

**The Embodied Mind:
The Metaphoric Character of Abstract Conceptualization**

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In this paper I plan to take a closer look at Lakoff & Johnson’s theory of the embodied mind. The mind is embodied, in that it is functioning only as a result and within the limits of the body we possess. Due to this fact, Lakoff & Johnson claim that the way we conceptualize cannot but be neurally grounded. Conceptual metaphor, which enters their theory as the crucially important neural mechanism of cognition, according to Lakoff & Johnson, defines most of our thinking and is responsible for our making sense of abstract concepts as such.

In section 1, I will be looking in detail at one of the corner-stone claims of their theory – the unconscious character of our abstract thinking. As Lakoff & Johnson suggest, all our reasoning is possible due to the existence of the so-called cognitive unconscious, which is simultaneously the background and the necessary condition of our very ability to make sense of our experience. An important point to make here is that this cognitive unconscious operates based on our bodily (physiological) experience of the world. Section 2 will illustrate how our embodied abstract conceptualization works in the case of the basic abstract concept of time. I agree with Lakoff & Johnson’s claim that time is impossible to think of, except for in terms of other – physical – domains that we use to project onto the notion of time (as well as many other basic abstract notions). Section 3, however, is more critical of Lakoff&Johnson’s theory of embodied mind. Essentially, Lakoff & Johnson’s *embodiment* implies more than our ability to project our bodily experiences to talk about abstract domains. Lakoff & Johnson claim that this projection is neurally grounded. What they mean by this is that the projections we make from the physical into the abstract (what they call “metaphors”) have a neural mechanism at their foundations. This claim is supported by certain neuroscientific experiments, which I will cite in this section. Despite the evidence being persuasive in simple cases, Lakoff&Johnson’s theory does not stand to the test of more complex abstract notions (e.g. some moral concepts), as their *embodiment* concept turns out to be too far from being just sensorimotor and has to extend to all kinds of experiences that we, humans, might have. Thus Lakoff & Johnson have to switch between the strictly physiological and the metaphorical embodiment, including all spheres of human interactions with the world and one another.

My aim in this paper is to explain what Lakoff & Johnson mean by the metaphoric character of abstract conceptualization, as well as how they support their claim that thinking is a neurally grounded process. Even if their theory about the nature of basic abstract concepts is a scientific breakthrough, there are still gaps and inconsistencies in the way they lay out their argument. My final task here will be to point out these inconsistencies and to suggest some ways of overcoming them.

§ 1. The Embodied Mind: Cognitive Unconscious at Work

Philosophy in the Flesh (1999) presents a comprehensive account of Lakoff & Johnson’s views on the nature of mind and abstract conceptualization. Lakoff & Johnson start the book with three main claims lying at the foundation of their theory: (1) the mind is inherently embodied; (2) thought is mostly unconscious; (3) abstract concepts are largely metaphorical.¹

¹ G. Lakoff and M. Johnson, *Philosophy in the Flesh* (1999), p. 3.

These claims are the cornerstones of what Lakoff & Johnson call *experientialism*, or *embodied realism* – the view aiming at combining, rather than juxtaposing, the traditional dichotomies of the mental/physical, the innate/learned, the objective/subjective, etc. Let us start by examining the second of their three claims².

To explain how conceptualization as such takes place Lakoff & Johnson postulate the so-called *cognitive unconscious* – “the hidden hand that shapes conscious thought”.³ For example, they explain, when you hear and understand a sentence you are unconsciously also doing such things as:

accessing memories relevant to what is being said;
comprehending a stream of sound as being language, dividing it into distinctive phonetic features and segments, identifying phonemes, and grouping them into morphemes;
... picking out the words and giving them meanings appropriate to context;
making semantic and pragmatic sense of the sentences as a whole;
*framing what is said in terms relevant to the discussion, etc.*⁴

Hence:

Consciousness goes beyond mere awareness of something, beyond the mere experience of qualia ... beyond the awareness that you are aware, and beyond the multiple takes on immediate experience provided by various centers of the brain. Consciousness certainly

² Claim (1) will be examined in section 3 of this chapter, and claim (2) in section 2. I anticipate the question why I am analyzing these claims in the following order. I consider this order more convenient for me to present my argument (and for the reader to have a clearer understanding of what is happening).

³ *Philosophy in the Flesh*, p. 12.

