Cognitive Semantics: An Extension of the Cartesian Legacy[1]

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The basic intention of this article is to show how the cognitive semantics inherits its ancestry from the Cartesian foundation. The emergence of the cognitive semantics is envisaged here as an integral part of the knowledge evolution, in terms of shifts, which ultimately determines the future direction of our epistemological quest. Basically two questions have been emphasized here: (a) how (and what amount of) common sense metaphysics can be incorporated within the existing system of knowledge; and (b) is there any substratum where the mind-body dualism can be boiled down?

0. Introduction

Study of semantics has faced a major challenge, due to the shifts, which has been initiated by the evolution of knowledge. In this article, we will try to develop a line of thought to conceptualize this shift (fig. 3), since it not only effects the semantics, but a similar kind of transmutation can also be found in other branches of rational enquiry.[2] Essentially, this shift can be envisaged as an obvious way to incorporate more and more *contextual information* to achieve a greater degree of *explanatory adequacy*. The shift can be defined in terms of the following points:

(i)   a shift towards the common sense metaphysics;
(ii)   a shift towards the physicalism from psychological understanding via phenomenological interlude; and
(iii)   a shift towards the exploration of the 'nature-absolute' from 'nature-relative'.

One obvious consequence of this shift is the need of the ontological up-rise, felt by the system of knowledge. This shift will ultimately help us to understand the embodiment hypothesis (Lakoff 1999); not as against the Cartesian dualism, but as an extension of the Cartesian core, because the hidden assumption is that the evolution of knowledge is cumulative in nature. Therefore, Cartesian metaphysics becomes an obvious way to start with.

Primarily, we would like to take a brief account of the Cartesian proposal, and how it is being succeeded by the following trends. The development of semantics under the supervision of the philosophers, in the following period, has been stressed, to show the inevitability of the *metaphysical necessity* of ontology, being felt by the knowledge evolution. In this section, we will try to substantiate the claim that knowledge evolution is cumulative one, and how the existing system has been augmented with the incorporation of the metaphysical understanding about the world. Later, in our concluding session, we would be in the position to show, how the study of semantics, because of the successive augmentation of the Cartesian foundation, provides a fertile ground for cognitive semantics, as a self-evident / self-consistent system. What would remain implicit, in this article, is a shift towards the *holistic approach*, because of being contextually rich, more and more, with each successive augmentation to the Cartesian core.
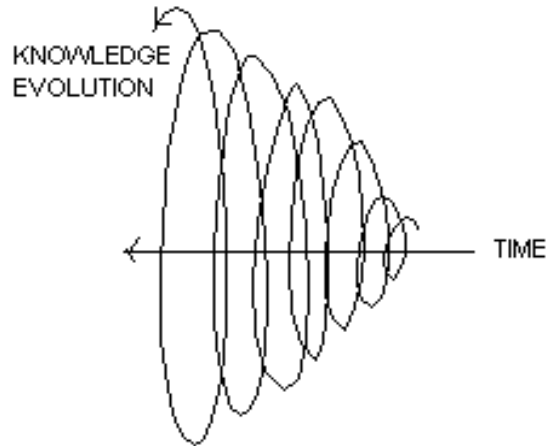
Figure 1

1. The Cartesian Perspective

Cartesian definition of 'idea' rests on the notion of 'simple nature' (*natura simplicissima; res simplex*). Since the absolute form of reality is a myth, what we understand as 'real' is not at all the invariant core of the existence rather it is the 'essence' (*ousia*) of it. We will label it as 'umbra' that metaphorically means the shadow of the invariant existential core. Umbra is the object of our knowledge. It is not something which is prior and absolute to start with rather it is the *end* – a projection of the underlying 'reality' of the nature-absolute. The mental image, again metaphorically, can now be viewed as the 'penumbra', because of being a projection of umbra. 'Simple nature' is all about the penumbra. In the post Cartesian epistemological revolution, 'idea' is defined as an object that is primary in respect to our knowledge and neither in respect to its 'essence' (= umbra), nor in respect to the nature-absolute.

