Two dogmatic assumptions of cognitive semantics

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ABSTRACT

The author describes two uncontrolled assumptions in cognitive semantics that researchers have barely discussed within this paradigm. Cognitive semantics shows how language shapes human knowledge and what are the basics of conceptualization in language. However, conceptualization must reflect parts of the manifest image of the world. Since primitive cognitive categories are taken from everyday bodily experience, they must form the world as it appears to be in a common prescientific view. The first dogmatic assumption of cognitive semantics says that concepts of folk psychology and common sense physics precede other concepts and categories. The second assumption presupposes the existence of a fundamental theory that could explain the basic concepts and origins of all human cognition and explain how fundamental and primary conceptualizations appear, how they are reflected in categories of language and why some of them precede others. In this sense, it appears to be a universal theory, a theory of all possible knowledge.

KEYWORDS

cognitive semantics; manifest image; George Lakoff; Mark Johnson; Ronald Langacker; image schema

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Cognitive semantics is the central part of cognitive grammar. It tries to capture the full range of meaning and mental phenomena with such tools as the theory of metaphor, mental spaces, frame theory, grounding and imaging. There is also a general consensus that cognitive semantics with its tools "constitutes a cluster of many partially overlapping approaches rather than a single well-defined theory" (Geeraets & Cuyckens, 2007: 3). The term cognitive indicates that meaning and related grammatical issues are considered mental phenomena. All mental phenomena are determined by the human way of experiencing the world. Therefore, the essential commitment of cognitive semantics is investigating conceptual structures and processes of conceptualization.

Language is understood in cognitive semantics in opposition to the transformational-generative view as a system that reflects the conceptual structure.

> The picture that emerges belies the prevailing view of grammar as an autonomous formal system. Not only is it meaningful, but it also reflects our basic experience of moving, perceiving, and acting on the world. At the core of grammatical meanings are mental operations inherent in these elemental components of moment-to-moment living. When properly analyzed, therefore, grammar has much to tell us about both meaning and cognition (Langacker, 2008: 5).

While describing grammatical patterns, one describes at least partially conceptual systems — the way we think, categorize and draw conclusions. There is a wide range of converging evidence in cognitive semantics that reveals the correlation between psychological patterns of perception and grammatical structure. Figure/background pattern, for example, not only mirrors our focus of attention in grammatical structures and their usage (Evans, 2007: 82), but also forms the structure of our knowledge and even shows how we understand language. Ronald Langacker writes:

> We can reasonably speak of background and foreground for any case where one conception precedes and in some way facilitates the emergence of another. In this broad sense, we can say that expressions invoke background knowledge as the basis for their understanding. Such knowledge is presupposed even by a detailed sentence (Langacker, 2008: 58).

Such patterns play a significant role in cognitive semantics. They are realized on a grammatical level and they allow us to understand language. However, it seems unclear how this realization of psychological patterns in cognitive semantics works.

In the early nineties, Langacker explained that cognitive linguists "believe that language is shaped and constrained by the functions it serves and by a variety of related factors: environmental, biological, psychological, developmental, historical, sociocultural" and, what is more, they "tend to believe that an understanding

of these factors is p r e r e q u i s i t e and f o u n d a t i o n a l to a revealing characterization of linguistic structure" (Langacker, 1991: 14). Seventeen years later the same author writes that "a conceptual semantic description is a major source of insight about our mental world and its construction" (Langacker, 2008: 4). Cognitive semanticists often introduce their studies as if they reveal the mind's nature through linguistic constructions. Vyvyan Evans and Melanie Green notice that for "cognitive semanticists, a language is a tool for investigating conceptual organization" (Evans & Green, 2006: 170). George Lakoff and Mark Johnson even attribute a philosophical role to cognitive semantics. Cognitive semantics not only "studies human conceptual systems, meaning, and inference" but "it studies human reason" as well (Lakoff & Johnson, 1999: 443).

If semantic description is a source of insight about our mental world it must be essential for understanding the biological, psychological, developmental, historical, sociocultural factors of human life as well. But in cognitive semantics these factors are foundations of language and at the same time they are shaped by the language. Such a relationship does not have to be contradictory, but without further explanation the discrepancy occurs here: on the one side, language is a product of essential factors of human life (psychological, biological, social). On the other, investigating language and its meanings allows one an understanding of the foundations of those factors.