⁴ *Ibid.*, p. 10.

involves all those plus an immeasurably vaster constitutive framework provided by the cognitive unconscious...⁵.

The cognitive unconscious is thus necessary for consciousness as such to operate. It plays a constitutive role, as our conscious thought has to be situated in a certain context provided by a summary of our physical experience of the world. This summary need not be attended to when we do abstract conceptualization, but, speaking metaphorically, it is the air our consciousness “breathes”. The framework Lakoff & Johnson are talking about necessarily *has* to be embodied, as the world, all things in it and all phenomena are unconsciously (and naturally) filtered through our human body, with its five senses, its perception of space and balance, its flesh and blood. In other words, the mind emerges from the body.

According to Lakoff & Johnson’s theory, our cognitive unconscious, the framework our consciousness is situated in, is responsible for our conscious conceptualization and categorization of the world. Let me explain how it is possible. As early as in *Women, Fire, and Dangerous Things* (1989), in describing the mechanism of conceptualization, Lakoff states that there are preconceptual building blocks which our mind (read *cognitive unconscious*) uses to build more complex concepts from.

1. There are at least two kinds of structure in our preconceptual experiences:

A. Basic-level structure: Basic-level categories are defined by the convergence of our gestalt perception, our capacity for bodily movement, and our ability to form rich mental images.

B. Kinesthetic image-schematic structure: Image schemas are relatively simple structures that constantly recur in our everyday bodily experience: containers, paths, links, forces,

⁵ *Ibid.*, p. 11.

*balance, and in various orientations and relations: up-down, front-back, PART-WHOLE, CENTER-PERIPHERY, etc.*⁶

These building blocks are not atomic, the way they would have to be from the point of view of objectivism. They are gestalts rather than non-divisible “primitives” which traditionally are held to lie at the bottom of classical objectivist categorization. To illustrate this, let me turn to the first of the two basic sorts of these building blocks.

Basic-level concepts, which come first in Lakoff & Johnson’s classification, are the famous folk categories of things in the world that have appeared as a result of our interactions with the environment:

*Our perceptual systems have no problem distinguishing cows from horses, goats from cats, or elephants from giraffes. In the natural world, the categories we distinguish among most readily are the folk versions of biological genera, namely, those that have evolved significantly different shapes so as to take advantage of different features of their environments*⁷.

These basic-level categories are what the authors call the mid-level in the categories hierarchy. For example, in the hierarchy *vehicle – car – sports car*, “car” is the basic level of the category, and is contrasted with “vehicle” on the superordinate level, and “sports car” on the subordinate level. At the same time “car” is perceived as a gestalt, in that if we imagine a car (or talk about a car) we first get an overall image of it, rather than attending to every detail:

Gestalts for general overall shapes (e.g., the shape of an elephant or a giraffe or a rose) are relatively rich in structure. Still, they occur preconceptually as gestalts, and although

⁶ G. Lakoff, *Women, Fire, and Dangerous Things*, Chapter 16.

⁷ *Philosophy in the Flesh*, p. 27.

*one can identify internal structure in them, the wholes seem to be even already psychologically more basic than the parts*⁸.

Furthermore:

*We have basic-level concepts not only for objects but for actions and properties as well. Actions like running, walking, eating, drinking, etc. are basic-level, whereas moving and ingesting are superordinate, and kinds of walking and drinking, say, ambling and slurping, are subordinate...*⁹

Lakoff & Johnson see the projection of these basic-level categories onto the subordinate and superordinate levels as one of the ways our abstract categorization goes, our mind particularizing in one case, and generalizing in the other. A quick reminder: *these basic-level categories comprise the non-metaphoric content of our cognitive unconscious*¹⁰.

The second way of building complex abstract concepts *is* metaphorical¹¹, namely, with the help of *image-schemata*¹², a term Lakoff & Johnson have consistently used throughout the whole history of their hypothesizing about the nature of abstract conceptualization. This notion is of extreme importance to their claim that most of our abstract thinking turns out to be metaphorical,

⁸ *Women, Fire, and Dangerous Things*, Chapter 17.

⁹ *Ibid.*, Chapter 17.

¹⁰ This part of Lakoff & Johnson's theory is often left out by their opponents claiming that Lakoff & Johnson's idea of abstract thinking is completely metaphoric.