'Idea', as a 'simple nature', can be classified into three broad categories, namely 'purely intellectual', 'purely material' and 'common notions' (*notiones communes*) or 'principles of logic'. Common notions are of two types. The first one designates an 'idea', which, irrespective of being a member either to intellectual or to material simple nature, stands by itself, such as existence, unity etc. (Marion 1992). Thus, known as 'real'. This 'real-common-simple nature' is analogous with the 'axiom'. On the other hand, the second one defines an 'idea' which stands only in relation to the other and hence 'logical'. 'Logical-common-simple nature' in later period of development turns up as 'theorem'. We have some vague idea that some of these theorems are basic than the others, and hence considered as axioms. None of us, however, can claim what theorems are truly fundamental (Wilson 2003).

1.1. res extensa vs. res cogitans

The main Cartesian concern was all about 'material-simple nature'. This concern ultimately leads towards the whole gamut of scientific enterprise. As a result, 'intellectual-simple nature' remains untouched, since it has been believed that intellectual simple nature requires reasoning of a purely intellectual kind, conducted in abstraction

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from the world of senses. Moreover, the probability of an error increases proportionately with the distance from the level of subordination (here, 'material-simple nature') to the level of super-ordination (that is 'intellectual-simple nature') - more away from the sense data, more vulnerable to error.[3] Since the basic intention of Descartes was "to establish anything at all in the sciences that was *stable and likely to last*", how could it be possible to give an emphasis on the 'intellectual-simple nature', which requires some degree of rationality (*nos rationis esse participes*)? There is no point here to disagree with the view that *rationality,* as a higher level state, is much more vulnerable to error. Therefore, 'material-simple nature' constitutes the domain for the epistemological enterprise, while the 'intellectual-simple nature' belongs to the domain of metaphysics.

But why should one talk about all these things? Later, in our discussion we will show how this basic design of Cartesian thesis reigned over the following semantic tradition, no matter whether it belongs to philosophical logic or to linguistic or to any other scientific discourse. In addition to our previous argument, we would just like to argue here that epistemological enquiries are turned as the study of *res extensa*, whereas metaphysical enquiries are in the domain of *res cogitans*. But to achieve a self-evident / self-consistent form of knowledge, we need dissolution of this distinction.

In our concluding section (5), we will take a brief account of the possible philosophical solutions to this issue of distinction. Now, in the next section our major concern will be to address the issue of erasing the boundary between the above mentioned epistemological concern and metaphysical concern, in terms of *shift*, particularly in the field of semantics.

2. Genesis of Semantics: Intrusion of common sense metaphysics

Genesis of semantics presupposes this developmental path. Semantics as a branch of philosophical logic is mainly concerned about *res extensa*. To what extent does our thought synchronize the knowledge of the extension? More explicitly, reasoning, being independent of human imagination, links the things, signified by the names, as if it is an part of the external world, and being shaped by the world. Reasoning emerges because there are enough causal determinants in the external world. Hence, extensional (Wilson 2003). Here the basic concern is to measure the justification of reasoning, with the help of the truth scale. The most primitive as well as basic definition of the truth has been originally proposed by Aristotle, which states that "to say of what is that it is not, or of what is not that it is, is false; while to say of what is that it is, or of what is not that it is not, is true" (Haack 1978). On the other hand, semantics, as a linguistics enquiry, is mainly concerned about the knowledge representation. Being an exploration in the field of *res cogitans*, it aims to construct a picture of a language, as a self-contained coherent system, whose constituents are in causal interaction. Under the banner of philosophical logic, its aim is to prescribe a standard form of reasoning or a theory of order (Feibleman 1979), which is in accordance with the scientific investigation; while as a branch of linguistics, it deals with the concept-internal structure mainly, to provide us with a model, explaining how a linguistic phenomenon comes into existence. Finally, a central concern of logic is to discriminate valid argument from invalid one, irrespective of its subject matter. That is why logic is 'topic-neutral' – it is concerned with the form of the

arguments, rather than their content (Haack 1978). In linguistics, the main concern is the internal structure of the concept.

