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## **The Sensory Order and the Neurophysiological Basis of Methodological Individualism**

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### **1. Introduction**

The present article analyzes the relationship between the cognitive psychology proposed by Hayek in his book *The Sensory Order*, as well as other works, and his individualistic theory of human action.

There are now a relatively high number of studies on Hayek's theory of the mind. Of course, many of them are very interesting and analyze acutely some of its implications for a number of different fields such as the cognitive sciences, evolutionary epistemology, economics, and political and social theory<sup>1</sup>. However, it seems to me that, apart from occasional exceptions<sup>2</sup>, scholars have more or less neglected a very important point. The following analysis will try to show that Hayek's cognitive psychology can be considered as an effort – indisputably very original – to support, on a neurophysiologic basis, the two twin ideas, claimed by methodological individualism, of the indeterminism of action and of the necessity of an interpretative approach (*Verstehen*) to the social sciences.

First and foremost, the epistemological implications of Hayek's theory of mind need to be carefully taken into account due to its undeniable scientific relevance. As highlighted by prestigious neurobiologists and cognitive scientists such as the Nobel laureate Gerald Edelman, Joaquin Fuster, or Barry Smith, Hayek needs to be regarded, together with Donald Hebb, as the father of one of the nowadays most quoted approaches on the studies of the mind: the “connectionist” paradigm<sup>3</sup>. Such paradigm is based upon the idea of the self-

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<sup>1</sup> See Caldwell (2006), pp. 261 ff.

<sup>2</sup> See Butos and Koppl (2004), pp. 20-22; Caldwell (2006), pp. 270-277

<sup>3</sup> See Edelmann (1982, 1987), Fuster (1995) and Smith (1997). For an introduction to connectionism please refer to: Dupuy (2000), Barthelemy, De Glas, Descles, Petitot (1996), Dreyfus and Dreyfus (2000); Petitot, Varela, Pachoud, Roy (1999) and Varela (1989). It has to be added that Hayek has worked out the core of the innovative theses in *The Sensory Order* well before the circulation of this work. They had in fact already been outlined in a short essay of the 1920s, as outcomes of the intuitions of a young Hayek, crossed between the passion for economics and psychology. Titled “Contributions to a Theory of How Consciousness Develops”, this essay has never been published due to scientific and personal issues. In *The Sensory Order* the theories contained will be taken up again and enriched, also in line with the contributions from cybernetics and the systems' theory

organization of complex systems, central concept within the framework of the overall epistemological and scientific reflection of Hayek<sup>4</sup>.

As it is well known, methodological individualism is based on three fundamental assumptions which distinguish it from the so called methodological holism.

The first is nominalism, viz. the idea that collective words (such as society, state, market, army, etc.) do not exist ontologically. According to holism, collective words are real entities which exist independently from individuals: they are irreducible data that must (and have to be) necessarily be studied (necessarily) as wholes. Nominalism rejects this hypostatization: it assumes instead that there is nothing in reality which corresponds to these collective concepts: they are thus, according to this view, only stenographs useful to describe synthetically complex phenomena, which ultimately however are reducible to individuals' actions and their effects<sup>5</sup>.

The second assumption is the indeterminism of action. This is the idea that action is not the mechanical consequence produced by factors exogenous to the individual (like cultural rules or holistic laws of social change). According to methodological individualism, an action is the outcome of an intentional choice which is not pre-programmed by the environment. It stipulates that the cause of action is internal to the individual. Consequently, it affirms that the explanation of action must be based on the interpretation (*Verstehen*) of the meaning the individual gives to his choice.<sup>6</sup>

The third assumption is the invisible-hand explanation. The analysis of the action in terms of purposeful intentions is the point of departure for methodological individualism. Its ultimate aim is to analyze the “unintended or undersigned results of the actions of many men”<sup>7</sup>. In this way, it becomes possible to explain more or less complex spontaneous phenomena like, for instance, a traffic jam or the market system.

According to the “traditional” methodological individualist point of view, all three assumptions have a metaphysical nature. The first one is ontological; the other two are heuristic rules.

I think that one of the most interesting aspects of Hayek's connexionist theory of mind lays precisely in the fact that it is an attempt to transform the second assumption of methodological individualism – the indeterminism of action – from a mere epistemological principle to what Popper calls an “objective knowledge”, viz. a knowledge which can be defined as true for either logical or empirical reasons<sup>8</sup>. As a metaphysical principle, the indeterminism of action is a methodological rule which one can choose to follow because of its heuristic utility. If one accepts it as an epistemological rule, he cannot deny in principle the admissibility of its opposite – the collectivist idea of the

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<sup>4</sup> For an analysis of the role covered by the concept of self-organisation within Hayek's epistemology please see Nemo (1988).

<sup>5</sup> See Antiseri (2006).

<sup>6</sup> See Boudon (1990), Lachmann, (2007), pp. 1-48

<sup>7</sup> Hayek (1953), p. 41.

<sup>8</sup> See Popper (1979).

determinism of action which supposes man as being directed by the social context. Using his theory of sensory perceptions, Hayek tries to show that the holistic theory of action is not only heuristically unfruitful, but also scientifically inadmissible for both logical and empirical reasons.

Hayek's thesis not only has implications concerning the problem of the indeterminism of action, it also has implications for the ontological sphere, i.e., the first assumption of methodological individualism. As Popper states, a metaphysical theory can be criticized if it contradicts a part of objective knowledge<sup>9</sup>. If Hayek's psychological theory is correct, it undermines the idea of the irreducibility of the social entities, especially because it implies the impossibility to assume the existence of laws which govern them as wholes.

Moreover, since the "invisible-hand" approach is based on the assumption of the indeterminism of action, Hayek's psychological theory also contributes to a part of its legitimacy. As Hayek states, holists are unable to see the importance of the non-intentional aspects of social life precisely because they deny the intentionality of action<sup>10</sup>.

Let us try to understand why connectionism implies, according to Hayek, arguments in favor of the individualistic theory of action and of the *Verstehen*. The crucial point is that, according to the theory of self-organization of the mind, cognitive processes are non deterministic. As Hayek underlines, if cognitive processes are non deterministic, it is impossible to consider the action as a mechanical effect of the social context as envisaged by methodological holism<sup>11</sup>. According to the Austrian author, connectionism legitimizes the idea, supported by Weber and the other methodological individualists that the explanation of the action goes through the reconstruction of its *sense*.

The present article is structured in two main sections. In the first section Hayek's connectionist theory is schematically delineated. In the second part the methodological consequences of such theory are analyzed. In particular, the way he resorts to it, to justify the necessity for a *Verstehen* method in social sciences, is investigated.

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<sup>9</sup> Ibid.

<sup>10</sup> Hayek (1953), pp. 61 ff..

<sup>11</sup> Hayek, 1952, pp. 192-193.

## 2. Knowledge by Categorization

According to Hayek, the mind is an apparatus of interpretation. For him, there is no correspondence between the sensorial world and the external world: “Every sensation [...] must [...] be regarded as an interpretation of an event in the light of the past experience of the individual or the species”<sup>12</sup>. Perceptions are thus interpretations that depend on memory: both on the biological memory (the way natural selection has shaped the nervous system and the receptive organs of stimuli) and the personal memory (what the individual has learned over his/her life). It follows that sensory qualities, i.e., the blue of the sky or the green of the grass, cannot be regarded as an objective property of reality, but as mental constructions. Hayek maintains that the mind reproduces only partially and approximately external world.

