from its role of transmission of sense data and physiological responses. Therefore, bodily feelings and bodily responses in general

are not necessary for emotion to be constituted; they are merely by-products of cognitive processes. Hence, cognitivist judgment approach presents a disembodied account of emotion.

4.1.1.2. The Cognitive Appraisal Theory of Emotions

Cognitive appraisal theory also relies on the cognitivist idea that our way of appraising or evaluating of the stimulus determines the emotion. The difference between them is that appraisal theory does not assume that there are beliefs, judgments etc. underlying emotions. Magna Arnold (1960) had introduced the concept of appraisal into the field of psychology. Appraisal is defined as a process of how the significance of something is determined for the agent, that is, the process of appraisal leads to attraction that the agent is get within. Thus, the emotion is described as the process of getting into this attraction; emotion is "felt tendency toward anything intuitively appraised as good (beneficial), or away from anything intuitively appraised as bad (harmful)" (Arnold, 1960, p.171). Frijda (1986) defines emotion as "action tendencies." This idea of tendency toward things remains common almost for all appraisal theories, yet there are different views changing in their emphasis. Appraisal is defined as the process of detecting and assessing the significance of the environment for organism's well-being (Moors, Ellsworth, Scherer & Frijda. 2013, p.120). In this respect, significance for well-being is understood as the process of satisfaction of concerns. "Concerns include the individual's needs, attachments, values, current goals, and beliefs; they include everything that an individual cares about" (Moors at al. 2013, p.120). Richard Lazarus (1991) maintains that appraisals are necessary and sufficient conditions in order to have emotions. For appraisal theory, there are different patterns of appraisals that determine particular characteristics of different emotions. Different accounts of appraisal theory actually differ in their understanding of these patterns according to the number of them and their particular features. For example, for Ira Roseman's

model (1984), when the agent gets a stimulus, it is appraised through five dimensions, which are motivational state (appetitive, aversive), situational state (motive-consistent, motive-inconsistent), probability (certain, uncertain, unknown), power (strong, weak) and agency (self-caused, other-caused, circumstance-caused) (Roseman, 1984, p.31). These five components of an appraisal get values and these values determine which emotion an agent will have. Thus, this fixed set of criteria is used in evaluating the significance of the situations that the agents encounter. Lazarus (1991) distinguishes between primary appraisals and secondary appraisals in this respect. The primary appraisals occur in order for establishing the significance or meaning of a situation whereas the secondary appraisals value the agent's ability to overcome the consequences of the situation. The appraisal theory of emotion like judgment theory also argues that the process of appraisal does not have to be deliberate or a conscious process. Lazarus (1991) argues that even if the brain process unconsciously, even instantaneously felt emotions, it would require some sort of cognitive appraisal of the situation. For otherwise, how would we know what we are responding to? Thus, appraisals may be effortless and we may not be conscious of them, but they are still happening.

The appraisal theory assumes that all the appraisals are followed by bodily responses and these responses are accepted as a part of emotion. Roseman describes the causal order of an emotional process in the sense that after the appraisal is made, the responses are set in motion as follows;

> I. The thoughts, images, and subjective 'feeling' associated with each discrete emotion," II. "the patterns of bodily response," III. the "facial expressions, vocal signals, and postural cues that communicate to others which emotion one is feeling," IV. a "behavioural component [that] comprises actions, such as running or fighting, which are often associated with particular emotions," and V. "goals to which particular emotions give rise, such as avoiding some situation (when frightened) or inflicting harm upon some person (when angered) (Roseman, 1984, pp.19–20).

Thus, it can be said that by means of the appraisal process, the organism is informed about its environment, and gets ready for acting on this information about the environment.

> The appraisal system has evolved to process information that predicts when particular emotional responses are likely to provide effective coping. Appraisals then guide coping by selecting the emotional responses from an organism's repertoire that are most likely to help attain important needs and goals under those conditions (Roseman & Smith, 2001, p.3).

The appraisal theory is not different from judgment theories in the sense that also appraisal is defined as "the process by which events in the environment are judged as good or bad" (Cornelius, 2000, p.4). The cognitive appraisal theory like judgment theories places cognitive evaluation process prior to emotional response. The emotion is defined as a combination of physiological arousal and cognitive appraisal, that is, what kind of emotion will be generated is determined by the combination of these two components. According to cognitive appraisal theory of emotion, the causal order of emergence of emotion is as follows:

Physiological arousal → Cognitive Appraisal → Emotion

Thus, appraisals precede and elicit emotions. Firstly, an agent perceives the environment, and secondly, the appraisal process takes place and evaluates the perceived environment with respect to the values on a set of measures as listed above, and then finally, the process of relating appraisal values to the agent's emotion occurs. The last stage of the whole process can be said to be a mediation process as in judgement theories of emotion in the sense that there is also a need for mediation between cognitive evaluation process or judgments and emotional response to link them. Hence, no matter conscious or unconscious appraisals mediate between the stimulus and the emotional response. That is, the stimulus must be evaluated before turning into meaningful emotional responses, and the process of evaluation serve as a mediator. We can ask in what consists the difference between judgment theory of emotion and cognitive appraisal theory if they both talk about a kind of cognitive evaluation process or judgements. We can say that for the cognitive

appraisal theory, the information processing is not defined as in judgment theories that characterize it by having directly propositional-like states namely beliefs, thoughts and evaluative judgements. It rather conceives appraisals as perception mechanisms (Roseman and Smith, 2001) as a kind of information processing channels, which are defined as working relatively in low levels which means that appraisals do not have to be deliberate or conscious. These information processing channels can be thought as particular patterns of neural activity in the brain. However, the fact that while one is experiencing an event there must be thoughts to precede the arousal of the body and emotion in order for assessing the event in accordance with the personal significance of it. This point is same for both the judgement theory and the appraisal theory. During the information processing, it is necessary to have some information at hand to compare them with the recent input. This is the determining antecedent condition of the cognition (Lazarus, Averill & Opton, 1970, p.219). The only difference in detail between judgement theory and the appraisal theory is their description of the working systems of how cognitive processes take place.

In appraisal theory of emotion, emotions are understood as *extracted* from appraisals i.e. the processes of evaluation. The body here again does not have a constitutive role, that is, the physiological changes do not initiate the actions and experiences even though they are recognized as important as a component of emotion. Its model for emotion can be summarized as follows; after something happens, the agent first thinks, and then produces emotion, and finally reacts. The appraisal mechanism works in the way of analysing an event, and choosing the appropriate emotion to feel, that is, choosing how you want to react to something in accordance with your needs and purposes. In other words, first perceiving and processing an event take place, and then one decides how to react. The appraisal theory apparently provides a useful tool for testing and analysing emotion in the field of psychology, and for explaining how emotions are differentiated in the sense that different emotions are produced by differing evaluations of events. However, it

presents a disembodied view of emotion just like the judgment theory of emotion due to the fact that the body does not have a constitutive role, but has a function as a passive receiver and transmitter. Therefore, **c**ognitivist theories of emotion distinguish emotion from bodily changes and feelings, so they conceptualize emotion from a disembodied ground.

4.1.1.3. Criticisms of Cognitivist Approach

In respect of the underlying mechanism of the process of appraisal and the nature of the representations on which these mechanisms operate, two mechanisms proposed by cognitivists are;

I. the rule-based mechanism, consisting of the on-line computation of one or more appraisal values,
II. the associative mechanism (also called schematic mechanism) consisting of the activation of learned associations between representations of stimuli and previously stored appraisal outputs (individual values or entire patterns) (Moors at al. 2013, p.120).

On this basis, it can be said that appraisals are rule-based cognitive process operating on symbolic representations, e.g. conceptual and/or propositional. Appraisals are also determinants of feelings that are the conscious reflection of the changes. "The appraisal process results in an appraisal output, that is, a representation of one or more appraisal values. This representation is unconscious by default but part of it can become conscious and hence become part of the content of feelings" (Scherer, 2009 in Moors at al. 2013, p.121). Thus, appraisals can be seen as based on abstract cognitive principles leaning on representational processes. These features make appraisals disembodied in the sense that what constitutes an emotion is an abstract, isolated brainwork. The judgment theories of emotion are not different from appraisal theories in that sense; emotions as appraisals or judgements are constituted by abstract cognitive processes which has nothing to do with the rest of the body or

online interaction between the body and environment. The body in that process has a passive role whereas “the mind” is active side that does the real job.

It is also a problem for cognitivist approach that how a set of evaluative judgements and appraisals are synthetized into an emotional experience characterized by a particular feeling is a challenging question. How does an emotion result in a particular feeling? In other words, how does an appraisal result in a particular feeling? Thus, we have to know how appraisals are associated with the feelings correspond to appraisals particular to them? First, cognitivism does not successfully give account of the essential role of feelings or affectivity in emotions, and how they are constituted. Their model is contradictory with the recent evidence from empirical research on emotions, which indicates the fact that there can be feelings without cognitive appraisal of an object as Antonio Damasio’s work argues (Damasio, 1999; 1994). I will show later in this dissertation that feelings and the subjective lived experience dimension of emotions are necessary components of emotional experience. This also matters for the question of whether affective component of emotion can be analysed in terms of the propositional elements of emotion. Since it is believed by cognitivists that the processes of judging or evaluating do not necessarily involve an affective flavor, that is, affectivity is understood as completely separated from cognitive evaluation (Griffiths, 1997). Thus, cognitivism does not successfully explain the connection between propositional and affective components in emotion; they are just seen as separate. Second, in order to explain the synthesis of propositional and affective components there should also be some explanatory mechanisms, and cognitivist perspective for the most part use techniques to analyse the propositional nature of the semantic fields determining the use of specific definitions for emotions (Scherer, 1999, p.637). This refers to the fact that they assume a logical structure determining the labelling of a feeling state with a specific emotion. Classifying operation of emotions reflects also how these emotions are constituted and thus it can be said that they also acknowledge the idea that emotions themselves are also constituted by a logical

structure and in most cases, especially for conscious appraisal or judgment processes, they have also propositional structure. Scherer states that what the appraisal theorists are interested is the "analysis of the propositional nature of the semantic fields that underlie the use of specific emotion terms, almost in the sense of definitions" (Scherer, 1999, p.640). On the one hand, this refers to the problem of the rationality of emotions, that is, how the standard propositional attitudes to be rational can be differentiated from the rationality of emotions if emotional rationality can be reducible to the rationality of beliefs as standard propositional attitudes (Lyons, 1980; de Sousa, 1987; Goldie, 2000). On the other hand, John Deigh (1994) objects to the idea of emotions as propositional attitudes by arguing that this idea leads to exclude animals and infants lacking language and cognitive capabilities as assumed by judgement theories or the cognitive appraisal theories. Thus, over-intellectualizing emotions leaves emotional life of non-human living beings unexplained.

The main assumption of the cognitivist theories of emotion is that cognition and emotion are not separable (Cornelius, 2000, p.5). However, the reason of their inseparableness is not that cognitivists think that they are structurally intertwined. Rather cognitivists claim for their inseparability with reference to their causal order, that is, for them, if there is no cognition that takes place before emotion, emotion does not arise. Although cognitivists argue for the inseparability of cognition and emotion due to this causal dependency of emotion on cognition but not their structural interdependency, we can claim that cognitivist perspective still supports emotion-cognition dichotomy. Since without a cognitive evaluation process takes place before emotion, a meaningful emotional response cannot arise. That is, for cognitivists, they are still understood as separate processes even though they are causally connected.

However, in contrast to causal order of emotional constitution argued by cognitivists as,

arousal → evaluation → emotion

scientists emphasize that emotions are immediate without cognitive appraisal process namely the cognitive label on it (Zajonc, 1984). That means emotion occurs without a label of thought. The underlying idea of this view is that sometimes emotional reactions happen quicker than our brain's ability to interpret the situation, thus we feel before we think, in other words, emotional reactions can be quicker than the interpretations of a situation. For example, you can feel scared when you are in the woods and hear a twig crack before you even have time to think about it. There are neurological research evidence showing that some neural pathways operating within emotion bypass the cortical areas involved in thinking; for example, one pathway runs from eye or ear via the thalamus to the amygdala so that by means of this shortcut a quick precognitive emotional response takes place before intellect intervenes (LeDoux, 1986). Therefore, the sequence of arousal, evaluation and emotional response might not be the right way of describing the nature of emotions. As LeDoux states, it is also possible to have emotions without a pre-existing evaluation process before emotional response. The following part will examine such kind of view to clarify how emotions occur without a pre-existing intellectual evaluation process.

4.1.2. The Non-Cognitivist Approaches

4.1.2.1. James-Lange Framework and Feeling Theories

In the 1880s, psychologist, theorist William James (1884) and physiologist Carl Lange (1885) independently proposed a theory of emotion on the basis of the idea that emotions are constituted directly by the perception of bodily responses, for example, fast breathing, racing heart, sweaty hands etc. In this respect, self-perception of bodily changes leads to emotional experience, and so emotions are experienced only after the physiological arousal has taken place. We can say autonomic nervous system such as increased muscular tension, perspiration,

accelerated heart rate and "butterflies" in the stomach are direct reactions to the stimulus, and they matter for the constitution of emotional experience. The causal order of emotional process is as follows:

Physiological arousal → Emotion (perception of bodily change)

Thus, James-Lange theory of emotion places bodily changes prior to the emotional process contrary to the cognitivist view that places it after emotion as a by-product of emotional experience. Non-cognitive theories of emotion give great importance to bodily changes as a part of emotion contrary to cognitivist views that place physiological responses after emotion. James explains his theory as follows;

> My theory ... is that the bodily changes follow directly the perception of the exciting fact, and that our feeling of the same changes as they occur is the emotion. Common sense says, we lose our fortune, are sorry and weep; we meet a bear, are frightened and run; we are insulted by a rival, and angry and strike. The hypothesis here to be defended says that this order of sequence is incorrect ... and that the more rational statement is that we feel sorry because we cry, angry because we strike, afraid because we tremble ... Without the bodily states following on the perception, the latter would be purely cognitive in form, pale, colorless, destitute of emotional warmth. We might then see the bear, and judge it best to run, receive the insult and deem it right to strike, but we should not actually feel afraid or angry (James, 1884, p.189).

Hence, James proposes the idea that stimulus is perceived and the bodily response is triggered automatically or reflexively (James, 1884, p.195). When I see a snake, my peripheral nervous system is changed in terms of both autonomic and somatic, and then I feel these changes and so fear at the same time. This idea underlies the non-cognitivist approach that gives autonomy to the body considering its own abilities of reacting to the environment. As James puts it;

> the nervous system of every living thing is but a bundle of predispositions to react in particular ways upon the contact of particular features of the environment… The neural machinery is but a hyphen between determinate arrangements of matter outside the body and determinate impulses to

inhibition or discharge within its organs (James, 1884, p.190).

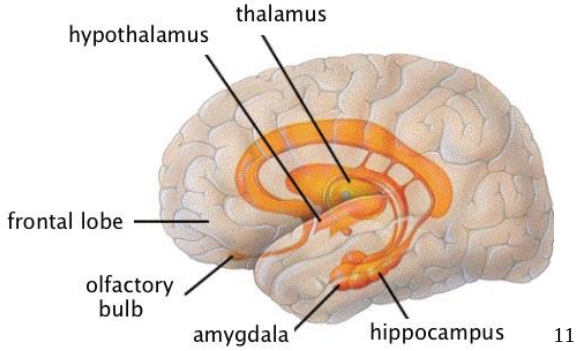
The main argument of this view is that bodily response is a necessary condition for emotion. James maintains that if we abstract the feelings from emotion, we have nothing left behind, that is, emotions are feelings rather than intellectual cognition. As he put it; “If we fancy some strong emotion, and then try to abstract from our consciousness of it all the feelings of its characteristic bodily symptoms, we find we have nothing left behind, no "mind-stuff" out of which the emotion can be constituted, and that a cold and neutral state of intellectual perception is all that remains (James, 1884, 193) Thus, the inner affects are the necessary feature of emotions, hence emotions correspond to subjective experiences as feelings. Emotions are defined by affectivity, that is, emotions are feelings that are the awareness of bodily changes or somatic responses. The James-Lange theory of emotion can also be named as “feeling theory” for that reason. Another name for James –Lange theory is “somatic feedback theories”; for emotions are defined as the process of getting feedback from the body (Prinz, 2004, p.5). Somatic, in this context, does not only mean “the part of the nervous system that receives information about the muscles of the body”, but also any part of the body including the states of the respiratory system, circulatory system, digestive system, musculoskeletal system, and endocrine system (Prinz, 2004a, 5). From this perspective, it is the unique patterns of somatic activity that differentiate emotions from each other. In other words, each emotion is a result of a unique bodily response, and these unique patterns determine which emotion we will have, i.e. my fear of snake has a different set of bodily changes from my anger for Donald Trump. Feelings are results of bodily responses, but not the other way around. The existence of these feelings are explained from an evolutionary perspective in the sense that emotions are the results of the evolution of our bodies to react automatically and adaptively to the environment that is significant for us for the sake of our survival. Therefore, James-Lange framework presents an embodied understanding of emotion in the sense that it

positions the body as the center of the constitution and determination of emotions. However, the question that James-Lange theory leaves unanswered is how the bodily changes are initiated by the perception of environment. I will dwell on that issue later. It can be said that the significant contribution of cognitivist theory of emotion to the philosophy of emotion is that they draw attention to the issue of intentionality of emotions in the sense that identifying emotions with feelings does not help to explain the intentional nature of emotions. Since they believe that feelings lack an intentional object whereas emotions are defined as always about something. (Broad, 1954) The issue of intentionality refers to the question of how agents detect relevancy and personal significance. The cognitivists believe that this is why we need evaluative judgments and appraisals, that is, we have to evaluate our environment in order to identify significance. However, cognitivists' solution remains disembodied and also in order to capture intentionality they have to separate between emotion and cognition. I believe that there is a strong correlation between how the bodily changes are initiated by the perception of environment and how emotions have an intentional structure without abandoning feelings. Thus, there should be a way to establish a theory of emotion that covers the problem of intentionality and also embodiment of emotions accompanied by bodily feelings. In this dissertation, I argue that enactivism solves this problem seamlessly.

4.1.2.2. Damasio's Somatic Marker Hypothesis

Antonio Damasio's Somatic Marker Hypothesis (SMH) takes James-Lange approach a step further by attaining a more critical role for the body. SMH is the hypothesis that cognitive processes as decision-making do not merely depend on an intellectual evaluation process; they rather depend on emotional components. But how does that happen? Over the last century, the theory for how emotions are embodied in neural

architecture has been based on the function of "limbic system[10]" (MacLean, 1949).



[11]

Figure 1: The Structure of the Limbic System

According to this anatomical framework, emotion is generated in virtue of the integration of sensations coming from the environment through the information from the body, more specifically the feedback from the viscera (Maclean, 1949). This idea

[10] The "limbic system" has been accepted as the part of the brain dealing with three key functions i.e. emotions, memory and arousal. It is also accepted as composed of several parts that are found above the brainstem and within the cerebrum. The limbic system associates the brain parts dealing with high and low functions. The brain regions that constitute the limbic system are: 1.Limbic Cortex (i.cingulate gyrus, ii. Parahippocambal gyrus); 2.Hippocambal Formation (i. The dentate gyrus, ii. Hippocampus, iii. Subicular Complex); 3.Amygdala; 4.Septal Area; 5.Hypothalamus (Rajmohan & Mohandas, 2007, p.133). It was James Papez in 1937 that first attributes a putative role in emotion to the limbic system (Rajmohan & Mohandas, 2007, p.133). Josep LeDoux rejected a conception of a functionally unified limbic system and suggested to abandon it since he believed that the term limbic system is an historical concept of brain anatomy that is no longer be accepted as accurate. He suggests to think the brain as an integrated whole rather than attributing a specific function such as emotion to a particular region inside the system, for e.g. the limbic system has been believed to be the emotional center of the brain due to the fact that the boundaries of the limbic system is subjected to be redefined repeatedly in virtue of advances in neuroscience (LeDoux, 2003).

[11] Retrieved from http://webspace.ship.edu/cgboer/limbicsystem.html

of emotion as a result of the feedback from the body has been regarded as resonated with James-Lange framework in the sense that emotions arise directly from brain's perceptions of bodily change. However, by his work of SMH, Damasio (1991) rejected the central role of limbic system. He proposed an incorporation of SMH with various brain regions outside of the classical limbic structures and an extension of the function of the limbic system beyond the visceral brain by claiming that multiple reservoirs of feedback from the periphery including visceral, somatosensory and so forth determine decision-making (Maclean, 1949). Thus, Damasio has furthered the limbic system approach through extending the influence of somatic processes to the regulation of decision-making and emotional experience in the sense that somatic markers getting signals from the body are "represented and regulated in the emotion circuitry of the brain particularly the ventromedial prefrontal cortex (VMPFC) to help regulate decision-making in situations of complexity and uncertainty" (Dunn, Dalgleish & Lawrence, 2006, p.240). Furthermore, he also furthered James-Lange framework in the sense of expanding the range of bodily states underlying our emotional experience by including registering of chemical changes in addition to other circuitries. Second contribution of Damasio's view to James-Lange framework is the idea that emotional experience can also occur in the absence of bodily changes namely the as-if-loop that I will explain more in the following parts. The main idea of SMH is that "decision-making is a process that depends on emotion and that both the amygdala and the orbitofrontal cortex are parts of a neural circuit critical for judgment and decision-making" (Bechara, Damasio H. & Damasio A. 2003, p.357). This hypothesis is based on the clinical work on the patients who have damage in their prefrontal region, especially if damage arises in ventral and medial sides of this region. The patients show severe impairments in personal and social decision-making although they show high ability in their intellectual capacities such as learning and retention of factual knowledge capacities (Damasio, 1994).

> Before the onset of brain damage the patients may be described as intelligent, creative and successful; but after damage occurs the patients develop a pattern of abnormal decision making which is most notable in personal and social matters. Specifically, patients have difficulty planning their workday; difficulty planning their future over immediate, medium and long ranges and difficulty choosing suitable friends, partners and activities. The plans they organize, the persons they elect to join, or the activities they undertake often lead to financial losses, losses in social standing and losses to family and friends. The choices these patients make are no longer personally advantageous, socially inadequate and are demonstrably different from the choices the patients were known to have made in the premorbid period (Damasio, 1996, p.1413).

Although the patients show normal ability to use logic in the solution of problems and in language capacities in addition to that their working memory and basic attention are not affected, they have abnormalities in decision-making, emotion and feeling. Thus, the damage in VMPFC indicates that even if this patient contemplates an object or event, this contemplation does not evoke the corresponding bodily feelings and emotions. This causes this patient not to approach or avoid this object or event if necessary, especially if some problems related to risk and uncertainty arise. They do not have the abilities to abstain from the alternatives that may lead to negative consequences as the Iowa Gambling Task (IGT) shows[12]. Instead, these patients have to use conscious deliberative interpretation process to evaluate negative and positive effects without an automatic bodily process. Let's look at how the normal bodily process occurs in order for a proper decision-making process. For Damasio, each emotion is a result of a cluster of changes in the body and brain,

[12] "IGT is a card selection task in which participants must learn, over a series of selections, which of four decks is the most rewarding. Each selection earns a monetary reward or punishment. Decks are rigged so that those which are initially advantageous become deleterious, and vice versa, mid way through the game. Bechara and colleagues (1996) report that an autonomic (skin conductance) response predicts the switch to more rewarding decks. This finding is interpreted as evidence for a link between bodily feedback and decision-making". (Bartol & Linquist, 2015, 83)

which is elicited by perceptions of objects and events in the environment. In the first place, some changes in the body that can be called somatic or body states take place, which include changes in facial expression, posture, hormones, heart rate, and muscle contractions so forth. Correspondingly some changes in the brain also happen as the release of neurotransmitters, which include dopamine, serotonin, noradrenaline and acetylcholine (Moss, 2011). Damasio presents an indissociably integrated relationship between the body and the brain by indicating the mutually targeted association between biochemical and neural circuits (Damasio, 1994, pp.87-8). He emphasizes on the fact that there are two routes that connect the brain and the body; first, the sensory and motor peripheral nerves which carry signals from every part of the body to the brain and from the brain to every part of the body, and second, the bloodstream which carries chemical signals e.g. hormones, neurotransmitters and modulators (Damasio, 1994, p.87). The changes in the brain also involve representations of the bodily changes. Damasio argues that these representations of bodily change are also connected to representations of the things in the environment, which trigger these changes. Thanks to these connections some representations get emotional relevance. In this respect, the "somatic marker" that is defined as "a body change that reflects an emotional state, whether positive or negative," provides unconscious signals that "facilitate and contribute to decision-making" (Damasio, 1999). Thus, somatic markers serve for tagging or indexing bodily changes by also associating them with other representations of the events that we are involved. Somatic markers arise in bioregulatory process where emotions and feelings also arise. This is why Damasio names markers as "somatic" in the sense that they "relate to body-state structure and regulation" no matter if they arise in the brain's representation of the body or in the rest of the body (Damasio, 1996, p.1413). Hence, Damasio refers to musculoskeletal, visceral and internal milieu components of the soma by "somatic", but it does not have to originate in the body proper in every instance since it can also be related to structures which represent the body (Damasio, 1996, p.1414). The process of marker signaling occurs in two ways; first, it can be a

covert action that depends on the undeliberated inhibition of a response learned previously, second, it can also occur as an overt action that depends on "deliberate evaluation of varied option-outcome scenarios as dangerous or advantageous" (Damasio, 1996, p.1413). At this point, it should be underlined that SMH is a manifestation of the fact that limiting human reasoning and decision-making to mechanisms based on "either conditioning alone or cognition alone in an exclusive and unrelated manner" must be abandoned (Damasio, 1996, p.1413).

Another contribution of SMH is that somatic markers can also be reactivated without being subjected to any physiological changes (Damasio, 1994).

> Somatic markers can reflect actions of the body proper (the 'body' loop) or the brain's representation of the action expected to take place in the body (the 'as-if' loop). In other words, the brain can construct a forward model of changes it expects in the body, allowing the organism to respond more rapidly to external stimuli without waiting for that activity to actually emerge in the periphery (Dunn, Dalgleish & Lawrence, 2006, pp.241-2).

That is, it does not have to be that a bodily reaction is always caused. In Damasio's model, what define emotions are not directly bodily changes, but rather the bodily representations of these changes in the somatosensory cortices. Thus, an agent can also experience emotion without the central autonomic effectors are activated, namely the bodily changes take place by means of activation of representations in the somatosensory cortices. Damasio calls this kind of emotional experience the "as if loop" (Damasio, 1994). His aim is to explain how we perceive our emotions considering James' understanding of emotion as perceptions of bodily changes. Damasio emphasizes on the fact that James also thought that the mechanism for the perception of a bodily change for an emotion to arise requires the process of mental representation of the body, that is, this process requires a perception of the body occurring in the brain (Damasio & Damasio, 2006, p.16). The underlying mechanism that connects the brain and the rest of the body are chemical signals as well as neural signals and contractions of muscles. The body here is understood to be composed of

various compartments; the viscera e.g. the heart, the lungs, the mouth, the tongue, the throat and the skin, and the communication between the viscera and the brain is not provided by only one way as the autonomic nervous system, there are other neural channels and also there is a chemical channel as well (Damasio, & Damasio, 2006, p.17). Thus, neurons are not the only way of signaling to the brain from the rest of the body, chemical molecules serve to signal to the brain as well. On the one hand, body states are continuously mapped in the brain. On the other hand, brain states also cause body states via neural and chemical channels. Hence, the body and the brain are constantly interacting i.e. their relationship is circular and this interaction has to be mapped in the brain continuously.

> The organism requires that sort of ongoing representation for rather transparent reasons: in order for the brain to coordinate physiological states in the body-proper [the rest of the body apart from the brain], which it does without our being consciously aware of what is going on, the brain must be informed about the various physiological parameters at different regions of the body. The information must be faithful and current if it is to permit optimal controlling responses: call this information-processing net- work the 'body loop' (Damasio, & Damasio, 2006, p.18, bracketed expression was added).

In this respect, as-if body loop is the other network that links the mind and the body. It corresponds to the brain capacity for simulating a certain body state as if it were occurring; "because our perception of any body state is rooted in the body maps of the somatosensing regions, we perceive the body state as actually occurring even if it is not" (Damasio, & Damasio, 2006, p.18). Thus, "as-if body loop" serves to enact body related changes directly in somatosensory maps under the control of neural sites e.g. the prefrontal cortices so that the as-if body loop bypasses the rest of the body. "As-if body loop" operates also for emotions. The essential idea about as-if body loop while we consider emotions is that the neurons in areas (the premotor/prefrontal cortex in the case of compassion, the anterior insular cortex in the case of disgust, and the amygdala in the case of fear) engaging emotion activate

regions that normally map the state of the body and move it to action (Damasio, & Damasio, 2006, p.19). These regions consist of the somatomotor complex and the insular cortex, both of which have the function of mapping the bodily states, and also they play a sensory role as well as participate in action.[13] The capacity of the body to represent and so map the bodily changes in the somatosensory cortices, which is the condition for as-if body loop to arise, corresponds to the fact that emotions are felt in our flesh i.e. Damasio calls the process of perception of emotion or bodily changes as *feeling*. "The emotion ends up felt in our flesh. The process unfolds in time and is both sensory and motor. The sensing of body changes leads to motor activations that in turn can be sensed" (Damasio, & Damasio, 2006, p.20). In this context, it should be stated that Damasio's view differs from James in the point that these feeling processes does not have to be conscious in every case in the sense that "the brain can register changes in bodily states without conscious awareness" (Damasio, & Damasio, 2006, p.20). For this reason, what Damasio calls as emotion is the bodily response, and it can be conscious and nonconscious, whereas what James calls as emotion is exhausted by feeling of this bodily change, that is, the process of feeling is conscious for James, and he calls this process as emotion (Prinz, 2004, p.6). Thus, for Damasio, the process of feeling and emotion refer to different stages. According to him, feelings of emotions are perceptions and, in this respect, they are similar to other perceptions in the sense that they have also an object as part of the process. Hence, the feelings of emotions are composed of the perception of the object and the internal construction the brain makes of it. However, the object of feelings is different from other perceptions' objects due to the fact that it is the body itself rather than an object external to the body. Thus, the object of feelings is inside the body, it

[13] Damasios find a parallelism between their theory of as-if body loops and the existence of "mirror neurons" proposed by Giocomo Rizzolatti. See G. Rizolatti, 2004. The relevant aspect of mirror neurons here is that they allow us to understand the actions of others by placing us in a comparable body state and this is also applicable for emotions as well (Damasio, & Damasio, 2006). However, this idea is not directly relevant to this thesis, thus I won't go in detail.

is the body or the organism itself. This difference reveals another difference between feelings and other perceptions in the sense that whereas the object of perception does not change when it is perceived, the object of feelings i.e. the body itself changes when it is felt.

> In feeling, the brain can act directly on the very object that it is perceiving, because the object at the origin is inside the body. It can do so by modifying the state of the body, or by altering the transmission signals from it. Thus, the object at the origin, on the one hand, and the brain map of that object, on the other hand, can exert mutual influences in a sort of reverberative process that is not to be found in the perception of an external object (Damasio, & Damasio, 2006, p.21).

Thus, it can be said that feelings trigger a dynamic engagement of the body that leads to a dynamic variation of the perception; thus they occur within continuous transitions. Besides, since emotion is a global change in the organism, in the brain and in the body, Damasio argues that feelings of these emotions are also "a composite image of that global change in the brain and the body" (Damasio, 2000, p.21). Damasio differentiates having feelings from knowing feelings in the sense that feeling does not have to be a conscious process. He presents the sequence of the process leading to feelings as in the follows:

> 1. Induction of emotion, 2. Ensuing organism changes in body and brain, 3. Neural patterns representing the organism changes, 4. Sensing of the neural pattern in the form of images (feeling) and 5. Feeling of feeling, which is a part of consciousness process [and it does not have to occur in every case] (Damasio, 2000, 21, bracketed expression was added).

Thus, the fifth stage is to feel what has already been felt and refers to know what you have felt or to become consciously aware of that you are feeling. According to Damasio's (1994) view, human brain dynamically constructs maps of the body, which serve to provide information about what happens to the organism inside and outside of its boundary. These maps function as a way of informing the body about

its states so that it can update the current states in accordance with the neural patterns that have already existed. The problem with the patients with brain damage is that the maps that their bodies have no longer receive updated information from the body. Thus, these patients cannot be aware of their bodily states. What Damasio (1994) proposes is that on the one hand, there are specific patterns of body reaction as innate dispositional representations in the brain e.g. causing the body to tremble in danger. On the other hand, there is also the representation of body states that are affected by the body's pre-programmed responses to certain stimuli. In this respect, Damasio differentiates primary emotions from secondary emotions. The primary emotions are based on evolutionary older brain circuits involving the amygdala, limbic system and the anterior cingulate (Damasio, 1994, p.133). Damasio points out that although innate and preorganized emotions as the basic mechanisms of emotional behaviors serve to accomplish some useful goals e.g. speedy concealment from a predator by automatically displaying anger toward the competitor, there is need for the next step as "feeling of the emotion in connection to the object that exited it, the realization of the nexus between object and emotional body state" (Damasio, 1994, p.132). The consciousness here comes to play, that is, if you become aware of the object that excited your emotion in relation to the bodily change that it created, you may have to develop ways of avoiding this object rather than just automatically respond to it. Thus, feeling an emotion and becoming conscious of it, which is based on our own experience in relation to the specific object, provides more advantageously enlarged protection policy (Damasio, 1994, p.133). As Damasio puts it, "feeling your emotional states, which is to say being conscious of emotions, offers you *flexibility of response based on the particular history of your interactions with the environment.* Although you need innate devices to start the ball of knowledge rolling, feelings offer you something extra" (Damasio, 1994, p.133). This step of feeling corresponds to what Damasio means by secondary emotions that refer to "forming *systematic connections between categories of objects and situations, on the one hand, and primary emotions, on the other*" (Damasio, 1994, p.134). He states that

limbic system is not sufficient to support feeling process, thus prefrontal and somatosensory cortices step in for a more complex process. The mechanism for secondary emotions is based on acquired rather than innate dispositional representations, which are obtained under the influence of innate dispositions. Acquired dispositions embody our own experiences about the world. The association between innate dispositions and acquired dispositions is provided by the body's ability to map its own states, which is also a matter of constructing memory over what a body is able to do structurally and automatically. It is essential in this point to list what those acquired dispositions lead to in the body since this process reveals how this aforesaid mapping or representing process is an embodied process indeed. I will also discuss what Damasio means by representation later on. Damasio lists the ways in which the acquired representations respond as follows;

> (a) by activating nuclei of the autonomic nervous system and signaling to the body via peripheral nerves, with the result that viscera are placed in the state most commonly associated with the type of triggering situation; (b) by dispatching signals to the motor system, so that the skeletal muscles complete the external picture of an emotion in facial expressions and body posture; (c) by activating the endocrine and peptide systems, whose chemical actions result in changes in body and brain states; and finally, (d) by activating, with particular patterns, the nonspecific neurotransmitter nuclei in brain stem and basal forebrain which then release their chemical messages in varied regions of the telencephalon (e.g., basal ganglia and cerebral cortex). This apparently exhausting collection of actions is a massive response; it is varied. It is aimed at the whole organism, and in a healthy person, it is a marvel of coordination (Damasio, 1994, p.138).

The secondary emotions should be understood as feelings of these bodily changes listed above. The dynamic representation or mapping of the body refers also to the constitution of self or consciousness. Damasio defines consciousness as the relation between a given organism and the objects perceived in its mind, that is, the body representation provides the construction of the self and consciousness (Damasio, & Damasio, 2006, p.22). For him, contrary to Descartes' view that defines the self as an

isolated central unite as the protagonist in "the Cartesian Theater", the self is the continuous re-creation of overall patterns of somatic markers and dispositional representations. Furthermore, this capacity of representation provides a connection between our own bodily states and the equivalent states of other people, i.e. we can attribute the same significance to others' states in virtue of our previous establishment of the connection between our own body states and its significance (Damasio, & Damasio, 2006, 22). This can be understood as the capacity for empathy through emotions and feelings.

The SMH refers to the idea that both primary and secondary emotional responses function as the perception of how different stimuli make the body produce reaction resulting in pleasant (good) or unpleasant (bad) responses. In virtue of emotions based on bodily states, the body evaluates and marks a situation as good or bad. Hence, somatic markers function as "biasing devices" that determine decision-making process by filtering various features of what the body encounter and of options that the body can react. Therefore, the underlying idea of SMH is that we make our decisions on a neurobiological level, and our emotions play an essential role in this process, which involves the interplay between neural systems that elicit emotional bodily states and neural systems that are mapping these emotions or bodily states (Carter & Smith-Pasqualini, 2004). Damasio argues that the body and the emotional experience play an essential role in our cognitive processes and in our rational decision-making. As he puts it; "the body… contributes a content that is part and parcel of the workings of the normal mind…the mind is embodied, in the full sense of the term, not just embrained" (Damasio, 1994, p.226, p.118). Somatic markers give the body autonomy in terms of gut reactions that lead agents to reject immediately and spontaneously negative course of actions and allow them to "choose from among fewer alternatives" (Damasio, 1994). Thus, SMH results in an embodied understanding of how decision-making as a cognitive capacity is realized. Damasio (1994) grounds his idea of cognition, which depends on emotion, on evolutionary explanation of survival.

> Evolution is thrifty and tinkering. It has had available, in the brains of numerous species, decision-making mechanisms that are body-based and survival-oriented, and those mechanisms have proven successful in a variety of ecological niches. As the environmental contingencies increased and as new decision strategies evolved, it would have made economical sense if the brain structures required to support such new strategies would retain a functional link to their forerunners. Their purpose is the same, survival, and the parameters that control their operation and measure their success are also the same: well-being, absence of pain. Natural selection tends to work precisely this way, by conserving something that works, by selecting other devices, which can cope with greater complexity, rarely by evolving entirely new mechanisms from scratch (Damasio, 1994, p.190).

Above all, emotions and feelings, as the patterns of neural activity, have evolved as manifestations and facilitators of the basic functions of nervous system that are reliably control basic reflexes and drives promoting the survival of the individual, e.g. feeding, species perpetuation, and sexual behavior (Damasio, 1994, pp.114-5). Rationality is presented as an instinctual capacity emerged as nervous system, which has become increasingly complex by generating responses to "the daunting task of predicting an uncertain future and planning out actions accordingly" (Damasio, 1994, p.xiii). However, Damasio states that emotions fortunately facilitate the task of rationality by activating two essential neural operation that the rationality depends on i.e. attention and working memory. Therefore, emotions and feelings involve in cognitive processes by determining and speeding up the decision-making processes by ruling out the options not likely to lead to survival and well-being.

4.1.2.3. The Role of Representation in Emotion and Cognition is Questioned in Damasio's View

In order to conceptualize the relationship between emotion and cognition from the perspective of SMH, it is worth to quote in length the background assumptions of SMH presented by Damasio:

(i) human reasoning and decision-making depend on many levels of neural operation, some of which are conscious and overtly cognitive, some of which are not; conscious, overtly cognitive operations depend on sensory images based on the activity of early sensory cortices;

(ii) cognitive operations, regardless of their content, depend on support processes such as attention, working memory and emotion;

(iii) reasoning and decision-making depend on the availability of knowledge about situations, actors, options for action and outcomes; such knowledge is stored in "dispositional" form throughout higher-order cortices and some subcortical nuclei (the term dispositional is synonymous with implicit and non-topographically organized); dispositional knowledge can be made explicit in the form of (a) motor responses of varied types and complexity (some combinations of which are part of emotions) and (b) images. The results of motor responses, including those that are not generated consciously, can be represented in images;

(iv) knowledge can be classified as follows: (a) innate and acquired knowledge concerning bioregulatory processes and body states and actions, including those which are made explicit as emotions; (b) knowledge about entities, facts (e.g. relations, rules), actions and action-complexes (stories), which are usually made explicit as images; (c) knowledge about the linkages between (b) and (a) items, as reflected in individual experience; and (d) knowledge resulting from the categorizations of items in (a), (b) and (c) (Damasio, 2000, pp.295-6).