Instead of their differences, both of the schools share the same underlying Cartesian design of 'mathesis universalia' (Gk. mathesis = science, Lat. universalia = universals), since the assimilation of 'common notions', within the Cartesian framework, opens the way to the principles of logic. But the development of linguistic semantics is not directly related with the foundation of logic, rather there exists an interlude of formal semantics (fig. 3). 'Common notions', as the principles of logic, along with the epistemological concerns, constitute the background of the formal semantics. Formal semantics differs from the logic, by the virtue of its interest. In logic, the basic concern is the performable computing operations (= reasoning), not the propositional form associated with a particular 'idea'; whereas formal semantics is motivated by the exactly opposite interest, namely the propositional form, being associated with an 'idea'. As a result, it now becomes quite tough to remain topic-neutral. On the other hand, the basic concern of the formal semantics is not to produce natural language semantics, but to clear the imperfections of logic, with the help of natural language evidences (Katz 1997). Following example will elaborate this claim. Both the sentences, namely *John found a unicorn* and *John painted a unicorn*, have the same underlying logical form, which is $(\lambda Q(\lambda P\exists x(Q(x) \wedge P(John, x)))$. Being specified, the λ-operator gives rise to the following two representations:

(1)   John found a unicorn = $\exists x(\text{UNICORN}(x) \wedge \text{FIND}(John, x))$

(2)   John painted a unicorn = $\exists x(\text{UNICORN}(x) \wedge \text{PAINT}(John, x))$

Both of these two translations admit the inference $\exists x(\text{UNICORN}(x))$ – that means both of them imply the *existence* of a UNICORN, while sentence (1) presupposes the *existence* of a UNICORN and in sentence (2) UNICORN is a *representation*. So, how to solve this puzzle? – In formal semantics, the most obvious way out is as follows:

(3)   John found a unicorn
             $\Rightarrow (\exists x: \text{Thing})(\text{UNICORN}(x) \wedge \text{FIND}(John, x))$
             $\Rightarrow (\exists x: \text{Thing})(\text{UNICORN}(x))$
(4)   John painted a unicorn
             $\Rightarrow (\exists x: \text{Representation})(\text{UNICORN}(x) \wedge \text{PAINT}(John, x))$
             $\Rightarrow (\exists x: \text{Representation})(\text{UNICORN}(x))$

Whether the concept UNICORN will be specified as a *thing* or as a *representation*, will be strictly determined by the meaning of the predicate associated with it, not by the concept internal structure of the UNICORN itself. Furthermore, the name 'John' should also be specified, since the acts of *finding* and *painting* are directly related with the concept of *rational agency*. So a fuller interpretation would be as follows:

(3′) $(\lambda Q(\lambda P(\exists x:\text{Thing})(Q(x) \wedge P(John: Rational, x)))(\text{ FIND})(\text{ UNICORN})$

(4′) $(\lambda Q(\lambda P(\exists x:\text{Representation})(Q(x) \wedge P(John: Rational, x)))(\text{ PAINT})(\text{ UNICORN})$

The knowledge of the commonsense metaphysics slowly intrudes in our existing theoretical setup. One can not ignore this *metaphysical necessity*, in course of attaining 'a meaning algebra by introducing a rich type structure' (Saba 2005). Later, while discussing linguistic semantics, we will talk about the same cumulative effect.

From our above discussion, what we can actually infer is that logic, as an axiomatic form, was not necessarily self-evident / self-consistent. As a result, it has been augmented into formal semantics – a voyage has been set up from the epistemological concern to the metaphysical one! This developmental scenario will be clearer, in a while, as we start to sail down the sections.