At this point, the discrepancy — I will argue here — reveals cognitive semantics to be a theory of the manifest image of the world. The manifest image of the world is a concept offered by Wilfred Sellars in his seminal work *Philosophy and scientific image of man* (first published in 1962). Sellars introduces here the distinction between a scientific and manifest point of view. The manifest image encompasses conceptualizations and commonsense knowledge about human beings and their environment. Sellars describes the manifest image as "the framework in terms of which man came to be aware of himself as man-in-the-world" (Sellars, 2017: 6). The manifest image precedes a scientific view and provides common terms for describing the world as it appears to be in a human-scale. In the manifest image the sun rises and goes down but there are no galaxies or orbits of planets. Human beings are conceived to be persons and do things according to their will and character but there are no neuronal firings or information proceedings in the brain. If one adds the weight of a tomato to another tomato, one has a sum of both weights, but there are no defects in atomic masses. Cognitive semantics as a theory of manifest image reveals — I will claim — the conceptual structure of this common-sense world with its folk psychology and folk physics, rather than delivering insights into psychology, biology or physics.

Hence there are two uncontrolled assumptions in cognitive semantics which are barely discussed by researchers working within this paradigm. The first begins with the belief that primary cognitive categories are taken from everyday

bodily experience. If this is so, they must form the manifest image of the world. They form the world as it appears to be in a common prescientific view.

The first assumption of cognitive semantics therefore, is that concepts of folk psychology and common-sense physics taken from the manifest framework precede more sophisticated and complex concepts and categories of science. In other words, embodiment as an origin of the manifest image of the world with its intentionality, typical object manipulations, natural surroundings and social environment is the condition of all possible human knowledge and science. The embodiment hypothesis assumes the priority of the manifest image over science, and cognitive semantics tries to reveal the structure of the manifest image, while describing the way we understand language and its concepts.

The second assumption presupposes the existence of a fundamental theory that could explain the basic concepts and origins of all human cognition and provide an explanation of how fundamental and primary conceptualizations appear, how they are reflected in categories of language, and why some of them precede others. In this sense it seems to be a universal theory, a theory of all possible knowledge.

These two assumptions are well-known frameworks in the philosophical tradition. The first one can be called "manifest image priority over science". In the twentieth century it was problematized in philosophical discussion thanks to Ludwig Wittgenstein and Wilfred Sellars. The second one, which I shall name the "foundational view", seems to be at least as old as Plato's philosophy and it is still alive in reductionism and physicalism. Foundationalism and the manifest image are well established elements of the philosophical landscape. In cognitive semantics, however, they become rather more like dogmas than issues. Not discussed, barely supported by argumentation, they still build the horizon of explanations, and provide the main framework of investigation within the paradigm.[1]

The heuristics of the scientific and common understanding of the world arose in twentieth century philosophy. Many philosophers and scientists used to describe the discrepancy between a commonsense picture of the world and a scientific explanation of its phenomena. According to the phenomenological approach, a/the life world, *Lebenswelt*, is a common horizon of all possible

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[1] Willard O. Van Quine in his famous article *Two dogmas of empiricism* takes the clarity of the term dogma for granted, but his description allows the reconstruction of the concept. For Quine, dogma is an assumption that is never explained, in terms of a given paradigm or in any other way. Dogmatic assumptions, however, are clearly articulated in theory as if they were obvious. This can be seen with dogmas of empiricism — like a "fundamental cleavage between truths which are analytic, [...] and truths which are synthetic", and reductionism (Quine, 1980: 20) — cannot be empirically proven, the dogmatic assumptions of cognitive semantics are not supported by any argumentation within the paradigm.

objects. It is common because "we, each 'I-the-man' and all of us together, belong to the world as living with one another in the world; and the world is our world, valid for our consciousness as existing precisely through this 'living together'" (Husserl, 1970: 109). The *Lebenswelt* is the very beginning of human cognition, which is not individual but social, biological and cultural.