In this list of background assumptions underlying SMH, the terminology that becomes prominent due to its relation to the problem of representationalism in this dissertation is Damasio's usage of "representation" or "image". It is essential to have a better understanding of these terms considering the purpose of this dissertation, which is to show that dissolution of the frame problem cannot be possible if one relies on the cognitivist understanding of cognition, and of emotion as well. The cognitivist approach relies on representations in cognitive and affective processes, which limits their existence to brain, and also to a symbol manipulation process of computing and information processing under certain rules. As Fodor puts it, there is "no computation without representation", from the perspective of computational

theory of mind, which is based on the cognitivist approach, representations used in the processes of cognition and rules that their manipulation relies on must be explicit for the sake of a properly working system (Fodor, 1981, p.180). The main argument of computationalism, which will be examined in detail in the following parts of this dissertation, consists in claiming that internal mental activity is merely based on manipulation of explicit symbols according to explicit syntactical rules. Moreover, by this way, it can be said that the cognitivist approach presents a disembodied understanding of cognition and emotion in the sense that the body is a mere transmitter of data, and in this respect, does not play a constitutive role in these processes. However, Damasio's view, on the one hand, gives an essential role to the body in emotion and so also in cognition, and on the other hand, argues for interdependence between emotion and cognition as bodily process. At this point, we should ask what Damasio means by representation or image that the body generates. Hence, we can have a sense about whether Damasio remains cognitivist in his understanding of cognition and emotion even if he pays attention to the role of body in these processes. Damasio explains what he means by representation or image through his account on how ventromedial prefrontal cortex[14] (vmPFC) performs as a repository of dispositionally recorded linkages between factual knowledge and bioregulatory states (Damasio, 1996, p.1414). According to SMH, the basic mechanism works in the way that "structures in vmPFC provide the substrata for learning the association between certain classes of complex situation and also the type of bioregulatory state (including emotional state) usually associated with that

[14] Ventromedial prefrontal cortex is defined as part of the prefrontal cortex in the frontal lobe of the brain. It is related to processing risk and fear in addition to producing emotional responses and playing role in decision-making. It is "connected to and receives input from the ventral tegmental area, amygdala, the temporal lobe, the olfactory system, and the dorsomedial thalamus. It, in turn, sends signals to many different brain regions including; the temporal lobe, amygdala, the lateral hypothalamus, the hippocampal formation, the cingulate cortex, and certain other regions of the prefrontal cortex" (Corison, 2013, cited in https://en.wikipedia.org/wiki/Ventromedial_prefrontal_cortex - cite_note-Carlson-4).

class of situation in prior individual experience" (Damasio, 1996, p.1414). That is, vmPFC holds the linkages between the facts from the given situation and the emotion previously paired with it in an agent's contingent experience (Damasio, 1996, p.1414). Damasio emphasizes on the fact that these linkages are dispositional, in other words, "they do not *hold* the representation of the facts or of the emotional state *explicitly*, but hold rather the potential to reactivate an emotion by acting on the appropriate cortical or subcortical structures" (Damasio, 1996, p.1414). Hence, the linkages as dispositional representation is defined here as a memory carrying a potential for reactivation of an emotion "between the disposition for a certain aspect of a situation (for instance, the long-tem outcome for a type of response option) and the disposition for the type of emotion that in past experience has been associated with the situation" (Damasio, 1996, p.1415). This point reveals what we need for the process of decision-making, as Damasio states;

> The experience we acquire regarding a complex situation and its components –a certain configuration of actors and actions requiring a response; a set of response options; a set of immediate and long-term outcomes for each response option– is processed in sensory imagetic and motor terms and is then recorded in dispositional and categorized form (Damasio, 1996, p.1415).

In this sense, the essential question here is how our experience is processed in sensory imagetic term. According to Damasio's statement above, the related dispositions are activated in high-order association cortices including pre-frontal cortices when a situation that was categorized before arises. Damasio says that this process leads to the recall of pertinently associated facts that will be experienced in imagetic form (Damasio, 1996, p.1415). This reactivation process can be carried out via either body loop or as-if body loop. Damasio explains what he means by image or representation in his book *Descartes' Error* (1994);

> Mental images are momentary constructions, *attempts at replication* of patterns that were once experience…these recalled images tend to be held in

> consciousness only fleetingly, and although they may appear to be good replicas, they are often inaccurate or incomplete. I suspect that explicit recalled mental images arise from the transient synchronous activation of neural firing patterns largely in the same early sensory cortices where the firing patterns corresponding to perceptual representations once occurred. The activation results in a topographically organized representation (Damasio, 1994, pp.100-1).

Damasio states that topographically organized representations that are needed for recalled images are constructed momentarily under the command of acquired dispositional neural patterns elsewhere in the brain (Damasio, 1994, p.102). Those representations order other neural patterns, and lead neural activity in other circuits that are part of the same system and with which there is a strong neuronal interconnection (Damasio, 1994, p.102).

> Dispositional representations exist as potential patterns of neuron activity in small ensembles of neurons I call "convergence zones"; that is, they consist of a set of neuron firing dispositions within the ensemble. The dispositions related to recallable images were acquired through learning, and thus we can say they constitute a memory. The convergence zones whose dispositional representations can result in images when they fire back to early sensory cortices are located throughout the higher-order association cortices (in occipital, temporal, parietal, and frontal regions), and in basal ganglia and limbic structures (Damasio, 1994, p.102).

What we recall or what dispositional representations hold in store is not a “picture” in its literal meaning but “a means to reconstitute “a picture” (Damasio, 1994, p.102). Thus, we can say that for Damasio representation does not refer to a content e.g. a picture or re-presentation of my mother’s face, but rather to the potential for firing patterns which trigger the momentary reconstruction of my past experience about my mother’s face (Damasio, 1994, p.102). “What I am calling a dispositional representation is a dormant firing potentiality which comes to life when neurons fire, with a particular pattern, at certain rates, for a certain amount of time, and toward a particular target which happens to be another ensemble of neurons” (Damasio, 1994,

p.103). That is, what Damasio refers by representation is that which exists in a potential state subjected to activation, but is not in the form of an explicit content that can be retrieved from a storage.

> Images are not stored as facsimile pictures of things, or events, or words, or sentences. The brain does not file Polaroid pictures of people, objects, and landscapes; nor does it store audiotapes of music and speech; it does not store films of scenes in our lives; nor does it bold the type of cue cards and TelePrompTer transparencies that help politicians earn their daily bread. In brief, there seem to be no permanently held pictures of anything, even miniaturized, no micro- fiches or microfilms, no hard copies (Damasio, 1994, p.100).

That is, our brains do not work like storage or it is not a library where fixed images or snapshots of external reality are represented. For Damasio, representation is a matter of the probability of action of momentary replication of patterns that were once experienced, and this action depends on our online interaction with the world. By suggesting an embodied-neurobiological model of mind, Damasio rejects Cartesian conception of representation that relies on a repetition or re-presentation of an already fully constituted physical or mental reality. Whereas Cartesian "image" mirrors the external reality, and exists in the mind as an explicit image of an object or an event existing outside the mind, Damasio's understanding representation signifies a "pattern that is consistently related to something" (Damasio, 1999, p.322, p.320). Damasio suggests to use the word "mental pattern" instead of "mental image" since the notion of image has unclear and various meanings and its use is fraught with difficulties (Damasio, 1999, p.317). This pattern or image is;

> based on changes which occurred in our organisms –including the part of the organism called brain– when the physical structure of the object interacts with the body. The signaling devices located throughout our body structure – in the skin, in the muscles, in the retina, and so on– help construct neural patterns which map the organism's interaction with the object (Damasio, 1999, p.320).

These neural patterns or maps are constructed in the multiple sensory and motor regions of the brain that can process the relevant signals. This construction process depends on the momentary selection of neurons and circuits engaged by the interaction between the body and environment. “The part of the pattern that remains in memory is built according to the same principle” (Damasio, 1999, p.321). That is, patterns or mappings of past and present experience are constructed according to the same mechanism. The essential point about patterns is that they are results of correspondences “between physical characteristics of the object and the modes of reaction of the organism” rather than correspondences between the perceived object and the picture or re-presentation of the object that is believed to be “transferred from the object to the retina and from the retina to the brain” (Damasio, 1999, p.321). Damasio rejects to argue for a resemblance between a computer and the mind and states that the brain has nothing to do with the metaphor of computer (Damasio, 1999, p.321). “Rather than mirroring the environment around it, as an engineered information-processing device would, each brain constructs maps of the environment using its own parameters and internal design, and thus creates a world unique to class of beings comparably designed” (Damasio, 1999, p.322). In that sense, the process of pattern creation or mapping does not refer to a one-to-one correspondence between what is mapped and the map, as Damasio puts it; “the brain is a creative system” i.e. maps or patterns reflects the unique interaction between bodies and their physical, biological and social environments, which is particular to different bodies and changing features of the environment. For Damasio, also consciousness arises from continuous mappings in the brain of the body and of its environment, which are also informed by past mappings. There is a correlation between current mappings and past mappings. Neural maps are correlated moment by moment with the neural maps that construct the self as a perpetually re-created neurobiological state, allowing us to own the bodily representations, that are otherwise remain unconscious (Damasio, 1994, p.99). Hence, the self is not the homunculus who perceives or produces the images or the representations inside the brain. Moreover, there is no single area that

produces representations by combining various sensory modalities into a unified image. Damasio emphasizes on the fact that the mental unity does not arise from the work of homunculus in the “Cartesian Theater”, but rather from the simultaneity among different brain states, so it is just a matter of temporality of brain functions, that is, the simultaneity between sensory representations and representation of the body leads subjective experience to occur.

Damasio emphasizes on the intimately interwoven relationship among body regulation, survival and mind. He argues that there are innate neural circuits containing dispositional representations, where their activation leads a complicated collection of responses to motion (Damasio, 1994, p.114). Drives and instincts e.g. causing fight or flight behaviors, are one of these innate circuits which “contribute to survival either directly by performing a life-saving action or indirectly by propitiating conditions advantageous to survival or reducing the influence of potentially harmful conditions” (Damasio, 1994, p.115). Damasio sees emotions and feelings as manifestations of drives and instincts, and they are central to cognitive processes including decision-making. Although the brain is part of this regulatory system which operates the mapping function, and so “perceive” this regulatory process, it is the body that regulates and governs itself for the sake of survival.

> Such regulatory mechanisms ensure survival by driving a disposition to excite some pattern of body changes (a drive), which can be a body state with a specific meaning (hunger, nausea), or a recognizable emotion (fear, anger), or some combination thereof. The excitement can be triggered from the "visceral" inside (low blood sugar in the internal milieu), from the outside (a threatening stimulus), or from the "mental" inside (realization that a catastrophe is about to happen). Each of these can engage an internal bioregulatory response, or an instinctual behavior pattern, or a newly created action plan, or any or all of them (Damasio, 1994, pp.116-7).

In accordance with the basic biological regulation for the sake of survival, living beings have basic set of preferences, or in other words “values”, that is, organisms develop ability to detect good and bad things due to their possible impact on

survival. Thus, the basic biological regulation and classification of good or bad things are interdependent processes, and hence the body has a central role in classifying things according to their values; for the body itself and emotions are results of this detection.

> As the brain incorporates dispositional representations of interactions with entities and scenes relevant for innate regulation, it increases the chances of including entities and scenes that may or may not be directly relevant to survival. And as this happens, our growing sense of whatever the world outside may be, is apprehended as a modification in the neural space in which body and brain interact. It is not only the separation between mind and brain that is mythical: the separation between mind and body is probably just as fictional. The mind is embodied, in the full sense of the term, not just embrained (Damasio, 1994, pp.117-8).

This idea resonates with James' statement that "every object that excites an instinct excites an emotion as well" (James, 1950, p.442). Thus, emotions play an essential role in organisms' survival, and this takes place in virtue of our bodies' potential or ability for self-regulation. However, this primary system for survival has been taken further by the evaluation of the brain to ensure body survival. Moreover as Damasio puts it, nature has created a solution here by representing or mapping the changes on the body of the events that the bodies are involved, namely the interactions between organism and environment. At this point, we can say that yes there are representations of the modifications that the environment causes in the body; yet they do not represent the outside world, but the changes of the body arise from the interaction between the body and the world. Here, we can assert the embodied being of the mind that shows itself as a solution for adapting to circumstances of the environment that could not have been foreseen in the genome (Damasio, 1994, p.229). The brain has gained more complex structure in evolution to generate not only motor responses, but also mental responses or mappings, which provides an organism first;

> a greater appreciation of external circumstances (for in- stance, perceiving more details about an object, locating it more accurately in space, and so on); a refinement of motor responses (hitting a target with greater precision); and a prediction of future consequences by way of imagining scenarios and planning actions conducive to achieving the best imagined scenarios (Damasio, 1994, p.229).

Second, without dynamically mapping its states anatomically and physiologically in both basic and current detail, the body couldn't have regulated and protected the whole organism. For Damasio, the development of mind is the development of the ability to map dynamically the body in operation externally and also internally, so that the body can be informed about the its functional states that concern the survival of the whole organism. These maps are not constructed in one area of the brain, but rather they are distributed over several areas "by means of temporally coordinated patterns of neural activity" (Damasio, 1994, p.231). Thus, for Damasio, mind arises from "the entire organism as an ensemble", and the representations that the brain constructs depend on mutual brain-body interactions, and this shows the interplay among brain-body-world. As Damasio puts it, "I am not saying that the mind is in the body. I am saying that the body contributes more than life support and modulatory effects to the brain. It contributes a *content* that is part and parcel of the workings of the normal mind" (Damasio, 1994, p.226). In this respect, the body is not a passive receiver when it perceives the environment, that is, it does not receive direct signals or pictures from a given stimulus, rather "the organism actively modifies itself so that the interfacing can take place as well as possible" (Damasio, 1994, p.225). This interfacing operation of the body between itself and the environment is the ground of perception. Moreover, an organism's continuous modification of itself results from the requirement to maintain homeostatis as the state of functional balance.

> The organism continuously *acts* on the environment (actions and exploration did come first), so that it can propitiate the interactions necessary for survival. But if it is to succeed in avoiding danger and be efficient in finding food, sex,

> and shelter, it must *sense* the environment (smell, taste, touch, hear, see), so that appropriate actions can be taken in response to what is sensed. Perceiving is as much about acting on the environment as it is about receiving signals from it (Damasio, 1994, p.225).

Neither the body alone nor the brain alone interacts with the environment, rather the entire organism interact with the environment. The cognitive activity depends on this interaction rather than one-way relation between the brain and the things around us. Therefore, organisms' ability to maintain their homeostatis depends on perpetual interaction with the environment, and also on the continuous dynamic mapping of bodily changes that arise from this perpetual interaction with the world. Emotions are one of the ways of governing this interaction for the sake of well being of the organism in the sense of both detecting good and bad, and also decision-making.

By showing neurological evidence that the brain has a power to affect mental states, Damasio first disproves the Cartesian body-mind dualism in the sense that the mind is not an immaterial substance separated from the material body. Secondly, he also disproves the view that cognition or reason and emotion are separate functions of the mind that is defined as supposed to dominate or control emotional life. He argues that emotion, feeling of these emotions, and also biological processes are necessary constitutive components of cognitive processes including decision-making. In this respect, feelings are not defined as immaterial entities; rather they result from the brain's perceptions of the body states, and emotions are patterns of chemical and neural responses as results of the activation of a set of brain structures. Furthermore, the body has the central role in mental operations including construction of representations for the sake of monitoring and regulating bodily states namely homeostatis. Third, we can say that considering former two counter arguments against Cartesian framework Damasio disproves the brain-body dualism as well by claiming that mental life is a result of the interplay between the body and the brain which is itself a part of the body. This interplay takes place by means of the dynamics of the feedforward and feedback loop systems between them. They interact

with each other in a complex manner by using both neural and chemical channels; hence they constitute mental life as being a unified organism.

4.1.2.4. Prinz's Embodied Appraisal Theory of Emotion

Jesse Prinz develops a philosophy of emotion as a hybrid theory of emotion on grounds of James-Lange view, and Damasio's SMH. He states that emotion results from the feedback from the body, i.e. it is the perception or registering of the bodily automatic response, as the ways in which James suggested, and as the way in which SMH provided the scientific evidence for it. Prinz's contribution to this debate consists in suggesting a plausible account of intentionality of emotions, which is left unexplained in other theories. He states that Jamesian view and Damasio's SHM have left some unanswered question about the intelligibility or the rationality of emotions, that is, why emotions seem so meaningful. Prinz's suggestion is that emotions are not only mere perceptions of changes in the body, but also perceptions of our relations to the world such as perceiving danger, loss or other kind of matters of concern. By this suggestion, Prinz tries to fill the gap in the somatic theories, or non-cognitive theories of emotion by giving an account of the interdependence between the body and world in emotional experience. His suggestion called "embodied appraisal theory of emotion" tries to eliminate the debate between two opposite camps of emotion theories namely cognitive and non-cognitive theories of emotion.

> Surely, emotions involve something more. At their core, emotions are more like judgments or thoughts, than perceptions. They evaluate, assess or appraise. Emotions are amenable to rational assessment; they report, correctly or incorrectly, on how we are faring in the world…Emotions are somatic, but they are also fundamentally semantic: meaningful commodities in our mental economies (Prinz, 2004b, p.44).

Prinz seems to call for a combination of emotion and cognition for the sake of giving account of how our bodily reactions toward the world create meaningful patterns of action or how our emotional responses seem somehow rational. Prinz suggests redefining cognition first, and he believes that then we can indicate how emotion and cognition merge into each other. However, he rejects not the cognitivist views asserting that the cognitive components bounded to our emotions are disembodied, which means that these cognitive evaluative components are above and beyond the bodily changes or inner states that register these bodily changes. His suggestion is based on his criticism of both the philosophical cognitive views asserting that the cognitions involved in emotion are in the structure of propositional attitude, and also psychological cognitive view based on the idea of appraisal that can also be reduced to propositional attitudes in the sense that "judgments are propositional attitudes *par excellence*" (Prinz, 2004a, p.24). The cognitivist camp –judgment and also appraisal theories of emotion– relies on the representational view of evaluation since first of all, to appraise or to judge means "to represent something as having some bearing on one's interests or concerns" (Prinz, 2004a, p.52). Prinz makes a maneuver different from cognitivist in his account of representation and change the definition of evaluation. For him, cognitive processes are those that;

> exploit representation that are under the control of an organism rather than under the control of environment. A representation is under organismic control if the organism has activated it or maintains it in working memory. A cognitive state is one that contains such representation, and a cognitive process is one that activates, maintains or manipulates such a representation (Prinz, 2004a, pp.45-6).

In this respect, Prinz differentiates cognition (thoughts) from the act of cognition (thinking) and argues that cognition involves concepts in a dispositional sense, which are amenable to organismic control.

> Being a thought only requires being made up of representations that are capable of being controlled by the organisms that has them. Thinking, in contrast, requires actual effort. A cognitive act is an act of generating a thought under top-down control. Thoughts produced automatically in the course of perception are unthought thoughts. We have them without thinking. They are cognitions, but not acts of cognition (Prinz, 2004a, pp.46).

This system of top-down control refers to the feedback and feedforward loop system between the brain and the body as it is in Damasio's account. What Prinz points out here about emotions is that they do not occur as acts of cognition, i.e. they are not in fact cognitive, but rather embodied appraisals that necessarily comprise representations of organism-environment relations with respect to well-being (Prinz, 2004a, p.52). However, the representations involved in emotion do not represent or carry information about something that exists outside of the body, or they do not refer to representations of bodily changes as Damasio asserted but, for Prinz, they represent organism-environment relations by tracking changes in the body. "Emotions are certainly set off by core relational themes[15]. That is, they are reliably caused by relational properties that pertain to well being" (Prinz, 2004a, p.66). They appraise the organism-environment relations by registering patterned physiological responses. Thus, Prinz argues that the physical changes serve as evaluations, and so it can be said that feelings carry information, in other words, as Prinz puts it, "feelings can obviate for cognition, because feelings carry information. The discrete motions of our bodies convey how we are faring in the world" (Prinz, 2004a, p.78). He differentiates "registering" from "representation" in the sense that our somatosensory systems registers the changes in the body, but those states based on

[15] The idea of core relational themes relies on Richard Lazarus's (1991) appraisal theory of emotion, which refers to the core meaning that is associated with a certain emotion e.g. danger, losses, threats, achievements etc. These core meanings are determined by organism-environment relations that bear on well-being. For Lazarus, core relational themes provide us to understand on what meaning a certain emotion is constructed according to the adaptational encounter between the organism and environment in the sense that every event we involved bears a relation to our body. These different themes serve also to distinguish different emotions.

the registered changes in the body represent relations between external states and our selves i.e. organism-environment relations (Prinz, 2004a, p.60). He makes a small modification in Damasio's idea that emotions represent changes in bodily states, and suggests that emotions are appraisals of organism-environment relations that pertain to well being of this organism. Hence, this small modification opens a way to account for intentionality of emotions in the sense that "in each case there is an object, situation, or event that bears some relation to the organism" (Prinz, 2004b, p.51). "Emotions are perceptions of those bodily states that are characteristically caused when an organism enters a relation that falls under a core relational theme" (Prinz, 2004b, p.51). In this respect, emotions can be defined as intentional in two senses; first, they have an object e.g. all fears concern dangers, and second, they fall under a core relational theme. Prinz states that this explains "how dependencies arise between representations of particular objects and somatic states" in the sense that "a representation of e.g. heights gets co-activated with somatic perception and linked to it in such a way that former causes the latter to occur, and the latter wanes when the former becomes inactive" (Prinz, 2004b, p.53). This idea opens a way to capture the intentionality of emotions without abandoning the idea that emotions are perceptions of bodily states. Therefore, Prinz makes a combination of bodily perceptions and evaluative states in order to give account of intentionality and also rationality of emotions.

> Emotions are embodied, just as James and Lange proposed. They are perceptions of changes in our somatic condition. But, ironically, they are also appraisals. Let us define an appraisal, not an evaluative judgment, but as any representation of an organism-environment relation bears on well being…certain bodily perceptions have exactly this property. They represent roughly the same thing that explicit evaluative judgments represent, but they do it be figuring into the right causal relations, not by deploying concepts or providing descriptions. Our perceptions of body tell us about our organs and limbs, but they also carry information about how we are faring (Prinz, 2004b, pp.53-4).

The essential difference of Prinz's embodied appraisal theory of emotion from cognitive appraisal theories is that he does not assume a privileged representation mediating the link between core relational themes and bodily changes, i.e. there is no need for deploying any other concept, description or an extra conceptual representation to have a causal relation between the body and environment, i.e. an evaluative process to link them. "The perception of that bodily state represents danger [as a core relational theme], because it is under the reliable causal control of dangerousness" (Prinz, 2004b, p.52). What happens during an emotion elicited is that sensations of bodily changes are *coupled with mental evaluative process*, which can be based on either "innate" and/or "acquired" perceptual triggers involving more complex cognitive processes as I showed above in the section on Damasio's SMH. This association is totally based on bodily dynamics rather than a conceptual abstract process of rational evaluation. There is no abstract evaluation process in the pathways that trigger an emotional bodily response and pair it with somatic responses. This process of pairing does not occur by assessment but by association (Prinz, 2004b, p.45). Emotions are somatic for Prinz, but they have also a semantic aspect. Emotions are perceptions of patterned changes in the body, but also perceptions of the relation of this body to the environment by reliably caused by these relations themselves. Therefore, by endowing emotions with semantic properties, Prinz's embodied appraisal theory of emotion presents a view that does not need to "supplement embodied states with meaningful thoughts", but that puts "meaning into bodies" and "let perceptions of the heart reveal our situation in the world" (Prinz, 2004b, p.54). If we can show emotions can be an evaluative system, we can also see them as mechanisms for a solution to the frame problem. In the next part, I shall discuss Megill's view as an example of seeing evaluative character of emotions as the solution for the frame problem.

4.2. Megill's Solution for the Frame Problem

Jason Megill develops the idea of emotions as the detecting mechanism of relevance by relying on Damasio's SMH. Megill sees Dennett's definition of the frame problem too narrow and broadens it:

> how a machine intelligence can be taught to determine the relevant consequences of a given act in a sufficiently efficient manner…is a narrow definition of the frame problem. The frame problem can also be cast in a broader light: how can *any* agent access the relevant knowledge needed to cope with *any* circumstance? (Megill, 2005, p.308).

According to this framework, he draws the scope of the frame problem in three essential questions:

> (1) how does an agent determine what the relevant objects in its environment are, (2) how does an agent recognize what the relevant implications of any given action are, (3) how does an agent efficiently access what specific pieces of knowledge in a vast knowledge-base are relevant to a given situation? In short, *how does an agent determine relevance*? (Megill, 2005, p.308).

The idea is that somatic markers as neurophysiological response serve to "edit" the large amount of possible choices by associating through learning with a given mental representation about things that are related to the present situation at hand and also by leading to the visceral experience of an emotion (Megill, 2005, p.309). Thus, the representations of things that we concern about in a situation are associated with either an unpleasant gut feeling or a pleasant one so that the agent is prompted in the way of discarding some choices over the others. Megill calls this process as "editing work" of emotions (Megill, 2005, p.311). Therefore, emotions play the role of preventing human beings from suffering from the frame problem.

Megill states that in a given situation, an agent faces mainly two questions: "(1) what are the more salient features of this situation, (2) what specific pieces of knowledge in my vast storehouse of knowledge are needed to cope with this situation?" (Megill, 2005, p.311). The appropriate answer to these questions from

among the large number of possible answers can be determined by the help of emotions through eliminating some undesirable options and making the list of possible answers manageable so that desirable options are gotten the mark of deserving attention. "Humans, constantly faced with a large number of possible options, can quickly settle on a handful of options because of the editing work performed by the emotions, and as a result, humans are by and large free from the frame problem. Emotional qualia play a key role in determining relevance" (Megill, 2005, p.312). We can think that the problem of framing our environment is not only about detecting relevance but also about selective attention accordingly. Emotions play a role in cognitive processes such as selective attention by making an agent to focus on particular aspects of environment while ignoring other aspects at the same time (Megill, 2014, p.190). This is inherently related to the problem of relevance in the sense that the focused aspects of the environment for an agent are also "important, salient or relevant" aspects of the environment for the sake of the agent's well being (Megill, 2014, p.190). As Megill puts it, "we pay attention to those aspects of our environment that evoke emotion, and such aspects are often those that deserve the most attention. For example, when standing in a burning room, we direct our attention to the fire, as opposed to the ceiling tiles, because the fire evokes an emotion, namely, fear" (Megill, 2014, p.191). It is a controversial debate whether emotions are involved in *some* cases of selective attention or in selective attention in general in all sorts of interactions with the environment. There are empirical evidence that support the latter option[16], for instance, by relying on scientific data, Schupp et al. argue that selective attention for visual perception is determined by emotionally significant stimuli (Schupp, Stockburger, Codispoti, Jungho, Weike, & Hamm, 2007). Furthermore, on the one hand, emotions do involve not only in shaping selective attention and detecting relevance but also in retrieving specific information from the memory as it is needed to deal with the situation at hand (Megill, 2014, p.192). On the other hand, as Megill puts it, emotions "play role in

[16] See Attar and Müller (2012), Lange et al. (1997) and Schupp et al. (2007).

determining what specific memories make it into our long-term memory in the first place" (Megill, 2014, p.192). For example, it is more likely to remember our memories that are emotionally charged rather than ones that are not emotionally encoded e.g. the things that we have learned affectively rather than indifferently importing data stack[17]. Therefore, Megill's (2014) conclusion that he draws from empirical evidence from neuroscience and cognitive psychology is that emotions play an essential role in cognitive processes such as framing or detecting relevance, selective attention and memory. As he puts it, "emotion often governs *the flow of information*. Emotion helps determine the information that we notice in our environment; the information that will get stored in memory; the information in our memory that will be brought to mind in a certain situation; and so on" (Megill, 2014, p.193). Therefore, Megill suggests regarding emotions as a system of performing an editing work of large number of possible option in order to eliminate the information that is not needed for a given situation.

4.3. Problems with Megill's View

Even if Megill confirms Damasio's non-cognitivist suggestion of embodied nature of emotions as physiological responses, he seems to remain cognitivist in his understanding of cognition, and seems to present a disembodied understanding of cognition. His cognitivism is in tandem with his separation between the processes of emotion and cognition. Although he argues for the essential role of embodied emotions in cognitive capacities, cognitive processes still remain to be understood from a cognitivist approach in his picture of mind and so disembodied. Hence, his solution for the frame problem as the role of emotions in the cognitive process relies on an emotion-cognition dichotomy between embodied and disembodied processes, which complicates the issue of giving account of the continuity of emotion and

[17] See Botzung et al. (2010) and Rubin (2010) for additional information related to empirical evidence about the role of emotions in memory (cited in Megill, 2014).

cognition in shaping the dissolution of the frame problem for living organisms. I will elaborate on the problems that result from these points in three parts; emotion-cognition dualism, insistence on cognitivism, the rejection of emotional qualia in the constitution of emotional and cognitive processes.

4.3.1. Cognitivist View of Cognition Based on Emotion-Cognition Dualism

Megill asserts that emotions play an essential role in cognition and they make human beings free from the frame problem. However, Megill's view assumes also that after emotions have played their role, the cognitive process takes place. "Once the emotions have played their role, the door is opened to the use of rational inference, but without the emotions, rational inference is useless in the face of the bewilderingly large list of possible courses of action facing an agent at any time" (Megill, 2005, p.310). In this picture of the mechanism of how emotions serve to cognition, emotions seem to function as the filtering system to sort out the needed information from what is not needed by the organism before the cognitive processes take place. At this respect, emotions are defined as the mechanism for narrowing down the large list of possible courses of action facing an agent at any time and also of the specific knowledge in agent's vast storehouse of knowledge needed to cope with this situation by filtering unnecessary information that distract the agent from arriving at a sensible decision. In Megill's view, it seems that the emotional filtering system serves to cognition that is the central mechanism for thinking and computing as the processes that are separated from the emotional process. In this point, the question of the nature of emotion and cognition for Megill and how he explains the interaction between these two separated mechanisms arise. The contradictory aspect of these interrelated questions is that Megill's separation of emotion and cognition is based on that he also differentiates the nature of cognition from the nature of emotion, and finally he puts emotions into service of cognition despite their different

nature. However, how two separate entities interact with each other remains unquestioned and so unexplained.

Even if Megill seems to confirm Damasio's view of emotion as neurophysiological response, his view of emotion remains unclear in the sense that Megill defines emotions as multifaceted phenomenon that has several components in it: "the only claim I make about the nature of emotion is that it is a multifaceted phenomenon, or consists of several components, and one of these components, whatever the others might be (e.g., judgment, neurophysiological response), are qualitative feels or emotional qualia" (Megill, 2014, p.190). He defines his view of emotion as a complicated sensationalist theory or as a hybrid of sensationalist and physiological views (Megill, 2003, p.90). He states that his view drastically departs from cognitive theories of emotion in two ways. First, emotions have the affective component namely the "introspective emotive experience or sensation" as Megill puts it (Megill, 2003, p.96). This distinctive feature refers to the point in which he agrees with feeling theories of emotion in the sense that "emotional qualia" is needed for emotion to fulfill its various roles in cognition (Megill, 2014, p.190). Second, his view departs from cognitivist views in the sense that he endorses Damasio's neurobiological framework in terms of individuating emotion types (fear, anger, sadness) from each other by relying on somatic markers rather than using beliefs or propositional attitudes to distinguish different types of emotions as cognitivist theories assumes (Megill, 2003, pp.96-7). Megill rejects the idea of propositional attitude for individuating different emotions. His view combines feeling theories as Jamesian framework and somatic feedback theories shown in Damasio's SMH in order to explain the nature of emotions. He believes that individuation of emotion types is determined by physiological states rather than propositional attitudes. These two features indicate that Megill's view of emotion has components of both feelings and physiobiological aspect of bodily being. It should be noted here that Megill uses the term "emotion" as a "blanket term" for both neurophysiological responses and emotional qualia, which the former refers to emotion and latter refers to feelings or

emotional qualia for Damasio (Megill, 2005, p.310). Megill states that if philosophical theories of emotion use neuroscientific evidence, they have to abandon cognitive theories of emotion, which merely rely on conceptual analysis. Therefore, it can be said that Megill's view of emotion presents an embodied theory of emotion based on bodily feelings and responses.

However, paradoxically, Megill also argues that this solution for the frame problem based on Damasio's theory of emotion shows us that traditional AI based on the computational theory of mind (CTM) has succeeded in correctly modelling key components of human mentality. That is, even if he is a non-cognitivist in his view of emotion, he adheres to cognitivist understanding of cognition. His cognitivist approach to cognition reveals itself in his manoeuvre to save AI from the frame problem. Megill differentiates two questions when he gives account of intelligent behaviour no matter whether it belongs to human beings or machines:

> (1) how do we decide or determine *what* to reason about, and (2) given the relevant factors we need to take into account, *how* do we reason? The first question involves determining what the content of our reasoning should be, while the second concerns the form of our reasoning, abstracted away from content (Megill, 2005, p.309).

Thus, he differentiates the content from the form of cognition and answers the second question in the way that reasoning for all types of intelligent being is "logical inference", which is "the core tenet of CTM" (Megill, 2005, p.309). Megill sees the problematic aspect of answering the first question for machine intelligence by relating it to the frame problem. Human beings and computers can do logical inference well, but only for machine intelligence we have to find a way to solve the problem of how they decide or determine the content of the process of logical inference, which can also be defined as the problem of determining relevance. Megill argues that Damasio's theory of SMH can be an explanation for how nature solves the frame problem for human beings and also an evidence for proving how computational theory of mind has successfully modeled human cognition. In his

manoeuvre to save computational theory of mind, he points out the fact that some of human beings do in fact suffer from the frame problem such as Damasio's case study on Elliot whose physiological mechanism related to emotions has been damaged due to brain tumour, which results in prevention of the emotions from effectively playing role in cognition (Megill, 2005, p.313). As a result, Megill emphasizes on the fact that due to dysfunction in emotion mechanism Elliot suffer from the frame problem revealed in Elliot's "inability to focus on the relevant aspects of the task at hand, which in turn led to his inability to achieve goals" (Megill, 2005, p.313). Thus, Megill finds the ground for obtaining evidence to prove that computational theory of mind has been on the right track in terms of modeling human mind as having possibility to suffer from the frame problem. He cites the existence of people who suffer from the frame problem as evidence for how human mind works. The paradox here is that even if Damasio argues for an embodied theory of emotion and so cognition, which are based on bodily processes rather than abstract representations of the external world where body and mind exist and work separately, Megill's manoeuvre takes this embodiment thesis and turns it to be an evidence for the sake of a cognitivist view that is based on disembodied and representational explanation of cognition. He argues that computational theory of mind was right to point out that the frame problem exists but they couldn't solve it without appealing to phenomenology of emotion "as emotional qualia are what allow properly functioning adults to focus on the relevant possibilities when solving problems" (Megill, 2005, p.314). He states that even if CTM has successfully modeled human mind, it is still incomplete due to the fact that AI does not seem willing to account for the function of emotional qualia in cognition for intelligent beings. Megill apparently turns the argument against CTM upside down and uses it in favor of the classical cognitivist approach. However, whether Megill's evidence is sufficient for supporting CTM is a problematical issue. Megill in fact finds the prominent sign for validness of CTM within our daily life along with extreme cases such as Elliot. His suggestion is not to overidealize ourselves in the sense that people who do not have any brain damage

can also suffer from the frame problem in our daily life. Megill gives the restaurant example (Megill, 2005, pp.313-4). Deciding on what to eat in a restaurant can be a tricky issue for all of us when we are hungry. When everything looks good on a par, we can have difficulty with deciding what to eat and decide randomly at the end like Elliot. Megill sees this moment of indecisiveness as human beings' manifestation of "irrationality of artificial intelligence systems when the affective states associated with emotions are off" (Megill, 2005, p.314). In this respect, an ordinary moment of indecisiveness in our daily life is liken to a case with serious brain damage resulting with emotional and also cognitive dysfunction like Elliot. The problem with this comparison is that, according to Damasio's SMH, in order to have a problem in decision-making that may result with the frame problem, there must be a disassociation of emotions from the cognitive processes. It seems problematic to liken a mere difficulty with choosing among options to a real problem with framing the world in general, which refers to not be able to detect relevance in one's phenomenal experience. Megill obviously is wrong in saying that we cannot decide what to eat in a restaurant because of the frame problem due to the affective states associated with emotions are off. Because, disassociation of emotions with cognitive processes apparently arises when a serious health issue related to neurophysiological problem erupts as Damasio's (1994) work shows. Megill's comparison seems tricky in the sense that Damasio grounds his theory of SMH on the idea that only if a brain damage occurs, the interaction between cognitive capacities and emotions dissolves. However, the reason of dissolution of this interaction is that feelings or "emotional qualia" (as Megill calls) vanish. We do not lack the ability to decide among the list on the restaurant menu because of that we suffer from the problem of detecting relevance due to the fact that we do not feel our emotions about the foods on the menu but rather that our feelings related to our emotions about different foods just may overlap. Thus, convergence of feelings causes the moment of indecisiveness but not a general problem about detecting relevance of foods for our personal interest. Considering Megill's approach, the missing piece in the puzzle seems to be

"emotional qualia" that actually serve to bridge cognition and emotion. Damasio summarizes Elliot's predicament as "to know but not to feel", that is, feelings have an indispensable function of informing the body about its states namely about what happens to the agent internally and externally through its dynamic mapping system (Damasio, 1994, p.45). Elliot's problem is the mapping system in his body that has no longer receives updated information from the body, that is, he does not feel the emotion that his body has. Thus, the bridge between cognition and emotion is provided by feelings of emotions. Without subjective felt experience of emotions, cognition cannot function properly considering detecting relevance and so decision-making processes. This point is directly related to next part of this chapter regarding to criticizing Megill's rejection of emotional qualia in the constitution of cognitive processes in the sense that even if Megill confirms that emotional qualia is a necessary component of emotions, his claim is that emotional qualia is not necessary for cognitive processes. Thus, Megill's idea of emotion and cognition as having different natures creates a difficulty in explaining how these two different entities are interacting in the case that emotional qualia is not necessary for both of them according to Megill.

4.3.2. The Rejection of Emotional Qualia in the Constitution of Cognitive Processes

In his article "Emotion, Cognition and Artificial Intelligence" (2014), Megill criticizes the claim [18] that since machines lack emotional "qualia", machine intelligence will fall short of human intelligence (Megill, 2014, p.189). He asks the question of whether phenomenal experience of emotion plays an essential or necessary role in cognitive processes. His suggestion is that even if emotional qualia

[18] See Jefferson (1949). "The mind of mechanical man." British Medical Journal, 1(4616), 1105–1110.

play an important role in cognition, they are not essential to the performance of cognitive processes in principle (Megill, 2014, p.189). For this reason, despite an intelligent machine lacks emotional qualia, it can perform cognitive abilities. Therefore, feeling of emotions is not necessary for performing cognitive abilities. The feeling process of emotion can be a component of the constitution of emotional experience, but it is not essential to the performance of cognitive abilities in principle. By this way, he claims to refute the objection against the possibility of AI, which is based on the idea that machine intelligence fall short of human intelligence due to the fact that intelligent machines lack emotional qualia. This idea also refers to the problem that I discuss in the previous part, that is, in order to argue that feelings as a component of emotions do not necessarily involve in cognitive process, one has to acknowledge that emotion and cognition are separate processes. That is, feelings play role in the emotion part but not in the cognitive part. That is, feelings are not necessary for the performance of cognitive abilities since cognition is the real center for reasoning and the real intellectual performance does not require bodily events to be constituted to a certain extent. Emotion including bodily feelings prepares the required condition for selection and detecting relevance and leaves the rest of the work to cognition. When we translate what Megill means by this argument, we can see that without knowing what an emotional bodily change means to the agent, that is, without knowing in which way the bodily emotional response matter to us, we can differentiate what is relevant or significant to us. Without feeling of an emotion, how we can account for emotional bodily changes that can gain their personal salience; or, how these bodily changes occurring in my body can become "my" emotions. That is, if we can see that feelings provide the mechanism for giving the personal thickness of emotions, we come to understand that without feeling emotions cannot gain their personal meaning particular to each body in the sense that whether the bodily changes in my body occur in a negative tone or in a positive tone according to my interests, needs and goal. Without having the mechanism for personalizing emotional changes, how can an intelligent being

determine what is relevant or significant for it on its behalf? This is the connection between cognition and emotion in which personal salience of things are also determined, however Megill rejects this connection by separating cognition and feelings for the sake of saving AI and cognitivist perspective regarding cognition. Feelings do not have a representable nature and above all they refer to the subjective aspect of emotional experience, that is, they give the subjective dimension of emotions that cannot be observed from outside objectively. That the subjective dimension is involved in the cognitive process would contaminate the claim of objectivity of a cognitive process for a cognitivist. That would open a gap between explicability of the occurrence of cognitive process and the information that is produced by this process that has a representational and objective nature. How can one explain a cognitive process from cognitivist perspective by appealing to subjective bodily feelings of the agent? From the cognitivist perspective, cognition is a process that is separated from bodily changes. That means cognitive evaluations are separate from bodily changes and a cognitive evaluation process does not need emotional qualia at all.