2.1 The Birth of Ontology

2.1.1 Formal Semantics
The genesis of formal semantics is a result of the augmentation to the existing version of the philosophical logic. Otherwise, it has the same theoretical apparatus, which has been inherited from Descartes. Philosophical logic works by and large on the basis of the bare minimal semantics of the *syncategorematic* symbols, such as '¬', '∨', '∧', '→' etc., which are not basic expressions, in the sense that they are not members of any syntactic category. They are limited in number and hence constitute the closed class, which is 'logical' in nature. *Categorematic* symbols are assigned to syntactic categories, such as names, n-place predicates etc. (Dowty, Wall & Peters 1981: 16). These symbols are infinite in number; constituting an open class. Semantics of this closed class *syncategorematic* symbols governs the logical computation.

In addition to this, in formal semantics, as we have already seen, the point of interest shifts toward the propositional form. Since, the study of propositional form requires some extra attention to the *categorematic* symbols, formal semantics starts to feel the necessity of an ontological support, ultimately resulting into the conceptualization of the higher order type-theoretic logic. These *types* are syntactic in nature.

In spite of having traditionally held syncategorematic and categorematic distinction, we have the corresponding categorical specifications, in terms of 'e' and 't', representing a *term* and a *formula* respectively, along with the *law of cancellation* (Dowty, Wall & Peters 1981: 83-85). Now the system becomes much more general and adequate in comparison to its earlier versions, since it is minimally designed. The process of augmenting the traditional logic to formal semantics has been done by blurring the distinction between the syncategorematic and categorematic elements. Therefore, categorial specification of a lexical item, irrespective of its syncategorematic or categorematic nature, in terms of 'e' and 't', ultimately preconceives a nascent form of ontology.

Even after introducing higher order type-theoretic mechanism, formal semantics remains far away to fulfill the criteria for a self–evident / self–consistent system; since the concept of type, irrespective of its degree of richness, has a very insignificant contribution, to the ontological studies, primarily because of its syntacto-centrism.
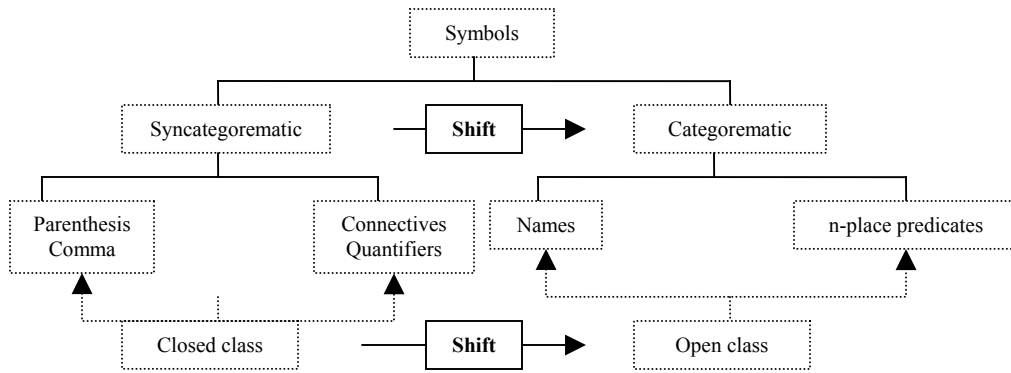
Symbols

Syncategorematic — **Shift** → Categorematic

Parenthesis Comma   Connectives Quantifiers   Names   n-place predicates

Closed class — **Shift** → Open class

Figure 2

2.1.2 Linguistic Semantics

Linguistic semantics has also faced same cumulative effect like formal semantics, though resulting in a different direction. It also makes a distinction between closed class vs. open class lexical items (Talmy 2000). Closed class lexical item, along with the notion of *selectional restriction*, determines the *semantic well-formedness*. The hypothesis of semantic well-formedness in linguistics has its root in logic, in terms of permissible computing operations, on one hand, and on the other, it has the nascent ontological support, the need of which has been felt by the formal semantics. As a result, linguistic semantics, also feels an internal urge to shift its points of interest to the semantics of the open class lexical item, from the closed class one. For example, consider the following two sentences:

(5)   John stabbed the man.