¹¹ This point is fiercely criticized by Lakoff & Johnson's opponents who, in their turn, claim that Lakoff & Johnson exaggerate the role of metaphor in abstract conceptualization. As the reader will see later, S. Pinker claims that much of abstract thinking is "concrete", or literal. According to him, our mind does not need to preserve the metaphorical connections Lakoff & Johnson point to. Thus, what Lakoff & Johnson consider metaphor (and what is traditionally called "dead metaphor") belongs to the sphere of purely literal concepts. However, as we move on, we shall notice that Pinker's attack on this part of Lakoff & Johnson's theory is not supported. Rather, the evidence cited by Lakoff & Johnson reveals that the so-called "dead" metaphor is still distinguished by common users from the literally used terms. It also reveals that we can create new metaphors on the basis of the allegedly literalized ones. All this proves that a significant part of abstract thinking has to be metaphoric.

¹² Johnson admits that he has borrowed the term from Kant, but his image schemas are not purely in the sphere of the mental, they are not internal "mental representations" of the external world. Rather, they *are* what we have for our reality.

as it is these image schemas, which are a summary of our physical experience, that get projected into the domain of abstract concepts, making it possible for us to conceptualize the abstract experience we come across.

Although image schemas are also gestalts (*e.g.*, the CONTAINER schema necessarily has to have an “interior”, an “exterior” and the “content”), they are too generalized to be equated with actual mental images. They are present in our cognitive unconscious as a very generalized, schematized summary of our experience of containers, paths, links, blockages, *etc.* This very generalized, schematized, form allows our cognitive unconscious to fill in the abstract content.

For example, on the simplest level we encounter the *metaphorical* use of, say, the UP-AND-DOWN schema. We come across this latter everyday – when we watch the level of water go *up* in the glass, when we get *up* and stay *up* all day (functioning, healthy), whereas if we fell sick we would be lying *down*, *etc.* As a result, the UP-AND-DOWN schema has multiple applications in our abstract thinking: we perceive GOOD as UP, HAPPY as UP, HEALTH as UP, ALIVE as UP, CONTROL as UP, STATUS as UP¹³ (and, correspondingly, the opposites of the above-mentioned notions employing “DOWN”).

On a higher level of conceptualizing, different combinations of basic-level concepts and image-schemas serve to form something that Lakoff & Johnson first call *idealized cognitive models*, or *ICMs*, and later call either *metaphors* or *frames*, which will be discussed in more detail in the next section.

¹³ See *Metaphors We Live By* (1980) for a detailed analysis of the usage of this and other image schemas.

§ 2. *The Embodiment of Basic Abstract Notions: Time*

We can now take up the third of Lakoff & Johnson’s foundational claims about the nature of mind, namely about the metaphorical character of our abstract thinking. Again, Lakoff & Johnson define metaphor broadly, as “a cross-domain mapping in the conceptual system”. Moreover, “the locus of metaphor is not in the language at all, but in the way we conceptualize one mental domain in terms of another”¹⁴ – where “another” also means for them a particular physical domain, namely a bodily domain.

Let us take a look at how this mapping works in the case of the concept of time. Lakoff & Johnson state a seemingly simple fact: time is understood in terms of space. Thus, when we talk about time we get the following metaphors:

The Time Orientation Metaphor

The Location of the Observer	→	The Present
The Space in front of the Observer	→	The Future
The Space behind the Observer	→	The Past

Linguistic expressions of this metaphorical mapping include: “That’s all *behind* us now. Let’s put that *in back of* us. We’re looking *ahead* to the future. He has a great future *in front of* him”.¹⁵

Other spatial metaphors we use to talk about time include the *Moving Time* metaphor and the *Moving Observer (or Time’s Landscape)* metaphor. In the first case events are moving past us as we observe them, in the second, we move along the time’s landscape. Let me show the way the mapping takes place in the second case to illustrate the complex character of the metaphor:

¹⁴ G. Lakoff (1982), “The contemporary theory of metaphor”, p. 1.

¹⁵ *Philosophy in the Flesh*, p. 140.