In order to criticize the essential role of feelings or emotional qualia in cognitive processes, Megill presents the argument from "conscious inessentialism" introduced by O. Flanagan (1992). According to Flanagan's formulation,

> For any intelligent activity *i*, performed in any cognitive domain *d*, even if we do *i* with conscious accompaniments, *i* can in principle be done without these conscious accompaniments (Flanagan, 1992, p.5).

This quote refers to the idea that conscious experience during the performance of a cognitive ability does not influence the performance of this cognitive ability since it can be performed without accompaniment of any conscious experience. The underlying idea is that even if qualia is removed, cognitive process cannot be affected by this removal since they do not play a causal role in the constitution or proceeding of cognition. Feelings are described only as artifacts of emotional

experience as mere epiphenomena. Megill gives an example to clarify his argument; our feeling of happiness when we recognize an old friend. In this case, he maintains that the process of facial recognition could occur without the feeling about the old friend even if accompanied by this feeling. Thus, recognizing her does not depend on my feeling of happiness. The argument Megill maintains is "weak conscious inessentialism", that is, qualia are not needed for the performance of any cognitive ability *even though* they do have a causal role in the production of cognition "in the sense that our physical organization or cognitive architecture could have been such that cognition could proceed as before in the absence of qualia" (Megill, 2014, p.194). Whereas strong conscious inessentialism (SCI) rejects the qualia that accompany the production of the cognitive abilities play a causal role since they believe that if qualia could be removed without affecting cognition, weak conscious inessentialism (WCI) maintains that;

> Even if the performance of a given cognitive ability *c* by a cognitive agent *a* often has conscious accompaniments, *c* could be performed by *a* even if these conscious accompaniments were absent. The reason (cognition could proceed in the absence of qualia) is that, even though qualia play a causal role in the production of our cognition, qualia are not essential to the performance of these cognitive abilities (in the sense that our physical organization or cognitive architecture could have been such that cognition could proceed as before in the absence of qualia) (Megill, 2014, p.194).

This means that qualia are the neutral element in the performance of cognitive abilities even if it plays a causal role since they can also be removed from the system. For WCI,

> it is likely that if qualia were absent, our physical organization or cognitive architecture would need to be altered to account for this absence; qualia play a causal role in the production of cognition, so if they were removed, this would affect cognition unless other physical changes occurred to account for their absence (Megill, 2014, pp.194-5).

For both SCI and WCI, we can say that they both maintain e.g. facial recognition could occur without emotional qualia, but their account of why and how this happens differ.

> SCI holds that facial recognition can still occur in the absence of qualia—even if the physical organization or cognitive architecture of the agent is held constant—because qualia play no causal role in the production of cognition. WCI holds that facial recognition can still occur in the absence of qualia—but probably only if the physical organization or the cognitive architecture of the agent is altered—because while qualia play a causal role in the production of cognition, qualia are not essential for facial recognition (Megill, 2014, p.195).

Megill makes another maneuver to save AI but in a very formal manner in this case. He wants us to agree with the core idea of conscious inessentialism on which SCI and WCI agree for the sake of saving AI. The core idea is that we may have conscious experience during the performance of a cognitive ability, but these conscious experiences are "superfluous" to the performance of the cognitive ability since this cognitive ability could have been performed without them (Megill, 2014, p.194). However, he also wants us to accept that even if qualia do play a causal role in the production of cognition, this role is neutral. You have to explain which physical change occur in the system with the removal of qualia, that is, they exist in the system but the system can also progress without qualia. Therefore, for Megill, we can say that yes qualia are there, and only because they are there, they do have a causal role but this does not change the core argument that this formal presence of qualia does not have an essential role in the performance of cognitive ability, hence this cognitive ability could also be performed without emotional qualia. As a result, Megill maintains that AI is right to deny the essential role of emotional qualia for the performance of cognitive abilities, because in the intelligent systems that do not have experience of qualia, you can still observe the performance of cognitive abilities such as face recognition without the experience of qualia. Even if emotional qualia have a causal role, this causal role does not have an essential effect on the performance of a

cognitive ability in principle. Therefore, the possibility of AI cannot be refuted on the ground that a machine lacking emotional qualia since "at least in principle even without conscious experiences of emotion (at least some of them) the cognitive abilities that we perform can still be performed by a machine" (Megill, 2014, p.195). For Megill also maintains that emotions contribute to the solution of the frame problem, we can say that Megill defends this idea even though he does not believe that even if emotions contribute to the solution of the frame problem, they can do this without appealing to feelings o emotions. This means that Megill excludes feelings of emotions even though they are one of the components of emotional experience. Megill seems to exclude one of the bodily events that emotions involve due to his cognitivist tendencies for this one is obviously the part that enables emotions to gain subjective valence. To show that the subjective dimension is an essential part of cognitive processes would constrain Megill from saving AI in the sense that the cognitive processes performed by machines can never have subjective dimension since they cannot have subjective conscious experience of the processes in their body or a self related to their conscious experiences. For Megill emotions seem to be an objective filtering system performing selection, detection and singling out objective pieces of information received from the body. It is just an interface serving to the real cognitive centre, which does not have a real direct connection to bodily events. Megill seems to ignore the role of subjective felt experience of emotion that links cognition and emotion according to Damasio's SMH so that the frame problem can be solved. What makes Megill blind to the subjective dimension of experience is his cognitivist tendency that avoids accounting for the connection between bodily events and intellectual work since he sees them as separate from the ground up.

What Megill suggests us is that if we regard the fact that emotions determine the meaning of thoughts, we can see that they can be solutions for the frame problem (Megill, 2003, p.82). Because the frame problem is about the mechanism for making the agent to focus on particular aspects of environment while ignoring irrelevant aspects, that is, it is directly connected with the intentional content or meaning of

mental states. The underlying idea of this view is that bodily emotional states are somehow associated with a certain thought so that they determine the meaning of the thought by shaping its content in Fregean sense. For example, in a propositional attitude such as "*S* believes that *P*" or "*S* remembers that *P*", emotions serve to determine the meaning of a thought, and they are associated with *P*, that is, they serve as the object of a propositional attitude. Megill points out that they are not the intentionality itself, but they just direct or guide intentionality, thus they are associated with *P* but not the propositional attitude itself (believes etc.). By this way, emotions are defined as intrinsic aspect of a thought (P) if they are to direct intentionality. In this picture of the relationship between bodily events and intellectual work in the sense-making process, being conscious of a thought as a mental state is defined as the representation of that state by the subject itself (Megill, 2003, p.83). The crucial point in representing and so being aware of this mental state is which thoughts will be selected to be represented for awareness out of the pool of potentially conscious first-order thoughts. Is this process working randomly or is there a mechanism for detecting the relevant thoughts? Megill's answer to this question points out emotions as the mechanism for selection and detection of the relevant mental states that are related to the given situation. Emotions also serve to selective attention for the internal process of conscious experience; "emotional connotation is one specific property a thought may have that ensures it enters awareness ahead of other thoughts" (Megill, 2003, p.83). That is, the thought that has an affective flavor is more likely to enter into conscious awareness. First of all, when he defines emotion as the mechanism for determining meaning or intentional content of a propositional attitude, he definitely differentiates emotional processes from thinking processes by separating the object of a propositional attitude from the propositional attitude itself. While the object of the thought is determined by bodily changes as emotional experience, the thinking process is determined by an intellectual work, which is based on a representational operation and has a propositional structure. Second, the conscious experience of a thought is described as

a process that is representational, which refers to an abstract intellectual brainwork rather than being related to the whole body as bodily consciousness. Thus, this indicates that the subjective character of a thought is given by this intellectual work but not by body itself even though the meaning of thought is given by emotion as bodily experience. A representational process constitutes the process of being aware of a thought as the cognitivist way of understanding of thought argues. In this process, the aspect of body beyond the brain remains passive only as transmitter of information, as the mechanism for guiding the flow of information, as the selecting, detecting, editing, and filtering mechanism but through having a passive nature since all these functions are performed by the body. In this framework, the body seems to be described as the objective side as being merely a raw matter, which is thus defined to be passive, and cognition seems to be described as the side that give the subjective valence to thoughts as the active part of the whole process. By this way, we can say that Megill's tendency to mind-body dualism leads him to separate bodily processes from cognitive processes and emotions from cognition. Emotions stand on the side of bodily processes, cognition stands on the side of intellectual abstract brainwork detached from the body in the production of thoughts and meanings. Megill suggests representations to fill the gap between these tow sides as cognitivists do. This sort of tendency toward cognitivist thinking can only lead to ad hoc solutions for the frame problem.

To the extent that Megill leans on Damasio's idea of embodiment of emotions, his solution to the frame problem comes from a nonrepresentational bodily process and these bodily affective processes serve to shape a representational cognitive process. Thus, he remains still representationalist in his view of cognition and for him, Damasio's theory solves the frame problem that cannot be solved by staying within the site of cognition. He seems to make a minor modification in his understanding of cognitive process without changing the core idea of cognitivist conceptualizing of cognitive processes. In order to solve the frame problem, he seems to import a non-representational filtering mechanism that actually does

nothing to do with the representational process of cognition. What body does for us to solve the frame problem is just a gift from the nature itself for Megill, and he does not feel an urge to account for how this natural phenomenon is related to cognition, which seems to him indifferent to and separated from the body beyond the brain. Therefore, it seems problematic in his view that a non-representational bodily process serves to a representational process of cognition to a certain limited extent since for him, cognition is a process that work via representations as cognitivist view suggests and the computational theory of mind provides a successful model of how mind functions. This explanation seems to create a gap between cognition and emotion again, which are presented by him as distinct processes that are functioning separately. Furthermore, this seemingly eclectic understanding of emotion and cognition should give the account of how these two processes interact. Megill leaves the relationship between cognition and emotion unexplained; he just states that the body or nature does the affective part in the name of us. Also, it seems that Megill's view of emotion treats body again as a vehicle of transmission of data like what the sense organs do for the process of perception. His understanding of emotion depends on the following ideas;

(i) Even if he does not assert that emotions are constituted in propositional attitude, he thinks that cognitive processes have propositional structure in Fregean sense.

(ii) He thinks that the computational theory of mind succeeds in explaining human cognition that maintains the idea of reasoning via logical inference even if it cannot solve the frame problem on its own without applying to affective processes. Hence, what we call as cognition is based on logical inference, which depends on the processes of storing, evaluating and manipulating the bits of knowledge.

(iii) He thinks that even if emotional qualia play an important role in servicing human cognition, they are not essential to the performance

of these cognitive abilities in principle. He relates this idea to the criticisms of AI and states that the objections against the possibility of AI based on the claim that a machine will lack emotional qualia are mistaken. Thus, he does not acknowledge the essential role of phenomenal side of emotional experience in the cognitive processes, that is, the subjective feeling of an emotional change in the body is not necessary for the cognitive processes.

According to (i) and (ii), Megill maintains a cognitivist and computational understanding of cognition that is based on representational processes. Considering (iii), for him, cognitive processes function properly without emotional qualia since emotional qualia has nothing to do with cognitive processes themselves. The function of emotions is a mere editing work in the face of the large list of possible courses of action facing an agent at any time. He maintains that somatic markers shorten the list to a manageable length before the use of rational inference that will be performed without the emotions in the next level. The frame problem for him is a problem of being able to manage the large list of possible actions namely the information present at hand in a given situation and after overcoming the frame problem by the help of emotional process, the stage of cognition that depends on logical inference and that is isolated from emotions takes place and does its job as the centre of sense-making. There are three main problems that I see in Megill's view of emotion and cognition related to the frame problem.

I. He separates an embodied process of affectivity from a disembodied process of cognition. Even if this interference seems to turn back to and favour the views that acknowledge the bodily constitution of emotions, he basically falls into the abyss of drawing a line between reasoning and affectivity and separating them.

In the next part of the dissertation, I will show that it is actually also possible to claim that emotion and cognition cannot be easily separated since how emotion and

cognition are connected and how one serves to other is not a sequential operation. Their relationship can be defined rather as intertwining. It is not possible to recognize the starting point of emotion without cognition and when it finishes its own work and starts to serve the cognition and so the cognitive process begins. This indistinct structure of their relationship is supported by the idea of enactivism that there is no emotionless cognition and no emotion without cognition in terms of the meaning-generating role of the body. For enactivism, the cognitive processes that we can call in the broadest sense as "sense-making" can be understood as a "bodily cognitive emotional form of understanding that is present in at least a proto-form in all living systems (Colombotti, 2010 in Meiese, 2014, p.236). This is how enactivism describes emotion; "at the level of living animals, emotion emerges as a form or structure of comportment, a perceptual and motor attunement to the world" "whereby an organism shapes its world into a meaningful domain" (Thompson, 2007, p.80) (Meiese, 2014, p.236). Megill presents his disembodied conception of cognition as the centre for sense-making and defines the function of the body as a vehicle to transmit inputs to the brain and outputs to the external world as responses. Emotions are here understood as the body's function of filtering the relevant data merely like an eye filtering the light. Even if the body affects the cognitive process indirectly, this remote interaction still cannot go beyond the Cartesian contact between the mind and the body. One of the ways of overcoming this unwelcome result of his approach from the perspective of this dissertation, which tries to save the embodiment thesis, is to acknowledge the embodiment of emotion and cognition together. That is, the solution of the frame problem requires a properly embodied system.

II. Due to the fact that the processes of emotion and cognition have different and distinct functional mechanisms, how these two associate in some point that emotional filtering serves to cognition, that is, the issue of the transitivity between them remains unexplained. How non-representational structure of affects is transformed into

representations to be progressed by cognition? Megill does not explain this process of transformation.

If the transitivity between emotion and cognition is claimed to be provided by means of transforming emotional data into representations by cognitive processes, it should again be reminded that as Damasio demonstrated, it is not even possible to directly identify provenances of affective processes. When Damasio talks about bodily representations that constitute emotion, he definitely does not refer the same representational structure as cognitivism means or what Megill has in his mind as representation when he refers to the process of cognition. The cognitivist approach assumes by representation the symbols that are in propositional structure formed in a syntactic order or logic and have an informational content. Conversely what Damasio means by bodily representation is not defined as carrying an informational content that can be detached from the body's interaction with the environment. Rather, the bodily dynamics arise directly in action in an intentional structure. Borrowing from phenomenology, this intentional structure is already determined by the reciprocal and dynamic structural coupling of brain-body-world. Furthermore, even if Megill knows that emotional process is realized by bodily dynamics, he defines the working mechanism of the affective bodily process as if it has a representational structure e.g. the process of emotional filtering is described as a process of scanning a list of information and progressing an evaluation process as in the cognitive processes. Megill does not have even a proper language to describe a bodily process due to the fact that he is extremely a cognitivist. I object to Megill's view that creates confusion between representationalism and non-representationalism in terms of defining emotion and cognition for the sake of indicating the weak side of cognitivist understandings of the relationship between emotion and cognition, and also showing that unless cognitivist views give up their disembodied conceptualizing of cognition, they have to find artificial solutions to the frame problem, which are partly imported from the views based on the embodiment thesis. According to enactivism, the intentional content of emotion cannot be understood as the content of a judgement or

as the object of a propositional attitude. Because "the intentionality of emotions is neither reducible to nor requires the intentionality of belief or thought" (Meiese, 2014, p.234). The embodied appraisal theory can provide a better account of emotional intentionality, that is, how an evaluative process is very much a part of the emotion. However, from the enactivist perspective, this evaluation process should not be understood an intra brain activity as cognitivists thought, it should rather be understood as an embodied and embedded process as a result of the body's interaction with the environment for the sake of maintaining its vitality namely its homeostatis.

III. Finally, Megill rejects the essential role of phenomenal side of emotional experience, that is, the subjective feeling of an emotional change in the body is not necessary for emotions to be constituted and also to serve for the benefit of cognition.

However, according to enactivism and also SMH, it is possible to show that emotional qualia or bodily feeling of an emotional change in the body and the process of appraisal are constitutively interdependent. Yet, in order to recognize this interdependency, one should give up the disembodied understanding of cognition. Enactivism claims that affective processes involve a type of appraisal process but not in a cognitivist context. For enactivism, the process of appraisal and affective processes are intertwined on behalf of the subjective significance of the possibilities that is shaped around the phenomenal experience or felt experience of our bodily reactions to the environment. First of all, enactivism suggests to acknowledge, "our capacity to understand our surroundings is essentially bodily and affective," and to "capture how the constitution of meaning involved in appraisal depends on the relationship between body and environment" (Northoff, 2008, 72 in Meiese, 2014, p.235). Then, it suggests to accept the idea that embodied appraisal have nothing to do with conscious evaluative cognitive processes. "Rather than being the object of conscious awareness, a particular bodily condition is lived through in the very process of evaluating one's environment, so that emotions count as a bodily

sensitivity to what is significant" (Colombetti, 2007, p.543). Furthermore, personal significance and sense-making processes are directly related to our link to the world around us. Enactivism calls this link as "attunement" between our bodies and the world. The "emotional attunement helps to anchor us in the world and makes the objects and situations we encounter intelligible by virtue of the fact that they somehow matter to us. The lived body and its relationship to the environment thereby serve as the constitutive basis of *personal* significance and meaning" (Meiese, 2014, p.235). Finally, being sensitive to what is significant is related to what our body personally needs and in order to have the personal aspect of our experience there must be a process of subjective bodily feeling of how we are interacting with our environment. In short, from the perspective of enactivism, emotions, appraisals and their feelings are not separable. "Feelings are not separate constituents of emotion, but emergent features of the whole complex system as it enacts an emotional interpretation" (Colombetti, 2007, p.16). This is the point how enactivist connect feelings and appraisal, which every process of appraisal is generated along with its felt experience and enactivists call this combination of appraisal and feeling as emotion. "Appraisals are not feelingless. There are feelings of appraisals and such feelings are constitutive of emotional experience" (Colombetti, 2007, p.16). From the perspective of enactivism, to separate emotions from feelings leads to the problem of "corporeal impersonalism" (Colombetti, 2010, p.153). This is the problem of assuming that one's non-neural body does not contribute to subjective, personal understanding, that is, is not a vehicle of meaning (Colombetti, 2010, p.147). The personal significance is the ground of sense-making processes; there is no meaning production process without a subjective point of view. Our subjective point of view is determined by our intentionality based on our body's interaction with the world. For enactivists, "emotional intentionality generates neurobiological processes that cannot be separable from associated feelings", that is, "physiological processes are also related to the experiential character of appraisals" (Meiese, 2014, p.235). The feelings that determine the personal significance

contribute to form the context boundedness of the structure of our affective and cognitive capacities. The context free structure of functioning mechanisms of cognition and emotion from the perspective of cognitivism is rejected in this respect by applying to the essential role of feelings for all living organisms unlike any computer program or robotic creatures.

Leaning on enactivist point of view can help to formalize the rejection of Megill's solution of the frame problem via emotions. Under the light of the criticisms above, it can be stated that Megill's disembodied understanding of cognition is an obstacle for him to provide a genuine solution for the frame problem. As I will show in the following chapters of this dissertation, the frame problem cannot be solved unless one does not give up the disembodied cognitivist understandings of cognition. Even if one confirms that affective processes are bodily constituted, as long as one's view leans on cognitivism it is not possible to eliminate the emotion-cognition dichotomy as well as mind-body dualism. Megill's search for a solution to the frame problem brings into question of the link between emotion and cognition. However, Megill does not answer this question himself because of his insistence on a cognitivist conception of cognition.

CHAPTER 5

ENACTIVISM

The dissolution of the frame problem or the problem of relevance as pointed out by Dennett and Dreyfus leans on two dimensions as the biological and the phenomenological dimensions of human experience. In this part of my dissertation, I will dwell on how these dimensions evolve and shape human cognition from the perspective of "enactivism." Enactivism mainly suggests that cognition arises in virtue of continuous dynamic interaction between the organism and the environment, that is, we selectively create our environment in virtue of our bodily skills and other bodily capacities such as our affectivity to interact with the world. On the one hand, there is the biological dimension that cannot be replicated or simulated by "cognitive wheels", which solves the frame problem in a natural way always in a context-based environment in the real world in the sense of both evolutionary and real-time processes as pointed out by Dennett. On the other hand, as expressed by Dennett that human cognition also operates on the facts that are learned by experience, there is the phenomenological dimension suggested by the phenomenological approach, which emphasizes that the lived-body gains this learned experience in its real-time interaction with the world, and that this interaction is always guided by the body's intentional arc. The way of a body's interaction with the world guided by its intentionality also cannot be replicated artificially by any kind of representationalist account of human cognition, which ignores the role of bodily dynamics in cognitive processes and human experience in general. In order to understand how the frame problem dissolves, a detailed understanding of these two dimensions of human cognition should be developed. The common point between these two dimensions is to question representationalism about cognitive processes. In this regard, embodied

cognition or embodied dynamicism as called by Evan Thompson comes into prominence in the sense that this perspective sees the mind as an embodied dynamic system rather than a collection of disembodied computational processes leaning on representations. It begins with the question of the relation between cognitive processes and the real world, and continues with questioning the view that cognitive processes are realized only in the brain and limited to the brain without taking into consideration the biological facts of the brain and its relationship to the living body of the organism and to the environment that it goes into interaction with. From the perspective of representationalism, the relationship between the mind and the real world is mediated by abstract disembodied mental representations. Embodied dynamicism rejects representationalism in that respect and focuses on self-organizing dynamic systems rather than mediating abstract symbols suggested by cognitivism or physical symbol systems of connectionism[19]. It emphasizes on the nonlinear and circular causality of continuous sensorimotor interactions among the brain, the body and the environment as also claimed by connectionism, but it differs from connectionism in the sense that embodied dynamicism does not see the mind as a neural network limited to the skull. For Evan Thompson, embodied dynamicism involves two main commitments: a dynamic systems approach and also an embodied approach to cognition (Thompson, 2007, p.11). The core point of dynamic systems theory is that cognitive agents are dynamical systems which make it impossible to isolate "inner" processes of an organism as responses to the environment from "outer" stimulus in the environment as the causes of these inner processes. That is to

[19] Connectionism is another approach that uses mathematical models called connectionist networks or artificial neural networks. It can be said that it is a computational sort of neuroscience. Connectionists use the idea of neural network as a model for understanding the mind, which is defined as emerging through the interconnections of networks of simple units. There are different forms of connections that can vary according to model e.g. units in the network representing neurons and connections representing synapses. Enactivism differs from connectionism in the sense that it rejects representationalism and also a brain-bound explanation of cognition.

say, we don't have any principle to divide the sides in a proper way, e.g. in perception, and to decide which side, inner or outer, constitutes mentality.

> A dynamic systems model takes the form of a set of evolution equations that describe how the state of the system changes over time. The collection of all possible states of the system corresponds to the system's "state space" or "phase space" and the ways that the system changes state correspond to trajectories in this space. Dynamic-system explanations focus on the internal and external forces that shape such trajectories as they unfold in time. Inputs are described as perturbations to the system's intrinsic dynamics, rather than as instructions to be followed, and internal states are described as self-organized compensations triggered by perturbations, rather than as representations of external states of affairs (Thompson, 2007, p.11).

This idea of circularity between internal and external conditions of a mental act reflects phenomenological perspective that dismisses the distinction between subject and object. In this respect, dynamic systems model[20] contributes to enactivism thereby suggesting focusing on processes rather than static states, interrelationalities

[20] The embodied dynamicist approach includes dynamic system theory, which is a branch of mathematics that tries to describe the changes over time occurring in physical and artificial systems e.g. it can be the solar system and also it can be used for a description of biological and psychological phenomena. In this respect, the dynamical approach of the science of mind takes cognitive agents as dynamic systems and tries to explain action, perception and cognition in terms of dynamicism. It claims that the temporal evolution of the system corresponds to its trajectory through the space that is abstract and multidimensional in terms of representing all possible states of the system by specifying all possible values of the system's variables (Thompson, 2007, p.42). It has influenced embodied dynamicism in terms of its emphasis on time. In this sense, it rejects cognitivism that uses the computer model for mind as a symbol-processing system for a computational model provides a static description in the sense that it defines only sequences of discrete states through which the system must pass contrary to dynamic systems that specify how process unfold in real time (Thompson, 2007, p.42). Thompson cites Van Gelder (1998) who contrasts these two opposite views as "change versus state; geometry versus structure; structure in time versus static structure; time versus order; parallel versus serial; and ongoing versus input/output (Thompson, 2007, p.42). Thus, cognitivism defines time and change by a shift between two discrete states whereas dynamicism defines them by focusing on how a system changes state continuously in time.

among the brain and the rest of the body, and the environment, which consists of a dynamic continuum between the body and its environment. Dynamicism allows enactivism to understand mental activity as generated only in the action of the lived body and in its dynamic interaction with the environment, which modifies each other reciprocally. I will go into the details of how dynamics system model operates on living organisms from the perspective of enactivism in relation to neurodynamics afterwards in the last chapter of the dissertation. On the one hand, dynamical system theory provides a useful basis for thinking about the basic dynamism of the body-environment interaction, which constitutes the mental activity. On the other hand, there is the embodied approach of which the core point is that "cognition is the exercise of skillful know-how in situated and embodied action" (Varela, Thompson & Rosch, 1991, cited in Thompson, 2007, p.11). The enactivist approach suggested by Varela, Thompson and Rosch (1991) tries to combine the embodied dynamicist approach of the mind and the philosophical insight of phenomenology about human subjectivity and experience. However, the key point about enactivism, which has a particular concern for this dissertation, is that while it combines the dynamicist approach and phenomenology, it also draws from biology and neuroscience in its account of how relevance is already built-in –as Dreyfus calls it– for living and cognitive beings i.e. how they already have the knowledge that is relevant to the context by coupling dynamically with the world. Hence, enactivism makes the notion of life as its common platform for all these different research areas, and this can allow us to account for the problem of relevancy from a holistic perspective including both phenomenal experience and also biological orientation of our bodies in the world without creating a dichotomy between human and non-human. In this respect, enactivism begins with the definition of autonomy of the body without ignoring the subjective experience itself, and then the description of cognitive processes come along. In this part of my dissertation, I will present how enactivism understands the notion of embodiment and cognition in the way of conceptualizing the solution to the frame problem from a holistic perspective.

5.1. Enactivist Perspective

Varela, Thompson and Rosch proposed the term "enactivism" in their book *The Embodied Mind* in 1991. In its broadest sense, the term enactivism means that "the process whereby a world is brought forth by the interaction or structural coupling between an embodied agent and its medium or environment" (Toscano, 2006, p.169). It is the study of the ways in which perceiving cognitive agents match their actions to what is needed in the present situation. Thus, what cognition is depends on the continuous activity of the cognitive agent; in Thompson's words, " a cognitive being's world is not a pre-specified, external realm… but a relational domain enacted or brought forth by that being's autonomous agency and mode of coupling with the environment" (Thompson, 2005, p.407). Enactivism suggests that a cognitive agent manifests an attunement to the present environment around it by rejecting representationalist explanations of this attunement. Enactivism rejects the cognitivist claim that a cognitive agent passively receives information from its environment and transforms it into representations of what is relevant in its present environment, and then by means of manipulation of these representations produces relevant responses and acts. The latter view has already been discussed as a computational, representational and cognitivist view of the mind. There are no two independent sides of cognitive activity such as the cognizing system and the objective environment independent of this system. The particular environment that is attuned by a cognizing system i.e. the body embedded in this environment, depends upon this system's activity and its capabilities. It is why there is no need for an extra-translation process of information between the embodied cognizing system and the environment, which provides the relevant aspects of this environment for the cognizing system's present activities, since this system is already attuned to its environment. The system and the environment are dependent upon each other. Varela calls this dependency as "laying down a path in walking" (Varela, 1987,

p.63). This idea refers to enactivism's explanation of cognition as a process emerging from embodied perception and action, which causes recurrency of sensorimotor patterns. Varela et al. give a preliminary formulation of enactivism as follows: the enactive approach consists of two points: (1) perception consists in perceptually guided action and (2) cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided (Varela, Thompson, & Rosch, 1991, p.173). Thus, for enactivism, what the cognitive agent perceives is determined by the agent's movement in the environment, and its movements depend on its interaction with the environment on the basis of the recurrent sensorimotor patterns. The meaningful act arises or enacted as a result of the reciprocal interaction between them that can be described as an "attunement" relationship. The attunement between the body and its environment is determined by the agent's abilities of skillful coping as expressed in its sensorimotor capacities. Hence, enactivism rejects the idea that cognitive activity is based on perception of an independent objective reality external to the agent; rather it suggests that the reality that we perceive is enacted through perceptually guided action as expressed in its sensorimotor capacities.

However, it should be noted here that there is not only one type of enactivism. There are actually three approaches in enactivism, which interpret the dependency among the brain, the rest of the body and environment from different perspectives though they share the core idea of the dependency between cognizing systems and the environment. These are autopoietic enactivism (Varela, Thompson, & Rosch 1991; Thompson 2007), sensorimotor enactivism (Noë 2004; Ward, Roberts & Clark 2011) and radical enactivism (Hutto & Myin, 2012). As it is understood by its name, autopoietic enactivism draws its framework within an autopoietic understanding of the interaction between the cognitive organism and its environment. The autopoietic organization of an organism refers to its self-producing and self-maintaining capability, which makes possible for this organism both living and cognizing at the same time. To live or survive and to cognize or produce meaning are same for enactivism. These are the conditions of being an organism and

adapting to the world where organisms are dynamically related to the network of ongoing interactions among them. In this sense, all the components in an autopoietic system are mutually dependent, and this serves to maintain the boundary of this autopoietic system e.g. a cell maintains its boundary that is to say its membrane. However, other approaches in enactivism such as sensorimotor enactivism and radical enactivism do not lean on the autopoietic understanding of the interaction between the cognitive organism and its environment. Their approaches to perception and cognition in general lean on only sensorimotor skills and sensorimotor interactions with the environment but not on autopoiesis. All these three approaches are similar in their rejection of cognitivist, representational and computational conceptions of mind but they differ in their own way of refutation even if these different ways of refutation assumes the same basis. On the one hand, from the perspective of sensorimotor enactivism, it is not the autopoietic organization but sensorimotor contingencies that can explain any subjective conscious experience and cognitive behaviors. For Alva Noë (2004), the knowledge of sensorimotor contingencies determines the relevancy between how we experience something and the expectations about how our experience of this thing will change when we move or the thing that we perceive moves. The correctness of our expectations means that we have mastered these sensorimotor contingencies. Their motto is that perceptual experience "isn't something that happens in us, it is something we do" (Noë, 2004, 216) Hence, they see cognition as realized in the active, extended and interactive engagements of the skillful animal (Noë, 2004, p.227). Neural substrates play a role in perceiving but even if they are necessary, they are not sufficient for cognitive activity. On the other hand, radical enactivism accuses both autopoietic and also sensorimotor enactivisms for falling into the traditional representationalism of theory of mind since they appeal to contentfulness at the end. For example, radical enactivism disagrees with how the idea of mastery of sensorimotor contingencies is understood by sensorimotor enactivism.

> Although they insist that perception and its experience is based on a kind of know how, they tend to fall into unguarded talk of perceivers' (or their brains') making assumptions, predictions, and judgments in ways that look decidedly as if the view is committed to the existence of propositional rather than essentially practical knowledge. This makes it appear as if the sort of knowledge that putatively grounds sensorimotor understanding is, on this account, really a kind of knowing that (Hutto & Myin, 2012, p.26).

Furthermore, for radical enactivism, autopoietic enactivism still has the language of cognition as a contentful process as remnants of "the idea that organismic responses relevant to basic mentality are responses that create, carry, and consume meanings" (Hutto & Myin, 2012, p.34). For instance, radical enactivists also do not agree with autopoietic enactivism in that not all properties of the human mind can generalize to basic minds, that is to say, unlike autopoietic enactivism they do not accept that the simplest living systems such as bacteria have the capability of sense-making. It is a very controversial issue to detect and draw the boundaries among these so-called different approaches in enactivism. Since it seems that even if they use different expressions, and they differ in details of their explanations for cognitive processes, it can be said that they are all useful to understand the main arguments of enactivism in general. To discuss all the differences between these approaches is beyond the scope of this dissertation. However, I should say that this dissertation aims to focus most on autopoietic enactivism due to its emphasis on the idea of strong continuity of life and mind as formulated in their motto "living is cognition" (Thompson, 2004, p.385). In this regard, Thompson (2007) defines as the distinctive feature of autopoietic enactivism as that it tries to combine the idea of autonomy as a fundamental characteristic of biological life due to the deep continuity of life and mind and the phenomenological understanding of intentionality as a fundamental characteristic of the lived body. Thus, this perspective allows us to conceptualize subjectivity and consciousness by explicating them in relation to the autonomy and intentionality of life in its fullest sense, including the organism, one's subjectively lived body and the life-world (Thompson, 2007, p.15). If we take the body into consideration in our

account of cognition, we have to consider also consciousness and subjectivity, which are nothing but "how thinking, perceiving, acting and feeling are experienced in one's own case," in our account of mental events since the body that is subjected to our investigation is always lived by someone. This aspect of the investigation leads us to the question of how living beings determine relevancy according to their own needs and factual requirements of their environments that they engage, and how these engagements are experienced in one's own body. When the issue comes to the feelings of bodily changes and how these feelings contribute to cognition in general, which is the main subject of this dissertation, consciousness and subjectivity will be foremost issues of my dissertation. Therefore, I believe that the deep problem about how living beings detect relevancy can be captured, or the dissolution of the so-called frame problem can be accounted for only from this sort of broad understanding of biological and also phenomenological constitution of the intertwined relation between how living organisms cognize and how they survive.

5.2. The Idea of Autonomy and Autopoiesis

The idea of autopoiesis was introduced by the biologists Humberto Maturana and Francisco Varela (1972) in order to explain self-maintaining living systems such as living cells, and then it has been broadened to other complex organisms such as an ant colony, or the human body which behaves as a self-determining unity in its interactions with its environment. The underlying empirical work before coining the term "autopoiesis" had been done by Maturana (1958) in his laboratory work on the neurophysiology of perception in frogs.

> He and his coauthors . . . found they could not map the visible world of color onto the activity of the nervous system. There was no one-to-one correlation between perception and the world. They could, however, correlate activity in an animal's retina with its *experience* of color. If we think of sense receptors as constituting a boundary between outside and inside, this implies that organizationally, the retina matches up with the inside, not the outside. From

> this and other studies, Maturana concluded that perception is not fundamentally representational. He argued that to speak of an objectively existing world is misleading, for the very idea of a world implies a realm that preexists its construction by an observer. Certainly there is something "out there," which for lack of a better term we can call "reality." But it comes into existence for us, and for all living creatures, *only through interactive processes determined solely by the organism's own organization* (Hayles, 1999, pp.136-7).

Considering the fact that the frog's visual system constructs what they perceive as the reality rather than represent it, the result of this research had showed Maturana that there is no pre-given objective world out there, which is perceived by human beings as well. What human beings perceive depends on the structure of the perceiving body of the perceiver. Maturana continued his empirical research on the perceptions of birds and primates later on (Maturana, Uribe, & Frenk, 1968; Maturana, 1969). According to the outcomes of his ten-year research, any account of human cognition should consider that what we perceive depends primarily on the structure of our brain and nervous system, and secondarily on our structural coupling with other organisms and surroundings around us. These ideas can be expressed in the best way in Maturana and Varela's description of the structural coupling as "a structural dance in the choreography of co-existence" (Maturana & Varela, 1987, p.248). For Maturana, the reality is not something objective that exists independently from cognitive agents and that is something re-presented through our cognition; rather our cognition is a process through which we bring forth the world that depends on our bodily being by means of this structural dance. In this respect, in order to understand the choreography of our co-existence, Maturana proposed to investigate the relationship between life and cognition. His definition of life starts with the description of what is self-making as the process of autopoiesis.

> An autopoietic machine is a machine organized (defined as a unity) as a network of processes of production (transformation and destruction) of components which: (i) through their interactions and transformations continuously regenerate and realize the network of processes (relations) that

> produced them; and (ii) constitute it (the machine) as a concrete unity in space in which they (the components) exist by specifying the topological domain of its realization as such a network (Maturana & Varela, 1980, p.78).

In respect of being a unity, the concept of autonomy underlies the idea of autopoiesis. Thompson (2007) makes a differentiation between autonomous and heteronomous systems. These concepts respectively mean self-governed and other-governed. On the one hand, "a heteronomous system is one whose organization is defined by input-output information flow and external mechanisms of control" "exemplified in traditional computational systems, cognitivist or connectionist network systems" (Thompson, 2007, p.43). On the other hand, Thompson defines an autonomous system by its endogenous, self-organizing and self-controlling dynamics that does not have inputs and outputs, and determines the cognitive process by itself. The concept of process comes into prominence rather than the ones we find as static entities in the definition of a system. The constituent processes in a dynamic system "(i) recursively depend on each other for their generation and their realization as a network, (ii) constitute the system as a unity in whatever domain they exist, and (iii) determine a domain of possible interactions with the environment" (Varela, 1979, p.55). When we consider the biological cell as the canonical example of an autopoietic system, it can be seen that the chemical processes within its metabolic network produce its own membrane and keep the system as a unity that set the cell apart from what it is not while this metabolic network determines all the possible interactions with the environment.

> For a system to be autopoietic (i) the system must have a semipermeable boundary; (ii) the boundary must be produced by a network of reactions that takes place within the boundary; and (iii) the network of reactions must include reactions that regenerate the components of the system (Thompson, 2007, p.101).

In the case of the cell, the boundary that serves to the unity of the system is only a material one. However, Thompson states that every autonomous system does not

have to possess only this sort of material boundary; in other words, an autonomous system can also have a bodily, social or territorial boundary as in ant colonies. The concept of relationality is one of the concepts that come into prominence in the theory. An autonomous system is not a closed system in terms of that it incessantly exchanges matter and energy with its surroundings. It has a circular and recursive network of relations that keeps the system as a unity, but also this system is always structurally coupled to its surroundings and exchange matter and energy with its environment. In this respect, an autonomous organism is an open system, so to speak, it must be open otherwise it dies. The autonomy is understood in the abstract level as "the operational closure" called by Varela in the sense that "every autonomous system is organizationally closed" (Varela, 1979, p.58). And this means that the system is materially and energetically close to the outside world. The material flux of metabolism is provided by its relational nature in terms of its interactions with its environment and also its incessant movement of exchanging matter and energy. The operational closure refers to the circular and recursive network of relations and recurrent dynamics of the system that define the system as a unity. The autopoietic organization of a system "must remain invariant otherwise the organism dies" (Thompson, 2004, p.389). However, the autopoietic organization of a system must also be involved in the incessant material flux of metabolism as much as it is maintained by this invariance so that it can stay in place. Although the autonomous system depends on a circular and recursive network, it is always subjected to change. "The organism is never bound to its material composition at any given instant, but by the same token it has to change, because stasis means death" (Thompson, 2004, p.389). Thus, the changes in an autonomous system are the results of its movement of exchanging energy and its openness in terms of its dynamic interactions or structural coupling with the environment.

> The result of any state change is always further self-organized activity within the system, unless its closure is disrupted and it is no longer able to carry on its coupling, in which case it disintegrates. Systems described as autonomous

> in this sense abound throughout the living world –single cells, microbial communities, nervous systems, immune systems, multicellular organisms, ecosystems and so on (Thompson, 2007, p.46).

This means autonomous living beings should be seen as "sources of their own activity, specifying their own domains of interaction, not as transducers or functions for converting input instructions into output products" (Thompson, 2007, p.46). Metabolic processes in an autonomous organism construct its boundary, but also this boundary makes these metabolic processes possible. It should be noted here that the notions of process, movement and relationality underlie the idea of autonomy and autopoiesis and if we want to talk about the ontological ground of enactivist framework, we can say that these are the essential notions of enactivism.