(6)   *A tree stabbed the man.

Sentence (6) is ill-formed because of the reason that the subject is not in accordance with the semantic necessity of the predicate (= stab), associated with it. The action of stabbing requires a human agency. Therefore, 'stab' will never *select* 'tree' as its subject. The point of interest is the existence of a developmental parallelism between the formal semantics and linguistic semantics. But in comparison to formal semantics, linguistic semantics goes far beyond the actual scope, by recognizing cognition, as an aspect of semantic concern. Incorporation of 'intellectual-simple nature', which constitutes the Cartesian foundation of metaphysics, now becomes inevitable, with the introduction of the long- awaited goal of ontology.

Unlike the logico-philosophical tradition, which, being heavily imbued with *extensionalism*, fails to understand the importance of the domain-modeling, by structuring the taxonomic information of the world, linguistics proclaims the goal of the *intentionalism*, by claiming that, 'to attain a self-evident / self-consistent system', one should consider the *domain of discourse*, system internally; since world is not something, lying outside, rather an emerging property of the brain. Once this point has been made cleared, a need of ontology becomes explicit.

3. The nature of *Ontology* and Science

Study of ontology, has two important facets, namely psychology and phenomenology. Psychological aspect of this story is an account of the world, which is subjectively relative (= penumbra). There also exists a world, as we have mentioned earlier, which is objectively relative – the world of phenomena (= umbra). This objectively relative world is being studied by the natural sciences. In science, we deal with the representation of the natural phenomena, obviously, in a higher order level, with a consideration that it exists irrespective of our subjective orientations; but in reality, the study of a natural phenomenon is relative to a subjective reference.

So, both kinds of relativisms, namely subjective and objective, are emerging properties of the human brain (Chomsky 2002). We know now, epistemological concern, as an symbol manipulation mechanism, is not enough to explore the enigma of the human mind, but a metaphysical anxiety about the existence may also be proved as a valid way to understand the nature of a self-evident / self-consistent system; since they embed each other. There is neither any episteme, devoid of metaphysics, nor any metaphysics, having no epistemological significance.

Once we agree with the claim that abstract concepts are the emerging properties of the human brain, it becomes the sole concern for the entire movement to address the *embodiment hypothesis*, which argues in support of the embodiment of knowledge, and its *evolutionary* aspect. Knowledge is not something which is dislocated; rather it is embodied within the socio-physiological world. To decipher this hidden chemistry of the embodied knowledge, study of language, no doubt, plays a crucial role, since as a social fact it is contingent to cultural evolution, and as a physical phenomenon, being necessitated by the biological evolution.

True, that language is a way to look into the mind, but not the only one. The ever emerging fields of science should also be considered among the other important avenues to mind. Science is a way to structure the taxonomic information of the world, which is objectively relative. If so, then isn't it tough to demarcate ontology and science, as two distinct domains? If our understanding of meaning of a certain concept is nothing but a matter of inferential licensing, then what is wrong in the blurring of the distinction between the scientific knowledge and the common sense metaphysics? These are the questions, what one has to face while entering into the new era of cognitive science.

Like all other categories, of the natural language, most of the categories of the science are mental in nature. Categorization as a process of cognition ascribes the properties to the so-called external world. If so, then the scientific reasoning also, like our natural language reasoning, is an emerging phenomenon of our body, because of being constrained by our sensori-motor system. Therefore, the Cartesian notion of *body*, now becomes an object of our rational enquiry – body is not something, from where the mind is dislocated or displaced; rather, the body along with the phenomenological considerations of different degrees, constitute the essential self, of the twenty first century.[4]