Arthur S. Eddington introduces a metaphor of two tables. Each of them symbolizes separate worlds: one of them seems to be familiar, well-known even, the other is everything but, "what spontaneously appears". In, the scientific world of physics the table is empty, and "in that emptiness numerous electric charges are rushing about with great speed". In opposition to that, the familiar world is comparatively permanent in the familiar world the table is a piece of furniture; it is steady, "it is colored; above all it is substantial" (Eddington, 2012: ix). Eddington concludes that "the world studied according to the methods of physics remains detached from the world familiar to consciousness" and, what is more, he notices that it is "true that the whole scientific inquiry starts from the familiar and in the end it must return to the familiar world, but the part of the journey over which the physicist has charge is in foreign territory" (Eddington, 2012: ix).

Sellars also uses the framework of two images to describe man in the world. He claims that the manifest image is a primary, commonsense framework that allows human beings to perceive themselves as a part of a group and a human-scale world. The manifest image consists of elements like mental causation, personhood, movement, objects, and other everyday concepts. Daniel C. Dennett describes it in the following way:

> The manifest image is the world as it seems to us in everyday life, full of solid objects, colors and smells and tastes, voices and shadows, plants and animals, and people and all their stuff: not only tables and chairs, bridges and churches, dollars and contracts, but also such intangible things as songs, poems, opportunities, and free will (Dennett, 2014: 37).

In contrast, the scientific image of man in the world "emerges from the several images proper to the several sciences" (Sellars, 2017: 20). All of the specific sciences describe human beings and their world as complex systems that could be interpreted eventually in terms of physics. Both images answer the question "what exists?" with a very different set of concepts. In the manifest image, there are human-scale objects and mental phenomena, including mental causation. In science, however, there are particles, chemical elements, genes and galaxies, black holes, suns, and planets — objects of all scales that are not limited to the human body and its activities.

So, there is a significant discrepancy between the manifest image and the scientific image. Both put forward claims of methodological priority. According

to some philosophers (with cognitive semanticists among them), every theory is constructed on the foundation of the manifest image. As Sellars puts it,

> the categories of theoretical science are logically dependent on categories pertaining to its methodological foundation in the manifest world of sophisticated common sense in such a way that there would be an absurdity in the notion of a world which illustrated its theoretical principles without also illustrating the categories and principles of manifest world (Sellars, 2017: 20).

Here, science is just a further development of the manifest image. The concepts of the manifest image are mostly pervasive, essential, and can be specified but not denied by scientific investigation. Alternatively, from the point of view of science, the manifest image can be taken as a valuable heuristic of what is real in the human-scale world. According to scientific image, theory or statement eventually finds its possible adequacy only in science. Science decides if some parts, principles and concepts of the manifest image are true or not or even if they exist. Within the scientific image the wind does not blow, the sun does not shine and there are no summer heats. There is no room for many common objects and events of the manifest image. What exists according to science is the movement of molecules, the orbit of planets, explosions on the surface of the stars.

Sellarsian heuristics of the two images can be understood as a source of discussion about reductionism. The tension between the images seems to reveal, on a closer examination, the question about the reducibility of elements of the manifest image to the scientific framework.

> Frameworks for Sellars are of varying scope — from a simple theory to a comprehensive view of man in the universe. Comprehensive frameworks can incorporate large numbers of individual theories. Sellars discusses reducibility problems in terms of c o m p r e h e n s i v e frameworks — of which he gives two examples, the manifest image and the scientific image (Russman, 1978: 74).

Discussion about the reducibility of the objects of one framework to those of the other is, to a great extent, an attempt to answer the question of what "really exists". In parallel to this, however, there arises the problem of concepts and explanation. Embodied conceptualizations, no doubt, can be explained by scientific models. The possibility of this explanation does not mean that common conceptualizations are ruled out or meaningless. On the other hand, it does not mean that embodied conceptualizations are *a priori* or independent.

In the philosophy of the mind, the problem of reducibility is widely discussed. Proponents of reductionism generally claim that mental phenomena can be translated into the terms of science and explained within its models.