*The Moving Observer Metaphor*¹⁶

Locations on the Observer’s Path of Motion → Times

The Motion of the Observer → The “Passage” of Time

The Distance Moved by The Observer → The Amount of Time “Passed”¹⁷

Combine this with the above-mentioned Time Orientation metaphor and you’ll get the whole scenario of what is happening. Moreover:

Since time is a path on the ground the observer moves over, it has extension and can be measured. Hence, the amount of time can be long or short. An extent of time can also be bounded; therefore, one can perform an action within an allotted time...:

There’s going to be trouble *down the road*. Will you be staying a *long* time or a *short* time? ...Let’s spread the conference *over* two weeks. We’re coming *up on* Christmas. ... We *passed* the deadline¹⁸.

The reader might be surprised at the seeming contradiction between the *Moving Observer* metaphor where we move along the time “path”, and the *Moving Time* metaphor. In reality, although these two metaphors are inconsistent with one another, they are what Lakoff & Johnson call “*the figure-ground reversals of one another*”¹⁹ (this phenomenon is not confined to time metaphors only, as it turns out). To me this comparison conveys something like an optical illusion, when it is unclear if the train is moving or the landscape outside the window is in motion – it is relative to a point of view, in the end.

¹⁶ If the reader recalls different types of image-schemas postulated by Johnson in *The Mind in the Body*, she’ll be sure to find some of them at play here (e.g., the FRONT-BACK schema, the SOURCE-PATH-GOAL schema, etc.).

¹⁷ *Philosophy in the Flesh*, p.146.

¹⁸ *Ibid.*, p. 146.

¹⁹ *Ibid.*, p. 149.

Moreover, metaphors we use for conceptualizing time, or any other basic abstract notion, do not have to be consistent. The mappings that our cognitive unconscious makes are always partial, as Lakoff & Johnson repeatedly state, both in *Philosophy in the Flesh* and other works. What this means is that only certain aspects of the source domain (which is the physical space location, in the case of time) are picked out to be mapped onto the target domain within any given metaphor. This explains the fact that you cannot, say, return to a point in time as you would be able to in case of traveling along a physical landscape. The crucially important point Lakoff & Johnson make here is that if you take away the metaphors we use to talk about time, there is nothing left²⁰.

It appears our understanding of time “stripped” of metaphors does not exist at all. It exists only within the domain of metaphorical mappings from our physical experiences. Thus, metaphor turns out to be not just a decoration you could do without, or a convenient way of getting the idea across to the listener. It turns out to be not a matter of language, but, rather, a matter of thought. Even scientists – no less than ordinary speakers – use metaphors when theorizing about time or other abstractions. This discovery makes it legitimate for Lakoff & Johnson to proclaim the metaphorical character of the very notion of time.²¹

²⁰ The reader might raise her brows and wonder what Lakoff & Johnson would say about a phrase like “wasting time”. Perhaps this is one way we can avoid the metaphorical time talk. But how? If we talk about *wasting* time, then we just exchange one metaphor for another, and now we conceptualize time as a *resource* (and a valuable resource) that can be *given*, *spent*, *wasted* or even *stolen*. This is another partial mapping, using a different experiential source domain. It is partial because, as Johnson says in one of his articles, if you give somebody your time, you cannot have it back, although this person can give you the exact amount of time back. Neither can you exactly have a “refund” on your spent time.

²¹ Some readers, opposed to the idea of this ‘linguistic’ move, might suggest that maybe we can think about time but have no non-metaphoric language to express it. However, suggesting this will lead us to discussing Wittgenstein’s private language argument all over again, as well as Quine’s problem of translation and inter-subjectivity of meaning. True, there may always be indeterminacy between what my neighbor and I mean, using one and the same term. However, how are we to know what this indeterminacy is? Consequently, how are we to know there is some non-metaphoric understanding of time if there is no evidence of it? How about the ‘feel’ of time, my reader might object? The ‘feel’ that animals (or infants, or even flowers, in a way) have, when they know the time to sleep and the time to wake up, the time to feed, the time to hibernate, *etc.*? However, it seems here we have two different levels (or concepts) of time. The first one is purely physiological, which need not to be verbally explained to be “understood”,

The interested reader might want to consult Part II of *Philosophy in the Flesh* for an explanation of the metaphorical character of such other abstract concepts as events and causes, the mind, or even the self. Lakoff & Johnson provide multiple kinds of evidence to prove that conceptual metaphor plays an important role in cognition. However, their claims about the extent of metaphoric thinking have often met with harsh opposition. For instance, Steven Pinker, one of the fiercest of Lakoff & Johnson's critics, argues:

[M]ost metaphors are not processed as metaphors at all. They may have been alive in the minds of the original coiners, who needed some sound to express a new concept (such as "attack" for aggressive criticism). But subsequent speakers may have kicked the ladder away and memorized the idiom by rote²².