As McQuade and Butos emphasize, Hayek considers the mind an “*adaptive classifying system* - a system which adapts to its environment by forming an internal maintained model of that environment”<sup>13</sup>. The structure of this system “has the potential for maintaining and continuously updating a model of the environment as currently experienced – a model that is capable of anticipating expected changes in the environment”<sup>14</sup>. This system interprets continuously the external reality through “acts of classification”<sup>15</sup> of stimuli. As we will see in detail later on, it is based on a principle of self-organization of complexity. It is bound “to generate knowledge”<sup>16</sup> about its environment which it uses in order to adapt itself.

An adaptive classifying system is able to tie typical sets of stimuli to typical meanings. Hayek expressed this concept in terms of the “Primacy of Abstract”<sup>17</sup>: the possibility to acknowledge that a given object is, for instance, a “car” depends on tracing a certain typical set of stimuli back to an abstract class “cars” (Hayek also talks about *pattern recognition* or *rules of perception*). It follows that he totally opposes the inductivist and observativist theory of knowledge. The perception of a tangible detail always presupposes interpretative schemes, a sort of theoretical knowledge selecting and interpreting the external reality, linked to past experience: “In the mind the abstract can exist without the concrete, but not the concrete without the abstract”<sup>18</sup>. Also as his fellow-countryman and friend Popper, the author of *The Sensory Order* thus regards that: “*all* we know

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<sup>12</sup> Hayek (1952), p. 166.

<sup>13</sup> McQuade & Butos (2006), p. 335

<sup>14</sup> *Ibid.*; see also McQuade (2007) p. 57.

<sup>15</sup> Hayek (1952), p. 78.

<sup>16</sup> McQuade & Butos (2006), p. 336.

<sup>17</sup> Hayek (1978), p. 35. There is some obvious analogy between Hayek and Kant. However, an important difference lies in the fact that Hayek’s categories are, unlike Kant’s, fallible and evolutionary. See Agonito (1975), pp. 62-71 and Butos & Koppl (2006), pp. 30-31.

<sup>18</sup> *Ibid.*

about the world is of the nature of theories and all ‘experience’ can do is to change these theories”<sup>19</sup>.

Hence Hayek holds that abstraction, the tendency to order the phenomena in typical classes, is not a purely rational and conscious ability. It is first and foremost a tacit or meta-conscious capability; a property of categories through which the mind operates: “the richness of the sensory world in which we live [...] is not –Hayek states – the starting point from which the mind derives abstractions”<sup>20</sup>, but “the product”<sup>21</sup> of meta-conscious abstractions.

The classification processes generating perceptions are not procedures of simple classification: they are, instead, modes of “multiple classification”<sup>22</sup>. This implies that, in spite of what is assumed by behaviorism, they never concern a single stimulus, but always groups of stimuli or events. Within the framework of these processes: “at any moment a given event may be treated as a member of more than one class, each of these classes containing also different other events; and a given event may also on different occasions be assigned to different classes according to the accompanying events with which it occurs”<sup>23</sup>. Moreover, the minds also carries out a “a third type of multiple classification: namely one in which successive acts of classification follow upon each other in relays, or on different ‘levels’; in this type the distinct responses which effect the grouping at a first level become in turn subject to a further classification (which also may be multiple in both the former senses)”<sup>24</sup>.

The detailed analysis of the functioning of this logic of multiple classification does not constitute part of the scope of the current work. It is sufficient to specify that this particular classifying activity constantly rectifies the interpretations, to which it leads according to the continuous flow of new experiences. Moreover, it allows the experience of a large abundance of sensory qualities. This is in accordance with the fact that it allows the overlapping of several abstract schemes of meanings. It is precisely due to the logic of multiple classification, on which the mind is based that, by observing a certain object, we can simultaneously gather a large number of particular characteristics. We can realize, for instance, that this item is a house, that it is a yellow house, that it is a house in an *art nouveau* style, that it is a house with three floors, that it is a house with a garden and so on. In the child or in the animal this capacity in terms of overlapping of abstract schemes is less developed. The sensory world of the child or the animal is simpler “because of the much thinner net of ordering relations which they possess – because the much smaller number of abstract

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<sup>19</sup> Hayek (1952), p 143. Regarding analogies between Popper’ criticism towards *observationism* and the connectionist approach please refer to Besnier (2005), pp. 75-79. As stressed by Herrmann-Pillath (1992), Hayek upholds a *evolutionary epistemology*.

<sup>20</sup> Hayek (1978), p 44.

<sup>21</sup> Ibid.

<sup>22</sup> Hayek (1952), p. 50.

<sup>23</sup> Ibid.

<sup>24</sup> Ibid., p. 51.

classes under which they can subsume their impressions makes the qualities which their supposedly elementary sensations possess much less rich”<sup>25</sup>.

According to Hayek, the sensory order consists thus in the order of analogy and difference relations amongst the sensory qualities. It is the way through which these qualities, and not the objective facts, differ from each other (in terms of dimension, color, weight, etc.) and it is also the whole set of meanings of the phenomenal reality<sup>26</sup>. As we already pointed out, according to Hayek, the sensory order is a simplification of the physical one. It reproduces the relations objectively in existence in an imperfect and partial way. The latter are drawn from natural sciences, nevertheless it does not imply that the latter analyze a world that is more real, because also the physical world is an “abstract” construction<sup>27</sup>. It is the outcome of an *alternative* classification compared to the mental one that produces new meanings and operates according to experimental theories<sup>28</sup>.

### 3. The Self-Organization of the Brain

Concerning the most complex sensory phenomena, Hayek maintains that his theory of the mind “leads indeed to conclusions very similar to those of the gestalt school”<sup>29</sup>. However, while the exponents of the *Gestalt* school hold that the unconscious organization, leading to the recognition of analogous forms also in the case of objects not having any identity in terms of physical structure, concerns elementary sensory qualities that are directly communicated to the mind from basic nervous impulses (that is a sort of basic “qualitative” information), Hayek holds a different point of view. He states that the impulses do not incorporate any sensory quality: in other words the sensory qualities are not linked to attributes of the impulses. He proposes what today is called a “connectionist” approach.

For the Austrian author the mental interpretations depend solely upon the way impulses are channeled through the neural networks, the connections amongst neurons that the impulses are able to activate. For every single *kind* of perception there is a peculiar *kind* of channelization of the impulses. Both the most and less “elementary” qualities are created via these processes. Impulses do not incorporate any basic “qualitative” information. According to Hayek, the theory of an original pure core of sensation is wrong: “[M]y theory maintains that the sensory (or other mental) qualities are not in some way originally attached to, or an original attribute of, the individual physiological impulses, but that all of these qualities are determined by the system of connexion by which the impulses can be transmitted from neuron to neuron; that it is thus the

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<sup>25</sup> Hayek (1978), p. 44.

<sup>26</sup> Concerning the idea establishing that the sensory order is a sort of relational order, Hayek has been influenced by Mach. See Mach (2001).

<sup>27</sup> Hayek (1952), p. 143.

<sup>28</sup> Ibid., pp. 145-146.

<sup>29</sup> Ibid., pp. 77. On this point see De Vecchi (2003).

position of the individual impulse or group of impulses in the whole system of such connexions which gives it its distinctive quality”<sup>30</sup>. Mental classifications thus depend on the activation of several neurons’ chains. They are the product of a system effect. This theory is confirmed by the fact that a precise location of perceptions in the brain does not exist.<sup>31</sup>

According to this connectionist paradigm the way neurons work is not controlled by a central unit, but is simply based upon certain “rules” of activation and on certain rules which govern the global coherence of the system. Such rules define the modalities and the conditions for the activation of the neurons. So whether or not a neuron becomes part of a chain of connections, carrying nervous impulses, depend solely on these rules. This means that perceptions *emerge* according to a logic of self-organization<sup>32</sup>. There is no central regulation, nor a central plan.