Reductionism covers many standpoints such as physicalism or eliminativism, or functional reduction. There are many anti-reductionistic views in opposition to it, which claim reduction (at least of certain mental concepts) to be impossible. Thomas Nagel (a famous antireductionist) introduces two kinds of antireductionism: the ontological, which "is the position that some physical phenomena, even though they can be explained in terms of principles that fit their specific features, simply do not have an explanation at the ultimate level, that is, in terms of the universal laws governing their ultimate constituents", and the epistemological, which "holds that even if in reality everything is explained by particle physics, we cannot, given our finite mental capacities, grasp the ultimate explanation of most complex phenomena, and would not be able to do so even if we knew the law or laws governing their ultimate constituents" (Nagel, 1998: 6).

The wording of the latter formulation can be understood, I think, in the following way: even if in reality everything is explained by science (like physics), we cannot grasp the ultimate explanation, even if we knew the laws governing the ultimate constituents of the world, because our mental capacities are limited by the concepts of the manifest image. We can understand the world only through and thanks to our bodily interactions with the environment. This is why Nagel supplements his explanation of epistemological reductionism: "We are therefore constrained to make do with rougher explanations couched in terms that our minds can accommodate" (Nagel, 1998: 7). Our mental capacities are limited to the repertoire of bodily interaction with the environment. According to this interpretation, basic concepts that are shaped by everyday experience and form the structure of the manifest image with its folk theories are not merely the source of possible knowledge but also continue to shape our understanding.

This is the dogmatic assumption of cognitive semantics, and it seems to be undisputable within this paradigm. However, it is a controversial standpoint within philosophy, and if one wants to defend this idea, one has to be prepared to face a long list of counterarguments.

According to the first dogmatic assumption, embodied categories are *a priori* in respect of scientific ones in the historical and cognitive sense, and they enable scientific modeling. Within the scientific image temperature is translated into the mean kinetic energy of molecules, and one can argue that what really exists are molecules. In order to understand what a molecule is, one needs to have a simple image of something that is very small, so small that it is invisible to the naked eye. To understand what kinetic energy is, one needs to have an embodied concept of movement that can be acquired only within the manifest framework. In this way, embodied, everyday life conceptualizations are conditions of the possibility to understand the world and to construct scientific models. They build the origins of science, and every single element

of a possible scientific model must be either derivable from the manifest image or impossible to understand.

The emergence of the manifest image from basic conceptualization is commonly called the embodiment hypothesis. In their ground-breaking book Eleanor Rosch, Francisco Varela and Evan Thompson define the embodiment:

> cognition depends upon the kinds of experience that come from having a body with various sensorimotor capacities, and... these individual sensorimotor capacities are themselves embedded in a more encompassing biological, psychological, and cultural context (Varela, Thompson, & Rosch, 1992: 173).

Other authors claim in the same way:

> To say that cognition is embodied means that it arises from bodily interactions with the world. From this point of view, cognition depends on the kinds of experiences that come from having a body with particular perceptual and motor capabilities that are inseparably linked and that together form the matrix within which reasoning, memory, emotion, language, and all other aspects of mental life are meshed (Thelen *et al.*, 2001: 1).

Tim Roher describes twelve concepts (senses) of embodiment in Cognitive Linguistics: from the directionality of metaphorical mappings, through being situated in social relationships and culture to humanoid robot projects (Roher, 2010: 28–31). The senses of embodiment cluster about two poles of attraction: embodiment as an experiential and as a bodily substrate (Roher, 2010: 31). In the first cluster, "the term refers to dimensions that focus on the specific subjective, cultural, and historical contextual experiences of language speakers", whereas the second one "emphasizes the physiological and neurophysiological bodily substrate" (Roher, 2010: 31). In both cases "it is a very live question as to whether the embodiment hypothesis is an empirical scientific hypothesis, a general theoretical orientation, a metaphysics, or some combination of all of these" (Roher, 2010: 28). Only in its experiential shape (the first cluster), does the embodiment hypothesis lead to the dogmatic assumption of the manifest image priority.

The embodiment hypothesis expresses the central position of the human body, culture, and environment in the world; therefore, it takes for granted the priority of human-size objects, artifacts, of socialization and its concepts. The obvious consequence of experiential-like ideas of the embodiment is not only the priority of our way of experiencing but also psychologism in epistemology (Itkonen, 2005: 151; Itkonen, 2016: 16).

Cognitive semantics shows how language shapes human knowledge and what are the basic units of language and understanding. As long as scientific theories are formulated in language, cognitive semantics describes the basic

units of theories as well. The basic units are embodied patterns that precede beliefs and neither need nor allow justification.