Finally, there is no such way to steal our discussion away from the importance of the social environment. We are aware of its importance, but to be precise, blurring of the distinction between social and individual will remain deferred, for some other occasion.
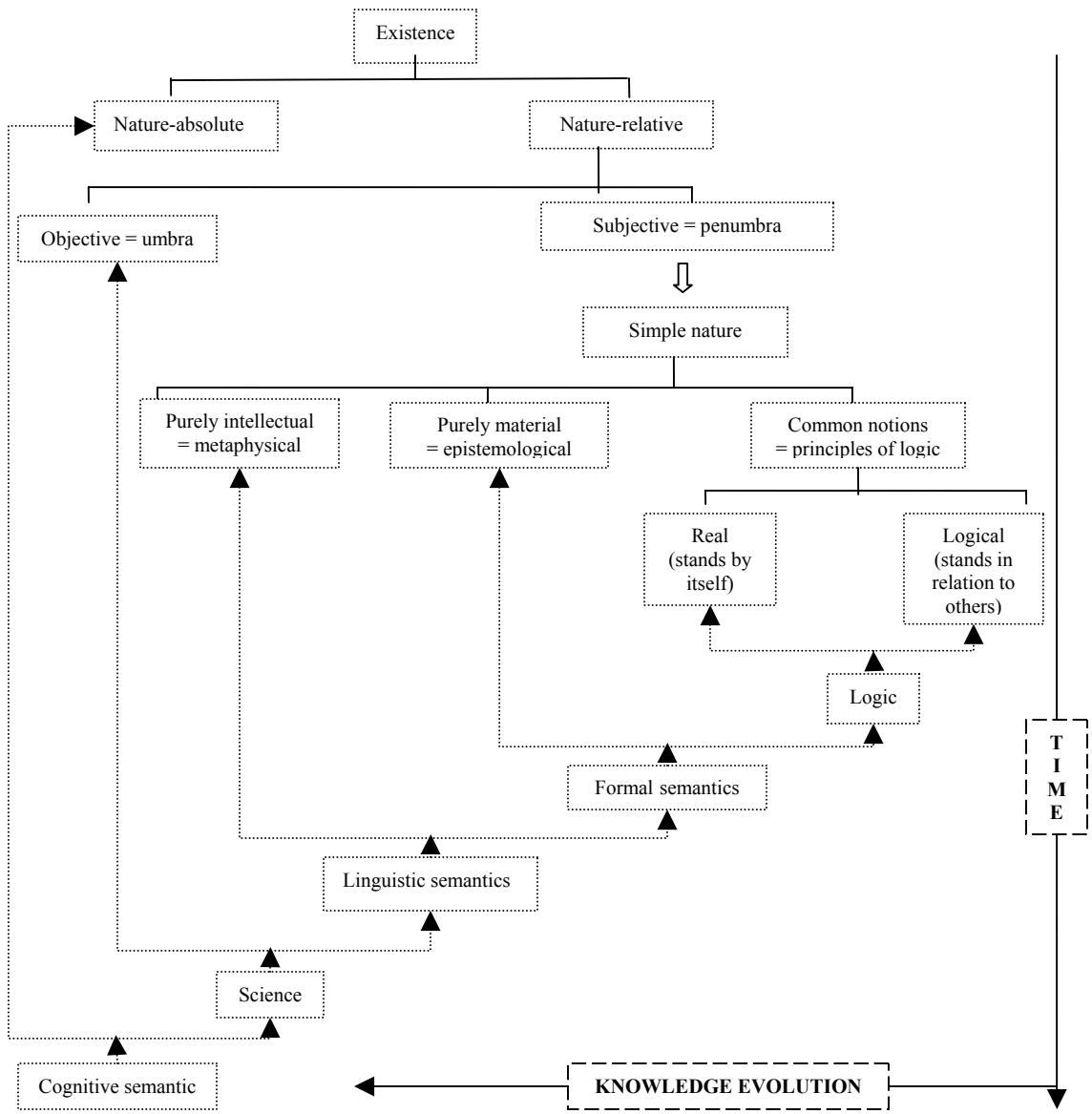
Figure 3