Here Pinker points to the so-called *dead metaphors* that are traditionally described as belonging to the sphere of the literal, thus disregarding Lakoff & Johnson's claim of their cognitive importance.

A similar objection comes from S. Levin who observes:

When I say 'I spent three hours on this problem' or 'This theory is weak,' I am not aware that these statements are conditioned in any way by concepts like TIME IS MONEY or THEORIES ARE BUILDINGS²³.

However, to defend Lakoff & Johnson's view Donald Freeman gives the following answer to Levin:

Levin is, presumably, likewise unaware that when he writes of a reader "negotiat[ing a] poet's linguistic straits"²⁴, he is expressing his understanding of the reading process

akin to the sense of balance an infant has almost right after she is born. It is the second - higher-order – concept of time that we are interested in. It is this time that requires metaphor, in Lakoff & Johnson's terms, to be understood and conceptualized as an abstract notion.

²² *Ibid.*, p. 3.

²³ S. Levin, *Metaphoric Worlds: Conceptions of a Romantic Nature*, pp. 10 – 11.

²⁴ *Ibid.*, p. 141.

through two fundamental and well-attested metaphors, THOUGHTS FOLLOW PATHS (a subset of LIFE IS A JOURNEY) and POETIC MEANING IS DEEP (from LANGUAGE IS A CONTAINER). ... Levin insists²⁵ that "My time is precious" is not metaphorical because that usage, originally catachrestic (he asserts), is now completely lexicalized (in his sense) and hence no longer deviant, that is, it does not "result in the need to project novel conceptions"²⁶, and a figurative expression produces no tension between itself and a term "normally used in that context"²⁷.

Nevertheless, Freeman asks the self-evident question:

But how do we determine what is novel? How do we determine "normally used"? How do we determine the tension Levin takes to be crucial to metaphor? How do we determine when we need no longer "project novel conceptions" for an expression?²⁸

Levin and Pinker belong to the camp of the numerous critics who try to deny the importance – or the very existence – of Lakoff & Johnson’s conceptual metaphor, referring it to the sphere of the literal. However, Lakoff & Johnson’s point here is that the so-called “dead” metaphors *have* to be “alive” in some corner of our cognitive unconscious in order for us to make up (or recognize) novel metaphors, or to create new abstract concepts. In *Philosophy in the Flesh*²⁹ Lakoff & Johnson cite experiments showing that everyday metaphors play a cognitive role in that “we use them in a systematic way to understand new extended metaphors automatically and without conscious reflection”³⁰. For instance, they mention Albritton’s psychological experiment³¹ (1992) which

²⁵ D. Freeman, “Songs of Experience”: New books on metaphor/review article, p. 150.

²⁶ S. Levin, *Metaphoric Worlds: Conceptions of a Romantic Nature*, p. 12.

²⁷ *Ibid.*, p. 10.

²⁸ D. Freeman, “Songs of Experience”: New books on metaphor/review article, p. 151.

²⁹ *Philosophy in the Flesh*, pp. 65- 73.

³⁰ *Ibid.*, p. 66.

³¹ *Ibid.*, pp. 83 – 84.

supports the cognitive character of the *Love as a Physical Force* metaphor (which is claimed to be non-metaphorical/literal, by the dead-metaphor theorists). The participants were presented with certain literal phrases mixed with others, containing conventional metaphors with the same terms. The study showed that the participants would distinguish between the literal and non-literal phrases very well, which undermines the “dead metaphor” claim. Moreover, due to the awareness of the metaphoric usage of such conventional metaphors, novel metaphors, like “We are driving in the fast lane of love” are created and understood.

Also, the strong opposition to Lakoff & Johnson’s view of conceptual metaphor as a mechanism of cognition may be explained by the critics’ ignorance (or rejection) of the extended definition of metaphor that Lakoff & Johnson introduce in their theory. Their view is that metaphor is not decorative but provides skeletal structure for thinking as such.

Lakoff & Johnson’s critics may not yet be satisfied with their account of metaphor but, in my view, Lakoff & Johnson’s idea of metaphor as the main conceptualizing mechanism used by our mind is persuasively supported in their writings. So, I would like to move on to their foundational claim (1) in order to consider what seems to be a much more serious problem with their philosophy of mind.