According to the idea of autopoiesis, for organisms with a nervous system, it is the nervous system that bridges the organism to its environment. Any nervous system operates in conformity with a basic "neurologic" (Thompson, 2007, p.46). The neurologic of our nervous system is to "couple movement and stream of sensory activity in a continuous circular fashion" (Maturana & Varela, 1987, p.142, p.176). In their book *Tree of Life*, Maturana and Varela emphasize that when the need of movement arises in the life of a multicellular organism, a nervous system correspondingly develops. "A nervous system links sensory surfaces (sensory organs and nerve endings) and effectors (muscles, glands) within the body. In this way it integrates the organism, holding it together as a mobile unity, as an autonomous sensorimotor agent" (Thompson, 2007, p.47). This is the neurologic of our animal body and this logic is the essential foundation of all different kinds of sensorimotor coordination systems of various animals. "In all animals, neuronal networks establish and maintain a sensorimotor cycle through which what the animal senses depend directly on how it moves, and how it moves directly on what it senses" (Thompson, 2007, p.47). Hence, our animal bodies are not passive receivers of the information coming from the objective reality rather how our bodies are constituted by our sensory motor bodily being determines how we experience and meet the world

around us. This idea is also emphasized by phenomenology in regard to the intertwined relation between the perceiving body-subject and the objects that are perceived by it. In this intertwined relation, it is really difficult to recognize which side starts first in the exchange of stimuli and responses since what a body does is always conditioned by the environment and it can also be thought from the other way around; "but in the same way, since all the stimulations which the organism receives have in turn been possible only by its preceding movements which have culminated in exposing the receptor organ to the external influences, one could also say that the behavior is the first cause of the stimulations" (Merleau Ponty, 1963, p.13). In respect of the operational closure, Thompson suggests that whereas autopoietic closure brings forth a minimal "bodily self" at the level of cellular metabolism, sensorimotor closure also creates a "sensorimotor self" at the level of perception and action, that is, at the level of behavior and intentional action (Thompson, 2007, p.49). "In both cases we see the co-emergence of inside and outside, of selfhood and a correlative world or environment of otherness, through the generic mechanism of network closure (autonomy) and its physical embodiment" (Varela, 1997 cited in Thompson, 2007, p.49). Enactivism sees our living body as a platform for intersections of various patterns of selfhood and couplings such as immune system etc. Thus, according to enactivism, thanks to cellular, somatic, sensorimotor or neurocognitive selfhoods emerging from distributed networks with operational closure, there is no need for an extra self or agent inside the system to control over the system or to organize it (Thompson, 2007, p.49). Therefore, autopoietic systems are the systems that continuously generate themselves. In this respect, the components that constitute autopoietic systems "must be dynamically related in a network of ongoing interactions" (Maturana and Varela, 1987, pp.43-4). That is, the ways of interaction between the components change continuously, but also interactions always continue so that the system does not die. The autopoietic organization of the organism also depends on that its components produce themselves by virtue of these interactions. Hence, these interactions between the

components of a system allow for new interactions, new components in order to preserve the system's autopoietic character.

5.3. Subjective Experience, Consciousness and the Feeling of Self

Enactivism inquires how consciousness and subjective experience are related to the brain and the body, not in the way of merely showing the correlations between consciousness and brain activity, but rather trying to explain how the biological constitution of the body generates consciousness and subjectivity. This idea is also a part of the project of linking the conceptual and epistemological gap between life and mind. Thompson (2007) states that the scientific accounts of mind ignore to account for subjectivity and consciousness in the same way as cognitive science that focuses on only cognition and neglects emotion, affect, motivation. He criticizes cognitivism for banishing the study of consciousness from the science of mind for the sake of constructing representational semantics. Cognitivism assumed that mental processes are computations nonconsciously performed by the brain. This has damaged the connection between mind and meaning, on the one hand, and subjectivity and consciousness on the other (Thompson, 2007, p.5). For cognitivism, mental or cognitive processes are "subpersonal routines", which cannot be accessed by personal awareness, that is, the subpersonal cognitive routines realized in the brain are separated from the subjective mental states of the person that we are aware of. According to Thompson, this separation results in an unbridgeable differentiation between brain-bound nonconscious cognitive processes where thinking as symbol manipulation takes place and the systems for perception, emotion and motor action. The cognitivist view estranges the cognitive system from the processes of personal awareness, that is, the subjective mental states of the agent who has an access to "epiphenomenal manifestations of subpersonal processes" (Thompson, 2007, p.6). In other words, cognitive unconsciousness is "neither somatic nor affective, and it is lodged firmly within the head" (Thompson, 2007, p.6). Thompson calls this

separation between cognitive processes and consciousness an “explanatory gap”, which supports the Cartesian dualism between consciousness and body or matter. Thus, cognitivism deepens the separation between cognitive processes and subjective experience or subjective mental phenomena. Thompson cites from Ray Jackendoff (1987) who points out that cognitivism produced a new “mind-mind” problem in addition to the mind-body problem by differentiating computational cognition from subjective experience (Thompson, 2007, p.6). “The mind-mind problem is the problem of the relation between the computational mind and the phenomenological mind, between subpersonal, computational, cognitive processes and conscious experience” (Jackendoff, 1987, p.20 cited in Thompson, 2007, p.6). What we should face today as a remaining of the mind-body problem can be summarized as follows:

1. The phenomenological mind-body problem: How can a brain have experiences?
2. The Computational mind-body problem: How can a brain accomplish reasoning?
3. The mind-mind problem: What is the relation between computational states and experience? (Thompson, 2007, pp.6-7).

These problems can be linked to each other on a common platform of the same explanatory gap. The emergence of the mind-mind problem shows that the way of cognitivism to solve the mind-body problem by using the computer model for mind does not work and gets the “hard problem of consciousness” into real trouble (Chalmers 1996 cited in Thompson, 2007, p.7). The hard problem of consciousness asks how and why we have phenomenal experience, that is, we have to give an account of how our sensations acquire some certain characteristics such as taste or color. How can we explain conscious subjective experience as *something it is like*? Even if we can give an explanation of taste or color somehow, we have to ask how and why it is conscious.

Enactivism proposes a radical way to conceptualize consciousness and subjective experience. They turn upside down the traditional ways of thinking on

consciousness as a separate entity from the biological constitution of life and suggest to abandon the conventional approach that sees phenomenal consciousness or consciousness in general as an isolated, internal and intrinsic property of certain mental states, which is in fact separated from life as an external, objective, structural and functional property of certain physical systems (Thompson, 2007, p.222). For the enactivist approach, this can be seen as the underlying assumption that makes impossible the solution of the hard problem of consciousness since in this way it becomes impossible to think consciousness as a natural entity, so to speak, to think its place in nature becomes impossible. This refers to the epistemological aspect of the problem as well in the sense that consciousness inquired from within as experienced from the "inside" by an agent is differentiated from physical accounts of how the structure or function of consciousness is constituted without describing it as it is lived by the agent. This approach results in the impossibility of making a functionalist analysis of what one experiences from inside. This refers to the problem of that we can explain somehow physically and functionally what a conscious being is but these explanations are not sufficient for explaining the subjective character of conscious experience. Thompson emphasizes the radical break between life and consciousness in functionalist explanations of the mind. The radical suggestion of enactivists is to start first with abandoning the standard dualist formulations of the hard problem, which accepts life as an external physical reality when compared to conscious experience. Enactivism invites us to think in terms of "internal" and "external".

> A purely external or outside view of structure and function is inadequate for life. A living being is not sheer exteriority (*partes extra partes*) but instead embodies a kind of interiority, that of its own immanent purposiveness. This interiority, as we have seen, comprises the self-production of an inside that specifies an outside to which that inside is constitutively and normatively related (Thompson, 2007, p.225).

Enactivists explain this "inner" life through the concept of autopoiesis as a matter of boundedness as we examined above. The potential of creating boundaries is also a matter of selfhood and sense-making in this regard.

> A living being enacts a milieu marked by significance and valence. Exteriority is surmounted by an internal relation of meaning and normativity between the two poles of organism and milieu. There is thus an inwardness to life that escapes a purely external conception. This inwardness underlies the deep continuity of life and mind, and is the context in which the emergence of consciousness must be understood (Thompson, 2007, p.225).

This inwardness is explained by the concept of autopoiesis as the biological reality of our bodily being. However, autopoiesis does not refer to an "interior" life that is closed to its "exteriority". In order to understand what this sentence means we have to reconsider autopoietic force of life from the perspective of the continuity between being an individual body and body's structural coupling with its environment. Therefore, in order to understand consciousness, we have to abandon the concepts of mind and body in traditional approaches and we should start from the lived body for understanding the continuity between life and consciousness. The feelings of the undergoing bodily processes constitute the inwardness to life. Thompson mentions William James (1981) and Antonio Damasio (2003) at this point to explain what feeling is; feelings designate all states of consciousness merely as such and they are defined as bearing witness to life within our minds (Thompson, 2007, p.235). Thompson maintains the concept of consciousness as *sentience* that is the feeling of being alive and exercising effort in movement (Thompson, 2007, p.161). Damasio calls this as a primitive feeling of self. "Thus, one might describe consciousness in the sense of sentience as a kind of primitively self-aware liveliness or animation of the body" (Thompson, 2007, p.161). In this sense, our bodily self-producing processes that actively regulate our encounters with our environment constitute our selfhood that differentiates ourselves from our surrounding. This approach corresponds to what Merleau Ponty means by "I'm a bodily subject" through which

he does not fall into any kind of dualism of mind-body or subject-object. The relationship between body-subject and the world around it is not that of subject to object but rather as being-in-the-world that I mentioned before. A body-subject is not an entity isolated from the world: "The world is inseparable from the subject, but from a subject which is nothing but a project of the world, and the subject is inseparable from the world, but from a world which the subject itself projects" (Merleau Ponty, 1962, p.430). For Merleau Ponty, our primarily way of interacting with the world is bodily and skillful rather than reflexive, which is called by him "motor intentionality", our bodily intentionality (Merleau Ponty, 1962, p.110). This is directly related to what I wrote about the "intentional arc", which refers to the body-environment circuit of motor intentionality. Thompson emphasizes that the intentional arc corresponds to the life of consciousness that integrates sensibility and motility, perception and action (Thompson, 2007, pp.248-9). Our bodily self-consciousness emerges in our interaction with the world where the things "perceptually situated by virtue of the orientation they have to our moving and perceiving bodies" (Thompson, 2007, p.249). Thus, our bodily self-consciousness is defined by the practical "I can" of movement and motor intentionality. "In this way among others, perceptual experience involves a non-object-directed and implicit awareness of one's lived body, an intransitive and prereflective bodily self-awareness" (Thompson, 2007, p.249). In this sense, the reflective conscious image of the body, which refers to the consciousness of the body-as-object, is different from the unconscious "body schema" (Gallagher, 1986). The body image as the body-as-object gives a conscious image of self, which is owned by the experiencing subject. Moreover, Thompson emphasizes that the body schema is not "an intentional object of consciousness or partial representation of the body, but rather an integrated set of dynamic sensorimotor processes that organize perception and action in a subpersonal and nonconscious manner" (Thompson, 2007, p.249). However, Thompson points out that prereflective bodily self-consciousness is neither body image nor body schema due to the fact that the body schema is not available to phenomenal

experience of the subject. The body schema is not related to the feeling of "my body" in the sense that "it is not the image, the representation, or even the marginal consciousness of the body. Rather, it is precisely the style that organizes the body as it functions in communion with its environment" (Gallagher, 1986, p.549). Thompson states that one's consciousness of one's body is not something limited to the body image. There is also the consciousness of the body-as-subject referring to the relation of the lived body to itself, so to speak, our experience of our body as acting and perceiving rather than something that is perceived. My body-as-subject or my body-subject does not correspond to an object as a body. Our body-subject is experienced prereflectively as self-awareness. It is prereflective in the sense that it is prior to reflection logically and also temporally (Thompson, 2007, p.250).

> Prereflective bodily self-consciousness is evident in touch; not only do we feel the things we touch, but we feel ourselves touching them and touched by them. When I picked up a cup of hot tea, I feel the hot, smooth surface of the porcelain and the heat penetrating my fingers, and these sensations linger for a time after I have put the cup back down on the table. Such bodily experience offers not only the experience of physical events that relate one's body to things, but also the experience of physical events that relate one's body to things, but also the experience of sensorial events that relate one's subjectively lived body to itself (Thompson, 2007, p.250).

This sort of bodily self-experience is defined as the dynamic linkage between outward perception and inward feeling, that is, one's encountering one's own bodily sentience directly. My body shows its materiality, which is animated from within by sensation and motility, so to speak, my aliveness. My body also has a dynamic sensorimotor relation to its own subjectivity and this relation is the thing that distinguishes my body from other things around it. Thus, it is not only the body's self-relation but also sensorimotor intersubjectivity that constitutes my sensorimotor subjectivity in the sense that how my body becomes other to itself is also determined by its possibility of being experienced by other bodies. When I touch my hand, I feel

also that it is something that can be touched by something else. Therefore, my bodily self-awareness is defined by otherness as much as the body's self-relation to itself.

> [t]his self-othering dynamic is a crucial precondition for empathy, in the broad sense of being able to recognize others as subjects like oneself on the basis of their bodily presence. It is precisely the body's double status of being a "subject-object" a subjectively lived body and a physical living body, as well as the dynamic interplay between ipseity (I-ness) and alterity (otherness) inherent in this ambiguity, that grounds one's ability to recognize other bodies as bodily subjects like oneself (Thompson, 2007, p.251).

The way in which enactivism combined with phenomenology can account for being a conscious subject which is intersubjectively constituted through empathy. This is highly important for the rest of this dissertation due to the fact that for enactivism, empathy here is understood from the perspective of the sensorimotor and also *affective* coupling of lived bodies. This indicates that affectivity also plays an important role in the constitution of the conscious bodily subject. I will return to this idea and dwell on the details of affective coupling of lived bodies in the following chapters. For now, I can say that what Megill troubles about consciousness is directly related to the content of this chapter in the sense that he understands consciousness as a process of reflective state, and he never considers about the notion of pre-reflective consciousness. The reason of this avoidance is his separation between cognition and bodily processes, and his cognitivist understanding of cognition. Cognitivist tendency in his view leads him to conceptualize consciousness only in two poles; personal vs. subpersonal processes, and conscious vs. nonconscious. However, if we listen to what enactivism suggests us, we can see that there are grey areas between these two poles. That is, if one abandons body-mind dualism, then it becomes possible to show that the process of feeling or being conscious of an experience can also be understood as a bodily process rather than a representational process conducted by an abstract intellectual unit. This view is related to Cartesian framework that focuses on the active and self-reflective character of subjective

experience. Cartesian consciousness is indifferent to the body as an unnecessary accompaniment of experience. The body has been conceived traditionally as an object rather than as the locus of subjectivity. “I” is something very abstract like a logical necessity as the given condition of experience rather than an experiencing subject. However, from the perspective of embodiment thesis and enactivism, pre-reflective feelings or bodily self-consciousness are constituted by the whole body as a result of our interaction with the world as the feeling of “I can” and also “I’m alive.” In this respect, “I” is conceived as an experiencing, active and also corporeal reality as an effort rather than a passive abstract condition. Therefore, consciousness also is not understood as reduced to sensory impressions by relying on external objects. Enactivism suggests that the “I” is related to our awareness of having certain possibilities of movements, which points directly to our experience of striving as the source and locus of effort (Colombetti, 2007b, p.532). “I” expresses my embodied being and my awareness of my possibilities of doing something on my own, that is “I can.” What enactivism argues is that this embodied and practical I is also a feeling, that is affective I. Enactivism maintains that the sensorimotor aspect of embodiment has also an affective dimension due to the fact that my perceiving and acts in my world through a corporeity is always already affectively nuanced (Colombetti, 2007b, p.532). I will dwell on this issue later on in the part of this dissertation on appraisal. Therefore, my conscious experience or feeling of my bodily states are not representations of a body schema somewhere in the brain, but related to the whole body as the feelings of bodily skills and of organismic unity or identity. Thus, that I’m feeling of my viability informs my body about its viability conditions so that it can regulate itself according to its interests and needs. For this reason, it is an essential part of my appraisal of the world. In order to understand the role of feelings in my evaluation about the world, it is necessary to see the link between emotion and cognition, which is the subject of the next part of the dissertation. Megill’s suggestion in regard to answer the question of how an agent determine relevance does not meet the requirements of a proper solution for the problem of relevancy due

to its lack of eliminating the gap between body and mind in the collaboration of emotion and cognition in the determination of relevancy. Megill remains cognitivist and representationalist in his view of cognition even if he relies on Damasio's understanding of the constitution of emotions as an embodied process. This results in emotion-cognition dichotomy in the sense that emotions based on bodily processes contribute to cognition that is an internal process taking place inside the brain. However, even if they corporate, they remain separate in the making process of this corporation.

5.4. The Relation between Emotion and Cognition

The idea that emotional processes are based on non-representational bodily processes is not complementary with non-representationalist view of cognition. To combine these two approaches in one view results in the explanatory gap between body and mind- subject and object, and even emotion and cognition at the end rather than eliminating them in favour of overcoming the frame problem. It can be claimed that enactivist approach can be presented as dissolution of the frame problem rather than a solution for it whereby suggesting a proper embodied understanding of cognition and emotion at the same time. It can be claimed that the dissolution of the frame problem depends on recognizing the intertwined structure of affective and cognitive processes, both of which have embodied non-representational nature. The arguments supporting this claim will be elaborated in this chapter under the light of discussions on representationalism and cognitivism in previous chapters.

5.4.1. Embodied and Enactive Cognition

Enactivism is a scientific movement against the "Cartesian anxiety" of cognitive science, which presumes that mind corresponds to have complete representations of the reality outside the brain (Varela, Thompson & Rosch, 1991). The solutions for

the frame problem have been suggested by relying on reproducing such kind of power of mind to represent the outside world, but they failed to do so due to the fact that mind is not a mechanism that can be understood as an abstract intellectual process. Instead of promoting the idea of cognition as a computational process that is based on what the cognitive agent already believes about the world, enactivist approach suggests the idea of cognition as the act of enacting or bringing forth agents' own worlds of significance. Instead of reducing and limiting the sense-making processes as cognitive activity to the evaluative functions of the brain and so making the rest of the body as a vehicle of transmission of information about both the environment and the body itself, enactivism opens this separation between the brain/ mind and body, and the distinction between inside and outside as the underlying idea of cognitivist scientific view to question. Its starting point is how life and mind are in continuum by conceiving the organization of a living system as an autonomous system in the sense of generating and sustaining its own activity by enacting its own cognitive domain (Thompson & Stapleton, 2009, p.24). For enactivism, to be a cognitive agent corresponds to embody a certain kind of autonomy, which means that living organisms are "internally self-constructive in such a way as to regulate actively their interactions with their environments" (Thompson & Stapleton, 2009, p.24). In this respect, detecting relevancy and producing meaningful reactions depend on organisms' power to regulate their interactions with the world in the way of transforming the world into a meaningful environment. Things around them do not possess the meaning and value by themselves, rather the organism enact the significance of the things around it through its autonomous dynamics. Thus, the things around the organism do not possess their value or relevancy intrinsically, but rather their significance for the organism appear in their relation to the organism itself. Moreover, organisms do not produce significance through an evaluation mechanism working with beliefs about these things around it, which are already stored and processes by the organism. These organisms in their relation to their environment enact the significance of things

around them. This transformation of the world into a meaningful environment is defined as the activity of sense-making for enactivism. Sense-making as the basic cognitive activity of the organism refers to the relational side of autonomy of the living being. Cognition is constituted always in a relational domain, so it does not have a specific location (Di Paolo, 2009). For enactivism, sense-making or cognitive processes are defined univocally as to be a living organism which enacting the relevance and significance of its environment for the sake of generating, maintaining its life and so adapting its environment. Thus, adaptive autonomy is the source of cognitive activity of the organism, which is based on the deep continuity of life and mind. Living organisms are autonomous agents that generate and maintain their bodily being through enacting their own cognitive domain. For the sake of generating and maintaining life, nervous system acts as an autonomous dynamic system, which refers to its active power to generate and maintain its own coherent and meaningful patterns of activity according to its operation as a circular and re-entrant network of interacting neurons (Thompson, 2007). In this respect, even if the nervous system does not generate and process bits of information in a computational manner, it creates meaningful patterns. The organism according to its skilful know-how generates cognitive processes in its situated and embodied activity. It is the sensorimotor coupling between organism and environment that modulates the formation of dynamic patterns of neural activity which in turn inform sensorimotor coupling. Living organisms embody a dynamic sensorimotor loop entailed by the sensorimotor coupling with the environment, that is, the way they move depends on what they sense, and the other way around, what they sense depends on how they move. The sensorimotor loop is defined as subordinated to the system's autonomy and to the maintenance of its autopoiesis. Thus, cognitive agent does not experience a world that is pre-specified as an independent reality, which is then represented by intra brainwork. It is rather enacted by this cognitive autonomous agent in a relational manner as a mode of coupling with the environment. At this point, enactivism gets help from phenomenological investigation of mind and suggests that

science should learn from phenomenology by taking into account considering the investigation of lived experience, consciousness, and subjectivity. Lived experience is central to enactivist approach in the sense that from the autonomy perspective, the intentional structures are defined as emerging in relation to the lived body in the act of perceiving, remembering, imagining and so on. The activity of mind is described as the dynamic process of flowing intentional act generated by pre-reflective habits and sensibilities of the experience of lived body. However, intentionality of the lived body here does not refer to mental states that possess representational content; rather it is the act of directedness brought forth only in action and on process. The point of enactivism here is that intentionality is generated in the lived bodily experience by the structural coupling of the living system and its environment, and so these systems enact meaning in its continuous reciprocal interaction with their environment. This serves to the autonomic survival of the living beings. Thus, the information to be generated in the experience is defined context-dependent and relative to the cognitive agent as a result of the structural coupling of the living system and its environment. It is determined by the needs and the physiological structure of the organism, and by also its adaptivity to the environmental structures. Information and meaning generated in the experience depend on the attunement between the system and its environment. Cognitivist and computationalist approach see information used in cognition as representational symbols in a computational language of thought by appealing to the information-bearing states inside the system namely the brain, thus for them information is defined as context-independent representation of the world. This is the objectivist understanding of information, that is, information can be defined and examined independently from the system, and its structural relation to its environment. This kind of information can be analysed by referring only to the success of representations in re-presenting the outer world. It should be noted here that from the autonomy perspective of enactivism, it is the mode of structural coupling between organism and the environment and the living system's operationally closed dynamics determine what will be counted as information. In this

respect, enactivism appeal to neurodynamics regarding the operation of the brain. Contrary to cognitivist approach, for enactivism, it is not that individual neurons detect objectively defined features of the reality as bits of information. Instead, "assemblies of neurones make sense of stimulation by constructing meaning and this meaning is generated as a function of how the brain's endogenous and non-linear activity compensates for sensory perturbations" (Thompson, 2007, p.53). Enactivist approach sees the brain's autonomous system as operating in a nonlinear causality rather than processing in a linear causal domain by manipulating bits of information as objective representations of the world. To have a better explanation Thompson cites Walter Freeman's scientific evidence:

> In this view [neurodynamics and autonomy perspective] the experimenter trains a subject to co-operate through the use of positive and negative reinforcement, thereby inducing a state of expectancy and search for a stimulus, as it is conceived by the subject. When the expected stimulus arrives, the activated receptors transmit pulses to the sensory cortex, where they elicit the construction by non-linear dynamics of a microscopic, spatially coherent oscillatory pattern that covers an entire area of sensory cortex… It is observed by means of electroencephalogram (EEG) from electrode arrays on all the sensory cortices… It is not seen in recordings from single neuron action potentials, because the fraction of the variance in the single neuronal pulse train that is covariant with the neural mass is far too small, on order of 0.1 percent. The emergent pattern is not a representation of a stimulus… It is a state transition that is induced by a stimulus, followed by a construction of a pattern that is shaped by the synaptic modification among cortical neurons from prior learning. It is also dependent on the brain stem nuclei that bathe the forebrain in neuromodulatory chemicals. It is a dynamic action pattern that creates and carries the meaning of the stimulus for the subject. It reflects the individual history, present context and expectancy, corresponding to the unity and wholeness of intentionality. Owing to dependence on history, the patterns created in each cortex are unique to each subject (Freeman 1999c, pp.149-50, cited in Thompson, 2007, p.54).

Thompson differentiates autonomy perspective from cognitivism of computational theory of mind in terms of their way of analysing the brain's functioning mechanism. He points out that information about stimuli as defined by an observer differs from

information in the sense of what meanings the stimuli have for the organism (Thompson, 2007, p.53). What is important for the brain's operation is the latter one. Its real function is not the same thing with how it is defined by the observer, who stands outside of the cognitive system. The computational model confuse an object "feature" defined by an observer outside the system, who is accessing the environment independently and trying to correlate this environment and neuronal responses, with the real function of the meaning of a stimuli in the organism's system. The organism's brain does not operate on the basis of a mapping system from features to neural responses. Thus, from the autonomy perspective, "the feature-binding problem is not the brain's problem, but the brain theorist's problem: it is an artefact of a certain way of looking at the brain" (Thompson, 2007, p.53). Hence, it seems that autonomous meaning-construction differs from heteronomous information processing from the perspective of computational model. In order to make this idea clear, Thompson points out the distinction between two modes of description a complex system; first, the linguistic mode that describes the system in terms of discrete, rate-dependent, symbolic elements, second, the dynamical mode that describes the system in terms of continuous, rate-dependent processes, that is, explicitly takes account of the flow of time (Thompson, 2007, p.54). The ultimate question here is "how do we know our linguistic descriptions are not simply observer-relative, but rather correspond to symbolic structures that belong to the system itself and play a role in its operation?" (Thompson, 2007, p.54). This corresponds to a mistake of confusing the features of our observations with the actual features of the operating system itself. The message that is read by the observer about the system is not the message the complex system operating. The cognitivist approach suggests information processing system that imposes information from without rather than describing it as formed within the context as suggested by autonomy perspective. "An autonomous system becomes informed by virtue of the meaning formation in which it participates, and this meaning formation depends on the way its dynamics specifies things that make a difference to it" (Thompson, 2007,

p.57). The notions of temporality, progress, difference and bodily-lived experience come to prominence in the view of autonomously dynamical systems. Information does not refer to objectively analysable representational bits of static reality, but being dynamically conceived; information is understood as "perform within" (Varela, 1979). Whereas cognitivist approach tries to fill the gap between information and the system due to the fact that s/he actually confuses what s/he observes and interprets with the actual operating system by establishing a model which indeed shows how the observer interpret the message s/he read rather than how the system works, the autonomy perspective focuses on how the information is produced within the system in its relation to its environment by taking account of subjective dimension of lived experience that necessitates to observe cognitive agent's own bodily being. It does not seem possible to understand how detecting relevance and signification in favour of sense-making is generated in an organismic system without considering the cognitive agent's own bodily needs and power of adaptation to its environment. This shows that in order to understand cognition and the organism's ability to detect relevance, it is required to see the continuity between evolution of life and mind, which does not need some mediatory conceptual tools to replace the reality itself. The cognitivist approach tends to create substitutions for a real bodily experience by replacing them with copies of this reality as representations that need an extra evaluation process to gain their meanings. We do not need representations as mediating constructions between the cognitive system and its environment to understand meaningful acts of the living beings in the life-world (*Lebenswelt*) though robots as non-autonomous beings need.

Maturana and Varela (1980) call living systems as autopoietic "machines" because of decisive dynamic connotations of the word of machine. The prominent feature of autopoietic machines is that they are autonomous. Autonomy is defined as the "self-asserting capacity of living systems to maintain their identity through the active compensation of deformations" (Maturana & Varela, 1980, p.73). In this respect, they differentiate autopoietic machines from allopoietic machines in the

sense that whereas autopoietic machines are autonomous, that is, "they subordinate all changes to the maintenance of their own organization independently of how profoundly they may otherwise be transformed in the process", the product of allopoietic machines' functioning is different from themselves, thus the changes in the allopoietic machines without losing their definitory organization are necessarily subordinated to the production of something different from themselves, so they are not autonomous (Maturana & Varela, 1980, p.80). Secondly, whereas autopoietic machines have individuality, allopoietic ones do not. Individuality means here to maintain an identity, which is independent of the autopoietic machines' interactions with an observer, by keeping their organization as an invariant through its continuous production (Maturana & Varela, 1980, p.80). Allopoietic machines, on the contrary, have an identity that depends on the observer, and so it is not determined by their operation due to the fact that their product is already different from themselves (Maturana & Varela, 1980, pp.80-1). Thirdly, whereas autopoietic machines have unities because of their specific autopoietic organization in the sense that their own boundaries are specified by their own operations in the process of self-production, the boundary of the allopoietic one is specified by the observer who specify what pertain to this machine in its operation by also specifying its input and output surfaces (Maturana & Varela, 1980, p.81). Finally, the most important feature of autopoietic machines is that they do not have inputs and outputs, and so their organization can never be treated as an allopoietic machine. It is worth to cite Maturana and Varela's explanation here;

> Autopoietic machines can be perturbated by independent events and undergo internal structural changes which compensate these perturbations. If the perturbations are repeated, the machine may undergo repeated series of internal changes which may or may not be identical. Whichever series of internal changes takes place, however, they are always subordinated to the maintenance of the machine organization, condition which is definitory of the autopoietic machines. Thus, any relation between these changes and the course of perturbations to which we may point to, pertains to the domain in which the machine is observed, but not to its organization. Thus, although an

> autopoietic machine can be treated as an allopoietic machine, this treatment does not reveal its organization as an autopoietic machine (Maturana & Varela, 1980, p.81).

This refers to the fact that autopoietic machines could remain constant by maintaining certain constant relations between its components which are otherwise in continuous change, but they could also not by being static and by maintaining its components constant as in allopoietic machines. The prominent issue for the maintenance of an autopoietic system is not permanence of the components or replacing of them, but the maintenance of the relations that determine the machine organization. An autopoietic machines can be treated as allopoietic ones but this does not mean that their organization is allopoietic. For example, a cell or a neuron can be a component of larger and complex system, but any change in this component in case of a perturbation does not effect the organization of the whole machine unless the whole process stops and relations vanish. Even if a neuron is treated as a component allopoietic machine by being integrated into a larger system as a neuron network, this does not mean that its organization is allopoietic rather than autopoietic. The dynamic stability of the system is maintained by the autopoietic system's activity of maintaining as constant certain relations between components that are in continuous flow or change. This idea can be applied to any kind of cybernetic machine as the self-regulating system in which feedback has a crucial role. However, this does not mean that they are all autonomous systems that have a given unity *per se* as in living beings. Living beings has to be understood in terms of relations rather than parts or components, and it is the organization of the system that gives the unity and individuality of the machine. The manner of an autopoietic organization can be implemented in other physical machine such as a robot, however, its organization will be in such a way that any interference with their operation outside their domain of compensations will result in disintegration (Maturana & Varela, 1980, p.81). Thus, allopoietic machines are not autopoietic and autonomous in this sense. A robot has a concrete hardware system defined by the features of its components or its static

relations and by the purpose it fulfil in its operation created by man as an artefact, but the nature of each component still say nothing about its constitution. Contrary to allopoietic systems, autopoietic autonomous living systems are homeostatic and all feedback mechanism is internal to them. They are defined by the particular network of processes and relations of production that maintain the system. In this respect, autopoietic machines have no inputs and outputs despite the fact that they can be perturbated by independent events that will result in undergoing internal structural changes. In this respect, autopoietic autonomous systems are closed but in the sense that the process of production and the product are the same thing, that is, the product is the system itself. All the changes occur inside the system as subordinated to the maintenance of the machine organization; however the system is always in interaction with its environment. As a consequence, the actual realization of allopoietic systems are determined by processes that do no enter in their organization, thus the systems that are not autopoietic do not produce the components that constitute them as unities, hence their product of their operation is different from themselves. These mode of organizations have by its nature input and output relations; its output is the product of its operation, its input is what it transforms to produce this product. Enactivism can be seen as an attempt to refute the theoretical ground of computational theory of mind concerning its model of cognition which is an allopoietic system rather than an autopoietic system. Dreyfus' criticism of artificial intelligence for confusing the structure of a man-made artefact with the organization and way of operation of human mind as a biological being can be reminded here. Cognitivist and computationalist perspectives model cognitive process on the basis of computational systems in tandem with the traditional studies of artificial intelligence and robotics, which indeed basically define human cognition on the ground that human brain is an information processing system and cognition is a form of computing as the production of outputs based on inputs. For a computer as an allopoietic machine, on the one hand, information is processed in a context-independent sense although for enactivism, autonomous systems do not operate on

the basis of internal representations that can be processes context-independently as suggested by objectivist view of cognitivist and computationalist perspectives. On the other hand, an allopoietic system does not have a unity and autonomy in the sense of self-asserting capacity of autopoietic systems to maintain their identity through the active self-compensation. It operates only on components not relations subordinated to the maintenance of the machine organization. Therefore, considering these qualitative differences between allopoietic and autopoietic systems, when intentionality and the systems of detecting relevance are considered, it should be noted that allopoietic machines are organized totally different from autopoietic ones.

(i) Autonomous autopoietic systems do not represent an external world; rather they enact an environment inseparable from their own structure and actions (Varela, Thompson and Rosch, 1991, p.140). By leaning on phenomenology, these kinds of systems constitute a world that bears the stamp of their own structure. Considering the animal life,

> the environment emerges as a sensorimotor being. The organism is a sensorimotor being thanks to its nervous system. The nervous system connects anatomically distant sensory and motor processes, submitting them in operationally closed sensorimotor networks. Through their coherent, large scale patterns of activity these networks establish a sensorimotor identity for the animal –a sensorimotor self (Thompson, 2007, p.59).

The sensorimotor world of animal is a body-oriented world of perception and action, which is lived by it. In this respect, the information in this system is the intentional relation of the system to its environment, established on the basis of the autonomy of the organism's system. External events are constituted or disclosed with the significance they have by virtue of the network's autonomous (self-organizing) dynamics of the organism's activity. "Their status as external events for the system (as opposed to their status for an observer of the system) is a function of the system's own activity" (Thompson, 2007, p.27). Therefore, intentional nature of information that an autonomous cognitive being enacts depends on the self-organizing dynamics

of the organism, which cannot be defined simply as processing of information as objective representations of the external world.

(ii) Autonomous autopoietic systems operate according to internal norms that determine whether otherwise neutral events are good or bad for the continuation of the organism. In this way, living organisms are immanently purposeful. Enactivism suggests that autonomous autopoietic systems have constitutive purposiveness immanently, which means "neither a nonrelational property of something internal to the system (as intrinsic can misleadingly suggests) nor a property determined by something outside the system (by something that transcends the system), rather purposiveness is a constitutive property the whole system possesses because of the way the system is organized" (Thompson, 2007, p.146). The dynamic pattern of activity proper to life has twofold immanent purposiveness as patterns of identity and sense-making (Varela, 1991, 1997). First, autopoiesis produces and maintain a dynamic identity in the face of material change. The living system establishes a self with an internal identity which is marked of from the external world and whose being is its own doing. This internal identity is the emergence of a bodily self. Every change the organism undergoes is subordinated to the maintenance of its own identity thereby regulating itself and its interactions according to the internal norms of activity. Thus, this identity provides a perspective to make sense of the world from the perspective of its own identity, of which is enacted by self-affirming activity of life. "A physical autopoietic system, by virtue of its operational closure (autonomy), produces and realizes an individual or self in the form of a living body, an organism" (Thompson, 2007, p.158). Second, an autonomous autopoietic system always has to make sense of the world for the sake of remaining viable. "Sense-making changes the physicochemical world into an environment of significance and valence for the system (Thompson, 2007, p.147). Varela draws a bridge between identity and sense-making:

1.An organism is fundamentally a self-affirming, identity-producing process based on autopoiesis.

2.A self-affirming identity establishes logically and operationally the reference point or perspective for sense-making and a domain of interaction.

The normative nature of sense-making of an autonomous autopoietic system entails not only the norm of self-continuance but also the norm of actively seeking to improve organism's conditions of self-production through the organism's capacity for adaptivity. By this way, an autonomous autopoietic system continuously regulates itself in terms of its conditions of viability and thereby modifies its environment according to the internal norms of its activity. Hence, autopoiesis and adaptivity are necessary and sufficient for sense-making (Thompson, 2007, p.148). Therefore, the immanent purposiveness of a living system is manifested by autopoiesis as the intrinsic teleology of self-production and the mechanisms for detection of relevance and significance in relation to the processes of sense-making as the projective teleology of adaptivity and cognition (Thompson, 2007, p.148). The immanent purposiveness as the organism's concern entails constitution of identity as self-production and sense-making processes as adaptivity and cognition, which are based on autopoiesis. Living beings detect relevance and make sense by the determination of immanent purposiveness of the organization of a living system. The organism detects things in its environment according to its own particular concern, its natural purpose so that it can keep on going, continue living, adapt its milieu and affirm its life. As Maturana (1980) says, "living is a process of cognition."

As a consequence, enactivism defines cognition as the activity of sense-making in relation to meanings and norms that the system itself enacts or brings forth on the basis of its autonomy (Thompson, 2007, p.159). These meanings and norms are determined by intentionality as the self-organization of the living system arising from the operational closure (autonomy) and interactive dynamics of autopoiesis. By these ways, intentionality is the constitution and disclosure of the world through the structural coupling between organism and its environment, and the organism's capacity of skilful coping. The sequence of Thompson's formulation of the motto "living is cognition" is as in the following way:

1. Life = autopoiesis and cognition.
2. Autopoiesis entails the emergence of a bodily self.
3. Emergence of a self entails emergence of a world.
4. Emergence of a self and world = sense-making.
5. Sense-making = enaction (Thompson, 2007, p.158).

In this picture of cognition, sense-making is conducted for the sake of viability. This conduct is defined as being oriented toward and subjected to the environment's significance and valence (Thompson, 2007, p.158). Therefore, in enactivist view, significance and valence do not exist independently of living beings as pre-existing entities in the external world, but they are enacted by living beings themselves, through which they turn the world into a meaningful environment. However, from the perspective of enactivism, the intentional arc determining significance and valence is not thought without appealing to affectivity of the body.

5.4.2. Embodied and Enactive Emotion

Enactivism defines emotion as a prototype whole-organism event that mobilizes and coordinates virtually every aspect of the organism rather than an event occurring in a specific region of the brain (Thompson, 2007, p.363).

> Emotion involves the entire neuraxis of brain stem, limbic areas and superior cortex, as well as visceral and motor processes of the body. It encompasses psychological level, emotion involves attention and evaluation or appraisal, as well as affective feeling. Emotion manifests behaviourally in distinct facial expressions and action tendencies (Thompson, 2007, p.363).

Enactivism's view of emotion relies on dynamical systems approach to emotion and phenomenological perspective (Lewis, 2000; 2005). Enactivism recognizes a bond between emotion and intentionality in the sense that when intentionality is no more defined as the static relation of aboutness, but rather as a dynamic striving for

intentional fulfilment, it can be seen as parallel with emotion considering its meaning as “an impulse moving outward” (Thompson, 2007, p.364).

> A way of making sense of emotion is to identify it with the intention to act in the near future, and then to note increasing levels of the complexity of contextualization. Most basically, emotion is outward movement. It is the “stretching forth” of intentionality, which is seen in primitive animals preparing to attack in order to gain food, territory, or recourses to reproduce, to find shelter, or to escape impending harm… The key characteristic is that action wells up from within the organism. It is not a reflex. It is directed toward some future state, which is being determined by the organism in conjunction with perceptions of its evolving condition and its history (Freeman, 2000, p.214).

The emotional performance of intentionality is not conducted by a specific area in the brain or in the body rather it is seen as a whole-organism event. The prominent reason of such an organization is based on enactivist conception of function in the brain. For enactivism does not recognize function as implementing some mapping from input (sensory stimulation) to output (motor response) by treating the brain as an autonomous system rather than heteronomous device, from this perspective a psychological function cannot be represented in the brain, thus the source of specific emotion cannot be indicated. From enactivist perspective, emotions are defined as a part of autonomous system that enabling self-determination of the organism since they are defined by organisms’ organizational and operational closure whereas linear output-input models are not. Enactivism replaces the linear input-output distinction with the nonlinear perturbation/response distinction. Thus, it understands brain processes in their relation to the circular causality of action-perception cycles and sensorimotor processes. Hence, emotion is not defined as a function in the input-output mechanism but rather a feature or part of action-perception cycle, that is, “the endogenous initiation and direction of behaviour outward into the world. Emotion is embodied in the closed dynamics of the sensorimotor loop, orchestrated endogenously by processes up and down the neuraxis” (Thompson, 2007, p.365).