Through the self-organization of the mind’s neural connections a “*map* of the relationship between various kind of events in the external world”<sup>33</sup> is produced, that “will not only be a very imperfect map, but also a map which is subject to continuous although very gradual change”<sup>34</sup>. It will be partly modified by new experiences. This is due to the fact that perception and memory act according to circular causality logic<sup>35</sup>: perception, created by the memory, affects the latter and changes in the memory loop back on perception. It follows that a learning process is incessantly running, developing under a *trial and error* fashion and consisting in a substitution of classification modalities, inbred or acquired, with new classification modalities; this substitution is based upon a partial restructuring of the neural connections system<sup>36</sup>. It is thus relatively easy to understand how an individual, after a time lag, can perceive the same fact or object differently.

By adopting a similar perspective, it is necessary to exclude the existence “of elementary and constant sensations as ultimate constituents of the world”<sup>37</sup> and assumes “the inconstancy of sensory quality”<sup>38</sup>. For a connectionist such as Hayek, “[t]o acquire the capacity for the new sensory discrimination is not merely to learn to do better what we have done before; it means doing altogether new. It means not merely to discriminate better or more efficiently between two stimuli or groups of stimuli: it means discriminating between stimuli which before was not discriminated at all”<sup>39</sup>. For instance, it makes no sense to state “that, if a chemist learns to distinguish between two smells which nobody has

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<sup>30</sup> Hayek (1952), p. 53.

<sup>31</sup> Ibid., p. 148.

<sup>32</sup> See Varela (1989) pp. 60-61. Hayek does not illustrate in depth the activation modalities of neurons. He goes as far as to agree with Hebb (Hebb 1949), that has been the first to analyse in details this issue. Please see: Hayek (1952) note 1 p. 64 and note 1 p. 114. Also see Hayek (2001) p. 20.

<sup>33</sup> Hayek (1952), p. 110

<sup>34</sup> Ibid.

<sup>35</sup> See also Fuster (1995), p. 87.

<sup>36</sup> See also Besnier (2005), pp. 75-79.

<sup>37</sup> Hayek (1952), p. 176.

<sup>38</sup> Ibid. p. 173.

<sup>39</sup> Ibid. p. 156.

ever distinguished before, he has learnt to distinguish between given qualities: these qualities just did not exist before he learnt to distinguish between them”<sup>40</sup>.

Mental *maps* are thus partly modified by experience. Given that and taking into account that the biological evolutionary logic makes a perfect correspondence of the individuals’ anatomic structure rather impracticable, a complete identity of human minds is in turn impossible. Human minds will in fact be sufficiently similar to allow the mutual comprehension and interaction amongst individuals, but “they will not be identical”<sup>41</sup>.

Having analyzed the modalities behind the elaboration of perceptions, Hayek can emphasize the relationship between perception and action. In his judgment, rules of perceptions have to be regarded as closely related to rules of action: the classification of *typical meanings* has to be conceived as functional to an adaptation effort consisting in the implementation of *typical and appropriate answers*. A trivial example is represented by the consequences of a driver’s perception of red traffic lights. Such acknowledgment of a typical meaning allows the driver to develop an adaptive answer that is in turn typical: that is to stop when the traffic lights are red. The abstract rules of perception allow to single out typical problematic situations. They incorporate, in the meanings they create, information about the rules of action that are useful to face them. These action rules can also be defined as “abstract”<sup>42</sup> because they can also be applied to abstract classes of events.

Hayek’s analysis leads to a rather important conclusion: know-how is the pillar of consciousness and of the rational thought. There is a tacit dimension of knowledge<sup>43</sup>. Such dimensions will allow us to use certain skills without being able to verbally explain what exactly entails the capability to do them. It embraces not only the meta-conscious competence to apply rules for the elaboration of the sensory world, but also the capacity to fully master some *practical skills* (as swimming, riding a bike and painting). These *practical skills*, not dissimilarly from those behind perception, can not be verbally described (it is impossible, for instance, to illustrate in a manual the guidelines to be followed in order to acquire capabilities to ride a bike without losing balance) and they also partly depend on instinct (the biological memory) and partly on learning (the personal memory). Therefore Hayek’s connectionism lets us comprehend that the mind is not limited to the sole logic and rational capabilities. Consciousness is the *tip* of an iceberg: “what we consciously experience is [...] the result [...] of processes of which we cannot be conscious”<sup>44</sup>. The *tacit* dimension of knowledge produces the necessary assumptions for intentional choice. It defines the basic framework of the process of the conscious decision. Namely, it selects a basic set of meanings and possible alternatives for action which is the foundation of the rational reasoning<sup>45</sup>.

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<sup>40</sup> Ibid.

<sup>41</sup> Ibid. p. 110.

<sup>42</sup> Hayek (1978), pp. 35 ff. See also Nemo (1988), p. 51-53.

<sup>43</sup> See also Polanyi (1958) and Dreyfus & Dreyfus (2000).

<sup>44</sup> Hayek (1978), p. 45.

<sup>45</sup> Hayek 132 ff

#### 4. The Impossibility of a Full Explanation for the Mind

Hayek specifies that the theory on the presuppositions of conscience that he proposes represents a mere “explanation of principle”<sup>46</sup>. It only takes into account a general logic of an extremely complex phenomenon. Hayek excludes the possibility for the mind to eventually arrive at a comprehensive self explanation. This is due to the fact the he denies the possibility for an *explanation of detail* of its running that would permit “to substitute a description in physical terms for a description in terms of mental qualities”<sup>47</sup>. To his judgment this possibility needs to be discarded for three reasons.

First of all he considers that, given that the mind is composed of 10 billion neurons able to interconnect with one another according to a virtually unlimited number of combinations, it belongs to the “complex phenomena”<sup>48</sup> category. It is impossible to identify all the interdependent variables contributing to determining such a complex order as the mind is. It is not feasible to master the whole of its physical causes. In such order “the number of variables which would have to be taken into account is greater than those that can be ascertained or effectively manipulated”<sup>49</sup>. Moreover, the chance to only resort to an *explanation of principle* presents severe drawbacks in terms of forecasting. In fact, only for the “simple phenomena”, caused by a limited number of variables, it is possible “to predict particular events”<sup>50</sup>. It follows that, “will shall never, by means of the same brain, be able to arrive at a detailed explanation of its working in particular circumstances, or be able to predict what the results of its operations will be”<sup>51</sup>.

The second reason is, instead, strictly linked to the adaptive logic of a self-organized order. This kind of order is not characterized by a fully knowable and foreseeable behavior also because, employing a concept widely used by Maturana and Varela, it is endowed with “autonomy”<sup>52</sup>. As increasingly clarified by the connectionist cognitive scientists, the behavior of a self-organized order is neither determined by a program introduced from the outside and followed mechanically (behavior of a self-organized order is not comparable to the one of a machine that has been previously programmed, as a computer), nor by the effects applied by the surrounding environment. Basically an order of this kind does not passively undergo such effects (its behavior has nothing to do, for instance, with the one of a pool ball that is, on the opposite, entirely determined by the external forces acting on it)<sup>53</sup>. The cause behind the behavior of a self-

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<sup>46</sup> Hayek (1952), p 182.