The modern debate in analytic philosophy was governed by the discussion of beliefs and their justification. The problem of the fundaments of knowledge can be considered as a matter of origins, the undoubted, primary assumptions of sciences and basic concepts. Questions as to whether all knowledge rests ultimately on the foundation of non-inferential elements, what the primary postulates are, and the possibility conditions of science itself are frequently raised within philosophy.

All these issues do have two things in common. Firstly, they generally assume an architectonic structure of human cognition and knowledge. This assumption voices that there are fundaments of knowledge. This view was described as a traditional idea of science (Baumgartner, 1994). Secondly, they share the conviction that some concepts are acquired before others. Some may be innate for example and therefore need no justification. These basic concepts build the base of the conceptual system, combining into further concepts of a higher level.

In early empirical theories, for example, sensual data constitute simple ideas. Those simple ideas form complex ideas during the cognitive operation of the mind. In his *Critique of pure reason*, Immanuel Kant shows how innate categories form sensual impressions. Edmund Husserl carefully describes passive sensual syntheses that constitutes an object with its properties in a field of view.

Foundationalism is not only the question of the justification of given beliefs, as it is frequently described, but also the question (as it was in Locke, Kant and Husserl's investigations) of how the belief itself could be possible, how it is awakened, how it could emerge and what categories constitute necessary primary beliefs. The pattern within foundationalism seems to be quite simple: some basic units or structures (usually concepts) that are acquired before others (or they are *a priori*) later form much more complicated units. The task of foundational theory is to find those basic units or structures, describe the rules that govern them and justify their priority.

A very good example of how the structure of the manifest image is described in cognitive semantics can be found in Leonard Talmy's work. Talmy explains what spatial conceptualizations can be found in language and how we express them. He calls his explanation "figures and ground geometries" and enumerates the possible relationships of figure and background. Qualitative geometries describe how prepositions indicate different geometric configurations as in "across", "through", "within", etc., (Talmy, 2000: 193 ff.), how we localize objects that are in asymmetry of directedness or being at some distance from something, or touching a part (Talmy, 2000).

Commonsense spatial relations are barely present in geometry, although understanding them and recognizing them in the human-scale world and

mapping them into syntactical structure form core schemas of the manifest image. Spatial configurations of objects (figure and background) allow us to understand how — let me repeat Sellars' definition once again — man came to be aware of himself as man-in-the-world. Those spatial configurations (as within, behind, in front of, *etc.*) constitute the structure of the human scale environment and allow us to understand human-scale commonsense physics. Therefore, cognitive semantics investigates the structure of the manifest image of the world. The question as to whether geometry (in a mathematical sense) is possible without understanding spatial relationships between figure and background and their expressions in languages is not answered by Talmy. Although if understanding language is necessary for developing scientific knowledge, it must be so — semantical geometries must be prior to geometry as science and make it possible.

Another striking example of how cognitive semantics describes the structure of the manifest world can be found in Lakoff and Johnson's works. Their early book *Metaphors we live by* offers a model of metaphorical projection, where "[t]he essence of metaphor is understanding and experiencing one kind of thing in terms of another" (Lakoff & Johnson, 2003: 5). Moreover "the nature of our bodies and our physical and cultural environment imposes a structure on our experience, in terms of natural dimensions" (Lakoff & Johnson, 2003: 230). As Lawrence Shapiro puts it, "our understanding of abstract concepts depends on a metaphorical expansion of more familiar concepts, and our understanding of more familiar concepts depends on a metaphorical expansion of basic concepts" (Shapiro, 2011: 88).

This model of combinational thinking (basic units are combined into more complicated structures) is repeated not only in generative grammar and objectivist theories of meaning, strongly criticized by Lakoff (Lakoff, 1987), but also by some theories in cognitive semantics. On a basic level, Mark Johnson claims, there are non-propositional image schemas. He defines an image schema as "a recurrent pattern, shape, and regularity in, or of [...] ongoing ordering activities. These patterns emerge as meaningful structures for us chiefly at the level of our bodily movements through space, our manipulation of objects, and our perceptual interactions" (Johnson, 1987: xiv, xvi). Moreover he "conceive[s] of them as structures for organizing our experience and comprehension" (Johnson, 1987: 27).