Thus, for emotional processes are defined as penetrated into the whole system of action-perception cycle run by structural coupling of the organism and its environment, intentionality performed by the whole organism is defined all emotive. In this point, enactivism tries to show how intentional behaviours that are all emotive emerge through self-organization of neural activity. Enactivism begins to investigate this question by considering the features of brain organization. "The overall organization of the brain reflects a principle of reciprocity: if area A connects to area B, then there are reciprocal connections from B to A. Moreover, if B receives most of its incoming influence from A, then it sends the larger proportion of its outgoing activity back to A and only smaller proportion onward" (Freeman, 2000, p.224). Enactivist perspective criticizes traditional neuroscience in respect of that it tries to map the organization of the brain onto a hierarchical input-output processing model that take sensory end as the starting point. "Perception is described as proceeding through a series of feedforward or bottom-up processing stages, and top-down influences are equated with back –projections or feedback from higher to lower areas" (Thompson, 2007, p.366). For enactivism, the processes in the brain are described as recursive, re-entrant, and self-activating, and do not start or stop anywhere (Thompson, 2007, p.366). Enactivism takes the brain's self-generated endogenous activity as the starting point for neurobiological analysis and recognizes perception and emotion as dependent aspects of intentional action rather than taking the sensory receptors as the starting point for analysis thereby recognizing perception as a later stage of sensation (Thompson, 2007, p.366). The activity of the brain's self-generation is generated far from the sensors (in the frontal lobes, limbic system, or temporal and associative cortices) and reflects the organism's overall protentional[21] set (its states of expectancy, preparation, affective tone, attention and

[21] Protention is used here in the meaning of Husserl's understanding of time-consciousness which has a threefold intentional structure: primal impression, retention and protention. Whereas retention refers to intention as just-past, protention refers to directedness in a more indefinite way toward the immediate future. For Husserl, these three work together in any intentional arc and cannot work on their

so on) (Thompson, 2007, p.366). Enactivism suggests that these states are necessarily active simultaneously as the sensory inflow. The difference between enactivist perspective and cognitivist perspective of traditional neuroscience in their understanding of the working procedure of these states is that whereas cognitivist view describes these states as working in a top-down manner on sensory processing, enactivism recognizes top-down or bottom up as heuristic tools though in fact these states work in a large-scale network that integrates incoming and endogenous activities on the basis of its own internally established reference point (Thompson, 2007, p.366). Therefore, for enactivism, in order to understand how intentional behaviours that are all emotive emerge through self-organization of neural activity, we have to look at this large-scale dynamic network.

Enactivism benefited partly from Walter Freeman's (1999c) model of intentional arc that is based on neurodynamics in order to understand the idea that emotion is essential to all intentional behaviours. Freeman's model consists of five circular causal loops (motor loop, proprioceptive loop, reafference loop, control loop, spacetime loop) including brain, the rest of the body and environment, but mainly based on the limbic system as the brain area particularly associated with emotion. The self-organizing dynamics of these loops enable emotion, intention and consciousness to emerge and to be embodied in particular ways. It is the motor loop between organism and the environment that is standing in a more global level among these loops. The operation through motor loop includes the sensorimotor circuit leading from motor action in and through the environment, and back to the sensory stimulation resulting from movement (Thompson, 2007, p.367). What motor activity consists arousal and search, which are directed toward objects or events in the

---

own part. In this respect, protention is taken into account for describing the dimension of any lived experience that embodies the feature of the continuous going beyond the present as opening into the future thereby our consciousness always involves an open and forward looking horizon and not limited to determinate content of intentionality directed by retention as filled by the consciousness of past or present moment that is fulfilled by primal impression which has reference neither to past or future.

environment, and also it expresses the organism's states of expectancy. From this perspective, the motor action determines the sensory stimuli that the organism receives and the organism's the way of moving is determined directly by the sensory consequences of its previous actions. The importance of the motor loop is taken into account by also phenomenology. In Merleau Ponty's words:

> Since all stimulations which the organism receives have in turn been possible only by its preceding movements which have culminated in exposing the receptor organ to the external influences, one could … say that… behaviour is the first cause of the stimulations. Thus, the form of the excitant is created by the organism itself, by its proper manner of offering itself to actions from outside (M. Ponty, 1963, p.13).

Whereas the motor loop entails traveling outside the brain and the rest of the body into and through the environment, the proprioceptive loop entails traveling outside the brain but it is closed within the body. The proprioceptive loop involves pathways from sensory receptors in the muscles and joints to the spinal cord, cerebellum, thalamus and somatosensory cortex (Thompson, 2007, p.368). The other three loops stands within the brain. In this context, it is noted that sensory stimuli take place in a setting of expectancy and motor activity.

> When a stimulus arrives, the activated receptors transmit pulses to the sensory cortex, where they include the construction by nonlinear dynamics of an activity pattern in the form of a large-scale spatial pattern of coherent oscillatory activity. This pattern is not a representation of the stimulus but an endogenously generated response triggered by the sensory perturbation, a response that creates and carries the meaning of the stimulus for the animal. This meaning reflects the individual organism's history, state of expectancy, and environmental context. These meaningful dynamic patterns constructed in the cortex converge into the limbic patterns constructed in the cortex converge into the limbic system through the entorhinal cortex, an area of multisensory convergence that receives and combines activity from all primary sensory areas of the cortex. The dynamic activity patterns are spatially and temporally sequenced in the hippocampus, an area known to be involved in memory and the orientation of behaviour in space and time. Reciprocal interaction between the entorhinal cortex and the hippocampus

> (the spacetime loop) creates a unified gestalt (in the form of a large-scale, coherent oscillatory pattern), which is transmitted both to the motor systems (the control loop), thereby mobilizing the visceral and musculoskeletal activities needed for action and emotional expression, and back to the sensory systems through corollary discharges (the reafference loop), thereby preparing them for the expected consequences of motor actions (Thompson, 2007, pp.368-9).

The flow of activity drawn in this model of loops is described as moving in both feedforward and feedback directions. Freeman's suggestion is that "the forward direction consists of microlevel fluctuations in neuronal activity that engender new macroscopic states, whereas the feedback direction consists of macroscopic order parameters that constrain the microlevel activities of the forwardly transmitting neuronal populations" (Freeman, 1999c, p.150). Freeman's idea indicates that whereas feedforward flow corresponds to the local-to-global side of emergence, feedback corresponds to global-to-local process of emergence. However, for enactivist perspective, the terms of forward and feedback still recognized as heuristic terms due to the fact that considering the circular causality, the system always moves as a whole.

As I elaborated in the previous part of the chapter, from the enactivist perspective, cognitive processes and sense-making in general entail the emergence of a bodily self. In this point, the next question in our mind is likely to be the relationship between consciousness and the bodily self. Enactivism suggests an understanding of consciousness which is based on sentience, the feeling of being alive and exercising effort in movement (Thompson, 2007, p.161). It is very similar to what Damasio (1999) means by the primitive feeling of self that is a kind of primitively self-aware liveliness or animation of the body (Thompson, 2007, p.161). Enactivism's point is that sentience is something that emerges with life itself, that is, sentience as feeling of liveliness emerges with the living body as the feeling of this body as a self among other things around it and aliveness. The organism is interested in its own being and continuation as similar to Spinoza's notion of *conatus*, which is

every mode strives to persevere in its being. Enactivism, from the perspective of autopoiesis, conceptualizes this concern as the twofold purposiveness of identity and sense-making. And this approach is supported by Freeman's model of loops, that is, Freeman links his model to consciousness as well. He suggests that along with the large-scale activity patterns that emerge in virtue of the non-linear dynamics of the spacetime loop, there is also another higher-order pattern at the hemispheric level of the brain, which includes the lower-order activity patterns of the limbic system and sensory cortices (Thompson, 2007, p.369). The function of these higher-order patterns is to organize and constrain the lower-order patterns. As globally coherent and spatiotemporal patterns of activity correspond to the brain correlate of a state of awareness and that consciousness consists of a sequence of such states (Thompson, 2007, p.369). It should be noted that whereas emotion as the internal impetus for action and intentional action constitute the cognitive flow in the feedforward direction, awareness and consciousness constitute the cognitive flow in the feedback direction. Hence, according to this model, awareness is neither accidental part of the cognitive process nor merely an epiphenomenal fact but it has a crucial causal role "as an order parameter that organizes and regulates dynamic activity" (Thompson, 2007, p.370). Hence, from this perspective, awareness or being conscious is not defined an internal commander of the cognitive activity rather it is defined as neurally embodied as a global dynamic activity pattern that organizes activity throughout the brain. "Consciousness is a dynamic operator that mediates relations among neurons and it is a state variable that constrains the chaotic activities of the parts by quenching local fluctuations" (Freeman, 1999c, p.132, 143). Freeman's model shows that emotion is essential to all intentional actions. To make this idea clear, let's think about how perception occurs. As I mentioned before, for enactivism, it is our skilful mastery of sensorimotor contingencies that we perform in the act of perception. When I elaborated on cognition in the previous part, I had concentrated on the global sensorimotor loop of organism and environment. But now, by the help of Freeman's model of loops, we can see that this loop contains numerous neural and

somatic loops, "whose beating heart (in mammals) is the endogenous, self-organizing dynamics of cortical and subcortical brain areas. Sensorimotor processes are motivated and intentionally oriented thanks to endogenous neural gestalts that emerge from depths far from the sensorimotor surface" (Thompson, 2007, p.370). Therefore, from the perspective of enactivism, sensorimotor processes modulate endogenous activity –even if it does not determine it– which in turn infuses sensorimotor activity with emotional meaning and value for the organism (Thompson, 2007, p.370).

Enactivism suggests a model of emotional self-organization, which entails an interaction between cognition and emotion. Thompson points out that cognition here involves perception, attention, evaluation, memory, planning, reflection and decision-making. These are also different aspects of emotional "appraisal", which I mentioned in the theories of emotion as the evaluation of event's significance. For enactivism, emotion involves arousal, action tendencies, bodily expression, attentional orientation, and affective feeling. Cognition and emotion are never separated, that is, they are definitely intertwined systems. Thompson gives two reasons for explaining why these two are not separate systems. First, the neural systems mediating cognition and emotion processes entail a large amount of anatomical overlapping between them, and the interaction between these systems are in a reciprocal and circular manner. Second, "the emergent global states to which these interactions give rise are *appraisal-emotion amalgams* in which appraisal elements and emotion elements modify each other continuously" (Thompson, 2007, p.371). These kinds of modifications take place in virtue of reciprocal interactions between local appraisal and emotion elements and circular causal influences between local elements and their global organizational form (Thompson, 2007, p.371). From the dynamic systems model of emotional self-organization perspective, Marc Lewis (2000, 2005) presents a development model of emotional self-organization at three time-scales –the microdevelopment of emotion episodes at a time-scale of seconds or minutes, the mesodevelopment of moods at a time-scale of hours or days, and the

macrodevelopment of personality at a time-scale of months and years (Lewis, 2000, p.59). The continuous modifications between appraisal elements and emotion elements take place in each time scale. At the microlevel, the self-organization of emotion process occurs in the form of emotional interpretation as "a rapid convergence of a cognitive interpretation of a situation and emotional state (happiness, anger, fear, shame, pride, sympathy, and so forth)" (Thompson, 2007, p.371). The continuous modifications between cognitive elements and emotion elements occur on a fast time-scale "while simultaneously being constrained by the global form produced by their coupling in a process of circular causality. This emergent form, the emotional interpretation, is a global state of emotion-cognition coherence, comprising and appraisal of a situation, an affective tone, and an action plan (Thompson, 2007, p.371). Lewis describes this emergent form of the emotional interpretation as a higher-order form and as corresponding to Freeman's model of global intention for acting on the world. When the connection between global intention and the higher-order form of emotional interpretation is considered, it should be noted that the global intention is both a whole-brain event and also a whole-organism event. Freeman puts it as follows:

> Considering the rapidity with which an emotional state can emerge –such as a flash of anger, a knife-like fear, a surge of pity or jealousy– whether the trigger is the sight of a rival, the recollection of a missed appointment, an odor of smoke, or the embarrassing rumble of one's bowel at tea, the occasion is best understood as a global first-order state transition involving all parts of the brain and body acting in concert (Freeman, 2000, p.224).

Lewis' model suggests that the emergence of an emotional interpretation starts as a variation in the intentional action that is triggered by a perturbation no matter it is external or internal. This variation disrupts the orderliness of the current emotional interpretation at the end. "Rapid processes of self-amplification through positive feedback ensue, followed by self-stabilization through negative feedback and entrainment, leading to the establishment of a new orderliness in the form of a new

momentary emotional interpretation and global intention" (Thompson, 2007, p.373). For the long term or large-scale emotional organization, this self-stabilization process is necessary due to the fact that it is the precondition for learning, that is, the consolidation of long-term emotion-appraisal patterns. Therefore, Lewis' model introduces three main phases in the emergence of emotional interpretation; a trigger phase, a self-amplification phase and a self-stabilization phase. Besides, the learning phase can be the forth one, which enables the influence of the present emotional interpretation to extend to future interpretations (Thompson, 2007, p.373). An organism is the one who is in the flow of divergence from one attractor to another within emotion-cognition processes.

Affective feelings are defined as the motivational component of emotions (Thompson, 2007, p.373). Enactivism appeals also to phenomenology to understand affectivity and conceptualize it through Husserl's notion of "receptivity" contrary to passivity, which entails being involuntarily affected. Receptivity refers to responding to an involuntary affection through turning toward it. Affection occurs precognitively while engaged in any activity. Appealing to Husserl's ideas (2001) Thompson emphasizes on the fact that every receptive action presupposes a prior affection (Thompson, 2007, p.374). Husserl states that "by affection we understand the allure given to consciousness, the peculiar pull that an object given to consciousness exercises on the ego" (Husserl, 2001, p.196). Here it should be noted that what Husserl means by allure does not refer to a "causal stimulus-response relation" but to an intentional "relation of motivation" (Husserl, 1989, 199, cited in Thompson, 2007, p.374). What gives attention at any level its motivational content is the affective allure of something. In this respect, one's motivations can yield to an affective allure involuntarily or voluntarily at the fold between passivity and activity, and thus receptivity can be defined as the lowest active level of attention. It can be said that the level of the affective allure determines what enters into our attention, what is relevant to us or what has significance for us. "Allure implies a dynamic gestalt or figure-ground structure: something becomes noticeable, at whatever level of

attention, owing to the strength of its allure: it emerges into affective prominence, salience or relief; while something else becomes unnoticeable owing to the weakness of its allure" (Husserl, 2001, p.211). Thus, the affective allure acts as "a parameter that at a certain critical threshold induces a bifurcation from passive affection (passivity) to an active and motivated orienting (receptivity) toward something emerging as affectively salient or prominent" (Thompson, 2007, p.378). Therefore, affectivity is the other aspect of intentionality, which determines the relevance and significance of the things in the environment for the body-subject. In this respect, from the perspective of enactivism supported by the neurodynamics and phenomenology, the frame problem does not need to be solved. Rather these positions suggest us its dissolution through their emphasis on the crucial role of the affective allure in detecting relevance of things around us. In this way they point to bodies' power to affect and also to be affected by other bodies which play a necessary role in the emergence of things into affective prominence. The idea of affective allure lies at the heart of the notion of intentionality in this respect. "The dynamic interplay of passivity and activity, affection and receptivity, expresses a "constantly operative" intentionality that does not have an articulated subject-object structure" (Merleau Ponty, 1962, p.xviii). The attempts to solve the frame problem from a objectivist cognitivist perspective is always subjected to fail given that this perspective ignores the role of bodily affections and intentional dimension of lived experience in detecting of relevance and determining significance by holding the separation between body and mind, subjective and objective sides of experience. The enactivist perspective suggests that the framing mechanism of a living organism depends on its bodily capacities of intentional act, which is a common field for the flow of skilful coping and affective transitions at the same time. An experience of the present moment is mainly determined by two processes; first, the brain's way of dynamically setting its own activity by forming transient and large-scale neural assemblies that has the function of integration of sensorimotor and neural events; and second, the changes in our long-term abilities, that is, the flow of habitual activity

does not remain same in all possible moments, it changes sometimes as smooth transitions, sometimes as breakdowns, thus what "I can" do can change moment to moment as we rapidly "switch" activity (Thompson, 2007, p.374). The neurodynamical perspective emphasizes on the fact that when these switches occur, the global neural assembly that is dominant at the present moment is confronted with disordering of its organization and need a new moment of global synchronization. What Varela and Depraz (2005) propose is that these switches are driven by emotion and they are manifested as dynamic fluctuations of affects. This means that at the present moment within an experience there is a flow of skilful coping and in this flow we switch activities "as a result of the attractions and repulsions we experience prereflectively" (Thompson, 2007, p.375). The dynamic fluctuations of affects operate as control parameters that induce bifurcations from one activity to another, from one present moment of consciousness to another. We can see that a complex microdevelopment of affectivity, which is actually contained within the microdevelopment of an emotional interpretation, directs the rapid switching activity that is based on organism's skilful coping. By this way, the affective allure acts as a parameter that induces bifurcations for both from passive affection to an active receptivity toward something emerging as affectively salient first and then also from one skilful activity to another by constituting intentional ground of experience.

Thompson presents a number of current components of affect in momentary emotion episodes:

1. A precipitating event or trigger (can be perceptual or imaginary)
2. An emergence of affective salience (involves the precipitating event's meaning). This component refers to the aspect of emotion that is described as appraisal, which is prereflective and unconscious.
3. A feeling tone (having a valence along a pleasant/unpleasant polarity)
4. A motor embodiment (in the from of facial and posture changes, and differential action tendencies or global intentions for acting on the world)
5. A visceral-interoceptive embodiment (in the form of complex autonomic-physiological changes [to cardiopulmonary parameters, skin conductance,

> muscle tone, and endocrine and immune system activities) (Thompson, 2007, p.376).

Let me give an explanatory example of these components in order to understand affective components better in parallel with Thompson's illustration. Suppose that you see the angry face of your boss who is a demanding one and currently nobody knows what s/he is angry at. His/her face amounts to a *precipitating trigger*, which has a strong affective allure. You had woken up to a peaceful morning but you've just come across this angry face. This encounter triggers the rapid emergence of *affective salience* and appraisal, which is an emotional interpretation of the angry face. The salience of the event increases with the realization that the boss is actually angry with you, that is, the emotional expression that you've encountered is directed at you. Thus, emotional interpretation is getting elaborated. A complex *feeling tone* of startle, fear and distress set your body on fire. However, you are still far from the source of the fire, the boss, so you immediately turn your eyes and start to explore the details of the checkered tablecloth on your desk as if nothing happened one second ago. Hence, your *motor embodiment* has already gone into action. Your global intention is to avoid your boss even if it is not to the point of feeling the need to run away from the workplace because of a physical danger (this is actually another appraisal included). Your gut contracts, your breath goes faster and shallower, your cheeks get red and hot, and your muscles get tense since you've already turned away and taken up another position. This phase shows your *visceral-interoceptive embodiment*. On the other hand, while you are trying to avoid your boss' angry face, you also realize that your boss has recently broken up with her/his boyfriend, so s/he might be aggressive because of this unexpected separation. Thus, you grow a feeling of sympathy for her/him and that can change your affective interpretation in seconds. This is a result of your flow of affections and emotional interpretations –"all complex emotional interpretations with their own triggers, saliences, appraisals, feeling tones, and associated motor and visceral embodiments rapidly alternate, reverberate and seemingly reinforce one another, in a matter of seconds" (Thompson,

2007, p.377). We can also take into account of your feelings for the rest of the day; your mood can be determined by this encounter in the rest of the day by the help of your memory, thus the longer-term, emotion appraisal patterns in your body can be affected by this change or the other way around. The emotion-appraisal patterns can expand and modulate your emotions for some time to come as Lewis tells us about the developmental model of emotional self-organization at three time-scales "emotional episodes", "moods" and "personality" as I mentioned above.

Considering the operation of the affective allure inducing a bifurcation from passive affection to an active orienting that is transition to receptive mode in which the agent is directed toward something emerging as affectively salient, Varela and Depraz (2005) defines this dynamics of affect as the "primordial fluctuation" of the body's feeling and movement tendencies. This fluctuation entails a movement tendency or motion disposition particular to the given instance, which is determined by a particular affective force. This affective force brings forth a rapid dynamic transformation of experience and mobilizes the agent's entire body. The transition from passive affection to receptivity depends on a "gradation of affection" relative to what is affectively efficacious and salient, hence dynamic fluctuations of a body is modified by the level of affective force determined by salience and significance of things around the lived body. These fluctuations are valenced as a result of complex space of polarities and possible combinations, and fluctuations in valence are the core of the dynamics of affect in an emotional interpretation. Thompson describes the complex space of polarities and possible combinations that determine the valence of fluctuations in the following way;

> As movement tendencies, they exhibit movement and posture valences – toward/away, approach/withdrawal, engage/avoid, receptive/defensive. As feeling tendencies, they exhibit affective and hedonic valences – attraction/repulsion, like/dislike, pleasant/unpleasant, and positive/negative. As socially situated, they exhibit social valences –dominance/submission, nurturance/rejection. And as culturally situated, they exhibit normative and cultural valences, that is to say, values –good/bad, virtuous/unvirtuous,

> wholesome/unwholesome, worthy/unworthy, and praiseworthy/blameworthy (Thompson, 2007, p.378).

The "primordial fluctuation" of the body's feeling and movement tendencies indicates that meaningful responses are given on the condition of a cognition-affect amalgam. Any sense-making process consisting detecting relevance occur on the basis of the interplay between cognition and affectivity. Their intertwined relationship is not a sort of approximation between two poles, but of merging each other by virtue of the intentional arc of a bodily experience.

5.4.3. Embodied and Enactive Appraisal

Enactivism dissolves the dichotomy between the brain as the locus of mental activity and the body, which has been assumed throughout the history of theories of emotion. From the perspective of cognitivist approaches, emotions are constituted at best as appraisals as a result of cognitive processes and correspondingly bodily components of emotion are reduced to be byproducts of these cognitive processes. In a similar manner, also cognitive processes are limited to intra brainwork from the perspective of cognitivism. In short, both for emotion and cognition a disembodied stance has been maintained. Although some current views on emotion have pushed this disembodied stance to its edges and argued that emotions consists both cognitive processes e.g. evaluation and bodily processes e.g. arousal, they still tend to treat these two as separate components. This separation results in the separation between cognitive processes and bodily events. From this perspective, the body is excluded from the processes of evaluation or sense-making in any case. This can be seen as a sign of that cognitivism is still operating within theories of emotion by imposing its disembodied perspective into their epistemological frameworks. In short, cognitivist theories of emotion do not favour EC. When we consider the perspective of EC, we can say that theoreticians of EC have not embraced the role of emotions in cognitive processes and ignored it as well. Furthermore, also the non-cognitivist theories of

emotion have privileged the role of body in the constitution of emotion and ignore explaining the evaluative and intentional aspects of emotions. On the one hand, cognitivist theories of emotion assert that cognition is an intellectual process based on beliefs, judgments and cognitive evaluations but not a bodily process beyond the brain, and the bodily processes such as physiological arousal and bodily responses are results of these intellectual operations. The reason of why the evaluative processes are not attributed to bodily processes is that they do not have the capacity of conducting reasoning based on what we know about this world. Computational theory of mental activity operates in here too. Let's remember that the meaningful or intentional interaction with the world from the perspective of cognitivism is maintained by representations and manipulation of them. Since what are operated within the cognitive process are bits of information that received objectively, in order for having a subjective valence this information must be interpreted by a cognitive system that does not require bodily feelings in this process of interpretation. Thus, they ignore the constitutive role of the experiential aspects of emotion and so subjective feelings of emotional changes in the body as the awareness of the bodily processes, that is, they ignore affective aspect of emotion. In this picture of emotion, in order to be gained a meaning or its intentional content bodily arousal requires to be interpreted and labelled by cognitive evaluation. However, it is not the body to conduct this act of labelling. Bodily events are defined as detached from the agent's mechanisms responsible for making sense of the world. What gives the subjective or personal aspect of meaning is defined as the appraisal part but not bodily processes, that is, it is assumed that the body cannot constitute the personal significance about the world. Considering the constitution and differentiation of emotions, arousal does not play a role since the necessary and sufficient condition of emotion is cognitive part but not bodily processes. The process of appraisal includes perception, evaluation, memory, attention and planning whereas emotion includes bodily arousal, feeling, action and attentional orientation (Colombetti, 2007b, p.538). These cognitive processes as appraisals are not influenced by bodily events; on the

contrary, they lead to these bodily events as the byproducts of intellectual evaluation processes. This is the disembodied view of emotion. On the other hand, there are also current attempts to reunite cognitive and bodily events in the process of constitution of emotions such as Prinz's theory of emotion as embodied appraisals, which refers to the capacity of the body of tracking meanings in its environment as an example of embodied evaluation. However, the problem with those sorts of theories trying to absorb and eliminate the influence of rejection of the role of the body in emotion is that they also fall into the fallacy of disembodiment of cognition. Megill's view is also another example of this perspective in the sense that emotions are re-embodied by including their bodily aspects through benefiting from Damasio's SMH, yet cognitive processes are not reinterpreted in accordance with EC. The problem here about these approaches is that they still tend to separate bodily constituents of emotion e.g. arousal and behavioural response from the cognitive component as appraisal (Colombetti, 2007a, p.53). Colombetti defines arousal as the activity of the autonomic nervous system, endocrine, somatic processes and also musculoskeletal system as well as facial expressions considering the fact that there is no clear-cut distinction between motor activity (behaviour, action) namely somatic or musculoskeletal processes and visceral (autonomic and endocrine) processes (Colombetti, 2007b, p.531). It is assumed that whereas appraisal takes place in the head, arousal and behaviour take place in the body. It is a cliché to suppose that appraisal operates like a homunculus in the head, which appears in cognitivist tendencies. The arousal-appraisal dichotomy still remains within their theory as a reminiscent of cognitivist separation of cognition and bodily events. The reason of keeping this dichotomy is that they maintain the disembodied understanding of cognition though they have an embodied theory of emotion. Colombetti calls this separation between appraisal and bodily events "corporeal impersonalism", which refers to the tendency to see bodily events as an objective index of emotion, rather than the process of a lived body (Colombetti, 2007b, p.528). The phenomenological interference of enactivism to EC begins in this point that enactivism concerns about

the body as experienced rather than "the body as an object of third-person investigations" (Colombetti, 2007b, p.528). Corporeal impersonalism identify personhood with the faculty of cognitive appraisal whereas they think of the body as an object among other object, which plays a role in the process of appraisal as the evaluation of its environment indirectly. As a cognitivist in his theory of emotion Arnold (1960) defines emotion as personal responses to the environment and for this reason, they must involve a subjective process of interpretation that is appraisal. The system functions in the exact opposite way for cognitivist perspective obviously, that is, they need cognitive evaluation process in order to have subjective interpretation, which is separate and far from bodily events. For the same reason, for them it is the appraisal part that differentiates emotions from each other. This problem of corporeal impersonalism as separating appraisal from bodily events can also be referred to that Megill and Prinz distinguish cognitive judgements from embodied appraisals in the sense that judgements are defined as cognitive appraisals as the products of intellectual activity that leads to bodily states in a linear causality.[22] Colombetti states that this is a kind of replacement of the traditional notion of judgement with appraisal and so re-proposing of an old view in new words (Colombetti, 2007a, p.54). The missing point in embodied appraisal theories is that they do not give up the idea of body as "concomitant" of emotion but not the constitutive ground of it (Colombetti, 2007a, p.55). When you separate appraisal from arousal, and appraisal from action, you treat the body only as a vehicle of transmission of arousal but the source of appraisal. "In order to acquire affective specificity at the personal level, arousal has to be labelled through a process of interpretation of the environment" (Colombetti, 2007b, p.532). It is the appraisal part of the emotion process that provides the personal significance, which is detached from the arousal part. For Colombetti, this split results in the idea that appraisal gives the subjective aspect of emotion though arousal and action are accepted as objective (Colombetti, 2007a, p.55). Megill's suggestion of emotions as a solution of the frame problem explodes

[22] See Prinz, 2004, 74, 98-100 and Megill, 2014; 2003; 2005.

in the point that he still adheres to cognitivist view based on subject-object dichotomy. The separation between subject and object arises from and also deepens the separation between head and body. These two divisions are remainders of cognitivism, which privileges head over the rest of the body in meaning production and see intelligence as the resident of head. As long as the body is seen as a vehicle of transmission of inputs to the head and of outputs from the head, it is not possible to understand and conceptualize how the body contributes to appraisals. The interaction between the head and the body remains as touching of two poles on each other as "making contact" somewhere in the brain. The crucial point is to be able to give an account of this contact, the system behind this contact, the mechanism for interaction. This dissertation argues that if you presume a separation between them, you will need an extra conceptual tool for explaining the nature of this interaction and as long as you assert representations as mediators between these two poles you will always need to explain how the organization of these representations gain their meanings that are always about the real world. How does an objective external world gain its subjective salience within the mechanism of manipulation of these representations? It is not enough to say that yes it is the emotion does the filtering work and emotions involve bodily components. You have to explain how the filtered knowledge is associated with appraisals that are seen as an operation of the cognitive centre. If we accept that emotions or what Husserl calls affective allure contributes to cognition and there is no cognition without affective allure in real experience, we have to explain the mechanism of how this contribution embodied within cognition. Although Megill's view embraces this contribution, his explanation lacks of how appraisal and emotion as separate systems contact. Due to separating bodily events from appraisals his view does not entail embodiment of mind and so his solution for the frame problem fails. His view relies on the idea of Damasio's SMH related to the James-Lange theory of emotion that rejects an understanding of emotion as a conceptualized appraisal or as in the structure of propositional attitude. In this respect, he embraces the somatic theory in the sense that changes in the respiratory

system, circulatory system, digestive system, musculoskeletal system and endocrine system play a causal role directly in the generation of emotion along with neural system. However, contrary to his embodied view of emotion he maintains the idea that cognition necessarily involves representation controlled by the intellectual functions of the brain. The underlying idea of these intellectual functions is that they are in control of the organism itself, that is, it is the organism itself that activates, maintains and manipulates representations. In this point it should be noted that whereas cognition is defined as active, emotions are defined as passive in the sense that emotions are not under control of organisms due to their nature as passive exposures. Since emotions are not cognitive appraisals in terms of that their function is only to detect and register bodily changes bearing on the agent's interests and concerns, these perceptions of bodily changes occur as passive internal processes but not dynamic modes of engagement with the world. Megill defines emotion as the filtering system to sort out the needed information from which is not needed by the organism before the cognitive processes take place. In this point, it seems that Megill describes the filtering system as a fixed and passive permeable surface where information flows and slips over or caught up by the meshes of a sieve. It is the cognitive centre itself behind the filters that actively make bodily feelings gain meaning or intentional content under the control of the organism. According to this, emotions do not have the capacity of constitution of meaning. Yet, that emotions are not fully under our control does not mean that they are entirely passive. "Emotions are not simply a matter of reactivity, but also modes of responsivity that shape subsequent cognitive processing" (Maiese, 2014, p.519). Embodied theory of emotion falls short to solve the frame problem. Mind must be embodied to the full extent for a solution. The relationship between emotion and cognition is not an instrumentally causal one. The reason of this argument can be found within enactivism in the sense that it asserts that emotions are not instrumentally related to cognitive appraisal rather they are directly connected to the active engagement with the environment since the bodily components are not detached from the cognitive

components, they both are embodied in the whole organism simultaneously. It is not that the bodily changes come first and then the appraisal processes come along in order for monitoring these changes. Enactivism asserts that also the bodily changes actively contribute to appraisal processes. Therefore, for enactivism, appraisal is a process that is integrated with arousal in terms of that we appraise the meaning of the world around us through our being embodied and situated in it and through the particular state of my body.

In this point, we can say that the dynamicism as the underlying idea of enactivism challenges these disembodied frameworks via assuming the structural coupling among brain, body and the environment as I presented above. And it provides a framework that allows for recognizing the intimate association between emotion and cognition as well as the foundational role of the body in the constitution of emotion-cognition amalgam. From the perspective of enactivism, emotions can enable us to show how body and mind are integrated by working together in the production of meaningful responses. Emotions do not primarily depend on cognition or bodily phenomena since those are wholly permeated by cognition and feeling simultaneously, that is, they are constitutively related rather than instrumentally related. Their common point is intentionality in the first place in the sense that neither the intentionality of emotions nor the intentionality of cognition can be reduced to intentionality of beliefs, thoughts or judgements, which are based on representations. Both of them cannot be thought without intentionality that finds its ground in the body's intentional arc. Cognition and bodily changes or feelings of these changes mutually constitute each other; hence they are not correlated or associated but inseparable. The sensitivity of an agent to the effects of its environment involves a somatic aspect as well as an intentional content.

> The bodily sensitivity consists in various changes in heart rate, blood pressure, hormones, skin temperature, and the orientation and positioning of the body parts; and the cognitive dimension has to do with appraisal and the apprehension of relevance and significance. For it to be a genuine instance of

> [e.g.] fear, the subject must display the appropriate sort of bodily sensitivity and bodily feelings, and also appraise her surroundings in a way that we would call fear is partially constituted by her undergoing various bodily changes and associated feelings; and these bodily feelings, in turn, are partly a matter of her appraising her surroundings in a particular way (Maiese, 2014, p.523).

The body does not feel of or generate sensitivity to its environment in a vacuum without an intentional directedness and having a low-level mode of appraisal of its surroundings. For enactivism, this is an immanent part of the whole process of appraisal. Bodily changes are in the core of emotional feelings. However, the reason of this is not that emotions are only perceptions of these bodily changes as argued by James-Lange perspective. It is rather that the intentionality of bodily feelings as a part of emotions is not directed primarily at the body or body parts but at the environment in terms of that a particular bodily event is experienced through the process of evaluating the agent's environment (Colombetti, 2007a, p.523; Maiese, 2014, p.523). Thus, emotions must be counted as a bodily sensitivity to what is relevant and significant for the organism. Now we can say that the bodily feelings within emotional experience are our ways of making sense of things in our environment. The bodily feelings contribute to constitution of the sense of personal significance and so they contribute to frame the world for the sake of fulfilling the needs of the organism and adapting its environment. This means that our personal interests, goals and values always inform our bodily feelings or emotional reactions. Hence, our affective being enables us to feel the presence and condition of our body in its relation to our environment whether in a positive "desire-for" or in a negative "desire-against."

> Desire-for and desire-against are experienced by a minded subject in and through her body during moments of attraction or repulsion, and advance or withdrawal. Features of the surrounding world impact or impose themselves upon the body; the subject is touched, affected, and stimulated; and what is experienced matters in some way or another (Maiese, 2014, p.524).

This means that all the arousals affect the body and so its feelings matter to it. For this reason, we can say that bodily arousals are not separated from sense-making processes. In this respect, the way in which the world is disclosed to the agent namely what the agent strives for in action are formed by these bodily feelings. These feelings do also shape memories, that is, memories are also affected by what the agent concerns for. Michelle Maiese calls this process as "affective framing", "whereby we make sense of persons, objects, facts, states of affairs, ourselves, etc." (Maiese, 2014, p.524) Our feelings show us the relevant and significant aspects of the world, thus if we remember enactivist definition of cognition as sense-making through enaction of the world, we can see also that our feelings are integrated with this process of enaction and sense-making.

> The term 'affective framing' is meant to capture the idea that emotions are a matter of active appraisal, and also that bodily affectivity permeates our interpretations and patterns of attention. Affective framing is a spontaneous, non-inferential, and pre-reflective way of discriminating, filtering, and selecting information that allows us to reduce the overwhelming clutter of information to something first-personally manageable and confer upon it specific cognitive significance. As we navigate our way through the world, obviously we do not sequentially process all of the cognitive and practical information that is potentially available to us. Affect operates as the "allure" of consciousness, and implies a "dynamic gestalt or figure-ground structure" whereby some objects emerge into affective prominence, while others become unnoticeable. (Maiese, 2014, p.524; Thompson 2007, p.374 cited in Maiese 2014)

By this way, the idea of affective framing is not a solution for the frame problem but indicates the dissolution of it in the sense that thanks to the capacity of affectivity built-in our bodies the frame problem never arises for living beings. Our bodily feelings determine the cognitive motivation of emotions and so our attention and perception. Hence, our feelings of our bodily changes determine and filter what is important and relevant for processing. Suppose that we do not have feelings or affective framing, in such a case we would face with a huge amount of possible

cognitive options, which is impossible to progress. In such a case, it would be impossible to adapt to our environment and even to survive, that is, we wouldn't detect what is relevant and significant for us, and so make proper decisions in accordance with the given situation. Our affective sensitivity to our environment enables our selective attention on the ground of which particular aspects of our environment become salient for us. In this respect, our cognitive appraisals are always infused with affective allure of things, and so appraisals are structurally intertwined with affections. When the affective frame is shifted, this results in changes in our perceptual framing including how we remember things, how we practically engage with the reasoning, how we relate to things around us in short. We do not represent the world around us in an abstract and detached manner. Rather we are always in a purposeful intertwined relation with it. The attunement in this relationship between my environment and me is provided by my bodily feelings. Since my feelings operating in affective framing are actively constitute the content and the valence of my experience, they are not simply preliminary filters in the service of subsequent cognitive appraisal processes.

It should be noted here that it is not only prefrontal cortex that contributes to affective framing but also the complex network of brain and bodily processes such as metabolic system, endocrine responses, musculoskeletal changes, and cardiovascular responses as pointed out by Damasio. Thus, affective framing should not only be understood as a neural achievement but as whole organism event. The patterns of affective framing are constructed by learning in progress of time, depending on the bodies' embodied interactions with their environment. The organisms develop an affective orientation in time and this determines their way of cognitive engagement with the world particular to their experience. This is why our way of cognitive engagement seems different from aboriginal or indigenous Australians' way of reasoning. These differences are hidden in our affective orientations contrcuted through different ways of embodied interaction with different surroundings, which condition our way of cognitive engagement with the world. There is not only one

way of networking among the brain, the body and the environment, thus there is not only one bodily structure or brain structure out of which we can model mental activity as one type of reasoning as well as there is not only one reality to be experienced presummed by cognitivist percpective. Diveristy in ways of cognitive-affective orientations in the world is guaranteed by the fact that appraisal is both cognitive and also affective at the same time, and appraisal proceeses depend on both the subjective conditions and environemental circumstances. The evidence from empirical research supports the intertwinement of cognition and affection, these can be listed as in the following (Maiese, 2014, p.526):

i. Appraisal results from the intertwinement of cognition and affection. This idea is supported by empricall data in terms of that appraisal systems overlap with arousal systems in the brain (Ciompi 2003).
ii. The cognitive and emotional contribution to executive control are conjointly and equally contribute to the control of thought and behavior, thus they cannot be seperated (Pessoa, 2008).
iii. Emotion is a composition of meaning-generating and adaptive mechanisms rooted in specific neural and endocrine processes, which allow organisms to adapt to life-challeging circumstances (Panksepp, 1998).
iv. The sub-personal processes that underlie appraisal and emotion are a distributed network of self-organizing and mutually influencing brain and bodily processes. Together with the amygdala, bodily arousal and endocrine activity help to maintain an organism's homeostatic equilibrum, enhance attention and prepare the individual for action. "Motor areas of the central nervous system are part of the homeostaitc loop itself" (Stapleton, 2013, 3), (Lewis, 2005).
v. The idea that cognition and emotion are inseperable is supported by the fact that among infants, attention reactions (the immediate focusing of attention on newly appearing stimuli) involve emotions such as interest, fear, and surprise (Ciompi, 2003).
vi. The bodily feelings and sensations signaling an object's salience or relevance assist in perception and object recognition from the very moment that visual stimulation begins. The personal relevance and salience are not computed after an object is already identified, but part of object perception itself. In Barrett and Bar's model, the brain is essentially a prediction engine and we perceive objects through these predictions about the relevance of an object or class of object. This relevance refers to the value of these objects to the agent either generally or at this particular moment in

> time. “This means that rather than perception being a matter of bottom-up processing whre the details are put together stage by stage to ake the whole, the overall prediction, i.e. the gist of the situation, is processed early on, becoming more and more detailed or occurate through the recurrences” (Stapleton, 2013, p.3) ,(Barrett and Bar, 2009).