<sup>47</sup> Ibid., p.189. See also Nadeau (2001), pp. 15-20.

<sup>48</sup> Hayek (1967), p. 55.

<sup>49</sup> Hayek (1952), p. 185.

<sup>50</sup> Ibid.

<sup>51</sup> Ibid., p. 189.

<sup>52</sup> Maturana & Varela (1980) pp. 77-87

<sup>53</sup> Hayek (1952), pp. 122-127.

organized order is not to be sought outside it. An order as the mind actively employs aleatory novelties that appear in the environment in a continuous and unpredictable manner, to constantly self-reprogram itself. Its logic is to safeguard its autonomy from the outer environment and thus its capability to adapt. An order of this kind is not predetermined **as** it is not possible to foresee the aleatory novelties affecting its behaviour, nor the way they will impact on the outcomes of its processes of self-organization and upholding of autonomy. These processes are acts of pure creation<sup>54</sup>. By virtue of its working modalities, a self-organized order is the “cause of itself”<sup>55</sup>.

The third and last reason taken into account by Hayek is of a logical kind (Hayek explicitly speaks of a Goedelian limit). As we have seen, Hayek regards the mind as an apparatus for classification. According to him, we cannot fully explain our interpretative categories because ultimately we rely upon these to create meaning in the first place. In other words, these categories are prior to any meaning and so have no place in the order of meanings they create: “There is [...] on every level, or in every universe of discourse, a part of our knowledge which, although it is the result of experience, cannot be controlled by experience, because it constitutes the ordering principle of that universe by which we distinguish the different kinds of objects of which it consists and to which our statements refer”<sup>56</sup>. To get around this problem we should place ourselves outside our own mind. A classifying apparatus of a higher complexity compared to the one of the human mind would in fact be required – an apparatus that, moreover, would in turn be, for the same logical reasons, unable to exhaustively explain its functioning<sup>57</sup>. Also due to this motive, we are faced, according to Hayek, with the impossibility to replace an explanation based on mental skills with one characterized by mere physical terms.

## 5. From the Indeterminism of Cognitive Process to the Necessity of *Verstehen*

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<sup>54</sup> See Atlan (1979), pp. 157 ff.

<sup>55</sup> See also Dupuy, (1990), pp. 109-124.

<sup>56</sup> Hayek (1952), 169-170. See also Hayek (1967), pp. 60-63.

<sup>57</sup> Hayek (1952), pp. 184-190. See also Nemo (1988), pp. 60-61. Thomas j. McQuade argues an interesting criticism of this logical limitation pointed out by Hayek. “The weakness in this line of argument”, he writes, “is the unstated assumption that the only classificatory system involved here is the human brain. But the classifications of science are not produced by a single human brain; they are the result of the interactions between many human brains in a system whose overall complexity exceeds that of a single brain – a system which, therefore, does not violate the condition set by Hayek’s opening proposition. The classification produced in the mind of an individual scientist, even though it includes feedback influences from his observations of the classification produced by science, is not the same thing as the emergent classification we call ‘scientific knowledge’ and should not be conflated with it” (McQuade (2007), p. 69.).

Hayek is, in a way, a monist: “in some ultimate sense mental phenomena are ‘nothing but’ physical processes”<sup>58</sup>. According to his view, “this, however, does not alter the fact that in discussing mental process we will never be able to dispense with the use of mental terms, and that we shall have permanently to be content with a practical dualism”<sup>59</sup>. Being impossible to detail the working of the mind, it is not feasible to seek the causes of thought in the physical characteristics of the external environment and in the physical processes induced by the former in the nervous system. It stems “that we shall never achieve a complete ‘unification’ of all sciences in the sense that all phenomena of which it treats can be describes in physical terms”<sup>60</sup>. Given that an *explanation of principle* of the sensory order is the only feasible route, it follows highly impracticable to reduce social sciences to physics.

Bearing in mind a system based on *autonomy*, as intended by Maturana and Varela, and being impossible to fully comprehend the way it functions, the idea stating that cognitive processes can be conceived in deterministic terms needs also to be ruled out. The prospect according to which action is nothing less than a mechanical product of the context, shared by the behaviorism of as much as by the methodological holism, is not compatible with Hayekian connectionism. By reason of the mind’s complexity and the fact that such order is the “cause of itself”, the “data” for the explanation of the action cannot be external to the individual. This conclusion, Hayek stresses, “is, of course, of the greatest importance for all the disciplines which aim at an understanding and interpretation of human action”<sup>61</sup>. The adoption of the collectivist paradigm and the search for the action’s causes outside the individual is, according to Hayek, the result of a *Hybris*. In other words it is a scientism-type and over simplifying conceit neglecting logical and epistemological limits, that is necessary to come to terms with in accounting for the outcomes of mental operations.

The Austrian author regards the explanation for the action as necessarily resulting in a reconstruction of the ideas motivating the individuals: he supports that the “data” of social sciences are internal to the actors. To support the thesis, as holists do, considering the “sense”, the action has for individuals, as irrelevant is illegitimate and misleading, according to Hayek: “Unless we can understand what the acting people mean by their actions any attempt to explain them [...] is bound to fail”<sup>62</sup>. The possibility to apply such hermeneutical and subjectivist procedure calls for existence of a *quid* common to the researcher and social actors: it needs, therefore, an invariant element in spite of the variability of beliefs and knowledge. Hayek states that such element does exist by virtue of a genetic predisposition, constituted by the knowledge *a priori* of the mind’s logical structure and of its perceiving basic categories<sup>63</sup>.

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<sup>58</sup> Ibid., p. 191.

<sup>59</sup> Ibid.

<sup>60</sup> Ibid.

<sup>61</sup> Ibid., p. 193.

<sup>62</sup> Hayek (1953), p. 53.

<sup>63</sup> Ibid., pp. 99-103. See Butos and Koppl (2006), pp. 35-36.

Holism has originally developed in close correlation with the naïve realism, one of the mistakes of the positivist vision of science. This helps understanding the reason why such paradigm has come to consider the mind as a deterministic mechanism instead of as apparatus for interpretation, taking the action's causes as objective or external rather than internal to individual minds. The naïve empiricism denies the dichotomy between sensory and physical order. Hayek demonstrates, instead, that precisely due to this dichotomy and the non reducibility of the mental to the physical, it is necessary to rule out the determinism of action and support a "subjectivist method"<sup>64</sup>. By the light of its "practical dualism", it become clear that it is not possible to set aside an explanation of the action in terms of universal *a priori* and effects of perceptive interpretations: "In the study of human action [...] our starting point will always have to be our direct knowledge of the different kinds of mental events, which to us must remain irreducible entities"<sup>65</sup>.

The approach supported by Hayek thus concerns a "*verstehende* psychology"<sup>66</sup>. According to this approach the powers of human sciences are bounded. The scientist has no other possibility but to "use our direct ('introspective') knowledge of mental events in order to 'understand' [...] the results to which mental processes will lead in certain conditions"<sup>67</sup>. However "such a *verstehende* psychology, which starts from our given knowledge of mental process, will [...] never be able to explain –Hayek writes – why we must think thus and not otherwise, why we arrive at particular conclusions"<sup>68</sup>. Moreover "assertion that we can explain our own knowledge involves also the belief that we can at any one moment of time [...] act on some knowledge"<sup>69</sup> due to the fact that it is associated to the idea that it is possible to acquire "some additional knowledge about how the former is conditioned and determined"<sup>70</sup>. This is a further reason behind the close association between methodological holism and constructivist rationalism.