§ 3. *Neural Foundations of Abstract Conceptualization*

Lakoff & Johnson’s view on the nature of the mind “throws out the innate-learned, nature-nurture and rationalist-empiricist dichotomies”, since there is “no way to sort out exactly what is ‘inborn’ from what is learned”³². Refusing the label “empiricists” (at least in the classical sense of the word) Lakoff & Johnson instead define their view as *experientialism*, which later develops itself into

³² G. Lakoff & M. Johnson (2002), “Why cognitive linguistics requires embodied realism”, p. 247.

*embodied realism*³³. This is the *experientalist* view that *experience is the result of embodied sensorimotor and cognitive structures that generate meaning in and through our ongoing interactions with our changing environments*³⁴. In fact, *interactionism* is what Johnson will call his theory in his *Meaning of the Body*, admitting that cognition – the mind’s work – is always *interaction* between the body and the environment, and it is as a result of this interaction that mind itself emerges. Thus, one of the main claims Lakoff & Johnson make is the *embodiment* of mind, its necessary relation to the body and the body’s neural functioning³⁵.

The point that raises the most severe critique from the side of this theory’s opponents is the claim about the neural grounds of abstract thinking. According to this claim,

*We must be able to move, without any ontological rupture, from the body-based meaning of spatial and perceptual experience that is characterizable by image schemas and affect contours, all the way up to abstract conceptualization, reasoning, and language use*³⁶.

With their *conceptual metaphor theory* as one of the main foundations in Lakoff & Johnson’s philosophy of embodied mind, they often describe metaphor as a “neural mechanism that recruits

³³ Lakoff & Johnson’s view may be more clearly understood, if contrasted with some more standard non-embodied accounts. I have discussed earlier Lakoff & Johnson’s attitude to the classical version of disembodied mind, with Kant as one of its main representatives. For more on Lakoff & Johnson’s understanding of their contemporary opponents (e.g., N. Chomsky’s linguistic move) see *Philosophy in the Flesh* (1999).

A more important (and a subtler) differentiation to make, in my opinion, is how Lakoff & Johnson’s idea of mind embodiment, with its (allegedly) neuroscientific foundations, differs from, say, S. Pinker’s neuroscientific theory of mind. S. Pinker, as we have seen in the previous section, acts as one of Lakoff & Johnson’s fiercest critics. The reason is obvious: Pinker’s hard-core reductionist physicalism prevents him from accepting Lakoff & Johnson’s conceptual metaphor as one of the leading mechanisms in abstract conceptualization. Pinker does *not* attack the neuroscientific part of Lakoff & Johnson’s theory. He is actually with Lakoff & Johnson in saying that we can claim that the mind is neurally grounded in that every thought of ours is instantiated in the brain, in the form of neuron firings. The crucial difference between the two theories (Lakoff & Johnson’s and Pinker’s) is their treatment of metaphor’s influence on our abstract thinking. In reality, Lakoff & Johnson’s embodiment of mind turns out to be metaphorical rather than literal. It actually extends beyond the limits of the body. This (and the insufficient experiential support) is the main reason for Pinker to attack Lakoff & Johnson’s view.

³⁴ G. Lakoff & M. Johnson (2002), “Why cognitive linguistics requires embodied realism”, p. 248.

³⁵ Lakoff & Johnson here must not be mistaken for identity theorists or anything of that kind, even though some might be inclined to make this conclusion from the above lines.

³⁶ M. Johnson & T. Rohrer, “We are live creatures ...”, p. 14.

our abilities to perceive, to move, to feel, and to envision in the service of ... theoretical and philosophical thought ... ”.³⁷

When Lakoff & Johnson first start talking more or less consistently about the *embodiment of mind* (in *Philosophy in the Flesh* 1999), the reader – overloaded with field illustrations of “undead” metaphors – is inclined to conclude that Lakoff & Johnson’s notion of embodiment actually amounts to their claims of neural grounds of abstract reasoning. This conclusion would find support in and between the lines of *Philosophy in the Flesh* and other, more recent, works. As they write:

*Philosophically, the embodiment of reason via the sensorimotor system is of great importance. It is a crucial part of the explanation of why it is possible for our concepts to fit so well with the way we function in the world. They fit so well because they have evolved from our sensorimotor systems, which have in turn evolved to allow us to function well in our physical environment*³⁸.