Langacker writes that:

> schematization is fundamental to cognition, constantly occurring in every realm of experience. The extraction of a schema is simply the reinforcing of something inherent in multiple experiences, at whatever level of granularity their commonality emerges. A schema should therefore be seen as immanent in its varied instantiations, not as separate and distinct (even if shown individually for analytical purposes).

> By its very nature, a schema serves a categorizing function: capturing what is common (Langacker, 2008: 56–57).

Image schemas are prerequisites of concepts. Johnson enumerates twenty–seven examples of image schemas, including balance, force, movement and container, and claims them to be categories in the Kantian sense that forms transcendental basic concepts. If it is so, they form universal foundations of what is called the manifest image. Allan Cienki analyzes the properties of Johnson's schemas. He describes three properties shared by schemas. These are firstly, bi-polarity, secondly, dynamic nature, and thirdly, superposition. Schemas are positively valued as compared with their oppositions like center/periphery, near/far or part/whole schemas (Cienki, 1997: 4) and this is bi-polarity. Secondly, they have a static or dynamic nature — so they can represent a process or a state, as in the case of the path schema where objects move from one point to the other. Thirdly, schemas can build superposition, that is "image schemas are often experienced together... in an experiential gestalt structure" (Cienki 1997: 7), as in the connections of path, scale and force schemas, when speaking, for example, about the strong impetus of a rushing train.

Sellars does not believe that we could know how we come to have the manifest image. He writes:

> The manifest image does not present conceptual thinking as a complex of items which, considered in themselves and apart from these relations, are not conceptual in character. (The most plausible candidates are images, but all attempts to construe thoughts as complex patterns of images have failed, and, as we know, were bound to fail) (Sellars, 2017: 15).

Nonetheless, Johnson's theory of image schema can be interpreted as a successful "attempt to construe thoughts as complex patterns of images". The Image schema theory shows how the manifest image can emerge from experiential embodied interactions.

In their book *Philosophy in the flesh*, Lakoff and Johnson apply the theory of metaphors and image schemas. They also present the concept of the cognitive unconscious that "plays a central role not only in conceptualization but in creating our world as we experience it" (Lakoff & Johnson, 1999: 453). The cognitive unconscious consists of embodied concepts that "include basic-level concepts, spatial-relations concepts, bodily action concepts (*e.g.*, hand movement), aspect (this is, the general structure of actions and events), color, and others" and what is most important here "abstract concepts arise via metaphorical projections from more directly embodied concepts [...] there is an extremely extensive system of conceptual metaphor that characterizes abstract concepts in terms of concepts that are more directly embodied" (Lakoff & Johnson, 1999: 453).

   These commonsense conceptualizations of actions (with their aspects) and objects with their common properties, furnish the manifest world. According to Lakoff and Johnson, the cognitive unconscious explains the philosophical problems and disagreement among philosophers about certain issues:

> Our preponderance of commonplace basic experiences-with basic-level objects, basic spatial relations, basic colors, and basic actions leads us to the commonsense theory of meaning and truth, that the world really, objectively is as we experience it and conceptualize it to be [...] the commonsense theory works very well in ordinary simple cases precisely because of the nature of our embodiment and our imaginative capacities. It fails in cases where there are conflicting conceptualizations or worldviews, and such cases are quite common (Lakoff & Johnson, 1999: 453).

Cognitive semantics is not a commonsense theory in itself. It describes how we commonly make sense of our experiences, in other words, how our manifest image of the world emerges. This can be applied to philosophy.

> It is our claim that philosophical theories are attempts to refine, extend, clarify, and make consistent certain common metaphors and folk theories shared within a culture. Philosophical theories, therefore, incorporate some collection (perhaps in a more precise form) of the folk theories, models, and metaphors that define the culture that they emerge in (Lakoff & Johnson, 1999: 453).

The description of philosophical problems "in the flesh" highlights that they are built on inconsistent metaphors. For example, the philosophy of mind has its origins in many different metaphors, as Mind Is a Container or Mind Is a Machine, and their contradictory implications. In this way, cognitive semantics tries to explain how "the whole undertaking of philosophical inquiry requires a prior understanding of the conceptual system in which the undertaking is set" (Lakoff & Johnson, 1999: 453).