According to Hayek the error of conceiving in deterministic terms cognitive processes is plainly illustrated in Karl Mannheim's approach: "In particular, it would appear that the whole aim of the discipline known under the name of 'sociology of knowledge' which aims at explaining why people as a result of particular material circumstances hold particular views at particular moments, is fundamentally misconceived"<sup>71</sup>. In opposition to Manneheim Hayek reaffirms that, given the sensory order's characteristics, the causes of actions can not be traced back to the influences coming from the external contest: "To us – he writes – human decision must always appear as the result of the whole of a

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<sup>64</sup> On the subjectivist implications of Hayek's psychology, see Butos and Koppl (2006), pp. 31-32.

<sup>65</sup> Hayek (1952), p. 191.

<sup>66</sup> Ibid., p. 192.

<sup>67</sup> Ibid.

<sup>68</sup> Ibid.

<sup>69</sup> Ibid.

<sup>70</sup> Ibid., p. 192.

<sup>71</sup> Ibid., pp. 192-193.

human personality – that means the whole of a person’s mind – which, as we have seen, we can not reduce to something else”<sup>72</sup>.

Therefore *The Sensory Order* represents the attempt to transform methodological individualism from a mere epistemological principle to an approach centered around a scientific theory of the mind, able to adequately account for the logic behind the creation of sensory perceptions; a theory that legitimizes the indeterminism of human action and the *interpretative* method and that, thus, well combine with the Weberian tradition<sup>73</sup>. While methodological holists consider the action as determined at an unconscious level, Hayek considers the *tacit* and *meta-conscious* processes, that are at the basis of knowledge, as legitimating methodological individualism.

It is worth noting how, by developing a connectionist approach similar to the Hayekian one, cognitive scientists as Dreyfus, Petitot and Varela have stressed the significance of the sense’s relevance that action embeds for the individual. These authors define the connectionist approach as a “phenomenological” approach and question another paradigm of cognitive sciences: the logical-symbolic paradigm. It compares the mind to a computer running a program and reducing it to only logical skills. It does not deem the mind as an interpretation apparatus, based on the self-organization logic, and does not take into account the issue relative to the sense’s explanation nor the role played by tacit capabilities in perceptions and action. The experimental researches connectionists have implemented over the past few years have reasserted Hayek’s intuitions on cognitive limitations connected to the study of the mind and, indirectly, also the epistemological consequences derived by Hayek<sup>74</sup>.

Underlining the empirical nature of his theory of perception, Hayek points out that it is confirmed by the neurophysiologic knowledge which is available at the time in which he writes<sup>75</sup>. As recent studies show, further developments in neurophysiology also give confirmation to his intuitions<sup>76</sup>.

## 6 Sensory Order and Praxeologic Approach

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<sup>72</sup> Ibid.

<sup>73</sup> See also Lachmann (2007), pp. 1-48. This thesis is criticized by Smith (1997) who states that in Hayek’s psychology there is no “room for planning, for self-control and for the deliberate self-shaping of the conscious subject”. As Butos and Koppl (2006, pp. 33-34) stress, Smith’s position is untenable. Hayek “shows us”, they write, “that any reduction of the mental to the physical can be made only ‘in principle’. We cannot describe thought and action without using words such as ‘plan’ and ‘purpose’ (...). Hayek’s methodological dualism vindicates our use of the language of planning and purpose, which Smith curiously imagines to be inconsistent with Hayek’s theory of mind”.

<sup>74</sup> See Dreyfus & Dreyfus (2000), Dupuy (2000), Petitot (1992) Varela (1989) and Winograd & Flores (1987). See also Long (2008), pp. 40 ff. Because of the “phenomenological nature” of connectionism, it may be possible to consider Hayek as a little bit more close to Alfred Schütz than what would appear at first sight. As it is well known, Schutz tried to base his methodological individualism on Husserl’s thought and to develop a phenomenological method for the social sciences. See Schütz (1967).

<sup>75</sup> Hayek (1953), pp. 147 ff..

<sup>76</sup> See Fuster (1995).

Even though Hayek is not explicit on this point, it seems to me that the conclusions which he attains in *The Sensory Order* are largely compatible with Mises' praxeological theory of action. As is well known, Hayek does not fully embrace Mises' apriorism. Unlike Mises, he stresses that the market theory is not a priori, but empirical. According to Hayek then, what is a priori is "only the logic of human action"<sup>77</sup>.

As we already pointed out, Hayek's cognitive psychology supports an argument against 'polylogism', the doctrine that different cultures have different logic<sup>78</sup>. He maintains that biological evolution selected universal categories of human action. This idea is shared by Mises: "The concepts of natural selection and evolution make it possible to develop a hypothesis about the emergence of the logical structure of the human mind and the a priori"<sup>79</sup>. However, neither Hayek nor Mises thinks that the empirical research on the evolution of these categories or the attempt to explain them in physical terms can be valid points of departure for social science. Both agree that a theory of biological evolution can only be useful to explain why these categories exist. However, both stress that the fact that we can know them does not depend on experience. These categories are *a posteriori* for the species, but *a priori* for individuals. "When we speak of a man", Hayek states, "we necessarily imply the presence of certain familiar categories"<sup>80</sup>. Mind is not "an object which we observe as we observe physical fact"<sup>81</sup>. Wherever "we speak of mind we interpret what we observe in terms of categories in which our own mind operates"<sup>82</sup>.

In *The Sensory Order* Hayek arrives precisely at the conclusion that the ultimate foundations of social science lie in our direct knowledge of the functioning of human mind<sup>83</sup>. He rules out the possibility of substituting an explanation of action in terms of direct knowledge of the categories of mind for an explanation of action in physical terms<sup>84</sup>.

Like Hayek, Mises strongly criticizes monism and reductionism: "There is no explanation," he states, "in terms of the natural sciences of what causes hosts of people to remain faithful to the religious creed in which they were brought up and others to change their faith, why people join or desert political parties, why there are different schools of philosophy and different opinions concerning a multiplicity of problems"<sup>85</sup>. In particular, Mises maintains that contrary to what positivists and scientists state, in order to explain the motivations of actors we cannot avoid the necessity of using a set of categories of action – intentionality, rationality, economical evaluation and causality – which are tautological or analytical<sup>86</sup>. They are implied in the concept of action: "There is no action in

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<sup>77</sup> Hayek, 1994, p. 72.

<sup>78</sup> See Butos and Koppl (2006), p. 36.

<sup>79</sup> Mises (2002), p. 14.

<sup>80</sup> See Hayek (1953), p 139.

<sup>81</sup> Hayek (1953), p. 136.

<sup>82</sup> Ibid.

<sup>83</sup> Hayek (1952), pp. 165 ff.

<sup>84</sup> Ibid.

<sup>85</sup> Mises (2002), p. 121.

<sup>86</sup> Mises (1998), p. 12.

which the praxeological categories do not appear fully and perfectly”<sup>87</sup>. These categories “are not derived from experience. They are, like those of logic and mathematics, a priori”<sup>88</sup>. According to Mises, praxeological categories are fundamental presuppositions of common sense as well as of science: “Without them we should not be able to see in the course of events anything else than kaleidoscopic change and chaotic muddle” (*Ibid.*).

A claim for the interpretative approach and methodological individualism is of course also a claim for universal categories of action. In order for us to understand others with their different knowledge and culture via methodological individualism, we need a common element between us and them. For Hayek, the use of praxeological and universal categories is legitimate because of the logical and empirical reasons which determine the complexity of mind and the impossibility of explaining action as a pure effect of internal and external physical conditions. Consequently, his theory of mind has to be considered to some extent as a defense of the praxeological point of view.