According to Lewis’ (2005) view that appraisal is both embodied and enactive, appraisal and emotion processes share attentional mechanisms. This means that in the psychological (personal) level these both lead the agent toward what is significant whereas at the neural (subpersonal) level “they include the same brain processes such as activation of the anterior cingulate and orbitofrontal cortex, the amygdala and hippocampus” (Colombetti, 2007b, p.538). Thus, their functions and operations overlap, and so appraisal and emotion are deeply structurally integrated. For Lewis, it is not possible to map emotion and appraisal onto distinct systems in the bodily and brain processes, that is, it is not possible to separate emotional interpretation from cognitive interpretation neither anatomically nor functionally (Lewis, 2005, p.170, 178). The subpersonal processes that entail appraisal and emotion including arousal are distributed over the networks of self-organizing and mutually influencing brain and bodily processes e.g. the amygdala has a role in both appraisal and arousal, which contributes to both planning, attentional orientation, emotional process and arousal (endocrine activity) that orient the homeostatic equilibrium of the body by enhancing attention and getting ready for the action. According to Lewis’ model, what he calls emotional interpretation involves both appraisal and emotion including bodily processes such as arousal, and these two are structurally integrated in virtue of reciprocally constraining processes of positive and negative feedback as self-amplification and self-stabilization respectively (Lewis, 2005, p.175,176). However, it should not be thought that only the brain is in the charge of evaluating the environment and the other parts are only reacting. Rather than being localized only in the brain, this integrated model entails that it is the whole embodied organism that involves in sense-making process as also supported by Freeman’s (2000) model of sensorimotor integration, which is based on the idea

of structurally integration of appraisal and arousal. As I presented above, Freeman's model of sensorimotor integration maintains that this integration is continuously modulated by the amygdala, which is thought to be in charge of detecting relevancy for the organism and decision-making. However, the role of the amygdala is not one that controls the whole process top to bottom in a hierarchical way but in a way that the whole self-organizing process of the organism allows for mutual modulation of one another, which all processes including perception, action and amygdala involve for the sake of organism's viability. This overall modulation entails the integration of appraisal and arousal and enables the process of sense-making to be distributed over the whole network of self-organization. In other words, Lewis maintains that the neural processes (subpersonal) enhancing psychological processes (personal), e.g. perception, feeling, evaluation, are structurally distributed by being open to influences of the complex network of reciprocal interactions. It is not possible to map one-to-one between personal and subpersonal or psychological processes and physical processes; thus, appraisal and emotion cannot be separated by clear-cut distinctions. So to speak, "what Lewis calls perception is not simply a means to an end for action orientation (and vice versa); similarly evaluation is not simply a means to an end for arousal (and vice versa), etc." (Colombetti, 2007b, p.541). Lewis' framework regards as being ambiguous the boundaries between physical processes and psychological processes, between action and perception, between attentional processes and mechanism of organismic self-regulation. In this respect, arousal is defined as belonging to the whole bodily processes distributed over a complex network of brain and bodily processes rather than being limited to only neural events, that is, none of these individually have the responsibility of appraising function. As he explains "the action of neuropeptides and neuromodulators on limbic and cortical structures is mediated by activity in the bodily endocrine system (as well as vice versa), and emotion is mediated by neural and endocrine processes within the individual's body" (Lewis, 2005, p.228; Colombetti, 2007b, p.541). The traditional cognitivist model sees the process of appraisal as a consequence of the physical

processes rather than being constituted by them as enactivism regards. Thus, enactivism suggests that appraisal is not instrumentally connected with the body and its acts; rather it is constitutively integrated with the whole body. As a result, we can say that from this framework relying on neurodynamics the body has a crucial role in evaluation processes. We can say that emotions are defined as cognitive due to their embodied being, and they are embodied because of that they are cognitive. Thus, a proper embodiment thesis entails that the notion of emotion-cognition amalgam depends on being bodily. As empirical evidence has shown, the emotional and cognitive parts of world-directedness cannot be separated in terms of that appraisal matters to whole organism.

Enactivism supports this idea by relying on biological structure of living beings that affective framing is the act of enacting meaning via continuous interaction with the environment on the ground of the capacities of self-organization, autonomy and being a dynamic system. The notion of enaction should be emphasized here in the sense that an organism is not simply exposed to the effects of its environment in a passive way rather participates in the sense-making processes by way of disclosing the world via its embodied being. The sense-making processes based on cognition-emotion amalgam as appraisal are not only a matter of embodied action but also the dynamic bodily engagement with the world. This dynamic relation part should be highlighted here for pointing out the enactive aspect of those sense-making processes, that is, the processes of appraisal are also physically grounded in "organismic processes of self-regulation aimed at sustaining and enhancing adaptive autonomy in the face of perturbing environmental events" (Thompson and Stapleton, 2009, p.27). The basic biological level of living beings determines affective framing composed of cognition-emotion amalgam. The notion of vital significance guarantee the existence of this amalgam on the ground of the living organism's bodily sensitivity to the objects or events in its environment, which are relevant to its own survival and well being. Enactivism suggests that the process of appraisal and bodily feelings are constitutively intertwined due to the fact that

"bodily sensitivity and responsivity are living organism's most basic ways of making sense of and navigating through its surroundings" (Maiese, 2014, p.527). Detecting relevance and significance is both a bodily process and also evaluative at the same time. Affective framing composed of cognition-affection amalgam is a result of our basic biological structure related with survival and adaptivity, which are the basics of autopoietic and autonomic self-regulatory foundations of living organisms. In this respect, autopoiesis is the core element in the construction of self-regulation of living beings, that is, it enables organisms to be capable of sustaining themselves by regulating their inner network of reactions that continuously regenerates the components of the organismic system. This is the condition of the necessity of a continuous process of sense-making so that the organism supplies the autopoietic process with what it needs for the sake of survival. For this reason, the stimuli gain a meaning according to how it is related to the norm of maintenance of the organism's integrity (Thompson, 2007, p.70). The stimuli can relate to this norm positively or negatively, the form of relating is determined by the norm of maintenance as the optimal condition of activity for the sake of realizing equilibrium within its environment. Considering the evolutionary conditions of mechanisms of survival, we can imagine the importance of adaptivity that refers to the tolerance of the organism to the continuous changes around it by actively monitoring perturbations and compensating for them (Thompson, 2007, p.147). The living organisms cognitive beings that have to make sense of their environments thereby their interaction with the environment based on their sensorimotor skills by interpreting the objects and events in terms of their vital significance and relevance for the organisms' well being. Affective framing operates here as the mechanism for detecting relevance and significance under the norm of self-maintenance of the organism. Such kind of low-level occurs spontaneously and below the threshold of awareness. The more sophisticated modes of action and bodily sensitivity are developed, the more sophisticated modes of sense-making and emotional feelings are developed in time. The organism always tries to adjust itself to the environment no matter in which level

or how complex is the surrounding world. In this respect, the affective framing attunes the organism to its surroundings by servicing to detecting relevant and significant features of its environment according to its "specific needs, body size, ways of moving, and current situational factors" (Dreyfus, 2007, p.265). The affective framing focuses our attention and make sense of what is relevant and significant for us even if in a complex social world like ours that requires more than concerning about survival and self-maintenance. I this case, adaptivity may become more important but the basics of framing are applicable in more complex socio-cultural contexts (Maiese, 2014, p.529). Therefore, we can think of emotions as a part of our evolution and our survival in this process, which functions as a synthesizer between continuously changing situations around us and our responses to these situations. Affective Framing equips and keeps alert us about what is relevant and significant for us by making us bodily sensitive to significant and relevant features of the environment. As a result in respect of our organismic life, we can say that emotions are both cognitive and bodily thanks to our biological beings, and the process of appraisal is both emotive and cognitive as a matter of biological fact. By this way of thinking, on the one hand, enactivism provides a framework that eliminates mind-body dichotomy, which discloses itself within appraisal-arousal and appraisal-behaviour dichotomies. On the other hand, it suggests an intertwinement between affectivity and cognition in the constitution of mental life that is structurally motivated toward self-maintenance and self-regulation of the organismic body.

5.5. Enactivist Dissolution of the Frame Problem

In the beginning of this dissertation, I presented the philosophical dimension of the frame problem as a challenging question about the human mind. I presented perceiving the things that are relevant and significant to us for the sake of our viability and well-being instead of perceiving the world in bulk to be the first sign of cognition. I argue that cognitive activity is a process of sense-making. I believe that

we can prove that sense-making and vitalness are the one and the same thing through showing that the vital connection between mind and life. If we recall what Dreyfus and Dennett say about the frame problem, we can see that the working systems and ways of functioning of human mind and intelligent machines that suffer from the frame problem are different in kind. The prominent difference between them is vitalness. If we follow the claim that living beings do not process information, we can see that there is not a difference between human and non-human living beings regarding that they preserve knowledge in their experiences and bodily skills through having biological nature, and transforming what they learn into feedback patterns by repeating learned experience. This is also to re-emphasis on Michael Polanyi's (1958) distinction between tacit knowledge and explicit knowledge by the help of the research in biology and neurodynamics. I felt an urge to make a research on how tacit knowledge, which arises only in action and can never be transformed into explicit knowledge, is processed by the body of a living being. Thus, I claim that the network of relations from which the tacit knowledge emerges is grounded on bodily feedback patterns that enable us to detect relevance and significance. This claim requires developing a holistic point of view about the body. This holistic point of view also requires eliminating the boundaries between cognition and affectivity. By this way, leaning on empirical research I am able to argue that our emotional experience and bodily events are constitutively intertwined with the processes of making sense of the world. This claim is contrary to the approaches based on mind-body distinction that reduces cognition to a process inside the skull. According to this, bodily events play a crucial role in the constitution of emotions contrary to the cognitivist theories of emotion that assert emotions as cognitive processes limited to brain work, and this role is also determinative in our appraisal processes of the world. Due to the embodied nature of cognition, emotions as bodily processes contribute to sense-making processes and function essentially as the mechanism for detecting relevance and significance. In these respects of emotion, we can say that we do not have to solve the frame problem for living beings since they do not suffer

from the frame problem at all unless they have a physiological defect because of a health problem in their body that can cause the frame problem e.g. as for Damasio patient Elliot who suffered from ventromedial frontal lobe damage as a result of tumor and subsequent surgery for removal. The living beings do not suffer from the frame problem if they have a working feedback mechanism in their body that functions properly if we consider the interaction among brain, body and environment. For this reason, the frame problem dissolves for living beings instead of being solved. In this respect, following the direction pointed out by the criticism of AI by Dreyfus and Dennett, I made a research on our biological nature that does not allow the frame problem to arise. According to this research, I come to the point that our appraisals of the world is not a subjective evaluative cognitive process that is limited to our head, and accordingly arousal and behaviours are not objective concomitants of emotion. Enactivism points out the bodily events as constitutive of appraisals by both in structural and phenomenological terms. At this point, we can say that enactivism goes beyond EC, and takes the claim of that the body plays a role in the cognitive processes a step further, and argues that our interaction with the world has an affective dimension as well. This affective dimension is connected to the capacity of self-production, self-regulation and self-maintenance of living beings. Our feelings are also a part of bodily events and they are not merely results of these bodily processes but constituents of sense-making processes about the world. The dissolution of the frame problem depends on that we reunite both mind and body, and cognition and affectivity. In short, the dissolution of the frame problem depends on taking account of the embodied and enactive dimensions of the body including affectivity. These dimensions can only be understood by concerning the immanent purposefulness built-in our bodily being that functions not in the activity of abstract cognition independent from bodily processes but in the driving force of our affective life that is not instrumentally connected to these bodily processes.

The following is the list of the points that shape the enactivist perspective that contributes to the dissolution of the frame problem;

1. The living beings are autonomous agents. This means that they are autonomous beings that generate and maintain their own identity contrary to the intelligent machines that are in need of a programmer to organize and update the flow of input and output. That they continuously generate and maintain their own identity and so being depend on their enaction of their own cognitive domain. This refers to the fact that human mind as being different from a computer does not process the pre-existing knowledge of the external world out there independent from the cognitive system itself. It rather enacts this information in its continuous interaction with the world. In short, the knowledge for living minds arises as a result of this interaction but not of individual functioning of cognition on the ground of the separation between internal and external processes as a result of a realist worldview. The reality is a process that is determined by the structures of both of the two sides of the process of enaction. There is no need for representation as a mediator since such a need arises on the ground of assuming a separation between internal processes and external processes for the sake of an effective objective knowledge of the world. Considering the structural coupling between living systems and their environments, mutually specifying domains are enacted by this coupling relationship.

2. The dynamic system theory tells us that nervous system does not function as a computer through processing information in a computational manner. This is to say that mind does not work as an operating system that is designed in a hierarchical order processing the flow of information in a sequential manner. Seeing mind in this way is to separate perceptive, cognitive and motor function, and to position them in a hierarchical order. In such a framework, perception and motor behavioural parts are seen as a result of evaluation processes performed by cognitive centre and in this case the body becomes the vehicle for transmitting sensory data for an efficient functioning of this cognitive centre. In fact, the scientific framework that enactivism relies on suggest us that nervous system is an autonomous system, that is, its own coherent and meaningful patterns of activity is generated and maintained by its own

activity via its operation as a circular and re-entrant sensorimotor network of interacting neurons.

3. What enactivism calls cognition is an embodied action. The recurrent sensorimotor patterns of perception and action enable the emergence of cognitive structures and processes. It is the sensorimotor coupling between the body and the environment that modulate the formation of endogenous and dynamic patterns of neural activity, which in turn informs this sensorimotor coupling. By this way, enactivism suggests us to see the whole organism as an embodied autonomous system that organizes itself by its own activity and so produces meaning as a result of this autonomous activity.

4. Enactivism involves the phenomenological notion that cognition entails a constitutive relation to its objects in the sense that the world the cognitive agent interacts is not a pre-specified external world that is represented internally by the brain, but a relational domain that is brought forth by the autonomous agent in its coupling with its environment. The world that we perceive is conditioned by the actions of the agent or its active mental engagement with the world. Our bodily structure determines how we perceive or practically handle our environment.

5. It is necessary to take account of subjective experience when we try to understand mind. Subjective experience is not a mere epiphenomenal side product. On the contrary, how we experience the world subjectively determines and constitutes the meaning we produce about this world.

Under the light of these elements, enactivism model shows us how human mind is embodied in whole organism and embedded or situated in the world. The mind is structurally embodied and enactive. The mental process of sense-making including detection of relevance and significance is not a product of intra-head processes and structures, but rather a product of the interaction between brain, body and environment. The meaning is enacted in this process.

According to enactivism, during this process of enaction, the body has at least three main activities; self-regulation, sensorimotor coupling, and reciprocal

interaction with the other bodies in the environment. First, self-regulation of internal body is necessary for the sake of self-maintenance and viability of the organism. Second, sensorimotor coupling appear in perception and action. According to enactivism, there is no extra process of evaluation between perception and action. Perception is action, that is, it is a sort of action. The process of perception is constituted on the ground of tacit knowledge, the intrinsic character of the sensory stimulation is determined by the movements of the body, and its movements are based on skilful knowledge of how sensory stimulation varies as a function of movement (Colombetti, 2007a, p.57). Sensorimotor activity as the way of mastering perception that continuously changes according to action is a skill in which the whole body involves. The disembodied brain cannot have such a skill. In this respect, perception is defined by motor processes rather than by sensory one. "1. Perception consists in perceptually guided action and 2. Cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided" (Varela et al., 1991, p.173). Our capacity to perceive presupposes our ability to orient ourselves in the environment (Colombetti, 2007b, p.530). This idea corresponds to the embodiment thesis within enactivism and also shared by EC, which refers to the fact that in order to have ability one must have a body. Third, reciprocal interaction between bodies corresponds to cognitive and also affective experience of other bodies in the agent's environment. All our background via our sensorimotor skills and also our bodily structure determine how we relate to other bodies and make sense of them and vice versa. According to cognitivist perspective all the processes of sense-making are operated by the brain and limited to these operations. However, enactivism suggests that the brain has a significant role in these three bodily activities but the brain itself is also reciprocally structured and shaped by these processes themselves throughout the life of the organism. Rather than being the centre of all the sense-making processes, the brain is only a part of the meaning generating process of the whole body. It should be noted that the notion of subjectively lived body (*Leib*) has a crucial role within all these processes, that is, to

experience or feel one's own body informs all these activities about the condition of the body so that the body can feel itself situated in the world and tune itself according to what reciprocal interaction with other bodies requires and vice versa. The bodily subjectivity appears in both skilful coping of the body as "I can" and also in feelings of bodily changes as emotions. Hence, according to the enactivist perspective, the mental activity of an agent is defined as deeply connected to this agent's presence and performances, which are embodied and situated, that is, cognition is grounded on the embodied being of the agent and on the organismic processes of self-regulation for the sake of viability as the other dimension of embodiment.

In this picture of embodied and enactive cognition, affects are defined as parts of dynamic feedback re-entrant couplings. This refers to the fact that affective information feeds directly into "the selection and from there into procedural memory, and from there to both gaze control and episodic memory" (Stapleton, 2013, p.3). The role of affects arises in perception, action, anticipation including detecting relevance and significance. Acknowledging this fact will save us from two kinds of Cartesian anxiety; first is about the role of the body as transmitting sensory data about the body itself and the external world to the mind that is claimed to be in charge of evaluation and organizing motor actions. Second one is about, the essential responsibility of this cognitive evaluative mind which is supposed to select, to process and to evaluate sensory information, and thus to tell the body what to do. Cognitivist approaches share a common understanding with Cartesianism; making sense of the world, or evaluating it, is a serious work to the extent that emotions must not interrupt. This sort of understanding ignores the essential constitutively active role of the body in the processes of reasoning. In fact, the body has the capacity of interpreting and involving in the sense-making processes on its own. When we start to think that mind and body are not separated, we have to look closely at the whole body in order to understand how the process of meaning production is generated. In this sense, emotion and cognition should be understood through dwelling on the

whole of the body. Rather than an abstract cognitive evaluation process, the whole body involves in the process of meaning production. Autopoietic and adaptive systems produce whole-organism-generated meaning since what enactivism calls sense-making is produced in bodily cognitive-emotional form. Affectivity is a part of this sense-making process. A bodily cognitive-emotional form of evaluation appeals to every kind of living beings since non-neural body also involves in the sense-making process for enactivism. Thanks to their autopoietic and autonomous character, living beings act according to their concerned point of view that they have established in the process of self-generation which provide the conditions of their survival and the constitution of themselves as unities. The relationship between autopoiesis and organisms' concerned point of view or generation of concerned meaning can be described in Weber and Varela's words as follows;

> The key here is to realize that because there is an individuality that finds itself produced by itself it is ipso facto a locus of sensation and agency, a living impulse always already in relation with its world. There cannot be an individuality which is isolated and folded into itself. There can only be an individuality that copes, relates and couples with the surroundings, and inescapably provides its own world of sense… By defining itself and thereby creating the domains of self and world, the organism creates a perspective which changes the world from a neutral place to an Umwelt [the lived or phenomenal environment, that is, the features of an animal's environment that are salient for the animal itself (Colombetti, 2008, p.5)] that always means something in relation to the organism (Weber & Varela, 2002, pp.117-8).

Thus, we can see that from the perspective of enactivism, the meaning that is produced by the organism is "generated within the system for the system itself", that is, any meaning produced by the organism is generated by the organism itself and at the same time consumed by the system itself (Colombetti, 2008, p.5). However, this does not mean that meaning is isolated from the interaction between the organism and its environment. The system that generates the meaning is autonomous and autopoietic due to its continuous exchange of matter with the environment just to

remind. Thus, the meaning always results from coupling between the organism and the environment, and it is always relational in this sense. Each system has its own way of relating to the environment particular to different couplings with the environment and so different point of views due to their different bodily structures. The particular point of view to each organismic structure emerges within the organism as the organism's concern for its own autopoietic organization and maintaining its identity. Therefore, for enactivism, to be a living being is to condition its own life, and to be concerned about maintaining these conditions. Hence, any living being does not wait to transform an independent neutral world by interpreting it –even transforming the information from this world into representations– and making sense of this world by evaluating it. As soon as it comes into the world, it is directed toward the world as being equipped to maintain its bodily being and life. Its equipment is to act in the direction of its concerned point of view for the sake of the immanent purposefulness of preserving life. We are not born into a world of which we have to make sense of; the embeddedness of our cognition or the processes of sense-making refers to the fact that we come into an already meaningful world. The thing that makes our world or our first encounter with the world already meaningful is our concerned point of view already built-in our bodily being. Reminding Dennett, robots have to gain a point of view since they start from zero point whereas living beings start from plus one in the course of survival. The world for an organism is always its own meaningful world that is the environing world (*Umwelt*). However, there are also grades of meaning that vary from one living form to another, or from one bod to another, or from time to time. The ultimate force to create these variations is the various forms and levels of capacity of adaptivity. The differences between us are determined by the quantitative differences among us in terms of the capacity to adapt the world as well as differences in our bodily structures. The main principle that can be applicable for all living beings is the vital impetus (*élan vital*), which is immanently built-in our bodily beings. This principle underlies intelligence. For the sake of adaptivity, the organism must regulate and monitor itself in terms of its

livability conditions (Di Paolo, 2005). This also requires a concerned point of view. Enactivism sees this condition within the autopoietic structure of the living organism. A living being is always motivated toward preserving its own integrity, which refers to autopoiesis, and to fulfil its preferences, which refers to adaptivity. In this sense, we can say that it is not sufficient to assert the continuation of life to be able to explain the gradual differences in our points of view. The gradations of values vary according to the differences in our capacities of adaptivity. Thus, we make sense of the world not on the ground of all-or-nothing assessments, that is, according to the scale of two poles evaluation system as good or bad, but in virtue of our adaptive capacity that brings forth a graded scale of values, we evaluate the world from within the pool of several values. According to enactivism, what we call cognition broadens *via* the notion of life since we come to understand that it includes all self-producing and self-generating systems. The body is not an interface that serves to cognition. It is rather a cognitive whole that determines values and preferences in virtue of its autopoietic and adaptive systems with its chemical and self-regulatory systems along with its neural networks, which contribute to maintenance of and adaptivity to life. Hence, without taking account of all the constitutive elements of the body we cannot talk about any cognitive activity for living beings. As in Damasio's definition of emotion, which defines emotion as the primary organismic process of self-regulation for the sake of maintain homeostatis, for enactivism, what we call sense-making is something that emerge out of the intertwinement between cognition and emotion aiming at maintaining homeostatis. Our affective being provides us action-guiding values and determines our preferences. Its most fundamental contribution is that it enables us to detect the things that have relevance and significance to us. Emotions are collection of meaning-generating and adaptive systems based on neural and endocrine processes in the sense that, they organize action and behaviour, and even modulate the activity of perceptual systems (Panksepp, 1998). That the values produced by emotions direct preferences, and actions are nested with cognition. Thus, since emotions also serve to self-regulation and adaptive organismic processes,

they are also part of sense-making processes. There is no emotionless cognition, and no emotion without cognition. Affectivity is defined as a sensibility for an agent's own existence. However, it does not mean that it refers to a passive state of being; rather, as I try to explain above, it refers to an active state of being if we consider that a body is affected only when another body, class of bodies or event strikes the agent as meaningful, relevant or salient. Even the simplest living beings such as bacteria are sensitive to what matters to their being, thus all living beings are affective. This means that all living beings have the capacity of realizing the relationship between them and their environment where they are already situated due to their biological nature that enables them to have immanent purposefulness and concern for the sake of preserving their viability. My body detects what is relevant and significant for itself –and even what is good and what is bad for itself that refers to valence of things– according to its immanent purposive nature that enacts what matters to its constitution. This process is not conducted by a disembodied cognitive faculty. My body cares for itself and it enacts meaning –including relevance and significance– under the guidance of its care for its own being. What is relevant for an organism is determined and detected according to its immanent purposefulness and care for itself. The mechanism for performing these two vital features is called affective framing. The affective framing is a sense-making process as a bodily cognitive-emotional form of understanding. If we describe the frame problem as the problem of relevance and recognizing significance, we can say that at the end that affective framing as the low-level mode of appraisal entailing intertwinement between affectivity and cognition is the ultimate reason of the dissolution of the frame problem for the living beings. Thanks to their biological structure, our bodies singles out what matters to them, concerns themselves with what is significant to them spontaneously and automatically without appealing to an extra intellectual evaluation independent and detached from bodily processes. Due to the fact that our framing the world is always infused with affect, our feelings and appraisal processes are always intrinsically intertwined. Our capacity to affectively frame the world is distributed all over the

complex network of our organism, that is, not only over the neural network but also over the metabolic system, endocrine system, musculoskeletal and cardiovascular system. All these systems contribute to sense-making processes in terms of servicing for the immanent purpose of preserving the life of the organism. Therefore, enactivism provides us a broader perspective than cognitivism to conceptualize the frame problem, which is based on the deep continuity between life and sense-making, emotion and life, personal significance and the agent's lived bodily dynamics. Without affective framing, cognition would be directionless and unable to handle huge amount of indifferent information about the world. If we did not regard the intertwined relationship between perception and affective selectivity, it would not even be possible to have a connection to any information about the world, but perhaps only to the fixed features of our environment. In short, without affectivity we cannot even live in a complex and continuously changing world. For a living being, without affectivity, it is not possible to cognize and thus to survive.

CHAPTER 6

CONCLUSIONS

The embodied, enactive appraisal theory of emotion as a non-cognitivist approach suggests that the process of appraisal and affectivity are merged into each other in an embodied way. As Giovanni Colombetti (2010) warns us, even if some embodied theories of emotion seems to be detached from cognitivism since they emphasize on the role of body in the constitution of emotions, they still remain cognitivist by separating cognitive part and bodily dynamics in the process of the constitution of emotions as such in Jesse Prinz's (2004) theory of embodied appraisal and Megill's view of emotion. Yet, when the embodiment thesis is concerned genuinely to the full extent, one can see how these two are intertwined, that is, they cannot be separated. In this respect, I argue that if we show the intertwined structure of affectivity and cognitive processes and at the same time the ways in which they function interdependently, this can provide a definition of sense-making depending on the formulation of brain-body-world interaction. Because, if we accept that emotions with their world-directedness have a bodily basis, and that they involve appraisals not in the sense of cognitivist conception, but rather in the sense of being determined by the intentional nature of body in its interaction with the environment, we have to abandon the traditional definition of cognition necessarily. If emotions have bodily intentionality, and if they are constitutively interdependent with appraisals, then we have to accept that all the sense-making processes involving appraisals about our environment are embodied and affective, and dependent on the interaction between the body and environment. Therefore, the body *via* its affective nature, without necessarily having an object of conscious awareness, recognizes and selects the relevancy around its world, and produces proper responses spontaneously for the

sake of fulfilling its needs to maintain its vitality. The affective processes provide an evidence for understanding that the frame problem has never a problem for living beings contrary to what Megill claims about the solution for the frame problem. Although the solution of the frame problem seems impossible for AI at least for now, it is not a problem at all for all the living beings having a well functioning body. This leads us to consider globally how nature has adopted and established affective and cognitive mechanisms for living beings to detect relevance. In order to have this global point of view, enactivism suggests us to consider the constitution of cognitive and affective capacities from within the definitions of vitality or life. From this point of view, we have to understand how the body generates sense-making within its struggle for survival and maintaining its life. Enactivism's theory of autopoiesis combined with phenomenological approach introduces a radical model of explaining the interdependence of affectivity and cognition and understanding sense-making on the basis of vitality principle without falling into the pitfalls of mind-body and subject-object dualisms. Enactivism places intentionality inherited from phenomenology within the biological dynamics of living organisms. The notion of "autopoiesis" developed by Francisco Varela and Humberto Maturana (1980) explains the purposeful life of all organisms grounded on their bodies' intentionality. The living organisms have natural purposes in the sense that they are autopoietic living systems in terms of their continuous regenerating the conditions of their survival (e.g. they exchange matter with the environment) and their act of establishing the boundary between themselves and the environment. By this way, enactivism argues that they constitute themselves as unities. Enactivism calls this naturally purposeful act as "sense-making" that is a bodily cognitive-emotional form of understanding that belongs to all living systems. For enactivists, any autopoietic system can be considered as a cognitive system in the sense that they are sense-producing and self-generating systems. This sense-making process in the autopoietic adaptive system is conceptualized in terms of the whole-organism-generated meaning in which also the non-neural body is a vehicle of meaning, that is, the body

has a central role in cognitive meaning production processes also thanks to its chemical and self-regulatory dimension. The key point in the idea of autopoiesis is that the living systems necessarily establish a point of view by means of autopoiesis and autonomy. This leads a living system to establish a concerned point of view that generates meaning namely a *concerned meaning-generating perspective*. The meaning in this sense is generated on the basis of the determination of each organism's own structural coupling with its environment. In this respect, meaning is not generated as an isolated entity from this structural coupling relationship; this is why enactivists call this process of sense-making as "enaction", that is, organisms by their self-organizing, autonomous and dynamic systems enact meaning through continuous reciprocal interaction with their environments. Hence, for enactivist, "cognition is not the representation of a pre-given world by a pre-given mind but is rather the enactment of a world and a mind on the basis of a history of the variety of actions that a being in the world performs" (Thompson et al. 1992, p.9). The point of view of each organism is established on the basis of this organism's concern with maintaining its own autopoietic organisation, that is, the organism is necessarily concerned with its own continuation. These are the two aspects of this sense-making process that on the one side, the living system by definition aims at regenerating its own viability conditions and at maintaining its identity, and on the other side, the environment is directly encountered as meaningful by this concerned living system rather than being a neutral entity awaiting to be internally represented and subjected to be evaluated in order to be meaningful as a secondary process.

The affective processes are not different from the cognitive processes as sense-making in the sense that emotions also refer to our capacities to make sense of our environment in virtue of being self-organizing and adaptive organisms. Emotions provide values and induce actions in accordance with these values, which are determined by the self-regulating and adaptive organismic processes of the body. It can be helpful for conceptualizing how emotions function to use Michelle Maiese's the concept of "affective framing" proposed to express how an organism shapes its

world into a meaningful domain via embodied desiderative feelings. The affective framing is the process whereby we interpret persons, objects, facts, state of affairs, ourselves, etc. in terms of embodied desiderative feelings (i.e. feelings of caring). A frame is a cognitive short-cut that people rely on in order to attend to and highlight particular features of their surroundings, and which thereby carves the "starting points" for deliberation, thought, and other cognitive processes (Maiese, 2014, p. 236).

In this respect, affective framing directly refers to the intertwined structure of emotion and cognition in the sense that it involves "a low-level mode of appraisal", which is a spontaneous, automatic, embodied evaluation below the threshold of awareness (Maiese, 2014, p.236). By this appraisal process permeated with affects, the living organisms evaluate their environment for the sake of survival and well-being. This evaluation or appraisal process is based on detecting what matters to the organism and what concerns them, or what of significance to them. The affective framing shows how personal significance and value are connected to one's lived bodily dynamics. Affective framing as a non-intellectual detection system of where to direct the organism's attention in a context is a pretheoretical or prereflective process as Merleau Ponty suggests, which is developed through learning and established on the ground of the organism's life-long embodied interactions with its environment. Enactivists argues that the emergence of this non-intellectual detection system sustained by affectivity cannot be reduced to the function of prefrontal lobe in the brain, that is, affectivity as the valuation system of our body about the environment is not *only* a neural achievement. "Affective framing is best understood as distributed over a complex network of brain and bodily processes, it engages not just neural circuitry, but also metabolic systems, endocrine responses, musculoskeletal changes and cardiovascular responses" (Maiese, 2014, p.237).

Therefore, from the perspective of enactivism, the ability to detect relevance is a biological necessity for an organism's survival and well-being, which seems that any robot cannot have due to its structure following algorithms that allow for

responding only to fixed features of what it has its environment. Thanks to their biological substructure, living organisms can detect what is relevant, which is actually constantly changing in the real time world, so that "the frame problem does not even arise" (Dreyfus, 2007, p.263). In this respect, the embodied, enactive appraisal theory of emotion provides a framework that affectivity, appraisal and feelings are interconnected in a single combined process without falling into the dichotomy of emotion and cognition. From this framework, the philosophical frame problem namely the problem of relevance dissolves due to the immediate capacity of living organisms for detecting relevance and value, or to put it in another way, thanks to our bodily beings in the world with affective and cognitive capacities the frame problem does not ever even arise. In this disseratition, the embodied and enactive understanding of mind is defended for the sake of proving the idea that it is possible to show that there is no emotionless cognition and no emotion without cognition in terms of the meaning-generating role of the body and the intertwinement of emotion and cognition is the only way of the dissolution of the frame problem. Thus, the main argument of this thesis is that The dissolution of the frame problem depends on the recognition of the fact that cognition and emotion are embodied processes, and so sense-making processes for living-beings are results of the interplay between cognition and affectivity, which are intertwined. Enactivist perspective provides us to show how this can be possible.

In order to show the possibility of showing the interplay between emotion and cognition, and how this dissolves the frame problem, the dissertation followed the order of the argumentation below;

First of all, the frame problem is defined from different perspective such as AI, logic, and philosophical one. This dissertation was interested in the philosophical aspect of the problem, and so defined the frame problem as limiting the range of information about the environement so that the cognitive agent can deal with only the relavant aspect of the given situation. Thus, it was defined as the problem of giving account of our ability to produce responds on the basis of the relevant

information in a given situation without considering all the information which is not relevant. The focus of this dissertation was to show that the frame problem couldn't be solved without considering embodied and also embedded being of human body. The underlying idea of being able to show this fact was that the frame problem is applicable for machine intelligence, of which cognitive processes are based on computational and representational structures, but not for living beings. In this respect, under the light of criticisms of Dennett and Dreyfus about AI, the underlying assumptions of representational theory of mind was criticized and it was indicated that the solution for the frame problem can only come from the perspective of a properly embodied system.

Secondly, it was suggested by this dissertation that as a combination of phenomenology and cognitive science EC can be seen as a possible way of dissolving the frame problem. In respect of understanding mind, rationalist traditions and phenomenology are compared and contrasted with regard to the role of the body in conitive processes. Meleau Ponty's philosophy of lived experience and body were suggested as a proper philosophical understanding of intentionality, which is the core point of the frame problem. The notions of "intentional arc" and "getting a maximal grip" came into prominence. According to phenomenology, as an agent acquires skills, those skills are stored not as representations in the mind, but as a bodily readiness to respond to the solicitations of situations in the world. In addition, there is a feedback loop between the body, or the learner, and the perceptual world, which is based on the skills acquired by dealing repeatedly with situations that then require more and more selective responses. In this chapter, this feedback meachanism was suggested as a natural system for solving the frame problem, and it was emphasized that cognition cannot be explained without referring to extra-cerebral structure namely the dynamics of the body and to the fact that the body is embedded in its natural and social environment. Thus, from this perspective, representationalism, computationalism, and cognitivism were rejected.

Thirdly, it is pointed out that EC ignores our emotional life as one of the aspects of our embodied being, which is also one of the nature's ways of dealing with the philosophical frame problem. In this respect, in this chapter, under the light of scientific research it was claimed that emotions are the central mechanism for limiting the range of information that an organism will take into account in an ongoing situation. In order to give backround information about cognitivist tendencies within theories of emotion, cognitivist and non-cognitivist theories of emotion were introduced. Within these theories the embodied appraisal theory of emotion seemed to be a proper way to understand the nature of how emotions are solution for the frame problem, however this chapter of the dissertation showed that this theory fails to solve the frame problem too, since it seperates evaluation and bodily event from each other. The chapter claimed that the dissolution of the frame problem depends on taking account of the embodied and enactive dimensions of the body including affectivity. Dissolution of the frame problem cannot be possible if one relies on the cognitivist understanding of cognition, and of emotion as well. It was shown that Megill's disembodied understanding of cognition is an obstacle for him to provide a genuine solution for the frame problem. The main idea was that the frame problem cannot be solved unless one does not give up the disembodied cognitivist understandings of cognition. Even if one confirms that affective processes are bodily constituted, as long as one's view leans on cognitivism it is not possible to eliminate the emotion-cognition dichotomy as well as mind-body dualism. Since the dissolution of the frame problem requires a proper embodied system, which eliminates the emotion-cognition dichotomy as well as mind-body dualism, enactivist perspective was suggested as the answer for how the frame problems dissolves.

For this aim, in the last part, the enactivist understanding of emotion and cognition was examined and suggested as a solution. It was shown that Enactivism understands emotion and cognition without falling into cognitivism's pitfalls, which are representationalism, formalism and rule-based transformation. It was also

indicated that enactivism argues that living beings do not suffer from the frame problem due to the fact that the structural coupling between the organism and its environment, which is based on co-emergence of the system and the environment, the organism's skilful coping with the environment, and the organism's affective sensitivity to its environment provide the ground of the dissolution of the frame problem. Enactivism mainly suggests that cognition arises in virtue of continuous dynamic interaction between the organism and the environment, that is, we selectively create our environment in virtue of our bodily skills and other bodily capacities such as our affectivity to interact with the world. The organization of a living system is an autonomous system in the sense of generating and sustaining its own activity by enacting its own cognitive domain. In this respect, detecting relevancy and producing meaningful reactions depend on organisms' power to regulate their interactions with the world in the way of transforming the world into a meaningful environment. Things around them do not possess the meaning and value by themselves, rather the organism enact the significance of the things around it through its autonomous dynamics. Thus, the things around the organism do not possess their value or relevancy intrinsically, but rather their significance for the organism appear in their relation to the organism itself. Detecting relevancy and producing meaningful reactions depend on organisms' power to regulate their interactions with the world in the way of transforming the world into a meaningful environment. Organisms in their relation to their environment enact the significance of things around them. This transformation of the world into a meaningful environment is defined as the activity of sense-making for enactivism. Lived experience is central to enactivist approach in the sense that from the autonomy perspective, the intentional structures are defined as emerging in relation to the lived body in the act of perceiving, remembering, imagining and so on. As a result of the whole dissertation, at the end it was claimed that the frame problem dissolves for living beings instead of being solved. Our appraisals of the world are not a subjective evaluative cognitive process that is limited to our head, and accordingly arousal and

behaviours are not objective concomitants of emotion. Affective dimension is connected to the capacity of self-production, self-regulation and self-maintenance of living beings. Thus, since emotions also serve to self-regulation and adaptive organismic processes, they are also part of sense-making processes. There is no emotionless cognition, and no emotion without cognition. Without affectivity we cannot even live in a complex and continuously changing world. For a living being, without affectivity, it is not possible to cognize and thus to survive.

REFERENCES

Anderson, M. L. (2003). Embodied Cognition: A Field Guide. *Artificial Intelligence,* Vol.149, 91-130.

Anderson, M. L. (2007). How to study the mind: An Introduction to Embodied Cognition in F. Santoianni, C. Sabatano (Eds.). *Brain Development in Learning Environments: Embodied and Perceptual Advancements,* 65-82.

Arnold, M. (1960). *Emotion and Personality*, New York: Columbia University Press.

Attar, C. H. & Mu¨ller, M. M. (2012). Selective attention to task-irrelevant emotional distractors is unaffected by the perceptual load associated with a foreground task. *PLoS ONE*, 7(5), e37186.

Barrett, L. F. & Bar, M. (2009). See it with feeling: Affective predictions during object perception. *Philosophical Transactions of the Royal Society*, 364, 1325–1334.

Bartol, J. & Linquist, S. (2015). How do Somatic Markers Feature in Decision Making? *Emotion Review*, vol. 7 no. 1, 81-9.

Bechara, A., H. Damasio & A. Damasio. (2000). Emotion, Decision Making and the Orbitofrontal Cortex. *Cerebral Cortex*, 10 (3), 295-307.

Bechara, A., H. Damasio & A. Damasio. (2003). Role of The Amygdala In Decision-Making. *Annals of the New York Academy of Sciences, vol.* 985, 356-69.

Botzung, A., Rubin, D. C., Miles, A., Cabeza, R., & LaBar, K. S. (2010). Mental hoop diaries: Emotional memories of a college basketball game in rival fans. *The Journal of Neuroscience*, 30, 2130–37.

Broad, C. D. (1954). Emotion and sentiment. *The Journal of Aesthetics and Art Criticism*, *13*(2), 203-214.

Carlson, N. R. (2013). *Physiology of Behavior*. 11th ed. Boston: Pearson.

Carter, S. & Smith-Pasqualini, M.C. (2004). Stronger autonomic response accompanies better learning: a test of Damasio's somatic marker hypothesis. *Cognition and Emotion*, 18 (7), 901-11.

Chalmers, D.J. (1996). *The Conscious Mind: In Search of a Fundamental Theory*. New York: Oxford University Press.

Churchland, P.S., Ramachandran,V.S. & Sjenowski,T.J. (1994). A critique of pure vision. In C. Koch & J. L. Davis (Eds.), *Large-scale neuronal theories of the brain* (23-60). Cambridge, MA: MIT Press.