Their reasoning for proclaiming the embodiment of mind is as follows:

Brains tend to optimize on the basis of what they already have, to add only what is necessary. Over the course of evolution, newer parts of the brain have built on, taken input from, and used older parts of the brain. Is it really plausible that, if the sensorimotor system can be put to work in the service of reason, the brain would build a whole new system to duplicate what it could do already?

Furthermore:

³⁷ G. Lakoff & M. Johnson, *Philosophy in the Flesh*, p. 568.

³⁸ *Philosophy in the Flesh*, p. 44.

*...From a biological perspective, it is eminently plausible that reason has grown out of the sensory and motor systems and that it still uses those systems or structures developed from them*³⁹.

These lines, coupled with Lakoff & Johnson’s account of image schemata at work, aim to prove the physiological *embodiment* of mind. Lakoff & Johnson provide plenty of neuroscientific experiments to ground their claim. Let me present just a few of them before evaluating how successful they are.

Surprisingly, Johnson’s talk about the embodied mind starts by describing the life of such primitive animals as, say, the hydra and the amoeba. This is done to support the argument that “central nervous systems evolved in multicellular organisms to coordinate sensorimotor activity”⁴⁰. Johnson describes how the hydra’s (or the amoeba’s) neural maps help them to survive in their environments. He goes on to introduce the reader to the notion of neural plasticity (the ability to develop new neural maps in new circumstances), which is possible in more complex animals (like owls or monkeys). He presents the striking result of the owls that have developed new neural topological maps in order to adapt to changed vision conditions (they had to wear some vision-distorting glasses). In this case the experiment shows that the owls still have their natural neural maps which they used to get space orientation for hunting, and, in addition to those, they have developed new alternative neural maps, without which they would not survive with their vision distorted by glasses. This is how “plasticity works in cross-modal neural maps,”⁴¹ Johnson states, in this case, between vision and spatial orientation.

³⁹ *Ibid.*, p. 43.

⁴⁰ “We are live creatures...”, p. 6.

⁴¹ “We are live creatures...”, p. 8.

Another experiment is presented to show how cross-domain perception functions. The gist of it is that babies are given pacifiers: the first one gets a smooth one, and the second, one with nubs. The experiment shows that later, when visually presented with both kinds of pacifiers, the babies tend to concentrate their attention on the pacifier they have been sucking. This reveals certain visual-tactile mental correspondences. The experiment is cited by Johnson to illustrate how cross-domain mental perceptions might work in the case of mappings onto the abstract domain⁴². Another experiment Johnson mentions is the fMRI neuroimaging study by T. Rorher showing that both literal and metaphorical stimuli relating to the body (here literal and metaphorical sentences using hand terms, like “She grasped an apple”, “He grasped the theory”) have the effect of “activat[ing] primary and secondary hand regions within the primary and secondary sensorimotor maps”⁴³.

The experiments Johnson and Lakoff cite partly support their neural embodiment theory. The reader may be inclined to admit, in light of this neuroscientific evidence, that at least *some* abstract concepts (based on the image-schemas as the primary source of imaginative internal mappings) *are* neurally grounded.

But when we get down to the details of *how* abstract thinking is neurally grounded we find Lakoff & Johnson’s explanations quite vague. On the one hand, Lakoff & Johnson give a physicalist account of what is happening:

⁴² In order to avoid the wrong inferences, I owe the readers a clarification on what these experiments are supposed to reveal in Lakoff & Johnson’s view. Both babies and owls operate unconsciously. However, the experiments show the presence of the preconceptual mechanisms, which Lakoff & Johnson call image schemas. These image schemas (in more complex “mind” systems) are the building blocks for our cognitive unconscious to structure orderly and consistently the domain of abstract concepts we possess.

⁴³ “We are live creatures ...”, p. 17.

We are neural beings... Our brains take their input from the rest of our bodies. What our bodies are like and how they function in the world thus structures the very concepts we can use to think. We cannot think just anything – only what our embodied brains permit.