## 7 The Nomological-Deductive Explanation of Action

Very often theoreticians of methodological individualism criticize the nomological-deductive model of explanation. In other words, they maintain that the social sciences, as distinct from the natural sciences, are not based on the use of covering laws. This is because they defend the indeterminism of human action. Consider, for instance, such authors as Collingwood, Croce and Dilthey<sup>89</sup>. In my opinion, Hayek, in spite of some ambiguities<sup>90</sup>, doesn’t follow this line. It seems to me that his position is largely compatible with the nomological-deductive approach as developed by Popper and Hempel.

In the *Sensory Order* he writes that the logic behind knowledge acquisition is universal and that science, like the mind, works through a classification procedure: it explains phenomena by grouping them in typical classes—thus in a nomological fashion. In *The Counter-revolution of Science* Hayek explicitly states that trying to explain individual actions implies “subsum[ing] them under rules which connect similar situations with similar actions”<sup>91</sup>.

As clarified by Weber himself, the *interpretative* method is not in contrast with the nomological-deductive paradigm<sup>92</sup>. Contrary to what is supported by the anti-nomological individualists, such a paradigm does not inevitably require the use of deterministic laws. It is also compatible with probabilistic laws and

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<sup>87</sup> Mises (1998), pp. 39-40.

<sup>88</sup> Mises (1998), p. 32.

<sup>89</sup> See Di Nuoscio (2006), pp. 129 ff..

<sup>90</sup> Hayek states that the concept of law is useless for social science (Hayek, 1967, pp. 3-42). However, this doesn’t allow me to consider Hayek an anti-nomological individualist because his criticisms are against the idea of determinist laws of social phenomena. It seems to me that his approach is not incompatible with the idea of tendential laws claimed by Weber, Popper and Hempel.

<sup>91</sup> Hayek (1953), p 53.

<sup>92</sup> For more details please refer to Weber (1975).

hence with the idea that action is non-deterministic. As clearly illustrated by Popper and Hempel, the social scientist cannot refrain from using this kind of law in reconstructing the logic of the situation, in other words, the *reasons* of the actor<sup>93</sup>.

Following Mises, Hayek maintains that the only absolute general laws we can apply in the explanation of human action are the praxeological ones. These laws are the basis of understanding and they are compatible with the indeterminism of action because they don't allow forecasting the specific features of behavior. However, Hayek, as well as Mises, is aware of the fact that these laws are not sufficient to explain action. In my opinion it is possible to interpret what Hayek calls "our direct knowledge of the different kinds of mental events"<sup>94</sup> – the knowledge he considers necessary to understand the action – as composed also of non-tautological laws, viz., what Popper and Hempel consider as empirical covering laws. Such empirical laws are only probabilistic and we usually use them in an unconscious way because they are, like the praxeological categories, rooted in commonsense<sup>95</sup>.

Consider, for instance, this historical explanation: After the Romans won against the Latins, they treated them less cruelly than the others they had vanquished. This was because they knew they would soon have to fight the Etruscans, Samnites and Gauls, and they would need the help of the Latins to conquer these peoples<sup>96</sup>. This explanation is nomological not only because it is founded on praxeological categories. It is also because it is founded on a trivial psychological law rooted in common sense: "If you want the help of somebody you need to be kind to him". Without this law it would be impossible to find the cause of the Romans' attitude towards the Latins. Categorization and explanation would be impossible. Of course, like all the empirical laws which concern human action this law is only probabilistic because it is uncertain that if I want the help of somebody and I am kind with him he will give his help. There is no determinism.

Consider this other example: "Carl struck John because John insulted him". This explanation is also implicitly founded on a commonsense covering law which is only tendential. Sometimes people who are insulted don't strike the person that insults them. However, even in this case, without using this tendential law we could have any explanation because we could link the reaction of Carl with what John said. The categorization would be impossible and we could not give a meaning to John's act.

According to Popper, the use of probabilistic laws implies that the empirical control in explanation of action concerns exclusively what he calls the reconstruction of the "situational logic"<sup>97</sup>, viz., the reconstruction of the initial conditions of the explanation. Of course, if we know that a law is only

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<sup>93</sup> See Hempel (1966) and Popper (2000, 2001).

<sup>94</sup> Hayek (1952), p. 191.

<sup>95</sup> See Di Nuoscio (2006), pp. 31-75.

<sup>96</sup> See De Sanctis (1960), p. 245.

<sup>97</sup> Popper (1961), p. 147.

tendential, we also know that it is empirically false because there are cases which are contrary to the law. So it makes no sense to try to test it. Consequently, Popper states that the logic of explanation of action is similar to the logic of explanation in applied physics. It is necessary to take care of initial conditions and to use laws, but there is no test of laws<sup>98</sup>.

However, Popper maintains, like Hempel, that the reconstruction of the initial conditions has to be more careful in social sciences than in applied physics<sup>99</sup>. This is precisely because of the fact that the majority of the laws used in social science (not necessarily the empirical laws concerning human action) are tendential or probabilistic laws. When it is impossible to use deterministic laws, the phenomenon we want to explain can be compatible with different causes. Consider, for instance, the explanation given by Thucydides about the re-election of Pericles in spite of the negative trend of the war against the Persians. This fact is compatible with different tendential laws. Athenians could have been obliged to re-elect him by the use of force or they could have been deceived. Thucydides rules out these hypotheses precisely by analyzing carefully, as a detective, the initial conditions. He shows that Pericles was beloved by the Athenians and he was able to convince them that it was right to re-elect him<sup>100</sup>.

Popper also agrees with Hempel on the fact that when we use probabilistic laws, the explanation is less certain because there is not necessarily logical deduction of the *explanandum* (the phenomenon we want to explain) from the *explanans* (the set of initial conditions and laws which are the foundation of our explanation). However, both Popper and Hempel underline that the use of tendential laws is not exclusive to the social sciences and it cannot be considered as the foundation of a different approach than that of the natural sciences. It is only more frequent in the field of social sciences. Clinical medicine, for instance, shows us examples of probabilistic laws: certain treatments against cancer are valid only in X% of cases. Examples of tendential laws can be taken also from meteorology and other natural sciences<sup>101</sup>.

It seems to me that the nomological-deductive model of Popper and Hempel combine well with the idea of knowledge by classification which Hayek proposes in *The Sensory Order*. Even though Hayek is unclear on this point, his cognitive psychology can be considered in a sense a defense of a nomological conception of methodological individualism.

Moreover, even the idea of “explanation of principle” which Hayek claims for the analysis of functioning of complex orders like mind or market can be easily showed as based on a nomological-deductive approach. It is an explanation based on laws, even though these laws are not quantitative and cannot allow a detailed forecast (like, for instance, the law, “every time the

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<sup>98</sup> Ibid.

<sup>99</sup> Popper (1992), p. 117; see also Nadeau (1989).

<sup>100</sup> See Di Nuoscio, 2004, p. 232.

<sup>101</sup> See Di Nuoscio, 2004, p. 212; 2006, p. 41.

amount of money grows there is inflation” or “every time the mind perceives something it does a classification”)<sup>102</sup>.

## 8. The Neurophysiologic Foundation of the Subjective Theory of Value

Hayekian theory of the sensory order, in addition to legitimize the *interpretative* method, is relevant for another reason. It establishes the subjectivism of values from a neurophysiologic viewpoint. As already mentioned, it excludes the possibility for a complete identity of the different *maps* occurring in the individual minds. According to Hayek, human minds will be sufficiently similar to allow the mutual comprehension and interaction amongst individuals, but “they will not be identical”<sup>103</sup>. This excludes a perfect matching of the personal assumptions of the subjective evaluations<sup>104</sup>.