Ciompi, L. (2003). Reflections on the role of emotions in consciousness and subjectivity, from the perspective of affect-logic. *Consciousness and Emotion*, 4(2), 181–196.

Clark, A. (2008). *Supersizing the Mind: Embodiment, Action, and Cognitive Extension*, Oxford: Oxford University Press.

Cohen N. J. & Eichenbaum H. (1993). *Memory, Amnesia, and the Hippocampal System*, Cambridge MA: MIT Press.

Colombetti, G. (2007a). The Feeling Body: Towards an Enactive Approach to Emotion. In *Developmental Perspectives on Embodiment and Consciousness*, (Eds). W.F. Overton, U. Müller and J. Newman, Erlbaum. 45-68.

Colombetti, G. (2007b). Enactive appraisal. *Phenomenology and the Cognitive Sciences*. 6, 527–546.

Colombetti, G. (2008). Enaction, sense-making and emotion. In Stewart, J., Gapenne, O. & Di Paolo, E. (Eds). *Enaction: Towards a New Paradigm for Cognitive Science.* Cambridge MA: MIT Press.

Cornelius, R. R. (2000). Theoretical Approaches to Emotion. In *Proc. of ISCA Workshop on Speech and Emotion: A Conceptual Framework for Research*. Newcastle, Northern Ireland. 3-10.

Damasio, A. R. (1994). *Descartes' error: emotion, reason, and the human brain*. New York: Grosset/Putnam.

Damasio, A.R. (1999). *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*. New York: Harcourt Brace.

Damasio, A. R. (2000). A second chance for emotion. (Eds) Lane, Richard D & Nadel, Lynn. *Cognitive neuroscience of emotion*. Series in affective science, 12-23. New York, NY, US: Oxford University Press.

Damasio, A.R., Tranel, D. & Damasio, H. (1991). Somatic markers and the guidance of behaviour: theory and preliminary testing. In: Levin, H.S., Eisenberg, H.M., Benton, A.L. (Eds.), *Frontal Lobe Function and Dysfunction*, 217–229. New York: Oxford University Press.

Damasio, A. R. B. J. Everitt & D. Bishop. (1996). The Somatic Marker Hypothesis and the Possible Functions of the Prefrontal Cortex. *Philosophical Transactions: Biological Sciences,* Vol. 351, No. 1346, Executive and Cognitive Functions of the Prefrontal Cortex, 1413-20.

Damasio, A. & H. Damasio. (2006). Minding The Body. *Daedalus*Vol. 135, No. 3, On Body in Mind. 15-22.

De Sousa, R. (1987). *The Rationality of Emotions*. Massachusetts: MIT Press.

Deigh, J. (1994). Cognitivism in the Theory of Emotions. *Ethics*, 104: 824–54.

Dennett, D. (1978). *Brainstorms*, MIT Press.

Dennett, D. (1984). Cognitive Wheels: The Frame Problem of AI. In Hookway, C. (Eds.). Minds, Machines and Evolution, 129-151. Cambridge. Cambridge University Press,

Di Paolo E.A. (2009). Extended life. *Topoi* 28 (1): 9-21.

Di Paolo E.A. (2005). Autopoiesis, adaptivity, teleology, agency. *Phenomenology and the Cognitive Sciences*, 4, 429-452.

Dreyfus, H. (1972). *What Computers Can't Do*, New York: MIT Press.

Dreyfus, H. (1992). *What Computers Still Can't Do: A Critique of Artificial Reason*, MIT Press.

Dreyfus, H. (1998). Intelligence Without Representation, http://www.class.uh.edu/cogsci/dreyfus.html, reached 15.11.2015.

Dreyfus, H. (2007). Why Heideggerian AI failed and how fixing it would require making it more Heideggerian. *Philosophical Psychology*, 20(2), 247–268.

Dreyfus, H. (2008). Why Heideggerian AI Failed and How Fixing It Would Require Making It More Heideggerian. In (Eds.) P.Husbands, O.Holland & M.Wheeler. *The Mechanical Mind in History*, 331–371. MIT Press.

Dunn, B. D., Dalgleish T. & Lawrence A.D. (2006). The somatic marker hypothesis: A critical evaluation. *Neuroscience and Biobehavioral Reviews*, 30, 239–271.

Flanagan, O. (1992). *Consciousness reconsidered*. Cambridge, MA: MIT Press.

Fodor, J. A. (1981). The Mind-Body Problem. *Scientific American*, 244:114-25.

Fodor, J. A. (1975). *The Language of Thought*. Cambridge, Massachusetts: Harvard University Press.

Fodor, J. A. (1983). *The Modularity of Mind*. MIT Press.

Freeman, W. (1999a). *How Brains Make Up Their Minds*. London: Weidenfeld and Nicolson.

Freeman, W. (1999b). Consciousness, Intentionality, and Causality. *Journal of Consciousness Studies*, 6: 143-172.

Freeman, W. (1999c). *How Brains Make Up Their Minds*. London: Weidenfeld and Nicolson.

Freeman, W. (2000). Emotion is essential to all intentional behaviours. In (Eds.) M.D. Lewis and I. Granic *Emotion, Development and Self-organization: Dynamic Systems Approaches to Emotional Development*, 209-235. Cambridge: Cambridge University Press.

Frijda, N. H. (1986). *The Emotions*. Cambridge: Cambridge University Press.

Gallagher, S. (1986). Body Image and Body Schema: a conceptual clarification. *The Journal of Mind and Behavior* 7: 541-554.

Gallagher, S. (2005). *How the Body Shapes the Mind*. Oxford: Oxford University Press.

Glenberg, A. M. (1997). What memory is for. *Behavioral & Brain Sciences*, 20, 1-55.

Griffiths, P. E. (1997). *What Emotions Really Are?* Chicago: The University of Chicago Press.

Goldie, P. (2000). *The Emotions: A Philosophical Exploration*. Oxford: Oxford University Press.

Hayles, N. K. (1999). *How we became posthuman: Virtual bodies in cybernetics, literature, and informatics.* Chicago: University of Chicago Press.

Heidegger, M. (1962 [1927]). *Being and Time*, (Trans.) J. Macquarrie and E. Robinson. Oxford: Basil Blackwell.

Hume, D. (1975). *An Enquiry concerning Human Understanding,* in *Enquiries concerning Human Understanding and concerning the Principles of Morals*, (Eds.) L. A. Selby-Bigge, 3rd ed. revised by P. H. Nidditch. Oxford: Clarendon Press.

Husserl, E. (2001). *Analyses Concerning Passive and Active Synthesis: Lectures on Transcendental Logic*. (Trans.) A.J. Steinbock, Dordrecht: Kluwer Academic Publishers.

Husserl, E. (1989). *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy, Second Book*. (Trans.) R. Rojcewicz and A. Schuwer. Dordrecht: Kluwer Academic Publishers.

Hutto, D. D. & Myin, E. (2012). *Radicalizing Enactivism: Basic Minds without Content.* Cambridge: The MIT Press.

Jackendoff, R. (1987). *Consciousness and the Computational Mind*. Cambridge, MA: MIT Press/A Bradford Book.

James, W. (1884). What is emotion? *Mind, 9*, 188-205.

James, W. (1950). *The Principles of Psychology*, Vol.2. New York: Dover Publications.

Käufer, S. & Chemero A. (2015). *Phenomenology: An Introduction.* Polity Press.

Lakatos, I. (1970). Falsification and the Methodology of Scientific Research Programmes. In (Eds.) Lakatos and Musgrave. *Criticism and the Growth of Knowledge*. Cambridge: Cambridge University Press.

Lakoff, G., & Johnson, M. (1999). *Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought*. New York: Basic Books.

Lakoff, G., & Johnson, M. (1980). *Metaphors We Live By*. Chicago: University of Chicago Press.

Lang P. J., Bradley M. M., & Cuthbert B. N. (1997). Motivated attention: Affect, activation, and action. In R. F. Lang, Simons, Balaban, M. T. (Eds.), *Attention and orienting: Sensory and motivational processes,* 97–135. Hillsdale: NJ: Erlbaum.

Lange, C. (1885). *Om sindsbevaegelser: Et psyko-pysiologisk studies.* Copenhagen: Jacob Lunds.

Lazarus, R. (1991). Cognition and Motivation in Emotion. *American Psychologist*, 46: 362–67.

Lazarus, R S., Averill, J. R, Opton, E. M. Jr. (1970). Toward a cognitive theory of emotions. In Feelings and Emotions, ed. M. Arnold, pp. 207-32. New York: Academic

LeDoux JE. & Hirst W. (1986). *Mind and Brain: Dialogues in Cognitive Neuroscience*, New York: Cambridge University Press.

LeDoux, J. (2003). *Synaptic Self*. New York: Penguin Books.

Lewis, M.D. (2000). Emotional self-organization at three time scales. In (Eds.) M.D. Lewis and I. Granic. *Emotion, Development, and Self-organization: Dynamic*

Systems Approaches to Emotional Development, 37-69. Cambridge: Cambridge University Press.

Lewis, M.D. (2005). Bridging emotion theory and neurobiology through dynamic systems modelling. *Behavioural and Brain Sciences* 28: 169-194.

Lyons, W. E. (1980). *Emotion*. New York: Cambridge University Press.

Panksepp, J. (1998). The periconscious substrates of consciousness: Affective states and the Evolutionary origins of the self. *Journal of Consciousness Studies*, 5(5–6), 566–582.

Pessoa, L. (2008). On the relationship between emotion and cognition. *Nature Reviews Neuroscience,* 9, 148–158.

MacLean, P. (1949). Psychosomatic disease and the visceral brain; recent developments bearing on the Papez theory of emotion. *Psychosomatic Medicine,* 11 (6). 338–53.

McCarthy. J. (1968). Situations, actions and causal laws. In (Eds.) M. Minsky, Semantic Information Processing, 410–417. MIT Press, Cambridge, MA.

McCarthy. J. (1986). Applications of Circumscription to Formalizing Common Sense Knowledge. *Artificial Intelligence*, vol. 26(3), 89–116.

McCarthy, J. & Hayes, P.J. (1969). Some Philosophical Problems from the Standpoint of Artificial Intelligence. In (Eds.) D. Michie and B. Meltzer. *Machine Intelligence 4*, 463–502. Edinburgh University Press.

Maiese, M. (2014). How can emotions be both cognitive and bodily? *Phenomenology and the Cognitive Sciences*, Vol. 13, issue 4: 513–531.

Maiese, M. (2011). *Embodiment, Emotion and Cognition*, Hampshire: Palgrave Macmillan.

Massumi, B. (2002). *Parables For The Virtual: Movement, Affect, Sensation.* Durham &London: Duke University Press.

Maturana, H. R. & Varela, F. J. (1980). Autopoiesis and Cognition: The Realization of the Living, In (Eds.) Cohen, Robert S., and Marx W. Wartofsky. *Boston Studies in the Philosophy of Science* Vol. 42. Dordecht (Holland): D. Reidel Publishing Co.

Maturana, H. R. & Varela, F. J. (1987). *The tree of knowledge: The biological roots of human understanding*. Boston: Shambhala Publications.

Maturana, H. R. & Varela, F. J. (1972). *De Maquinas y Seres Vivos. Una caracterizacion de la organizacion biologica*, Santiago (Chile): Editorial Universitaria.

Maturana, H., Uribe, G., & Frenk, S. (1968). A biological theory of relativistic color coding in the primate retina. *Archivos de biologica y medicina experimentales,* Suplemento No. 1. Santiago.

Maturana, H. (1958). *The fine structure of the optic nerve and tectum of anurans: An electron microscope study*. Unpublished Ph.D. dissertation, Harvard University.

Maturana, H. (1969). The neurophysiology of cognition. In (Eds.) P. Garvin *Cognition: A multipleview*, 3-23). New York: Spartan Books.

Maturana, H. (1980). Biology of Cognition: Biological Computer Laboratory Research Report BCL 9.0. Urbana IL: University of Illinois. In *Autopoiesis and Cognition: The Realization of the Living*, 5-58. Dordecht: D. Reidel Publishing Co.

Megill, J. (2003). What role do the emotions play in cognition? Towards a new alternative to cognitive theories of emotion. *Consciousness & Emotion,* 40. 81-100.

Megill, J. (2005). Easy's Gettin' Harder All The Time: The Computational Theory And Affective States. *Ratio* XVIII. 306-16.

Megill, J. (2014). Emotion, Cognition and Artificial Intelligence. Minds & Machines, 24. 189–99.

Merleau-Ponty, M. (1962). *Phenomenology of Perception*. (Trans.) C. Smith. Routledge & Kegan Paul.

Merleau-Ponty, M. (1963) *The Structure of Behaviour*. (Trans.) Alden Fisher. Boston: Beacon Press.

Merleau-Ponty, M. (1964). Eye and Mind (Trans.) Carleton Dallery. In (Eds.) James Edie. *The Primacy of Perception*, 159-90. Evanston: Northwestern University Press.

Merleau-Ponty, M. (1968). *The Visible and The Invisible*. Evanston: Northwestern University Press.

Minsky, M. (1974). A framework for representing knowledge: Tech. Report 306, *Artificial Intelligence Laboratory*, MIT. http://courses.media.mit.edu/2004spring/mas966/Minsky 1974 Framework for knowledge.pdf reached 22.09.2015

Moors, A. Phoebe C. Ellsworth, Klaus R. Scherer & Nico H. Frijda. (2013). Appraisal Theories of Emotion: State of the Art and Future Development. *Emotion Review*, Vol.5 No.2. 119-124.

Moss, S. (2011). Somatic Marker Hypothesis. In *Sicotests*: http://www.sicotests.com/psyarticle.asp?id=408, reached 09.05.2016.

Noë, A. (2004). *Action In Perception*. Cambridge, MA: MIT Press.

Nussbaum, M. (2004). Emotions as judgements of value and importance. In R. C. Solomon (Eds.). *Thinking about feeling: Contemporary philosophers on emotions*, 183–199. New York: Oxford University Press.

Panksepp, J. (1998). *Affective Neuroscience*. Oxford: Oxford University Press.

Polanyi, Michael. (2002[1958]). *Personal Knowledge: Towards a Post-Critical Philosophy*. London: Routledge.

Prinz, J. (2004a). *Gut Reactions: A Perceptual Theory of Emotion.* New York: Oxford University Press.

Prinz, J. (2004b). Embodied Emotions. In (Eds). Robert Solomon. *Thinking About Feeling,* 44-56. New York: Oxford University Press.

Roseman, I. J. (1984). Cognitive determinants of emotions: A structural theory. In (Eds.) P. Shaver. *Review of Personality and Social Psychology: Vol. 5.* 11–36, (Emotions, relationships, and health). Beverly Hills, CA: Sage.

Rajmohan, V. & Mohandas, E. (2007). The Limbic System. *Indian J Psychiatry*, 49(2). 132–139.

Rizzolatti, G. & L. Craighero. (2004). "The mirror-neuron system". *Annual Review of Neuroscience*, **27** (1): 169–192.

Roseman, I. J., Smith, C. A. (2001). Appraisal Theory. In: K. Scherer, A. Schorr, T. Johnstone (Eds.). *Appraisal Processes in Emotion: Theory, Methods, Research*. Oxford: Oxford University Press.

Rubin, D. C. (2010). Emotion and autobiographical memory: Considerations from posttraumatic stress disorder. *Physics of Life Reviews*, 7. 132–3.

Salmela, M. (2002). The Problem of Affectivity in Cognitive Theories of Emotions. In *Consciousness and Emotion* 3(2): 159-182.

Scherer, K. R. (1999). Appraisal Theory. In T. Dalgleish & M. Power (Eds.), *Handbook of emotion and cognition.* Wiley. pp. 637-63.

Schupp, H. T., Stockburger, J., Codispoti, M., Jungho ̈fer, M., Weike, A. I., & Hamm, A. O. (2007). Selective visual attention to emotion. *The Journal of Neuroscience*, 27(5), 1082–1089.

Sedley, David. 1993. "Chrysippus on psychophysical causality", in Brunschwig and Nussbaum 1993: 313-331.

Shanahan, M.P. (1997). *Solving the Frame Problem: A Mathematical Investigation of the Common Sense Law of Inertia*, MIT Press.

Shanahan, M.P. (2003). The Frame Problem. In *The Macmillan Encyclopedia of Cognitive Science*, ed. L. Nadel, Macmillan, 144–150.

Shanahan, M.P. (2009). The Frame Problem. *The Stanford Encyclopedia of Philosophy.* (Eds.), Edward N. Zalta, http://plato.stanford.edu/archives/win2009/entries/frame-problem/ reached20.11.2015

Shapiro, L. (2007). The Embodied Cognition Research Programme. *Philosophy Compass,*vol 2, 338-46.

Shapiro, L. (2011). *Embodied Cognition*, London and New York: Routledge.

Solomon, R. C. (1993). *The Passions*. *Emotions and the Meaning of Life*. Indianapolis/Cambridge: Hackett Publishing

Solomon, R. C. (1977). The logic of emotion. *Noûs*, *11*, 41–49.

Stapleton, M. (2013). Steps to a Properly Embodied Cognitive Science. *Cognitive Systems Research*, Vol.22-23: 1-11.

Thompson, E. (2007). *Mind in Life: Biology, Phenomenology and The Sciences of Mind*. Cambridge: The Belknap Press of Harvard University Press.

Thompson, E. (1996) The Mindful Body: Embodiment and Cognitive Science. In (Eds.) Michael O'Donovan-Anderson, *The Incorporated Self: Interdisciplinary Perspectives on Embodiment*, 132-45. Lanham, MD: Rowman & Littlefield.

Thompson, E. (2005). Sensorimotor Subjectivity and the Enactive Approach to Experience. *Phenomenology and the Cognitive Sciences* 4: 407-427.

Thompson, E. (2004). Life and mind: From autopoiesis to neurophenomenology A tribute to Francisco Varela. *Phenomenology and the Cognitive Sciences* **3:** 381–398.

Thompson, E. & Stapleton, M. (2009). Making Sense of Sense-Making: Reflections on Enactive and Extended Mind Theories. *Topoi* 28 (1): 23-30.

Thompson, E. Varela F. & Rosch, E. (1992). *The Embodied Mind: Cognitive Science and Human Experience*, Cambridge: MIT Press.

Toscano, A. (2006). Enaction. In (Eds.) John Protevi. New *A Dictionary of Continental Philosophy*. Haven and London: Yale University Press.

Varela, F.J., Thompson, E. & Rosch, E. (1991). *The Embodied Mind: Cognitive Science and Human Experience.* Cambridge MA: MIT Press.

Varela, F., Maturana, H. & Uribe, R. (1974). Autopoiesis: The organization of living systems, its characterization and a model. *Biosystems* 5:187-196.

Varela, F., Thompson, E., & Rosch, E. (1991). *The embodied mind: Cognitive science and human experience*. Cambridge MA: MIT Press.

Varela, F.J. (1979). *Principles Of Biological Autonomy*. New York: Elsevier North Holland.

Varela, F.J. (1987). Laying down a path in walking. In (Eds.) W.Thompson, *Gaia: A way of knowing. Political Implications of The New Biology*, 48-64. Hudson, NY:Lindisfarne Press.

Varela, F.J. (1991). Organism: a meshwork of selfless selves. In (Eds.) Teuber, A. *Organism and The Origin of Self*, 79-107. Dortrecht: Kluwer Academic Publishers.

Varela, F.J. (1997). Patterns of Life: intertwining identity and cognition. *Brain and Cognition* 34:72-87.

Varela, F.J. (2005). At The Source of Time: Valence and the Constitutional Dynamic of Affect. In (Eds.) G. Colombetti and E. Thompson, *Emotion Experience*, 64-81. Thorverton, UK: Imprint Academic.

Ward, D. Roberts, T. & Clark, A. (2011). Knowing What We Can Do: Actions, Intentions and The Construction of Phenomenal Experience, *Synthese*, 181 (3): 375-394.

Weber, A. & Varela, F.J. (2002). Life after Kant: Natural purposes and the autopoietic foundations of biological individuality. *Phenomenology and the Cognitive Sciences* 1, 97-125.

Wheeler, M. (2005). *Reconstructing the Cognitive World: The Next Step*. The MIT Press: Cambridge.

Wilson, A. D. & Golonka, S. (2013). Embodied cognition is not what you think it is. *Frontiers in Psychology*, vol.4, 1-13.

Wilson, M. (2002). Six views of embodied cognition. *Psychonomic Bulletin & Review*, vol.9, 625-36.

Zajonc, R. (1984). On The Primacy of Emotion. *American Psychologist*, 39. 117-123.

Ziemke, T. (2002). What's that Thing Called Embodiment? *Proceedings of the 25th Annual Meeting of The Cognitive Society*, 1305-10.

APPENDICES

A. CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: USLU, Ayşe
Nationality: Turkish (TC)
Date and Place of Birth: 16 April 1984 , ALMANYA
Phone: +90 554 8454225
email: ayuslunna@gmail.com

EDUCATION

Degree	Institution	Year of Graduation
MA	Bilkent University Communication and Design	2011
BS	METU Philosophy	2007

FOREIGN LANGUAGES

Advanced English

PUBLICATIONS

Uslu Ö. Ayşe, 2016, **"**Zihin-Beden Ayrımına Dayanan Duygu Felsefelerinden Olası Bir Çıkış Yolu Olarak Bedenlenmiş-Enaktif Duygu Anlayışı", ***Felsefe Dünyası***, Sayı: 64.

Uslu Ö. Ayşe, 2016, "Göstermeyen Semiyotikler ve Toplumsallığın İnşası", **Mimar Sinan Güzel Sanatlar Üniversitesi Sosyal Bilimler Dergisi,** Sayı:15.

Uslu Ö. Ayşe, 2016, "Sosyal Bilimlerde Duygulanımsal Dönüşün Felsefi Arka Planından Bakarak Duygulanımı Anlamak**",** ***Ethos: Felsefe ve Toplumsal Bilimlerde Diyaloglar***, Sayı 9**.**

Uslu Ö. Ayşe, 2016, "Hafıza ve Geçmişin Talebi Olarak Tarih Arasındaki Ayrım", ***Vira Verita Disiplinlerarası Düşünce Dergisi***, Sayı 3.

Uslu Ö. Ayşe, 2015, "Bir Beden Neler Yapabilir? Sorusunun Biyoetiksel Yankıması ya da Ölüm ve Yaşam Üzerine Felsefi Bir Soruşturma", ***Türkiye Biyoetik Dergisi,***

Sayı 2, Cilt 2, 90-103.

Uslu Ö. Ayşe, 2015, "İnsanlar, Hayvanlar ve Taşlar: Spinoza'nın Bireyleşme Felsefesinde İnsan Olan ve İnsan Olmayanın İlişkisi" ***Cogito Düşünce Dergisi***, Sayı 80. Mart, YKY.

Uslu Ö. Ayşe, 2014, "Ulus Baker ve Hissedilebilir Filmler Yapmak" ***Teorik Bakış Toplumbilim Dergisi*** Vol. 6, January, Sel Yayıncılık.

Uslu Ö. Ayşe, 2013, (çeviri) "Kantian Ethics and Human Rights" Johannes Fritsche tarafından, ***Cogito Düşünce Dergisi***, sayı. 74, Politika Felsefesi, YKY.

Uslu Ö. Ayşe, 2012, "A Story of a Craftsman", Photo-Essay, ***Zezine Online Journal of Culture***.

Uslu Ö. Ayşe, 2012, "Kurtlara Yem Olan Kadınlar", ***Amargi,*** Sayı 26**,** Mart.

Uslu Ö. Ayşe, 2012, "Ulus Baker ve Belgesel Sinema'da Gerçeklik", ***Duvar Sanat, Politika ve Edebiyat Dergisi***, sayı 2.

BOOK CHAPTERS

Uslu Ö. Ayşe, 2016, "Vide(affecti)o Action and Capturing Time", ***Autonomous Archiving*** içinde, ed. Artıkişler Collective, Barcelona: DPR.

Uslu Ö. Ayşe, 2014, "Ruhsal Bir Otomaton Olarak Sinema" ***Günümüzü Felsefe ile Düşünmek*** *içinde,* ed. Bahadır Gülşen and Erhan Bozkurt, Ege Üniversitesi Yayınları.

Uslu Ö. Ayşe, 2013, "Sinemayı Sinemasız Düşünmek" ***Göçebe Düşünmek*** içinde, ed. Ahmet Murat Aytaç ve Mustafa Demirtaş, Metis Yayınları.

Uslu Ö. Ayşe, 2012, "What is Video-essay*?"*, **ArtUP Media Art Project Book** (Bulgaria, Greece,Turkey), Goethe Institute, Ankara.

PRESENTATIONS

2016, (Fuat Oğuz ve Hasan Çağatay ile birlikte), "Tacit Knowing, Bodily Embodiment and Spontaneous Order: A Discussion on the Philosophical Roots of Rule-following and Pattern Recognition", *WINIR* (World Interdisciplinary Network for Institutional Research), USA.

2016, "Tarihsel Maddecilik ve Yeni Maddecilik Ayrımı Bağlamında Bedeni Anlamak", 5. Feminist Forum, Ankara.

2013, “On The Conception of Time: Towards a Possible Non-Representational Theory”, Representation and its Discontents International Conference, İstanbul Üniversitesi, İstanbul.

2011, “Whose story is it?: Visual Ethnography and Ethical Experience in The Field”, Documentarist (International Documentary Film festival). İstanbul.

PROJECTS

2014-2016 Teoriden Praksise Felsefenin Gündelikte Yeri Ve İfadesi Bilimsel Araştırma Projesi (BAP), ODTÜ.

2009-2010 *Kırsal Avrupa’yı Derinden Anlamaya Doğru,* Avrupa Birliği Uluslararası (Hollanda, Fransa, Türkiye) Ortak Sivil Diyalog Programı Çerçevesinde Görsel Antropoloji Projesi, Bilkent Üniversitesi.

B. TURKISH SUMMARY

DUYGU VE BİLİŞİN BEDENLENMİŞ VE ENAKTİF İÇ İÇELİĞİ PERSPEKTİFİNDEN ÇERÇEVE PROBLEMİNİN ORTADAN KALKMASI

Bu tez, bedenin anlam üretimine katkısı bakımından duyguların yokluğunda bilişin, bilişin yokluğunda duygunun oluşmadığını göstermenin imkanını sorgulamayı, ve eğer bunun olanağını göstermek mümkünse, bu durumun Çerçeve Problemini aşmaya nasıl katkıda bulunduğu incelemeyi amaçlar. Tezin ana argümanı, Çerçeve Probleminin ortadan kalkışının, bilişin ve duygunun bedenlenmiş süreçler olduğu ve yaşayan canlılar için anlam üretim süreçlerinin iç içe girmiş olan bilişsellik ve duygulanımsallığın arasındaki karşılıklı etkileşimi sonucu olduğu gerçeğinin kabulüne bağlı olduğudur. Bu bakımdan bu tez, biliş ve duyguyu bedenlenmemiş süreçler olarak kabul eden, buna bağlı olarak da biliş-duygu ikiliğini öne süren bilişselci yaklaşımları eleştirmektedir. Çünkü, biliş ve duyguyu konusunda bedenlenmemişliğe ve bunların ayrılığı fikrine dayalı hiç bir yaklaşım, Çerçeve Probleminin yaşayan varlıklar için nasıl bir problem olmaktan çıkmış olduğunu açıklayamaz. Aşağıdaki yazı, tezin argümantasyon sırasını takip ederek, problemleri ve bunlara önerilen çözümleri ana hatlarıyla ortaya koymaktadır.

Tezin birinci bölümünde öncelikle ana sorun olarak ele alınan literatürde "Çerçeve Problemi" denilen problem tanıtılmaktadır. Çerçeve Problemi, temel olarak mantıkçıların ve AI çalışmalarının ilgilendiği bir sorundur. Basitçe şöyle açıklanabilir: bir robot inşa ettiğinizi düşünün. Bir program geliştiriyorsunuz, bu program gerçek dünyada robotun deneyim alanında elde ettiği bilgileri değerlendirip, duruma uygun tepkiler verebilmesini sağlamalıdır. Girdiler öyle bir şekilde değerlendirilmelidir ki, robotun her edimi, yani çıktısı, deneyim alanında neyi değiştirecek, neyi değişmeden bırakacak bunun hesaplanması önceden yapılabilmelidir. Böylece, robot ortamdaki verili durumun içinde neye yönelmesi

gerektiğini bilebilsin. Bir durumdan sakınması mı gerekli, bu durumda kaçmak için gerekli bilgiye sahip olmalı, örneğin odada kaçması gerektiği şeyin ne olduğunu tespit edebilmesi için, yani doğru seçimler yapabilmesi için kaçması gerektiği şeyin bilgisi robotta olmalıdır. Fakat odada bu hesaba katılması gereken yüzlerce değişken vardır, ve kaçma görevini yerini getirmesi için, ediminin sonucunda odada değişmeden kalacak olan şeylerin de hesaba katılması gerekir. Bu bağlamda Çerçeve Problemi şöyle tanımlanabilir: devam eden bir durum içindeyken, durumla açık olarak ilgisi olmayan bütün şeyleri dikkate almadan, aksine sadece devam eden durumla ilgili olan şeyleri hesaba katarak seçimler yapma ve karar verme yetimizi nasıl açıklayabiliriz? Bir edimimizin sonuçlarını çıkarsamak için gerkli olan akıl yürütmenin kapsamını nasıl daraltırız ya da daraltmak mümkün müdür? Kısaca, içinde bulunduğumuz durumla alakalı olan nesneleri ya da olayları, durumla alakalı olmayanlardan nasıl ayırt edip, eleriz?

Gerçek dünyada biliriz ki, bizler edimlerimizin sonuçlarını ve aynı zamanda edimimizin sonuçlarına bağlı gelişmeyen durumların hesaplamasını tekdüze, dizgesel bir akıl yürütmeyle yapmayız. Riskler alırız, sonuçlara atlarız, kısaca zihinsel çıkarımsal bir işlemin sonucu olarak ortaya çıkmaz edimlerimiz. Biz insanlar, çıkarımsal mantıkla temsil etmesi çok güç, daha çok sağduyuya benzer bir bilgiyle hareket ederiz. Çünkü, biraz düşünürsek şunu söyleyebiliriz ki, eğer edimlerimizin sonucunda değişecek şeyler kadar değişmeden kalacak şeyleri de bir hesaplama sürecine tabi tutarsak, bu durumda değerlendirmeden geçirmemiz gereken çok yüklü bir veri yığınıyla baş başa kalırız. Sürekli değişen, karmaşık bir dünyada, gerçek deneyimin içinde, bu büyük bilgi yığınları karşısında başımıza gelmesi muhtemel en büyük şey sistemimizin kilitlenip, hareket edememesidir. Bizim hafızamızın sanki, içinde bulunduğumuz durumların içinde bizimle alakalı olan şeyleri, durumumuzla alakalı olmayan şeylerden doğal olarak, biz farkına varmadan ayırıyor gibi göründüğünü söyleyebiliriz. İşte, felsefeciler literatürde Çerçeve Problemiyle ilgili olarak, problemin ilgililikle ilgili boyutuna dikkatimizi çekerler. Daniel Dennett (1984) bu proble-min bizi en çok ilgilendirecek yanının, tam da bir durumun

değerlendirilmesinde, neyin bu değerlendirmeyle alakalı neyin alakasız olduğunu ayırt etmenin kendisinin olduğunu belirtir. Biraz düşünürsek bunu kolaylıkla kavrayabiliriz, akıl yürütmeleri-mizde ancak bizimle alakalı olan şeyleri ayırt etmek, aynı zamanda alakalı olmayan şeyleri dışarıda bırakmaktır. Benim edimimin amaçlarıyla alakasız, bağlantısız olan şey, edimimin amacının nihayetinde değiştirmeden bırakacağı şeydir. AI'ın mantıksal problemi, bunu ayırt edecek sistemi mantıksal bir dilde temsil edebilmeyi sağlayıp sağlayamamakla ilgiliyken, genel olarak felsefenin ve epistemolojinin bakış açısından problem, deneyim alanımızda bizimle ilgili ve bizim için önemli olan şeylerin nasıl ayırt edildiği üzerine düşünmek gibi çok daha geniş bir tartışmaya gönderme yapmaktadır. Bu meseleye aynı zamanda yönelimsellik problemi olarak da bakılabilir. Dünyayla olan etkileşimimizde bizi ilgilendirmeyen değil de bizimle bir şekilde alakalı olan şeyleri ve olayları diğer her şeyden bağımsız olarak nasıl ayırt ederek onlara yöneliriz? Yönelimselliğimiz pratik olarak hayatta kalabilmemizi ve içinde bulunduğumuz durumlara göre uygun tepkiler üretebilmemizi sağlar. Dünyaya dair karmaşık bir bilgi ve nesnler yığını içinden anlamlı bir dünya algısı nasıl doğmaktadır? Yönelimselliğimizin nasıl meydana geldiğini açıklamak bu soruya evrilecek yanıtta yatar. Bu bakımdan, kısaca Çerçeve Problemini bir organizmanın yaşamsallığının devamı ve iyiliği için hesaba katması gereken bilginin kapsamını daraltması, sınırlandırması problemi olarak tanımlayabiliriz.

Bu soruya verilecek olası yanıtları hesaba kattığımızda iki türden eğilimin var olduğu söylenebilmektedir. Bir tarafta, zihinsel etkinlikten ya da bilişsel faaliyetten temsil-lerin değişikliğe uğratılmasını anlayan "temsiliyetçi" görüşün, düşünmeyi girdilerin anlamlandırılmasından sonra bu değerlendirme sürecinin ürünü olarak anlamlı çıktıların yani tepkilerin oluşturulması olarak anlayarak çerçeve problemini çözmeye çalışan yaklaşımı vardır. Diğer tarafta ise, bilişsel faaliyetin temsillere bağlı olmadan bedenin çevreyle etkileşiminin ve etkileşim tamalinde kurulan duyusalmotor bedensel yetiler aracılığıyla belirlendiği görüşünü savunan temsil karşıtı görüşlerin olduğu söylenebilir. Bu bağlamda, AI'ın temsile dayalı bilişsel

faaliyet açıklamasını eleştiren Hubert Dreyfus (1972) bize şunu hatırlatır; Çerçeve Problemi akıllı varlıkların, bağlama endeksli olarak onlarla alakalı (context-dependent relevance) şeylere karşı nasıl duyarlı olduklarını anlama meselesidir. Ona göre, Çerçeve Problemi bizim gibi biyolojik varlıkların değil, bilişsel süreçleri temsille yönlendirilen varlıkların problemidir. Bu nedenle, Çerçeve Probleminin çözümünün, biliş ve zeka konusunda temsiliyetçiliğin aşılmasına bağlı olduğunu belirtir. Çerçeve Problemin, yaşayan canlılar için değil ama ancak bilgisayımsal ve temsili yapılara dayalı makina zekası için geçerli olduğu söylenebilir. Dreyfus, bilişin bir tür bilgi işlem süreci olduğunu ve genel olarak zekanın beli kurallar altında sembollerin değişikliğe uğratılmasına dayandığını savunan AI'ı eleştirir. Bu eleştirisi, kendisinin AI temellerini oluşturduğunu iddia ettiği dört ana ön varsayımın çürütülmesine bağlıdır; biyolojik varsayım, psikolojik varsayım, epistemolojik varsayım, ve ontolojik varsayım. Biyolojik varsayım şunu iddia eder; beyin ve bilgisayar aynı biçimde işlev gösterir, yani nörofizyolojik seviyede beyindeki nöronların, dijital bir bilgisayarın sıfır ve bir temelinde işlediği gibi, hep ya da hiç atışlarıyla ateşlediği iddia edilmektedir. Psikolojik varsayıma göre ise, insan zekası belli kurallar altında sembollerin değişikliğe uğratılma sürecidir. Epistemolojik varsayım, tüm bilgimizin formulize edilebileceğini söyler, yani gerçeklik hakkında bildiğimiz her şeyi bağlamdan bağımsız biçimsel kurallarda ifade edebiliriz. Son olarak, ontolojik varsayım bize, insanlar tarafından bilinen gerçekliğin, birbirinden bağımsız şekilde varolan nesnel atomic gerçekler ya da unsurlar olarak formulize edilebileceğini söyler. Kısaca Dreyfus şu varsayımlara karşıdır; 1. nörofizyolojik seviyede beynin ve bilgisayarın işleme mekanizmaları aynıdır. 2. İnsan zekası, belli kurallar altında sembollerin manipülasyonu işlemidir. 3. Gerçeklik hakkında sahip olduğumuz bilgiler, bağlamdan-bağımsız biçimsel kurallarla ifade edilebilir. 4. İnsanların sahip oldukları bilgiler, nesnel atomik gerçeklik parçaları yani atomik bilgi birimleri olarak formüle edilebilir. Dreyfus' göre, eğer genel olarak zekayı içsel kuralların yönettiği içsel sembollerin değişikliğe uğratılması olarak anlarsak, öyle görünüyor ki, insan zekasının ürünü olan insan davranışlarını bağlamdan azade

olarak nitelendirebiliriz. Bu temel fikir ışığında Dreyfus bu dört varsayımı sırasıyla şöyle çürütür; birincisi beyindeki nöronların nasıl ateşlediği ve ne zaman ateşlediği dijital bir süreç olarak değil, analog bir süreç olarak anlaşılmalıdır. Nöronlar çoklu olasılıklar üzerinden hareket ederler, ikili bir sistem üzerinden değil. Beynin bilgiyi işlediğini varsaysak bile, bu sürecin global bir süreç olduğunu söylemek zorundayız. Her bilgi birimine bir sembol tayin etme şeklinde, bir ya da sıfır mantığına dayalı şekilde işlemez beyin. Nöronlar sırayla/arka arkaya gelerek işlemez. Bilgisayardaki dizgesellik yoktur orada. Nöronların hareketi, devamlı, eş zamanlı ve birbirleri arasındaki etkileşim sayesinde kurulur. İkincisi, insan zekasının araştırma, sınıflandırma, hesaplama ve dijital bilgisayarların yaptığı gibi nötr olarak birbirinden ayrı bilgi parçalarını depolama yoluyla işlediğine dair bilimsel bir kanıt yoktur. Üçüncüsü, insan bilgisinin dilsel inşalar gibi atomik gerçeklere ayrılması imkansızdır. Gündelik bilgimizi ele alırsak, onun her zaman bağlama-tabi bilgiler üzerine kurulu olduğunu anlayabiliriz. Sonuncu olarak, fenomenolojik olarak, insanlar fiziksel dünyayı doğrudan algılarlar. Anlamlı bir dünyada anlamlı tepkiler üretmek için, kuralların ve sistemlerin dünyanın birleştirilmiş bir resmini sunarak aracılık etmesine ihtiyaç yoktur. Yani, insanlar bilgisayarlardan farklı olarak fiziksel dünyayı doğrudan algılarlar, arabulucu olarak kurallara ya da sistemlere ihtiyaç duymazlar. Anlamlı bir dünyada edimde bulunmak adına, dünyanın bütünleşik bir algısını üretmek için temsiller gibi ara yüzlere ihtiyaç duymazlar. Buna göre, bilişselliği temsillerden bağımsız bir şekilde anlamaya çalışırsak, insanların neden Çerçeve Probleminden muzdarip olmadığını anlayabiliriz. İnsanlar sağlıklı bir biyofizyolojik yapıya sahip oldukları sürece, insan zekasının bedenlenmiş ve konumlanmış (embeded) doğası gereği dünyayı çerçeveleme, yani kendileri için alakalı ve önemli olan şeyleri ayırt etmekte sorun yaşamazlar. Dreyfus, temsillere dayanmayan bir bilişsellik anlayışının neden insanların Çerçeve Problemini deneyimlemediklerini ortaya koyabilceğini öne surer. İnsanlar Çerçeve Probleminden dolayı acı çekmezler, çünkü insan zekası bedenlenmiş ve konumlanmış bir doğaya sahiptir. Temel olarak, bağlamdan-azade temsillerle işleyen

zeki sistemlerle, içkin manada bağlama-duyarlı doğal sistemlerin zekası arasında, dünyayı çerçeveleme yolları bakımından bir fark ortaya koyulur. Bu fark, yaşayan canlıların biyolojik temelli bedenlenmiş doğalarında yatar. Dennett, yaşayan sistemlerin, bağlama-tabi bir çevrede çerçeveleme sürecini belirleyen biyolojik bir yapıya sahip olduklarını iddia eder. Bu sistem canlıların içkin manada kendi doğaları gereği bağlama-duyarlı olduklarını söyler. Bu iddiaların bedenlenmiş biliş (embodied cognition) alanı tarafından ciddiye alınarak geliştirilip sistemli bir bilimsel çerçeveye kavuşturulmuştur.