4. Cognitive Semantics and *Embodiment Hypothesis*

The basic assumption of cognitive semantics is the embodiment of the knowledge. In contrast with the Cartesian rationality, where the mind-body dualism plays a crucial role, cognitive semantics erases the three hundred years' old Cartesian boundary between 'nature-absolute' and 'nature-relative'. This boundary now becomes permeable. Semantic study now requires linguistic, as well as neurological signatures (Pinker & Ullman 2002). Whatever knowledge representation we have that should be verified in terms of the cognitive revolution, primarily on basis of the experiential evidences. Knowledge in

general, and meaning in particular is not a transcendental fact, rather it is a consequence of our physical existence, and the environment, where we, the rational agent, is situated. Of course, this one is not the recent finding. If we minutely examine the entire line of development then it will become prominent that embodiment hypothesis starts to germinate just after the Cartesian Meditation, by which our intellectual activity has been imbued, for last three hundred years. In our concluding session we will talk on this issue, since embodiment hypothesis by and large is considered as the self-proclaimed manifesto of the cognitive science in general and cognitive semantics in particular.

5. Conclusion

Cartesian argument upholds the view that mind and body are two different substances. Mind is non-extended, whereas body is extended. Mind-body interaction is impossible, because of having difficulty in explaining the causal interaction of a non-spatial mind and a spatial body, on any normal understanding of causality. In reaction to this issue, *occassionalism* argues that mind and body never causally interact, but run in two parallel realms, though perfectly synchronized, but un-touching. The synchronism is imposed by divine intervention. On the contrary, *epiphenomalism* claims that mental events are the reflection of the underlying physical events, but have no causal properties of their own. Finally the thesis of the *property dualism* claims that the mind consists of the non-spatial element of a spatial thing (here, *brain*) (Wilkinson 2000).

What is interesting here, is not the differences between these three anti-Cartesian traditions, rather the quest for an unknown substratum, where the impasse between the phenomenological world and physical world can be boiled down. In consonance with this grand dialectics, we would like to summarize the following points, which remain implicit in this paper:

(a)   Cartesian rationalism acts as a basic stable foundation of the scientific enquiry in general and cognitive semantics in particular.
(b)   Scientific knowledge is cumulative. So, the genesis of a theory should be properly rooted within the previous system of knowledge.
(c)   The development of cognitive semantics is a result of successive augmentation of the Cartesian notion of 'principles of logic'.
(d)   The amplification of the Cartesian core is a voyage towards the metaphysics from the Cartesian foundation.
(e)   This metaphysical turn ultimately directs towards the study of cognition, to understand the nature of the existence with fuller extent.

Notes:

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2. In Support of our claim, we would like to recall a similar developmental situation, in geometry, for an instance. It is not the case that prior to Euclid there was no geometry. History reveals the fact that even before Euclid, there was geometry, though not in a well-ordered form of rational enquiry, but as a collection of isolated geometrical facts, empirically discovered. It is Euclid, who put all the previous findings into an *axiomatic form*. But axioms are not *necessarily self evident*, since nothing is sacrosanct about an axiom. Therefore, a quest for a self-evident geometry continues its investigation, over the years, till the recent achievement of *non-Euclidean* school, (namely elliptic and hyperbolic geometries,) with the systematic violation of the axiomatic status of the fifth postulation. We will conclude by arguing that non-Euclidean geometry, being a result of the historical dialectics, in the field of rational enquiry, is an offshoot of early system of geometrical knowledge, which is being augmented successively.

3. Here to substantiate our point we would like to quote Markman and Dietrich (2000), where they have argued, "…the low level mediating states are not in error, but higher level states introduce error in the process of inheriting the relevant information and making categorical judgments".

4. "… (reason) is shaped crucially by the peculiarities of our human bodies, by the remarkable details of the neural structure of our brains, and by the specifics of our everyday functioning in the world." – Lakoff & Johnson (1999).

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