This is another reason why the relation between the action and the environmental context is structured according to more complex terms compared to what maintained by those advocating the *objectivistic* and *collectivistic* approach in social sciences.

## 9. The Analogy between the Self-Organization of the Mind and that of the Market

As we pointed out, according to Hayek’s connectionist paradigm the way neurons work is not controlled by a central unit, but is simply based upon certain “rules” of activation. It follows that for him perceptions *emerge* according to a logic of self-organization<sup>105</sup>.

Due to the above, some authors have correctly underlined that an analogy does exist between Hayek’s theory of the mind and his conception of the market. Both these phenomena are for him *spontaneous* and *knowledge-generating* orders<sup>106</sup>.

It is possible to schematically resume the analogies which exist between mind and market according to Hayek:

1) Both are adaptive classifying systems which generate knowledge by a sort of categorization. As McQuade and Butos point out, while the mind creates by classification the meaning of reality in order to allow an adaptation of the behavior, the market generates a classification which concerns the goods and

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<sup>102</sup> See Hempel (1966), pp. 359 ff. See also Di Nuoscio (2004), p. 234.

<sup>103</sup> Hayek (1952), p. 110.

<sup>104</sup> For details please refer to Cubeddu (1993).

<sup>105</sup> See Varela (1989) pp. 60-61. Hayek does not illustrate in depth the activation modalities of neurons. He goes so far as to agree with Hebb (Hebb 1949), who was the first to analyze this issue in detail. See Hayek (1952) note 1 p. 64 and note 1 p. 114. Also see Hayek (2001) p. 20.

<sup>106</sup> See Butos & McQuade (2002, 2005); McQuade (2007); Smith (1997).

their prices<sup>107</sup>. Giving a specific price to every good, it allows the coordination of the economic activities and the cost minimization. Consequently, it works like a cybernetic system, based on feedback regulation, just as the mind does. While in the mind the transmission of information and the categorization are based on chains of neurons, in the market they are based on chains of prices<sup>108</sup>.

2) Both are complex systems based on the logic of self-organization. They don't have a single locus of control, but are polycentric. Their functioning depends only on the existence of general rules that bind the behavior of the parts. It doesn't depend on a central calculation. Hayek himself underlines this similarity. Commenting on the nature of market society, he states: "the brain of an organism which acts as the directing centre for that organism is itself in turn a polycentric order, that is, that its actions are determined by the relation and mutual adjustment to each other of the elements of which it consists"<sup>109</sup>.

This fact has important epistemological consequences. As Varela underlines, self-organization is a necessary attribute of complexity<sup>110</sup>. The performance of complex self-organized orders would be inconceivable as the outcome of a central direction. Both the idea to consider the mind as a computer and the idea that it is possible to centralize the direction of economic activities are fallacious for systemic and cognitive reasons. No computer or central planner can use the distributed and tacit knowledge which mind and market can use<sup>111</sup>.

3) As self-organized orders, both adapt themselves to continuing and unpredictable changes and both have consequently a dynamical structure. Inside these systems, order always coexists with a certain degree of disorder because they re-adapt themselves continually. In this way they can preserve their functioning<sup>112</sup>. In the case of mind the re-adaptation that results from new experiences concerns the systems of connections, while in the case of market the re-adaptation concerns the structure of production and division of labor. As Atlan points out, the time of this kind of system is indeterministic<sup>113</sup>. Their future is not inscribed in their past. It depends on the way in which future changes will influence their capacity of self-organization – it is unforeseeable<sup>114</sup>. This phenomenon has been well analyzed concerning the market by O'Driscoll and Rizzo who criticize the theory of general equilibrium because of the fact that it is based on a *Newtonian* time, underlining that for understanding the market it is necessary to use a "dynamic conception of time"<sup>115</sup> as intended by Bergson.

4) Both are emergent phenomena. Mind emerges from the brain and especially from the activity of neurons in conformity to the rules that regulate

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<sup>107</sup> Butos & McQuade (2005), p. 345.

<sup>108</sup> See Smith (1997), p. 113.

<sup>109</sup> Hayek (1967), p. 73.

<sup>110</sup> Varela (1989), pp. 61-77.

<sup>111</sup> See Petitot (2000), pp. 2-46.

<sup>112</sup> See Dupuy (1990), pp. 109-124.

<sup>113</sup> Atlan (1979), pp. 157 ff..

<sup>114</sup> Ibid.

<sup>115</sup> O'Driscoll e Rizzo (1996), p. 51.

their functioning. Markets emerges unintentionally from the intentional actions of individuals who follow specific ethical principles and civil laws. As we will analyze further, a fundamental characteristic of the emergence lies in the fact that it creates systems that are endowed with attributes irreducible to the attributes of their basic components. Mind cannot be reduced to the brain. Similarly market cannot be reduced to the intentions of individuals<sup>116</sup>.

5) Both are evolutionary orders, the outcome of a long process of trial and error<sup>117</sup>. These orders developed in an indeterministic way by adaptation to unforeseeable facts or conditions. This fact is one of the sources of Hayek's criticism of the constructivist mentality. "Man" - he states in the epilogue of *Law, Legislation and Liberty* - "is not and never will be the master of his fate: his very reason always progresses by leading him into the unknown and unforeseen where he learns new things"<sup>118</sup>.

## 10. Sensory Order and Social Change

Considering action as determined by social factors, the holistic paradigm sees the source of the social change outside of individuals. It puts it in laws of historical evolution which govern the social collectives as wholes and which enforce their control on actors. Methodological individualism considers the holistic theory of social change as untenable because of the existence of two fundamental sources of indeterminism which avoid the possibility of establishing laws of historical evolution. On the one hand, the indeterminism of human action and, on the other hand, the emergence of unintentional, unforeseeable consequences<sup>119</sup>.

Vanberg and others scholars have criticized Hayek's theory of cultural evolution, centered on the idea of group-selection, underlining its inconsistency with the pillars of methodological individualism<sup>120</sup>. They maintain that Hayek, by heavily relying on the role of group-selection and on action governed by acquired rules, has ended up in deriving a theory of cultural determinism which considers the group not as the effect of individual behavior, but as its cause<sup>121</sup>. Vanberg states that Hayek uses a "functionalist type of argument, according to which its contribution to the 'maintenance' of a social system explains the existence of a social pattern or institution, a type of argument has had some popularity in sociology and social anthropology"<sup>122</sup>. This collective-functionalism

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<sup>116</sup> See Nadeau (2003), p. 18.

<sup>117</sup> Smith (1997), p. 114.

<sup>118</sup> Hayek (1979), p. 176.

<sup>119</sup> See Boudon & Bourricaud (1990).

<sup>120</sup> See Vamberg (1994), p. 48 ff. See also Boehm (1989), Gray (1986) & Hodgson (1991, 1994).

<sup>121</sup> Ibid.

<sup>122</sup> Vanberg (1994), p. 84.

“explicitly rejects the idea that the relevant social process can be explained [...] in terms of *individual actions*”<sup>123</sup>. According to Vanberg, “[a]pparently and strangely enough, Hayek appeals to such a *collectivist-functionalist* notion when he stresses that, in cultural evolution, a process of *group selection* is of ‘greatest importance’”<sup>124</sup>. His “appeal to the collectivist-functionalist notion of a process of cultural evolution that operates at the group-level, as such, stands in contrast” Vanberg concludes, “to the explicit methodological individualism that otherwise informs his work”<sup>125</sup>.