The same strategy was applied to mathematics by Lakoff and Núñez (Lakoff & Núñez, 2001). In their work, *Where the mathematics comes from?*, they apply the idea of Saunders Mac Lane, who writes that "the real nature" of structures which mathematicians have described "does not lie in their often artificial construction from set theory, but in their relation to simple mathematical ideas or to basic human activities" (Mac Lane, 1981: 470).

Lakoff and Núñez try to show how a "great many cognitive mechanisms that are not specifically mathematical are used to characterize mathematical ideas" and they add that these primary mechanisms "include such ordinary cognitive mechanisms as those used for the following ordinary ideas: basic spatial relations, groupings, small quantities, motion, distributions of things in space, changes, bodily orientations, basic manipulations of objects (*e.g.*, rotating and stretching), iterated actions, and so on" (Lakoff & Núñez, 2001: 28). Examples

of those manifest "ordinary ideas" are the concept of a class that "makes use of the everyday concept of a collection of objects in a bounded region of space" or the concept of recursion that "makes use of the everyday concept of a repeated action" (Lakoff & Núñez, 2001: 28). So this is why "the only access that human beings have to any mathematics at all, either transcendent or otherwise, is through concepts in our minds that are shaped by our bodies and brains and realized physically in our neural systems" (Lakoff & Núñez, 2001: 346).

Although Núñez and Lakoff do not use the term cognitive semantics in their book, the method is exactly the same. They claim, for example, that there exists a basic metaphor for algebra. "Algebra is about essence. It makes use of the same metaphor for essence that Plato did — namely, Essence Is Form" (Lakoff & Núñez, 2001: 110) and it was Euclid who "brought the folk theory of essences into mathematics in a big way" (Lakoff & Núñez, 2001: 109). The central idea of the authors here is this: if one can recognize the form of a tree or triangle or any other object, one can answer the question "how many trees or triangles are there?". So the countable quantity requires the Essence Is Form metaphor because at the very beginning, any collection of any objects has its quantity only as far as we can recognize different forms. For example, if one recognizes something as wooden blocks, one can say there are two wooden blocks. This is how commonsense conceptualizations of the manifest image allow us to build algebra. "The folk theory of essences is part of what constitutes our everyday 'common sense' about physical objects; that is, it is part of the unconscious conceptual system that governs our everyday reasoning" (Lakoff & Núñez, 2001: 109).

Another founding metaphor in mathematics is Arithmetic Is Object Collection. It maps operations from the source domain (object collection) onto the target domain (mathematical addition). A collection of objects, like wooden blocks, can be enlarged by adding other elements or collections, and in this way, we form the basic concept of the operation that is called addition. By taking a smaller collection from a larger, we form the concept of subtraction. Two collections of the same size give the concept of number. There can be greater and smaller collections, which enable us to form the mathematical concept of bigger than and smaller than (Lakoff & Núñez, 2001: 432). The central idea behind this is that manipulation with objects forms a condition of the possibility of mathematical concepts. It shows how common and basic conceptualizations like having a collection give rise to scientific notions like numbers.

This idea seems to be the general characteristic of cognitive semantics. Not only mathematics but also the manifest image and its refinement in sciences derive from basic conceptualization. If scientific models are able to explain the manifest phenomena (like the wind, warmth, taste and the redness of a tomato), it still remains impossible to introduce and understand scientific explanations outside the manifest image considering that embodied conceptualizations

form the fundaments of our knowledge. Cognitive semantics describes how we build and use those categories, thereby, it seems to provide an explanation of how human knowledge and science could be possible in general.

This is how the first dogmatic assumption of cognitive semantics arises. It implies a strong thesis: every scientific concept, every concept in general is a refinement of a basic embodied meaning that forms the manifest image of the world. In other words, every notion in science has its origins in how we experience the world. It leads to a second dogmatic assumption, the standpoint which I would like to call a reversed reductionism — every scientific notion is at least traceable to common experience and can be explained or analyzed in cognitive semantics. Cognitive semantics, therefore, brings back to life the old idea of a universal theory. Both assumptions are expressed but not discussed in cognitive semantics.

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