*... Metaphor appears to be a neural mechanism that allows us to adapt the neural systems used in sensory-motor activity to create forms of abstract reason. If this is correct, as it seems to be, our sensory-motor systems thus limit the abstract reasoning that we can perform ...*⁴⁴

Judging by this quotation our abstract reasoning *adapts* sensori-motor neural maps to use them in other domains. However, Lakoff & Johnson also state (and this appears to be supported by their owl and monkey experiments) that:

*Our enormous metaphoric conceptual system is ... built up by a process of neural connection. Certain neural connections between the activated source- and target-domain networks are randomly established at first and then have their synaptic weights increased through their recurrent firing. The more times those connections are activated, the more the weights are increased, until permanent connections are forged*⁴⁵.

Or, to put the point in other words, “once we have learned a conceptual system, it is neurally instantiated in our brains”⁴⁶.

So, on the one hand, we *have* the *same* topological maps for literal and metaphorical concepts, and this claim is supported by such experiments as the study of “grasp” (Johnson and Rohrer’s “We are live creatures ...”). If we remember this experiment, the same areas of the brain were activated whether the sentences with the literal use of “grasp” were presented, or the

⁴⁴ J. Brockman, “*Philosophy in the Flesh: A talk with George Lakoff*”, p. 1.

⁴⁵ *Philosophy in the Flesh*, p. 57.

⁴⁶ *Ibid.*, p. 5.

metaphorical ones (like “to grasp an idea”). On the other hand, as Lakoff & Johnson claim sometimes, humans *develop* new neural maps for abstract concepts. This claim is meant to be supported⁴⁷ by, *e.g.*, the owl experiment (see “We are live creatures...” for detail). In short, Lakoff & Johnson claim that, just as the owl managed to survive in the vision distorting glasses (and literally developed new neurological maps to operate with changed spatial characteristics), so are people capable of analogous neural activity. With either the ‘old’ neural maps used for both the literal and the abstract (or “metaphorical”), or the new neural maps built in virtue of neural plasticity *(illustrated by the owl experiment), it is unclear to which of the claims Lakoff & Johnson eventually stick. The authors seem to ignore this inconsistency.

Whatever version of this neural theory⁴⁸ we choose, we end up with the conclusion that our mind operates with the help of multiple neural maps. This point is nothing new, and metaphor in this case may as well appear redundant as there is still insufficient proof of its role in building (or using) those maps. Thus, in this light Pinker’s critique sounds quite legitimate when he says:

It is true that "the frames [or metaphors] that define common sense are instantiated physically in the brain," but only in the sense that every thought we think – permanent or transient, rational or irrational – is instantiated physically in the brain⁴⁹.

So, my second objection to Lakoff & Johnson’s theory is their claim that *all* metaphor is neural, hence *all* our thinking is neurally grounded. Certainly, the experiments they cite support one part of their theory, namely, that humans may have topological neural maps that are responsible for both literal and metaphorical appreciation of the physical and abstract concepts (as

⁴⁷ It may also be indirectly supported by the studies of babies’ behavior, as well {with children (a) capable of making cross-modal mappings, as in the case with the pacifier; (b) children capable of learning new ‘tricks’ on the basis of their past experience).

⁴⁸ As the reader may have probably noticed Lakoff & Johnson seem to be purposely vague on what they count for “neural”, freely interchanging the term with “sensorimotor”. But this is a topic for another paper.

⁴⁹ S. Pinker, “Block that metaphor”, p. 3.

in the “grasping” or up-and-down case). But, when Lakoff & Johnson go on to analyze more complex abstract notions, things get more complicated. For example, when Lakoff & Johnson focus their attention on the metaphoric character of morality, they also state that it is neurally grounded. Nonetheless, they do not provide any support for *this* claim.

Johnson must have realized this at some point, as in his *Meaning of the Body* (2007) he suddenly switches from speaking of the physical embodiment (and, consequently, the neural grounding of abstract reasoning) to a much broader understanding of the embodied mind. He suggests extending the notion of embodiment to include the social, phenomenological, and other aspects of human interactions with the world. However, in this case the focus on the neural grounding will slip away. Lakoff & Johnson seem unaware of the problems that are caused by this constant switching in the laying down of their theory’s foundations.

Conclusion

In order to be consistent, Lakoff & Johnson need to either stay hard-case neuroscientific and provide more experiential support for the *literal* version of embodied mind; or they might choose to accept the *metaphoric* (extended) foundation of embodied thinking. In this latter case there will have to be a move from the physicalist, neuroscientific point of view to a more holistic *interactionism* which includes all kinds of human-environment coupling.

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