This kind of criticism does not take into account the fact that Hayek, as already illustrated, considers the mind in a rather different way than the holistic sociologists. He neither regards it as a machine that mechanically implements a program previously acquired via the process of socialization, nor as an order directed by external factors. According to Hayek, applying a certain response rule in specific situations will never be characterized by a mechanical nature because, as we have already seen, it relies on interpretive processes which are based on a self-organized and indeterministic logic. For him, these interpretive processes can concern the same meaning of cultural rules and the way they can be applied because this meaning could sometimes be ambiguous and contradictory<sup>126</sup>. But then, if one accepts Hayek’s *Verstehen* psychology, he needs to conclude that the study of the social conditioning has to consist in the analysis of the way in which this conditioning is *interpreted* by the actors. In order to understand how it influences them it is necessary to understand how they perceive it<sup>127</sup>. There is no way according to Hayek’s connectionism to consider simplistically and mechanically social conditioning as the source of action.

Moreover it has to be remembered that Hayek considers the mind, being based on the logic of self-organization, as endowed with the capacity to modify, at least partly, the effects of prior learning (and thus also the effects of the socialization process). The connectionist approach regards the mind as having the capacity to develop, according to new experiences, new perceptive and adaptive rules in line with the safeguarding of its autonomy<sup>128</sup>.

*This implies that, according to Hayek, the group cannot be the cause of individual behavior, but only its effect.* For him, groups do not exist ontologically and the “group selection” is a selection of systems of rules that are not taken up because of a cultural determinism<sup>129</sup>. Hayek considers the action on the one hand as the outcome of tacit processes which aim to maintain the *autonomy* of mind, and on the other hand as the result of what Boudon calls, following Simon, an intentional choice based on a *bounded rationality*<sup>130</sup>. For the Austrian author, intentional choice is founded on these tacit or meta-conscious processes of self-

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<sup>123</sup> Vanberg (1994), p. 85.

<sup>124</sup> Ibid.

<sup>125</sup> Ibid.

<sup>126</sup> Hayek (1973), pp. 55 ff.

<sup>127</sup> See also Boudon & Bourricaud (1990), pp. 412 ff.

<sup>128</sup> See also Boudon & Bourricaud (1990), pp. 527-534.

<sup>129</sup> See Di Nuoscio (2000), pp. 177-178 and Nadeau (2003), pp. 13-18.

<sup>130</sup> See Boudon (1992), pp. 30 ff. See also Simon (1982), p. 45 ff.

organization of the mind and can be reconstructed using praxeological categories. Consequently, if one accepts Hayek's theory of mind, one has to conclude that the reason why people follow certain rules cannot be found other than in the activity of the human brain. Thus the holist overstates the importance of the social context. In other words, one needs to admit that action cannot be explained without an individualistic approach which aims to understand the *reasons* of individuals<sup>131</sup>.

Of course, this does not mean, as we have already pointed out, that Hayek is a social reductionist and that his approach reduces all societal attributes to individual attributes. Actually, none of the main exponents of methodological individualism makes this kind of mistake, which would make this approach epistemologically useless and sociologically unfounded. Like the other main methodological individualists, Hayek considers the groups as systems, viz., as non-aleatory combinations of elements<sup>132</sup>. Consequently he sees them as something more than the simple addition of many individualities: “[I]he existence of those relations which are essential for the existence of the whole cannot be accounted for wholly by the interaction of the parts”<sup>133</sup>. A reductionism that denies this point is incompatible with the interpretation of methodological individualism shared by its most prestigious champions. Such a reductionism would be incompatible also with the concept of emergence of unintentional consequences, central in the individualistic approach. Moreover, it would be incompatible with the theory of self-organization because this latter is inseparable from the concept of a system.

As we saw, even regarding this point it is possible to find analogies between Hayek's connectionist conception of mind and his theory of society. As Nadeau points out, according to Hayek, the “best way to understand the relationship between individual actions and society is what has been called in philosophy of mind ‘supervenience’. Just as ‘mind’ can be said to supervene to on ‘brain’, society can be said to supervene on ‘individuals’: and in the very same line of thinking, ‘cultural groups’ can be said to supervene on ‘individual agents’. The Hayekian brand of methodological individualism qualifies as ‘emergentist’ as opposed to ‘reductionist’”<sup>134</sup>. On social ground the emergence is given by the formation of unintentional consequences which can be obviously explained only via methodological individualism. Without applying this approach, and its invisible-hand explanation model, it becomes impossible to switch from the micro-dimension of the actors' intentional compartments to the macro-dimension of the unintentional resulting social order. This demands that we admit the existence and the relevance of the intentionality.

Consequently, the difference between holism and individualism is not given by the reductionist nature of the latter. It is given rather by the tendency of holism to hypostatize the groups following the naïve empiricist error to mislead

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<sup>131</sup> See also Boudon (1992), pp. 30 ff.

<sup>132</sup> Di Nuoscio (2000), pp. 178-179.

<sup>133</sup> Hayek (1967), p. 71.

<sup>134</sup> Nadeau (2003), p. 18.

the theoretical nature of the social phenomena as well as of the other phenomena<sup>135</sup>. In other words, this difference is given by the tendency of holism—which was, especially at the beginning, very influenced by the naïve empiricism—to consider the groups as social data, that is, as concrete entities—entities not explainable theoretically in terms of intentionality and emergence, but only as “given wholes”, governed by macro-laws which determine the actions of the individuals, who are intended to be nothing but emanations of the group<sup>136</sup>.

A last point needs to be considered. As a foundation of his theory of action, Hayek’s connectionism rules out not only the idea that his theory of social group is linked with cultural determinism, but it also rules out the chance of identifying laws governing social changes. First of all, it is incompatible with the historicist point of view of authors like Comte, Hegel and Marx which assumes the existence of laws governing the evolution of mind and, as a consequence of this fact, of society<sup>137</sup>. If the mind is a self-organized order, the existence of these laws as well as the possibility of predicting the future evolution of society by forecasting the evolution of mind are inconceivable. Secondly, Hayek’s connectionism is incompatible even with the most recent holistic theories of social change. These theories refrain from predicting the future evolution of the whole society. They are more modest and only establish laws governing the change of specific parts of it<sup>138</sup>. These laws affirm a deterministic relation between a certain type of variation in the environmental conditions and the coming of a distinct type of social structure. Consider, for instance, Parsons’ theory on the tendency towards the “nuclearization” of families in industrial societies. Hayek’s approach helps us in understanding why this kind of theory does not work and why it is possible to find opposite historical cases which falsify them. Considering in particular Parson’s law, what indicated that this “is a *non sequitur* is simply the fact that in *certain* societies, as Japan, industrialization has occurred with, rather than against, the extended family and has tended to strengthen it, at least over a long period”<sup>139</sup>.

Hayek’s theory of mind supports the idea that social change cannot be forecast on the basis of deterministic laws. It argues rather for the idea that it must be analyzed *ex post* via methodological individualism, that is, by the reconstruction of the reasons of the individuals and of the effects of their actions.

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<sup>135</sup> Di Nuoscio (2000), p. 179.

<sup>136</sup> Idem.

<sup>137</sup> Hayek (1953), pp. 111 ff.

<sup>138</sup> See Boudon (1991), p. 3 ff..

<sup>139</sup> Boudon (1991), p. 22.

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