Peki, insanları robotlardan ayıran bu "bedenlenmiş biliş" ne mene bir şeydir. EC (bedenlenmiş biliş), bilişsel bilimler içinde kendine geniş bir literatür kazanmış bir alandır. Fenomenolojiden yararlandığı kadar emprik bilimlerin araştırma verilerinden de yararlanıyor. EC diyor ki, dünyayı anlamlı bir şekilde çerçeveleyerek algılamamı-zın ve uygun tepkiler üretmemizin koşulu, sadece beyin içi bir sürece indirgene-meyecek olan, bedenimizin tamamını ilgilendiren ve ayrıca bedenimizin çevreyle girdiği sürekli etkileşime dayanan bir bilişsel sürece sahip olmamızdır. Edimlerimizi şekillendiren yönelimsel bir kanal içinden dünyayı algılarız ve bu yönelimselliği kuran bedenimizin dünyayla girdiği karşılıklı uyumluluk ilişkisi ve bu ilişkiyi modüle etmeye yarayan bedensel yeterliliklerimizdir. Beden genel olarak yetileri sayesinde iki tür aktivite içindedir; birincisi yönelimsel kanallar inşa etmek, ikincisi azami bir duruma hakim olma durumuna ulaşarak dünyayla karşılıklı bir denge kurmak. Bilişselci ve bilgisayımsal zihin modeline göre, action ve perception arasına temsiller ve bu temsillerin anlamlandırılması süreci girerken, zihnin görevi üçüncü bir katılımcı olarak algı ve edim arasındaki sıralı ilişkiyi kurmaktır. Bu ilişkinin bir takım, biçimlere ve kurallara göre işlediği varsayılır. Semboller, birbirinden ayrı, belirlenebilir içsel durumlardır. Bunlar semboller olduğu için, kural temelli dönü-şümlerini belirleyen temel anlamları değil, sembollerin biçimleri olur (mantıktaki gibi). Bu bizi bir tür, biçimsel soyutluğa çıkaracaktır. Sembolün anlam kazanması nasıl gerçekleşir? Sorumuz bu. Bilişselcilik, bir bilişsel durumdan bir diğerine geçişi sağlayacak olan kurallara ihtiyacımız olduğunu söyleyecektir. Oysa,

frame problemin çözümü içeriğe duyarlı bir işletimi açıklamakla alakalıdır. Buna göre EC bize, bu düşünme biçiminden tamamıyla kurtulmayı önerir. Buna göre, bilişsel aktivite beynin ötesinde bedensel yetilerimize dayalı kurulur. Bilişsellik, bedenli olmaklığımıza bağlı olarak sensory-motor yetilerimiz ve bu yetilerin biyolojik, psikolojik ve kültürel bağlamlarda konumlanmış olmamızla belirlenir. Birey ve dünya arasında bir feedback sistemi olduğu fikri hem felsefece hem de bilimsel olarak ileri sürülür. Biliş tüm bedenimizde hem nedensel olarak hem de fizyolojik olarak bedenlenmiştir. Bilişsel süreçler gerçek zamanlı beden ve çevre eşleşmesinin ürünüdür. bu etkileşim amaç-yönelimlidir (goal-directed). Bu etkileşimler bedensel yetilerimizin gelişimini belirler. Yani kısaca, bilişsellik, bilişselci görüşlerin savunduğu gibi bi bilgi işleme sürecine değil, çevre ve bedenin bütünü arasındaki uyumlanma ilişkisinin ürünü olarak bedende örtük olarak saklanan bilginin eylem içinde ortaya çıkması olarak anlaşılır. Bu durumda gerçeklik, düşünen zihinden bağımsız, bağlamsız ortaya çıkan bir şey değil, ancak bu etkileşimle aktive olan, açığa çıkarılan bir şey olacaktır. Bu anlamda rasyonalist gelenek ile phenomenolojik yaklaşım arasında fark vardır; rasyonalist gelenek bedenin yani beyin ve beynin haricinde geriye kalan kısmının da bilişsel süreçte ve genel olarak insan deneyiminde oynadığı rolü görmezden gelir. Bu görmezden gelmenin basilica nedeni, beyni bir bilgisayar olarak kabul etmek ve bir program olarak zihnin beyindeki etkinliklerin control eden gücü olarak anlaşılmasıdır. Beden, rasyonalist gelenekte tıpkı klavye ya da monitörler gibi duyu verilerinin aktarımı görevini üstlenen taşıyıcı olmaya indirgenmiştir. Merlau Ponty'e göre bir birey bedensel yetiler kazanır ve bu yetiler zihindeki temsiller olarak değil, dünyada bizi kendine çeken durumlara tepki vermeye hazır olma olarak bedende tutulur. Bu tutulmayı sağlayan, Merleau Ponty'nin de bahsettiği, beden ya da öğrenici ve algısal dünya arasındaki geribildirimsel döngüdür. Bu döngü, sürekli olarak dünyayla başetmelerimizin tekrar etmesine bağlı olarak gelişen yetilerimiz ve bu yetiler sayesinde tepkilerimizin her geçen gün daha seçici hale gelmesiyle tanımlanır. Merleau Ponty, bu geri bildirim sisteminin çevre ve eylemimiz arasındaki dairesel ilişkiye bağlı olarak geliştiğini

belirtir; organizma ve çevresi arasındaki ilişkiler lineer bir nedensellikte değil, dairesel bir nedensellik ilişkisinde gelişir. EC bize, beyin hücrelerinin ötesindeki bedensel dinamiklere ve aynı zamanda bedenin doğal ve toplumsal çevresinde konumlandırılmış doğasına gönderme yapmadığımız sürece bilişin açıklanamayacağı fikrini önerir. Bu anlamda, EC temsiliyetçiliği, bilgisayımsalcılığı ve bilişselciliğe reddeder. Temsiliyetçilik, algı ve edim arasına akıl tarafından kurulan bir boşluk yerleştirir. Akıl ya da zihin algı ve edim arasında, algıyı akla dönüştüren, bu ikisinin ard ardalığını düzenleyen üçüncü bir katılımcı işlevi görür. Bu boşluk Kartezyen yaklaşımın önerdiği temsiller tarafından doldurulur. Önden verili bir dünya ile bilişsel aktivite arasındaki ilişkiyi kuran işte bu temsillerdir. Diğer yandan, bilişselcilik üç temel prensibini biliş anlayışlarına dayatır; temsil, biçimcilik ve kural tabanlı dönüşüm. Beyindeki semboller, belirli zihn durumlarının yerime geçen ayrı ve açıkça belirlenebilir içsel durumlardır. Tıpkı modern mantıkta olduğu gibi, bu sembollerin birbirlerine kural tabanlı dönüşümünü sağlayan asıl unsur sembolün biçimidir anlamı değil. Bu türden biçimsel bir soyutlama olarak bilişsellik, temsillerin varlığı için gereklidir, çünkü zihinsel sembolle onun anlamı ayrı şeylerdir ve bunlar arasındaki ilişki tamamıyla keyfidir. Kısaca bilişselciliğe göre, özne ve nesne ya da algı ve edim arasındaki boşluğun yanında bir demtemsillerin içsel süreciyle, anlam ve edimin dışsal dünyası arasında da boşluk vardır. Bu boşluk, biçimsel bir soyutlamayı beraberinde getirir. Bilişselciliğin üçüncü unsuru diğer ilk ikisinden çıkarsanabilir; sembol anlamından koparıldığı için, bilişselcilik bir bilişsel durumun bir diğerine dönüşebilmesi sürecini yönetebilmek için bazı biçimsel kurallara ihtiyaç duyar. Bu noktada bilişselciliğin sırtını, bağlama-duyarlı işlemin olnağı yerime daha çok bu soyutlamaya dayalı kurallara dayadığını görürüz. Bu fikirler ışığına bilgisayımsallığın olanağı doğar. İşte EC bu bilgisayımsal, temsiliyetçi ve bilişselci zihin anlayışını eleştirmek üzere ortaya atılmıştır. EC'nin üzerine kurulduğu temel varsayımlar şunlardır; A. Biliş konumlandırılmıştır. Biliş-sellik her zaman gerçek dünyada bir çevre bağlamında meydana gelir. B. Biliş zamana karşı yarışın ürünüdür, başka bir deyimle biliş bir zaman baskısı altında

gerçekleşir ve bu baskı çevreyle girilen gerçek zamanlı etkileşimin ürünüdür. C. Bizler çevreden bilmeye ihtiyacımız olanlar ölçüsünde bilgi toplarız. D. Çevre bilişsel sistemin bir parçasıdır. Düşünmek beyinle başlyan ve beyinle biten bir süreç değildir, daha ziyade tüm bedeni ve çevreyi de kapsar. E. Bilişsellik edimler içindir. Zihnin görevi edimleri yönlendirmektir ve algı ve hafıza gibi bilişsel mekanizmalar ancak duruma uygun davranış üretmeye katkıları ölçüsünde anlaşılmalıdır. F. Çevrimdışı düşünce de beden temellidir. Çevreyle eşleşmesi askıya alınsa bile, zihinsel faaliyet, çevreyle etkileşim üzerinden evrimleşmiş, duyusal işleme ve motor control gibi mekanizmalarda temellenir. Soyut bilişsel işlemler bile, algı ve edimler sırasında sürekli olarak aktif olan nöral devreyi yeniden harkete geçirerek duyusal-motor sistemlerden faydalanır. Böylece, diyebiliriz ki, bedenlenmiş zihin kavramı bedeni ve bedenin çevreyle ilişkisini merkezine alan ve bilişsel faaliyeti beynin soyutlanarak anlaşılmış olan içsel alanine kısıtlamaz. Ona göre bilişsel faaliyet, bedenin bütünü ilgilendiren ve duyuşsal-motor yetilerle temel olarak belirlenen bütünsel bir süreçtir.

Fakat, algı mekanizmalarını açıklamak üzere ortaya atılmış EC frame problemin çözümü için yeterli olmayabilir. Çünkü yine bedenselliğimizin bir parçası olan duygulanımlarımız bu açıklamanın dışında kalmıştır. İşin ilginç yanı, duyguların bilimsel olarak bilişselliğe katkıda bulunduğunu ve hatta frame problemin çözümü olarak, alakalı ve önemli şeylerin ayırt edilmesinde temel görev üstlendiğini söyleyen görüşler mevcuttur. Örneğin, Damasio'nun Somatic Marker hypothesis (SMH), duyguların bedensel kaynaklı olduğunu, ve sonsuzca seçenek içinden anlamlı seçimlerin tam da bu bedensel tepkiler tarafından elenerek sınırlandırıldığı iddia edilmiştir. Duygular, seçime uğraması gereken yaşayan olasılıklar kümesi içinden ve sonsuz olasılıklar içinden yapılacak olan çıkarımları eleyerek sınırlar ve azaltır. Bu görüşü kendine temel almış ve onun yardımıyla frame problem'ı çözmeyi önermiş görüşlere Megill'in ki de örnek verilebilir. Yani duygular, hem değerlendirme süreci hem de bedensel süreçler olarak kabul edilmiştir. Bu yaklaşıma literatürde bedenlenmiş değerlendirmeye dayalı duygu kuramları (embodied

appraisal theories of emotion) adı verilir. Duygular sayesinde, birinci olarak, bireyin çevresindeki kendiyle alakalı nesneleri ayırt edebildiğini, ikinci olarak da, verili bir edimin alakalı sonuçlarının neler olabileceğini belirlemede etkin olabildiğimiz, ve üçüncü olarak da, büyük bilgi yığınları içinden sadece bazı belirli bilgi parçacıklarını ayırt edebildiğimiz savunulur. Duygular, adeta bir kesip-biçme işi yapar. Fakat bu görüş, her ne kadar bedenin duygular ve bilişsellik sürecinde merkezi rolünü kabullense de, yine içinde bazı problemler taşır. Bu problemlerin, genel olarak bu görüş içine sızmış bilişselcilikten kaynaklandığı söylenebilir. Bu görüşü savunanlar, sadece bilişin bir bilgi işleme süreci odluğu kavrayışını elden bırakmamak adına, duyguları bilişsellikten ayrı süreçler olarak tutarlar ve duyguları bilişin hizmetine atarlar. Bu anlamda, duygular bedensel süreçler ve bilişsel süreçler arasında bir arayüz olarak işlev görür. Bilişselciler bedensel süreçler olarak hislere bilişsel süreçlerde rol vermezler. Başka bir deyişle, bedensel hislerin yani öznel deneyimin bilişsel süreçte doğrudan etkisi yoktur.

Jason Megill bedenlenmiş değerlendirme duygu kuramını savunanlardan biridir ve bu görüşü savunan diğerleri gibi o da bilişselciliğin tuzağından kendini kurtaramaz. Onun da görüşünde şöyle bir problem vardır; duygu görüşünde bedenlenmiş bir anlayış ortaya koysa da, biliş konusunda bilişselci kalmakta ısrar etmiştir. Bu durum, onun duygu ve biliş süreçlerini birbirinden ayırmasıyla sonuçlanır. Megill'in temel fikri şudur; duygular görevini yaptıktan sonra, ki bu görev değerlendirmeye alınması zor büyük miktarda bir bilgi yığınını daraltmak ve düzenlemektir, sıra akılsal çıkarıma gelmektedir. Yani, biliş hala bilişselcilerin anlattığı şekilde bilgi işlemeye dayalı şekilde işler ve bu akılsal değerlendirmelerin kendi başlarına halledemediği bireyle alakalı ve onun için önemli olan şeylerin ayırt edilmesi kısmını duygular üstlenir. Burada bilişsellik hala, beyin içi bir sürece sınırlandırılmış şekilde anlaşılmaktadır. Bu görüşün en büyük sonucu, bedenlenmiş değerlendirme kavramına inananların, her ne kadar duyguların bilişsel süreçlerde rol oynadığını iddia etseler de, bilişsel süreçle duygulanımsal süreci birbirinden ayırmaları nedeniyle, duygulanımsallığın yani bedensel değişimlerin özne tarafından

deneyimlenmesinin hissedilmesi olarak öznel deneyimi her türlü değerlendirme sürecinden ve sonuç olarak bilişsellikten uzak tutmalarıdır. Bu bakımdan, bilişselci duygu görüşlerinden bir farkları kalmaz. Oysa, hem Damasio'nun hem de enaktivizmin bilimsel araştırmalara dayalı biçimde öne sürdükleri gibi, duygusal olarak kişiyle yakından bağlantılı tecrübenin niteliği/doğası (emotional qualia) ya da öznel hisler tam da bilişsellik ve duygular arasındaki bağı kuran yegane unsurdur. Duygusal olarak kişiyle bağlantılı deneyimin niteliği, duyguların oluşumu için gerekli bir bileşen olarak kabul edilir, fakat bilişsel sürece etkide bulunma gücü yoktur. Böylece, öznel deneyimin dünyayı anlamlandırma sürecinde etkisi reddedilmiş olur. Buna bağlı olarak da, algı ve edimin her şeye rağmen yine de nesnel süreçler olduğu, öznel deneyimlerin bu süreçlerde şekillendirici bir etkisinin olamayacağı sonucu çıkar ortaya. Öznel deneyimler alanı olarak beden yine bilişsel süreçlerin dışına itilmiş olur. Oysa en başta, Çerçeve Probleminin çözümünün ancak bir bedenin kendi yapısı ve yetileri bağlamında dünyayı anlamlı şekilde doğal olarak algılayabildiğini söylemiştik. Şimdi ise, bedenin duygulanımları bağlamında dünyaya olan öznel duyarlılığı kapı dışarı edilmiş olmuştur. Böylece, benim tezim şöyle açıklanabilir, öznel duygulanımsal süreçleri dışarıda bıraktığı sürece, her ne kadar duyguların bedensel süreçlere dayalı olduğunu iddia etsek de, ve her ne kadar duyguların bilişselliği şekillendirici etkisinden bahsetsek de, biliş ve duygu arasındaki olmazsa olmaz bağı ortadan kaldırdığımız sürece, frame problemi çözmüş olmayız. Öyleyse, ortaya şu gerçek çıkmaktadır; Çerçeve Problemini ortadan kaldırmak için duyguların ve bilişselliğin iç içeliğini gösteren bir görüşe başvurmak zorundayız. Bu konuda benim önerim enaktivizm görüşüyle örtüşmektedir. Enaktivizm bize hem bilişi hem de duygulanımları bilişselci bir noktadan hareket etmeden açıklama, hem de bu ikisi arasında olmazsa olmaz bağı gösterebilme imkanı sunar. Bunu, temsiliyetçilik, biçimcilik ve kural-temelli dönüşüm (rule-based transformation) yaklaşımlarına başvurmadan yapar.

Enaktivizm'e göre, bilişsel sistem ve çevrenin birlikte-ortaya çıkışı (co-emergence) söz konusudur. Bu birlikte meydana geliş, yani organizma ve çevre

arasındaki yapısal eşleşme ilişkisi, organizmanın çevreyle yetisel olarak başetmesi ve aynı zamanda organizmanın çevreye olan duygulanımsal duyarlılığı sayesinde meydana gelmektedir. Buna göre, bedensel yetilerimiz sayesinde çevremizi seçici olarak biz yaratırız. Enaktivizm, iki temel görüşe dayanmaktadır; birincisi, dinamik sistemler kuramı; ikincisi, bedenlenmiş biliş görüşü. Enaktivizm, dinamik sistemler kuramını bilişselliğe uyarlayarak, şunu savunur; organizmanın içsel süreçlerini dışsal süreçlerden soyutlayıp, dışsal nedenleri içsel olayların nedeni olarak göstermek imkansızdır. Yani, zihni kuranın iç mi yoksa dışsal süreç mi olduğunu söylemek mümkün değildir. Bu nedenle, bir şeyin temsil edilmesinde olduğu gibi statik durumlara odaklanmak yerine, süreçlere odaklanmayı önerirler, çünkü beden ve çevre arasında olan etkileşim bir devamlılık halidir, kesilme değil. Çevre ve beden birbirilerini sürekli olarak değiştirir ve dönüştürürler. Bu dönüşüm enaktivizme göre biyolojik gerçekliğimizin bir gereği olarak iki prensip temelinde gerçekleşir. Birincisi otopoiesisdir (autopoiesis); organizma kendi bilişsel alanını kendi açığa çıkararak kendi kendinin yeniden üretimini ve devamlılığını sağlar. Otopoietik makinalar olarak yaşayan canlılar, ürünü kendinden yani sistemin kendisinden farklı olarak çalışan allopoietik makinalardan farklı olarak, kendi kendilerini üretirler. Kısaca, allopoietik makinanın girdileri ve çıktıları vardır, ama otopoietik olan girdi ve çıktılarla işlemez. Otopoietik bir makina, birinci olarak, üretim süreçleri (dönüşüm ve yıkım da dahil) ağından oluşmuştur. Bu üretim süreçleri arasında sürekli bir etkileşim ve dönüştürme ilişkisi vardır, böylece sistem kendi kendini üretmektedir, üretirken kendi kendinin farkına varması da bu ilişkiler ağının parçasıdır. Buna ek olarak, bu üretim süreçlerinin bileşenlerinin arasındaki kaynaşık ilişki sayesinde makinanın mekanda birliği de sağlanır. İkinci prencip ise otopoiesis kavramının içinde zaten kapsanmakta olan otonomidir. Organizmaların kendi kendilerini kurabilme, ve çevreyle etkileşimlerini düzenleyerek onu anlamlı kılma kapasitesine gönderme yapmaktadır. Etrafımızdaki şeyler ve olaylar, anlamlarını organizmaların onları açığa çıkarma ilişkisi içinde kazanır. Otopoietik makinalar, bütünlüklerini ve devamlılıklarını, parçalarının yerime parçalar koyarak değil, tam tersine

makinanın organizasyonunu belirleyen ilişkileri korumaya çalışarak yaparlar. Kısaca, organizmanın etrafındaki şeyler değerlerine ve ilgililiklerine içsel şekilde sahip değillerdir, organizma şeylerin önem ve alakasını otonom dinamikleri aracılığıyla açığa çıkarır. Yani, önem ve alaka çevredeki şeylerin organizmayla ilişkisi bağlamında belirir. Bu belirme süreci bilişselci anlamda dünya hakkındaki inançlarımıza dayalı bir değerlendirmeye dayanmaz. Daha ziyade organizma bedenin bütünüyle çevresini anlamlı bir dünyaya dönüştürüyordur. Enaktivizm'e göre, bu dönüştürme işlemi her türlü anlam üretimine tekabül eder. Dolayısıyla, anlam üretimi organizmanın bütünüyle katıldığı bir süreçtir, mekanda özel bir "yeri" yoktur.

Organizma için anlam üretmek, yaşamsallığını üretmek demektir. Yaşamsallığı üretmenin ilk basamağı, organizmanın çevresinde kendi yaşamsallığının üretimi, devamı ve çevreye uyumu için ayırt edici ve önemli olan şeyleri ve olayları tespit edebilmesidir. Bu noktada sinir sistemi otonom dinamik bir sistem olarak hareket eder. Buna göre, kendi anlamlı ve uyumlu etkinlik örüntülerinin üretimi ve devamlılığı birincil işlevidir. Bu etkileşim halindeki nöronların dairesel ve tekrar-girişli hareketiyle kurulan ağla sağlanır. Bu anlamda, nöronlar bilgisayar gibi bilgi birimleri üretmese de, anlamlı örüntüler yaratır. Nöronlar tek başına, gerçekliğin nesnel bir şekilde tanımlı özelliklerini tespit etmezler, tam tersine nöron toplanışları bu işlemi yapmaktadır ve bu işlem lineer olmayan bir doğaya sahiptir. İşte, organizmanın bedeni ve çevre arasındaki duyusal motor eşleşme ve etkileşim, bu nöral etkinliğin dinamik örüntülerinin şekillenmesini modulate etmektedir. Bu modülasyon, dairesel şekilde yine duyusal motor eşleşmeyi bilgilendirir. Yaşayan organizmalar çevreyle duyusal motor eşleşmeleri tarafından sağlanan dinamik bir duyusal motor devir meydana getirirler. Yani, hareketleri neyi duyumsadıklarına, neyi duyumsadıkları nasıl hareket ettiklerine göre belirlenir. Kısaca, ürettikleri anlam, nasıl hareket ettiklerine göre değişir. İşte bu duyusal motor döngü, sistemin otonomisine ve otopoietik varlığına tabidir. Yani, benim bedenim için önceden tanımlı, belirli ve anlamlı bir dünya algılamam, daha ziyade dünyayla kurduğum duyusal motor eşleşme uyarınca anlam üretirim. Yönelimsel edimlerin bir

akışı içindeyimdir, ki bunlar refleksiyon öncesi alışkanlıklar ve deneyimleyen bedenin öznel duyarlılıkları tarafından üretilir. Yönelimsellik burada, temsili bir içeriğe sahip olmak manasında kullanılmaz, sadece hareket ve süreç içinde açığa çıkan bir yönelmişlikten bahsettiğimizi unutmayalım. Dolayısıyla, hareket içinde üretilen anlam her zaman, ilişkisel, bağlam temelli ve bilişsel bireye görecedir. O organizmanın, ihtiyaçları, fizyolojik yapısı, ve çevreye uyum sağlama kapasitesine göre değişir. Anlamı belirleyen organizma ve çevre arasındaki uyumluluk derecesidir. Bilgi organizmanın bekasından ayrı analiz edilemez, ayrı bir varoluşa sahip değildir. Otopoietik sistemler için yaşamsallıklarının devamını sağlamak içkin bir amaçlılık kazandırır onlara. Bir organizmanın içkin amaçlılığı, özdeşlik örüntüleri yaratmak ve anlam üretmektir. Özdeşlik, organizmanın dışarıyla sürekli madde alışverişi yapmasıyla sağlanır. Bu durum, bedensel özdeşliğin kurulumu için önceliklidir. Yani organizmanın uğradığı her değişiklik, organizmanın kendi kendini düzenlemesi sayesinde bu özdeşliğin devamlılığına tabi kılınır. İkinci olarak da, organizma hayatta kalmak için sürekli anlam üretmek zorundadır. İşte önem ve alaka bu amaçlılık doğrultusunda tespit edilir.

Duygular ve bilişsellik bu amaçlılık uğrunda iç içe geçen süreçler olarak tanımlanmaktadır. Duygular bilişsellik gibi girdi ve çıktı mekanizmasıyla değil de, daha çok edim-algı çemberinin bir parçası olarak tanımlanırlar. Duygular, duyusal motor döngü dinamikleri içinde bedenlenirler. Duygular, duyusal motor sistemle entegre şekilde organizmanın yönelimselliğini kurarlar. Duyusal motor süreçler aynı zamanda içsel aktiviteyi de ayarlayıp düzenlemektedirler, ki bu modülasyon nihayetinde dairesel bir düzende duyusal motor aktiviteye duygusal anlamın nüfuz etmesini de sağlar. Duygular ve biliş iç içedir çünkü, birincisi, duygu ve biliş süreçlerine aracılık eden sinir sistemi anatomik olarak birbiri üzerine binmiştir, ve bu iki sistem arasında karşılıklı olarak sürekli bir etkileşim vardır. İkincisi de, bu iki sistem birbirini sürekli ayarlayıp düzenlerler. Yani, bu sayede duygular sürekli olarak anlam üretim sürecine katılarak, değerlendirmenin bir parçası olurlar.

Duygulanımsal hisler bu noktada, duyguların motivasyonel bileşenleridir. Dünyaya karşı alıcılığımız (receptivity), öncesinden duygulanımsal bir ton kazanmış olmayı gerektirir. Yani, örneğin bizimle ilgili ve önemli olan şeyleri ayırt etmemizi sağlayacak olan dikkatimizin motivasyonel içeriğini sağlayan, nesnelerin ve olayların duygulanımsal çekiciliğidir. Bir edimimizden bir diğerine geçişi sağlayan duygulanımlarımızın dinamik akışıdır. Pasif bir etkilenişten, alıcı hale geçişi sağlayan şey, bizi etkileyen şeylerin bizimle alakalı ve bizim için önemli olan taraflarının ayırt edilmesidir. Bu anlamda, sinir sistemi, iç salgı sistemi, somatik süreçler ve kas iskelet sistemi birlikte çalışır, çünkü motor aktivite ve organizmanın içsel sistemlerini birbirinden ayrı çalışmaz. Yani kısaca, değerlendirme süreçleri ve bedensel olaylar arasında bir ayrım yoktur. Bizim dünyaya öznel olarak anlam yüklememiz için, ayrıca bir bilişsel değerlendirme sürecine ihtiyacımız yoktur. Bedenimiz bunu zaten kendi kendine yapar ve bunu yapabilmesi, bedenimizin tepkilerini aynı zamanda bizim tarafımızdan öznel olarak hissedilmesine bağlıdır. Uyarım (arousal), davranış ve değerlendirme (appraisal) birbirinden ayrılmazdır. Ve hisler bu yapışıklığı sağlayan bir yapıştırıcı görevi üstlenir. Yoksa filtrelenmiş bilgi ile değerlendirmelerin nasıl birbiri ile ilişki içine girdiğini açıklamak zorunda kalırız. Hisler sayesinde, dünyayla ilişkimiz kişiselleşir. Böylece organizma hayatta kalma ve çevreye uyumlanma sürecini kişisel bir perspektiften ayarlayabilir. Hisler bedenimizin içinde bulunduğu durumun, koşulların değer kazanması sürecidir. Çevreyle ilişkimizin negatif ya da positif olmasını sağlarlar. Dünyaya karşı duygulanımsal bir çerçeveleme işlevi görürler. Bu bu çerçeveleme süreci, yalnızca alın korteksinin (prefrontal cortex) işlevine bağlı değildir; metabolik sistem, iç salgı tepkileri, kas-iskelet sistemindeki değişimler, kalpdamar sistemine bağlı tepkiler de bu sürece katılır. Duyguların ve bilişin bedendeki formasyonlarının birbirinden ayrı olduğunu iddia etmek mümkün değildir. Yaşayan bir sistemin düzenlenişi, kendi bilişsel alanine açığa çıkararak kendi etkinliğini ortaya çıkarması ve devamlılığını sağlaması bakımından otonomdur. Otonomi, yaşayan canlıların, çevreleriyle etkileşimlerini aktif olarak düzenlemeleri yoluyla içsel olarak öz-kurucu oldukları

gerçeğine gönderme yapar. Bu anlamda, organizmanın kendiyle alakalı olan şeyleri tespit etmesi ve bunlara göre anlamlı edimler üretmesi, organizmanın dünyayı anlamlı bir çevreye dönüştürmesi yolunda bu etkileşimleri düzenleme gücüne bağlıdır. Bir organizmanın çevresindeki şeyler, kendilerinden kaynaklı anlamlı ve değerli değildir. Daha ziyade, organizmanın kendisi, kendi otonom dinamikleri sayesinde etrafındaki şeylerin önemini ve alakalılığını açığa çıkarırlar. Kısaca, önem ve alaka, bu karşılıklı etkileşimin ürünüdür. Değer ve önem, şeylerin kendinde değil, ilişkisel bir alanın ürünü olarak meydana çıkarlar. Değer ve önemin belirlenmesinde organizmanın bizzat yaşamsal ihtiyaçları ve gereklilikleri belirleyicidir ve bunlar organizmanın fizyolojik yapısı ve otopoietik sistemin devamlılığı ilkesi uyarınca düzenlenirler. Bu ilke her canlı için verili bir amaçlılığa tekabül eder. Kısaca, canlı varlıklar, diğer zeki makinalar gibi sıfırdan programlanmış varlıklar değildir, biyolojik varlıkları ve çevreye uyumlanma süreçlerinin bir sonucu olarak, öğrenme ve yetiler geliştirme kapasiteleri ölçüsünde doğaları gereği kendileriyle bağlantılı şeyleri algılar ve bunlara göre tepkiler oluştururlar. Alakalı ve önemli şeylerin ayırt edilmesi ve buna uygun tepki üretilmesi, enaktivizme göre, genel olarak "anlam üretmek" adı altında toplanan bir faaliyettir. Yani bilişsel aktivitenin tümü anlam üretim sürecidir ve tüm canlılık için geçerlidir. Bir bakteri de insan bilişselliğinden farklı bir şey yapmaz. Çevresindeki dünyayı anlamlı bir dünyaya dönüştürerek kendiyle ilgili olan şeyleri ve olayları, kendi yaşamsallığı için gerekli olan ve önemli olan şeyleri ayırt eder ve geriye kalan önemsizleri değerlendirmeye tabi tutmaz. Kısaca, tüm calıların bu anlamda yönelimselliği biyolojik varlıklarında hali hazırda yerleşiktir. Bu yerleşik yönelimsellik mekanizmasının işleyebilmesi için "yaşantılanmış deneyim" kavramının büyük önem vardır. Bir organizma, kendi bedensel deneyiminin farkında olması gerekir ki, böylece kendi kişisel bakış açısıyla önem ve alakayı belirleyebilsin denilebilir. Otonomi kavrayışının bakış açısından, yönelimsel yapılar, algı, hatırlama, hayal etme vb. Etkinlikler içinde yaşantılanmış deneyimle ilişkisi içinde ortaya çıkarlar. Yani tüm bu faaliyetleri, ancak kendi öznel deneyimim ölçüsünde düzenlerim. Bu anlamda, duygulanımsallığın da dünyayla

ilişkimize alakalı olan şeylerin tespit edilmesinde belirleyici bir rol oynadığını hesaba katarak şunu söyleyebiliriz, bedensel değişiklikler olarak duygulanımlarımızın hissedilmesi ve kişisel deneyimlere dönüşmesi de bu tespit mekanizmasına dahildir. Eğer kişisel bir bakış açısı olmasaydı, yani bedensel olarak verdiğimiz tepkiler özne tarafından sahiplenilmeseydi, kişiselleşmemiş soyut bir tepki meaknizmasının ötesine geçemezdi bedensel tepkilerin doğrudanlığı. Ve bu nedenle, şunu söyleyebilirdik; bedensel tepkiler deneyimin nesnel tarafıyken, bilişsel değerlendirmeyi yapan ve bu nesnel tepkilerin kişiselleşmesini sağlayan yine zihinsel olarak ayrılmış iç bir mekanizmadır. Bu cevap, bilişselciliğin düştüğü "kişiselleşmemiş bedencilik" sorunundan ayrı bir yere düşmemek anlamına gelirdi. Oysa, biz biliyoruz ki, Çerçeve Probleminin çözümü bilişselciliği bütünüyle aşmaya bağlıdır. Çerçeve Problemi canlılar için çözülmesi gereken bir problem değil, daha çok söz konusu olmayan bir konudur. Bunu sağlayan, bir canlının bedeninin tümden anlam üretim sürecine dahil olmasıdır. Bu sürece, bedensel olayların tümü hakimdir ve bu süreçlere hisler de dahildir.

Bu tezin ortaya attığı sorunsal, bedenlenmiş duygu kuramlarının, duyguların oluşumda bedenin merkezi bir öneme sahip olduğunu kabul ettikleri için bilişselcilikten kopmuş gibi görünselerde, bedensel dinamikleri ve bilişsel faaliyeti yine de birbirlerinden ayırdıkları için, bu kuramların bilişselci kalmaya devam ettikleridir. Megill'in pozisyonu bunun en bariz örneğini sunar. Oysa, bedenlenmişlik tezini bütünüyle kabul etmek duyguların ve bilişselliğin iç içe geçişini de kabul etmekle ancak mümkündür. Bu tezin iddiası, eğer duygulanımların ve bilişselliğin iç içe geçişini ve bunların birbirilerine bağlı şekilde işlev gösterdiklerini bilimsel ve felsefi olarak gösterebilirsek, Çerçeve Problemini ortadan kaldıracak olan, beyin-beden-dünya etkileşimine dayalı bütünüyle bedenlenmiş bir sürece dayalı anlam üretimin tanımını verebiliriz. Eğer duyguların yönelimselliğinin bedensel bir temele dayandığını ve duyguların bilişselci anlamda değil de bedenin tümünü hesaba katan bir yönelimsellikle değerlendirmeyi içerdiğini kabul ediyorsak, geleneksel biliş anlayışını bir kenara koymamız gerekir. Çünkü, duygulanımları ve bilişi birbrinden

ayırmak bilişselci bir biliş anlayışından kaynaklanmaktadır. Eğer duygular bedensel bir yönelimselliğe sahipse, ve eğer değerlendirme süreciyle kurucu şekilde karşılıklı etkileşim içindeyse, bizim çevreyi değerlendirmelerden ibaret bütün anlam üretme süreçlerinin bedenlenmiş ve aynı zamanda duygulanımsal olduğunu, ve beden-çevre etkileşimine dayandığını kabul etmemiz gerekir. Bu bedenin, illaki klasik anlamda bilinçli bir farkındalığa sahip olmadan da dünyadaki kendiyle alakalı ve kendi için önemli şeyleri ve olayları ayırt edip, tespit edebildiği ve bunlara uygun tepkiler üretebildiği anlamına gelir. Bu süreç, bedenlerin kendi yaşamsallıklarının devamı adına ihtiyaçlarını karşılayabilmeleri uğrunda girişilen bir çabanın ürününden başka bir şey değildir. Duygulanımsal süreçlerin ve bedensel hislerin düşünümsellik öncesi bir tür bilinç hali olduğunu kabul etmek, ve bedenin kendi yaşantılarının farkına varması olarak hislerin bu çabanın önemli bir parçası olduğunu kabul etmek gerekir. Oysa, Megillinki gibi kuramların, bilişselci biliş anlayışlarını bırakamamaları nedeniyle bilişi ve hisleri birbirinden ayırarak, hislerin yani öznel deneyimin değerlendirme sürecinde rolü oynamadığını iddia ettikleri görülüyor. Bu durum bu türden kuramların, bilişselci biliş anlayışını bırakmadıkları sürece içine düşmekten kurtulamayacakları bir soruna tekabül etmektedir. Bu tezin önerisi, eğer Çerçeve Probleminin ortadan kalkmasını istiyorsak, bilişselciliğe bütünüyle bırakmamız gerektiğidir. Çerçeve problemi, canlılar için bir problem değildir, çünkü sağlıklı bir fizyolojik yapıya sahip her türden beden duygulanımsal doğası nedeniyle, yönelimsel doğası gereği çevresiyle girdiği etkileşimde kendisi için önemli ve kendiyle alakalı şeyleri ve olayları ayırt edebilmektedir. Bu süreç bilişselciliğin iddia ettiği gibi, girdi ve çıktılarla işleyen bir mekanizmanın ürünü olarak değil, lineer bir nedenselliğe sahip olmayan dairel bir düzende beden-beyin-çevre arasında kurulan geri besleme döngüleri sayesinde gerçekleşmektedir. Bu döngülerin doğasını anlayabilmek için, bilişsel faaliyete ve canlılığın bedensel varlığına bütünlükçü bir bakış açısıyla yaklaşmak gerekir. Bu bütünlükçü bakış açısını anlayabilmek adına enaktivizm, bilişsellik ve duygulanımsallık arasındaki geçişliliği ve iç içeliği anlamak gerektiğine ve bunun yolunun da yaşamsallığın tanımına bakmaktan geçtiğine işaret eder.

Yaşamın tanımı bize, anlam üretmenin biyolojik, kimyasal ve fiziksel arkaplanını gösterecektir. Böylece, bedenin hayatta kalmak ve yaşamını koruyup devam ettirmek uğrunda ne türden mekanizmalar geliştirdiği ve evrimsel süreçte bu mekanizmaların nasıl evrildiği ve adapte olduğunu görebiliriz. Bu tez bu bakış açısını yakalayabilmek için, fenomenolojinin geleneksel rasyonalist eğilimlerini eleştiren tavrına ve bilimsel çerçevelerin, anlam üretmeyi sadece beyinsel etkinliğe indirgeyen bilişselcilikten olduğu gibi indirgemeci olanlarından uzak durup bütünselci yaklaşıma sahip olanlarına odaklanmış ve enaktivizmi bu ikisinin ortaklaştığı bir görüş olarak Çerçeve Problemi gibi çok geniş ve büyük bir felsefi probleme bu bakış açısıyla bir yaklaşım geliştirilmesine katkıda bulunmuştur. Dünyayla kurduğumuz ilişkinin yönelimsel doğası, ancak yaşamsallığın ne olduğuna bakılarak anlaşılabilir. İnsan yapımı zeki makinaların insan bilişselliğini anlamak için bir model oluşturduğunu düşünmekle, canlı bir bedene sahip insanın anlamlı biçimde eyleyebilmesine izin veren sistemin gerçekte nasıl işlediğini ortaya koymak birbirinden iki ayrı sonuca götürecektir bizleri. Çerçeve Problemi açısından bakıldığında, durum onu gösterir ki, allpoietik makinalar olan yapay zeka örnekleri ve otopoietik makinalar olan insan bedeni farklı konumlardadır; insan Çerçeve Probleminden muzdarip değilken, bir allopoietic makina bu sorunun tam da ortasına doğar. Insan bedeni gibi diğer canlı varlıkların, neden bu problemden muzdarip olmadığını açıklamanın en doğrudan yolu, bunların duygulanımsal varlıklar olduğunu kabul etmektir. Duygulanımsal doğaları sayesinde, dünyayı doğal olarak değerlendirir ve buna göre anlamlı tepkiler üretiriz. Bebekler ve robotlar arasındaki en büyük fark bedensel yapılarındaki fizyolojik farklılıktır. Bu fizyolojik farklılık göz önünde bulundurulmadıkça, bir bakterinin ya da bir insan yavrusunun dünyaya gelir gelmez yaşamsallığının devamı adına kendisiyle alakalı ve kendisi için önemli olan şeyleri ayırt edip dünyayla nasıl anlamlı bir ilişki kurduğunu ve bu anlamda da bilişsel bir faaliyet gösterdiğini anlayamayız.

TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü	
Sosyal Bilimler Enstitüsü	X
Uygulamalı Matematik Enstitüsü	
Enformatik Enstitüsü	
Deniz Bilimleri Enstitüsü	

YAZARIN

Soyadı : USLU
Adı : AYŞE
Bölümü : FELSEFE

TEZİN ADI (İngilizce) : THE DISSOLUTION OF THE FRAME PROBLEM FROM THE PERSPECTIVE OF EMBODIED AND ENACTIVE INTERTWINEMENT OFAFFECT AND COGNITION

TEZİN TÜRÜ : Yüksek Lisans [ ] Doktora [X]

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]
3. Tezimden bir bir (1) yıl süreyle fotokopi alınamaz. [X]

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: