Hayek's Terra Incognita of the Mind

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Although Friedrich Hayek has been long recognized for his economic insights, and in fact was awarded the Nobel Prize in 1974 for his theory of money and economic fluctuations, very little academic attention has been paid to other aspects of his thought. This oversight is unfortunate. Hayek's theory of mind provides us with a compelling defense of the market system. Moreover, with the publication of books like Daniel Dennett's *Consciousness Explained*, Paul Churchland's *Matter and Consciousness*, and Francis Crick's *The Astonishing Hypothesis*, Hayek's views regarding the unpredictability of the human mind are particularly timely.

In the following paper, I undertake to examine Hayek's theory of mind. Toward this end, the paper is organized into three sections: In the first section I will summarize Hayek's theory of mind. In the second section I will explain Hayek's claim that the human mind can never be predicted by man or machine. In the final section I will focus on how Hayek's theory of mind provides a compelling defense of the market system.

A Summary of Hayek's Theory of Mind

Hayek's theory of mind is not located in a single text; it is instead distributed throughout the corpus of his writings. Nevertheless, Hayek's first and most substantial foray into the subject of mind occurred when he began writing *The Sensory Order* in 1920. Soon after embarking on that manuscript, however, Hayek was drawn to issues of economic theory and was unable to complete the project until 1948. The book's immediate goal was to criticize the positivist epistemology of Hermann von Helmholtz, Johannes Müller, and Ernst Mach that dominated Vienna's psychological circles from before 1918. These and other positivists were unsatisfied with the notion that there is a physical domain and a mental domain, between which interaction is impossible. Mach, specifically, rejected such dualism. He maintained that there is *not* something different behind what appears to our minds and he objected to the view that there is a vail between our sensory experiences and the world around us. Instead, every object has sensory characteristics; sounds, temperatures, odors, mass, and so forth. For Mach the physical world and the objects in it are nothing other than complexes of such sense data. A chair is nothing more than a collection of the sensory qualities of size, shape, texture, and so on. In Mach's words, "Bodies do not produce sensations, but complexes of sensations make up bodies."[1]

Groupings of sensations that regularly appear together, or that "cohere strongly," comprise what Mach calls items—items that we identify with labels such as star, atom, or chair.[2] This position is called "neutral monism."[3] "Monism" because sensory data are the *only* elements in the universe. "Neutral" because sensations are neither

physical or mental. There is simply a one-to-one correspondence between the sensory qualities of the physical world and our sensations of these qualities. Reality and our perception of it, in other words, contain "ontologically homogeneous elements."[4]

Hayek takes his starting point with Mach's universe of sensory characteristics. Like Mach, Hayek distinguishes between the singular and the plural: The singular consists of the sensory characteristic itself; the plural consists of the bundle of sensory characteristics that comprise an item. With this definition, both Hayek and Mach recognize that comprehension is not limited to the digestion of singular sensory qualities. It instead includes the activity of grouping sensory qualities with each other.

Mach's views regarding our mind's grouping activity, however, are not fully worked out. Whereas Mach maintains that every item we observe can be reduced to its component sensory characteristics, Hayek notes that sensory characteristics do not have self-evident meaning. Rather, they have "meaning only within a given order...[of] relation[s]," relations that our mind *imposes* on the swirl of innumerable sensory experiences.[5] Thus, any conception of a sensory experience cannot stand independent of the mind's grouping activity. It is instead embedded in the very comprehension of an item.

With this recognition Hayek commences his discussion of the complex construction of human knowledge. Reaching into a tradition that dates back to David Hume, Hayek contends that knowledge does not begin with the sensory event at hand.[6] Knowledge, rather, is forged by the *connection*, or "linkage," of new sensory information—optical, acoustical, and otherwise—to previous sensory experiences.[7] The process of comprehension thus does not begin with particular sensations, but precedes them. It operates on previous sensory events that organize them into a pattern that becomes the basis for their mental significance. We may express this also, explains Hayek, by stating that comprehension is a product of previous experience. The mind operates by assembling new sensory data into associations with our accumulated inventory of knowledge, with our mnemonic archive.[8] The result of this activity is an interconnected network of "linked" sensory experiences Hayek calls the "sensory order," an order that enables each individual to wade through life's sea of sensory information.[9]

Because sensory experience precedes understanding in this way, Hayek argues that *meaning is not given, but constructed*. The attributes of a given sensory event are not intrinsic qualities that are somehow "communicated" to the mind.[10] Rather, to understand something is to connect it to things external and prior to it. Sense is *brought to*things before they are comprehended. As such, what is comprehended is

merely the byproduct of the "linking" activity of the human mind rather than an objective reality given to it by the world. Indeed, Hayek wonders if

the classification of events in the external world effected by our senses proves not to be a 'true' classification, i.e., not one which enables us adequately to describe the regularities in this world, and...the properties which our senses attribute to these events are not objective properties of these individual events, but merely attributes defining the classes which our senses *assign* them.[11]

Accordingly, reports Hayek, "the fact that the world which we know seems wholly an orderly world" is not the result of a translucent *logos*, but "merely a result of the method by which we perceive it."[12] If *logos* were self-evident there would be no hesitation regarding meaning; the order of our ideas would simply conform to the order of the world, doubt would be eliminated, and we would possess knowledge for all eternity. On the contrary, Hayek does not view knowledge as a ubiquitous logic, but as an intelligibility arrived at through the domestication of our sensory experiences. Knowledge is only the *aftermath* of this process.

Hayek's emphasis on the notion that the mind is a mechanism that constructs objects of knowledge by actively "linking" sense experiences distinguishes his theory of mind from that of John Locke. Indeed, for Hayek, we *initiate* knowledge by bringing meaning to our environment, but Locke holds an essentially *causal* theory of knowledge, one that states "that the way in which the senses furnish us with knowledge of nature is by the qualities of objects *causing* ideas in our minds."[13] To put this distinction another way, the Lockean view of the relationship between subject and object can be represented by a film projector that casts the external world onto our mind; whereas in Hayek's view of the subject and object relationship, the activity of knowing can be represented by a flashlight that illuminates aspects of the world around us. In either case the orientation toward knowledge is different; for Locke an encountered sensory experience imposes knowledge on us, for Hayek we impose knowledge on our encountered sensory experiences.[14]

Hayek's un-Lockean approach nevertheless highlights his point that knowledge is the result of cognitive connections. It consists of creating coherence through the use of relations so that the tempest of sensory events can be organized into various forms and patterns. Otherwise, as William James points out, if we were unable to order our sensory experiences, we would simply get each successive moment of experience as a sea-anemone on a reef receives whatever nourishment that washes by. But through ordering we harness our sensory experiences and drive them to our pragmatic ends.[15] The scope of Hayek's connectionist theory of mind, however, does not end here. It leads him to four conclusions: that the mind is self-referential, that

imperfection is a condition of the mind, that the mind evolutionary, and that a layer of the mind is unknowable to the conscious self.

Self-Referentialism

As we have seen, Hayek contends that the mind is a weave of old and new sensory data in a network of connections or "links" called the "sensory order." This network, he maintains, involves past sensory information to which new sensory information is connected; that is, sensory data have significance insofar as they show a certain regularity in appearance to things we have experienced in the past. For Hayek, this conception of the mind means that each sensory event is path-dependent; it is colored by experiences that are not a part of the particular event that is occurring, but that are shaped by what exists within the web of one's prior experiences. That is to say, "what we know at any moment about the external world is determined by the order of the apparatus of classification which has been built up by pre[vious] sensory linkages."[16] The implication of this view is that the connection of a new sensory experience is uniquely conditioned by what precedes it in one's specific life. Because each "sensory order" is biographical or, more figuratively, historically fingerprinted, an identical sensory experience would require "an identical history"—a requirement that ultimately "precludes the possibility that at any moment the maps [or "sensory orders"] of two individual should be completely identical."[17] So, just as there are no two identical snowflakes, there are no two identical sensations of a snowflake. And although people can refer to the same sensory experience, linguistic sign, or cultural symbol, it neither follows that these things have the same location or intensity in their "sensory order," nor that all the connections that extend from them are the same.

In asserting the uniqueness of each mind, Hayek emphasizes that the world we perceive is only "an interpretation based on the experience of the individual"[18] or similarly, "every sensation, even the 'purest,' must...be regarded as an interpretation of an event in light of the past experience of the individual."[19] Indeed, Hayek poses a scenario in which an archaeologist discovers an item and cannot discern whether it is a manmade artifact or a product of nature that by chance appears to be an artifact. With respect to this scenario, Hayek claims that "there is no way of deciding this but by trying to understand the working of the mind of prehistoric man, of attempting to understand how he would have made such an implement...[but ultimately our archaeologist] interprets what he sees in terms of the workings of his *own* mind."[20]

For Hayek, then, we understand everything in light of our previous sensory experiences. We are like historians confronted with a collection of documents that must be interpreted. Although the documents may suggest some theories, the data must be organized to arrive at a explanation of the past that has some coherence.

There is, however, an intermediary sphere between historian and document, subject and object, a sphere occupied by our experience. Understanding is thus mediated by the specific experiences of the historian/observer. As a result, all knowledge is an interpretation of being provided by a living and cognizing subject. Thus conceived, meaning is not something independent, unconditioned, and universal. Rather, it is inextricably involved with the being of the living subject and the world that the individual has constructed.

The flip side of this proposition is that we cannot interpret that to which our experience does not provide us a link. Indeed, according to Hayek, "we can only know such kinds of events as show a degree of regularity in their occurrence in relations with others" already in our mind.[21] In other words, a sensory event that has no relation to anything previously perceived cannot be comprehended. As Nietzsche once put it, we sit within our historical net "and whatever we may catch in it, we can catch nothing at all except that which allows itself to be caught in precisely *our* net."[22]

Self-referentialism is thus a significant aspect of Hayek's connectionist theory of mind. Indeed, at one point, he reports: "My gain from hearing or reading what other people thought was that it changed, as it were, the colors of *my* own concepts. What I heard or read did not enable me to reproduce their thought but altered *my* thought. I would not retain their ideas or concepts but modify the relations between *my* own."[23] Furthermore, Hayek asserts that since it is possible to "understand only what is similar to our own mind, it necessarily follows that we must be able to find all that we can understand in our *own* mind."[24] In other words, knowledge arises from a historical capacity that exists *antecedent* to comprehension. A sensory experience unique in all its aspects, therefore, will be utterly incomprehensible; information is only intelligible when it can be associated with that which is *Bekannt*, or already familiar to us. Consequently, concludes Hayek, "much that we believe to know about the external world is, in fact, knowledge about ourselves;" it is a disclosure of who one is historically.[25]

Imperfection as a Condition of the Mind

Given the historicity of knowledge, Hayek maintains that there is no basis to believe that the representation of physical reality that it makes possible is an accurate representation of the world as it is. Each mind functions, he says, through a recognition of what is similar to that mind at the expense of what is particular to an item. "What we perceive of the external world," says Hayek,

are never all the properties which a particular object can be said to possess objectively, not even only some of the properties which these objects in fact do possess physically, but always only certain 'aspects,' relations to other kinds of

objects which we assign to all elements of the classes in which we place the perceived objects. This may often comprise relations which objectively do not at all belong to the particular object but which we merely ascribe to it as a member of the class in which we place it as a result of some accidental collection of circumstances in the past.[26]

In other words, there is an "imperfect correspondence" between our perceptions and the world around us.[27] Our "sensory order" is not a strict catalogue of empirical representations, but an extracted collection of similarities and types, of incomplete representations that do not capture the full detail of things. As Anna Galeotti summarizes Hayek's view, we do not know particular things, but kinds.[28] Nevertheless, our "sensory order" constitutes the very mechanism through which we interpret new experiences and are able to interact with our environment at all.

Since what we experience is extracted, Hayek argues that we must "divest" ourselves "of the habitual assumption that all we have learned from experience must be true...knowledge based entirely on experience may be entirely false."[29] Moreover, as knowledge must always refer to extracted "elements which are defined by certain relations with other elements," knowledge is ultimately based on the "assumption that these relations actually exist."[30] In short, Hayek questions the authenticity of the image that our mind presents to us because the contents of our observations are selected and ordered. Hence, he argues, our knowledge of the surrounding environment is conjectural and we should not dogmatize it. Hold all your positions open to criticism, he says, even this one.[31]

Evidently, Hayek contends that the mind is neither a passive receptacle nor an unblemished mirror for 'reality.' Instead, he acknowledges the primacy of historical practice over metaphysical certitude in the formation of human mind, and he recognizes that our mind abstracts our surroundings so that we can function pragmatically in the world. Indeed, like Wilhelm Dilthey, Richard Avenarius, and others, Hayek argues that imperfection is a precondition of practical human activity and that our imperfect knowledge is a kind of real-life strategy without which the human organism cannot survive. As Hayek puts it, the mind "simultaneously plays with a great many patterns of which some are confirmed as conducive to the preservation of the species."[32]

Because everything we understand undergoes extraction and ordering, the resulting map or model we form of the world is in no objective respect grounded in the basis of sheer sense data, themselves incorruptible. This leads Hayek to doubt that humans are capable of apprehending elementary or pure sensations from which we can form a

foundation for human knowledge. Our perceptions are not translucent accounts of natural objects. Rather, the picture we form of the world emerges directly from our interaction with it, and it is always conjectural in organizing and integrating things among the infinite aspects that the world contains. In other words, we cannot separate our means of perception—our mind—from that which is being perceived—the world; that is, "we behold all things through the human head and cannot cut off this head."[33] There is no unmediated vantage point from which this knowledge can be gained, for such a vantage point implies a possibility not granted to us; the possibility of transporting ourselves outside of our existence to behold it objectively. Instead, participation in existence is our only window to the world. We cannot escape from our "sensory order's" lens to attain a presuppositionless or unsituated perspective on the world as a whole in itself. Our mind's ordering process is the basis for all our knowledge; there is no alternate route to the 'real' world. The very means by which we observe the world intervenes in what we can observe, and although we can reflect on aspects of our sense experience, we must realize that reflection is *always* secondary and cannot stand independent of the observation process itself.

The belief that there is an objective viewpoint that gives an accurate account of the world, concludes Hayek, thus "must break down."[34] No such world is accessible. There is no starting point for thinking about consciousness because all thinking presupposes consciousness. Our view of the world, in other words, is mediated unavoidably by the very means by which we view it.

That we cannot achieve an unmediated view of the world leads Hayek to conclude that the historical aim of philosophy to develop a transcendental metaphysics must be abandoned. The goal of philosophy cannot be the illumination of ontological certainty, but rather the investigation of the limits of human knowledge. Moreover, says Hayek, an investigation of the "sensory order" must be reflexive since, in the end, all such inquiry is immanent inquiry. Hayek is a skeptic, then, in repudiating the belief that metaphysics can expose the essences or natures of things. He rejects the view held by Mach and other positivists that there is available to us immaculate perception or pure sensations that can contribute to an objective picture of the world. Instead, everything we observe is imbued with presuppositions. The notion that there are pristine sensations that "involve some direct communication of properties of the external objects, or...[that] constitute irreducible mental atoms or elements" is worthless because of the very "lack of meaning of these hypotheses."[35] Moreover, Hayek is emphatic that "the conception of an original pure core of sensations...is an entirely unnecessary fiction."[36] Our view of the world, rather, is mediated by our mind's ability to sort through the chaos of the infinite number of stimuli that can be perceived and create order where none exists to make the world intelligible.

Dependence on our mind's "linking" activity thus leads Hayek to deny, like Immanual Kant, that we can know how things are in the 'real' world. We can only know how our mind orders our sensory experiences. In other words, Hayek asserts that we do not observe a translucent representation of the world *Ding an sich*.[37] Rather, our minds impose a pattern on it, making it impossible to observe the supposed things that lurk behind appearances. This intersection with Kant, however, should not be exaggerated. Although both thinkers similarly recognize that objects of cognition are synthetic, Kant goes no further. Hayek, on the other hand, espouses an evolutionary theory of the mind. He argues that the objects of cognition are not only historically constructed, but also fluid in their character; that is, they change. Hayek thus distinguishes himself from Kant in his view that the phenomenal image our mind presents to us is in continuous motion.

The Evolutionary Mind

Given our movements through time and space, Hayek argues that the contents of our "sensory order" are not fixed data. The things we know are but the result of the connecting activity of the mind as it orders experiences and is modified continuously by experience. Our "sensory order," in other words, evolves with each additional sensory experience; its contents and the relations among them are continually being updated with the introduction of each new bit of sensory information. Occasions arise, however, when our network of connections does not provide a ready binding point for a new experience. In such a case, our "sensory order" is compelled to reorder so as to assimilate the new experience. Such an event "forces us to revise [our] classification[s]" to incorporate inconsistent experiences and adapt to the world that we inhabit.[38] According to Hayek, such adaptation occurs when the mind defaults to a more instrumentally fit principle of connection, one that is capable of incorporating new and old sensory experiences. The human mind, then, evolves when it conforms to a principle of connection that has selective advantage over a previous principle of connection.

Robert deVries' linguist example provides an excellent metaphor for this evolutionary process:[39] Suppose that someone with little formal education but lots of curiosity began to contemplate the linear order of sentences. This hypothetical person notices the following regularities:

John has called his sister.

Peter can buy a bicycle.

People won't die.

and

Has John called his sister?

Can Peter buy a bicycle?

Won’t people die?

What does our aspiring linguist do? He sees the following "rule:" statements can be altered into questions by reversing the order of the first two words of a sentence.

But then our would-be linguist encounters some new experiences that falsify this "rule."

The big house is cheap.

People without lungs will die.

and

Is the big house cheap?

Will people without lungs die?

If his "rule" were applied the above questions would have the following syntactic form:

Big the house is cheap?

Without people lungs will die?

As these questions are meaningless, our linguist’s principle of organization, or "rule," no longer accounts for his experience; that is, the first and second words of a sentence are demonstrated not to be the fundamental elements of the grammatical world. When this realization occurs, our linguist is compelled to reorder his linguistic universe to behave pragmatically in his relations with the external world. He may then notice a second pattern of regularities, one that states that sentences can be changed into questions by reversing the order of the object and the finite verb. This second "rule" is more instrumentally fit; not only does it explain his new experiences, but it would have explained his old experiences had he employed it before. Such a process of conforming to principles that have selective advantage is analogous to the evolutionary process Hayek claims transpires in the "sensory order." Of central

importance to Hayek's theory of mind, however, is that this evolutionary process is not entirely knowable to the conscious self.

The Unknowable Mind

Some thinkers, such as Karl Popper, acknowledge the existence of a 'submerged' portion of the mind, but they deny that this disturbs the unity and continuity of the self. They contend, rather, that the unconscious aspects of the mind can be "recalled," or accessed from the surface of consciousness.[40] Hayek is not convinced. He maintains that everything that is made conscious belongs only to the surface, but like any surface, it reveals something, but *conceals* even more. Indeed, Hayek contends that a portion of our mind's activity is hidden beyond the scope of self-conscious introspection.

To understand what Hayek means when he claims that a portion of the self is hidden, we must begin with his belief that that which becomes conscious is involved in causal relations that are *entirely withheld* from us. According to Hayek, the process that orders the contents of our consciousness is beyond our self-awareness. We are, he argues, subject to the workings of an evolving cognitive network that organizes our sensory experiences into our conscious mind and that is implicit in everything to which our mind refers, but that is nonetheless inexplicable to our conscious mind. It is important to recognize the precise sense in which Hayek maintains that a portion of the self is *entirely withheld* from us. A claim that we can know the cognitive processes that result in our conscious mind would mean that we could arrive at a substantive explanation of why we think as we do and how we know what we know. In such a case, the conditions would be favorable for deliberately directing our consciousness. We could on the basis of our conscious knowledge be able to direct successfully our own mind's activity. To make this conclusion, however, would entail positing the presence of a free-floating consciousness that is independent of the precursory workings of our "linking" mind. Hayek rejects the possibility of such an autonomous engineer of consciousness, such a Cartesian self.

In Hayek's view, what we call the conscious mind is generated from the microlevel interactions or connections of new and old sensory information. The mind that arises from this microlevel activity has its root therein, and it emerges therefrom, but does not belong to it. It instead constitutes a new order of complexity that cannot recursively describe its own construction.

Hayek uses a calculator to elucidate this point that we cannot have conscious access to our own mind's operation: Suppose the highest value a calculator can display is 999,999,999. There are 500,000,000 sums of two positive numbers that equal 999,999,999. Furthermore, there are 499,999,000 combinations of two positive

numbers that equal 999,999,998; and so on. As a result, the total number of summation the calculator can perform is greater than the largest number it can display. To this number would have to be added all the combinations of three numbers, four numbers, and so forth. Ultimately, the total number of distinct combinations the calculator can perform far exceeds its display capacity.[41]

Applying this same principle to the human mind, Hayek concludes that although "linking," or connecting, sensory events provides an explanation of the general principle on which our "sensory order" operates, we 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 an operation will be. The number of connections the "sensory order" contains through additions and reorganizations is of a far greater magnitude than that same "sensory order" can compute. As Hayek puts it, "the number and complexity of these relations is probably greater than anything which we could ever explicitly state or describe" to ourselves.[42] Indeed, to achieve conscious awareness of our mind's operation would require, in addition to showing how any one sensory experience will behave in a particular situation, that we would be capable of showing how any one of the other sensory events would behave in any one of a large number of *other* situations. Self-conscious prediction of consciousness, in other words, is based on the impossible capacity to self-consciously know the behavior, over time, of each sensory event under varying future conditions. Like Hayek's calculator, the sheer number of possible future scenarios exceeds our conscious computational capacity, and although the principle upon which the function and pattern of growth of our complex "sensory order" may be appreciated, it is impossible to know all of the facts that contribute to its specific manifestation. Based on this description of the "sensory order," Hayek concludes that there is a hidden part of the mind; the process that orders the contents of our conscious mind is beyond our self-conscious capacity to know. There is, in short, "a permanent cleavage" between our consciousness and our conscious knowledge.[43]

In this respect, our mind encounters some of the same limitations as an "executive routine" of a computer program. That is, consciousness arises from a process that arranges the contents of our minds but, like an "executive routine," we do not have access to the process that oversees the ordering of this information. For example, the "executive routines" of current chess-playing programs do not have access to the process employed by the software, but only to the "summary judgment" of its "move evaluator." This "summary judgment" is a numerical quantity that represents the result of the program's application of its processes, yet the "summary judgment" conveys *no* information back to the "executive routine" regarding the process by which it was derived. An "executive routine" thus does not directly consider the

principle upon which it functions.[44] It operates instead on the basis of the results of its "summary judgment." Like a chess-playing program, the conscious mind is ordered by a process that cannot be accessed or self-consciously explicated. Indeed, Hayek contends that the mind is ordered by a process that we cannot consciously articulate—we have only access to the consequences, our "summary judgments." The mind, in short, is subject to a process that operates on the contents of consciousness but that cannot itself be consciously known.

It is important to realize, however, that this analogy is not fully appropriate. Unlike chess-playing software, the non-conscious process Hayek speaks of does not consist of innate or Platonic ideas that are preprogrammed into human beings. Instead, Hayek argues that the connective process is incidental. It simply refers to how, without a directing, overseeing self, our ongoing microlevel "linkages" spontaneously determine the overall order of the contents of our conscious mind.

Hayek maintains, moreover, that just because the microlevel connective processes occur on a non-conscious level, it does not follow that they should be characterized as "sub" conscious. Hayek puts this point clearly when he explains that "it is generally taken for granted that in some sense conscious experience constitutes the 'highest' level in the hierarchy of mental events, and that what is not conscious has remained 'subconscious' because it has not yet risen to that level."[45] Indeed, Hayek does not doubt that many mental processes through which stimuli evoke actions do not become conscious because they proceed literally on too low a level, "but this is no justification for assuming that all the [cognitive] events determining action to which no distinct conscious experience corresponds are in this sense subconscious."[46]Hayek contends that if his conception is correct that processes of

which we are not even aware determine the sensory qualities which we consciously experience, this would mean that of much that happens in our mind we are not aware, not because it proceeds at too low a level but because it proceeds at too high a level. It would seem more appropriate to call such a process not 'subconscious; but 'superconscious,' because they govern the conscious process without appearing in them. This would mean that what we consciously experience is only part, or the result, of processes of which we cannot be conscious, because it is only the multiple classification by the superstructure which assigns to a particular event that determined place in a comprehensive order which makes it a conscious event.[47]

The argument Hayek is trying to make here is that the order that emerges from the complex interaction of past and present sensory experiences "seems never to be the outcome of a conscious process, not something at which we can deliberately aim, but always a discovery of something which already guides its operation."[48] If this

connective activity *were* consciously accessible, we could know the rules upon which our very thoughts are based. But this, he notes, is impossible because we cannot self-consciously calculate the activity to which all our conscious thoughts necessarily refer. In other words, the "assertion that we can explain our own knowledge involves also the belief that we can at any moment of time both act on some certain knowledge and possess some additional knowledge about how the former is conditioned and determined. The whole idea of the mind explaining itself is [thus] a logical contradiction."[49] As a result of this opacity, there is no orchestrating or Cartesian self. We instead function on the results of our mind's superconscious ordering activity. "Our mental activities are not guided by the particulars at which they are consciously directed, or of which the acting mind is aware, but by abstract rules which it cannot be said to know yet which nevertheless guide it."[50]

For Hayek, then, consciousness is simply a manifestation of connective activity that is not consciously engineered. What we experience as consciousness is a symptom of our mind's ordering of our thousandfold complexity. It is the outcome of a multiplicity of sensory experiences whose interaction is the basis of our thought and consciousness. Under this view, everything that enters consciousness as a 'unity' is already tremendously complex. Hence, Hayek sees consciousness not as a beginning, but as an end, the last link of a chain, the verdict of underlying microlevel activity.

This view leads us to what is called the "actor-action" presumption.[51] The "actor-action" presumption holds that actor A wills action B; that is, actor A *brings about*action B. Such a distinction places the emphasis on the deliberate subject and implies that he/she has some meaningful discretion over action B. It implies that actor A has the ability to do otherwise and exercises an independence of action B. The most important consequence of the "actor-action" presumption is its overestimation of the conscious self. Under the "actor-action" presumption, the subject is separated from his/her acts and given the status of a preeminent author. But in Hayek's view, consciousness is not qualitatively separable from the superconscious process, which already arranges, simplifies, schematizes, and interprets the contents of our consciousness.

In the end, Hayek destabilizes the notion of the Cartesian self. Under his view, consciousness does not necessarily imply the presence of a unit, an "I" that oversees consciousness. Instead, consciousness is the byproduct of an underlying multiplicity of cognitive interactions. The self is not a unity, it is something *complicated*, something that is a unity in word only. A unitary or Cartesian subject is thus not the prime mover, or sovereign architect, of human consciousness. Rather, consciousness is an order without a conscious designer; it arises spontaneously from the elementary cognitive operations that culminate in the form of the conscious self.

For Hayek, then, our behavior is *not* guided by a declarative or deliberate self. Rather, it is mediated by a different system, one which operates above our conscious awareness. Hayek argues that we do not have introspective access to these workings and interactions, but only to the consequences—such as the way we behave and feel. Thus, thoughts are conscious products of a non-conscious process. It is crucial to remember that the subjective experience we call consciousness is, therefore, not the primary business of the system that generates it, but is shaped by an introspectively inaccessible process. Although this barrier to introspection may be valid, it does not rule out the logical possibility that a computer could calculate the connective process that culminates in our conscious mind. With regard to this prospect, however, Hayek provides us with a series of insights that demonstrate that such prediction is impossible.

Hayek's Terra Incognita of the Mind

Although initially suggested over 75 years ago, Hayek's "linkage" model of the mind contains three properties—iteration, sensitivity to initial conditions, and irreducibility—that commonly occur in what chaos theorists today call "emergent" systems.[52] An "emergent" system is a natural phenomena, such as a weather pattern, in which evolving orders arise out of a complex array of interactive components. They are called "emergent" because they are *moving through* what is called "state space," where a "state point" is defined as the mathematical conception whose coordinates describe the state of an "emergent" phenomena at a given point, or snapshot, in elapsing time.[53]

"State space," however, is not literal or physical space but something that can be understood by direct analogy. "State space" is a conceptual "space" that contains the various aspects or "dimensions" acting upon a phenomenon. For example, consider the characteristics of the weather; temperature, pressure, humidity, air friction, and convection. Each of those characteristics corresponds to one point on five different charts, charts that contain the respective range of possible temperatures, pressures, *et cetera*. Now suppose the ranges of all five charts could be represented simultaneously in a multidimensional space, and that a single point within that space represents all five aspects of the weather at a particular moment in time. In that case, the weather is reduced to a single "state point" in a multidimensional space, yet the point still contains all the information that has been recorded about the elements of the weather. Consider further that as the weather changes with time, the point representing it appears to move about the multidimensional space.[54]

In a major respect, the concept of an "emergent" system is compatible with Hayek's notion of the "sensory order." Like an "emergent" system, Hayek conceives of the

mind's connective activity as neither on a continuum nor on a grid, but as a phenomenon moving through a "state space" that contains all the possible ranges of past, present, and future sensory experiences. Moreover, as in "emergent" systems, Hayek recognizes that the combination of the properties of iteration, sensitivity to initial conditions, and irreducibility results in a profound unpredictability.

Iteration

The first property Hayek identifies in the functioning of our "sensory order" is iteration. Iteration is the successive process by which a phenomenon fulfills and consumes itself. What results, to paraphrase Hayek's student Ludwig Lachmann, is a "kaleidic" process—interspersing intervals of order and assurance with disintegration that cascades into a new pattern.[55] In the case of the "sensory order," this process consists of the continual reshaping of our cognitive framework; that is, as the "sensory order" incorporates new bits of sensory data, it is itself altered by that data—it recontextualizes. In a sense, the "sensory order" is like a mental encyclopedia that, at each successive moment, publishes a revised edition into which the next relevant entry is inserted. Thus, Hayek emphasizes that the human mind is in a state of continual motion. Indeed, he asserts, the phenomenal world we perceive is not constant, but "incessantly changing;" all our doing and knowing is not a succession of facts, but a continuous flux.[56]

Given this property, the "sensory order" is *not* a timeless phenomenon. A timeless phenomenon is a closed system such as a collection of musical notes, where the possible patterns that can be played today are identical to the possible patterns that can be played next week, next year, or next century. But what happens when the unity is broken and a new note is introduced? The nature of the possible permutations changes. No possible permutation of the former set of notes can replicate a sequence of the new sounds. The introduction of a new note, therefore, dramatically changes the possible outcome of all future melodies.

Similarly, the introduction of each new bit of sensory information alters the "sensory order's" possible future scenarios. Indeed, the "sensory order" changes perpetually. Hence, each new sensory event one witnesses will be interpreted within the context of an updated network system of connections, one which incorporates the immediately preceding sensory information. As one continues this process of weaving new information into the network, one's mind not only redefines relations between given sensory events and other events actually observed, but also between new and old events and even conjectural relations between events. Added to this already dynamic picture is the process of mental reorganization. When reorganization occurs, says Hayek, the configurations of earlier orders are recombined into still more complex

configurations. Each recontextualized order that then emerges contains within it the earlier orders, and the events of those orders acquire novel qualities that did not exist in them before their integration within the new order. As a consequence of this iterative process, each contemplation is unique or, as Heraclitus might put it, you cannot step into the same stream of thought twice. The structure of the connections in the mind, explains Hayek,

is modified by every new action exercised upon it by the external world, and since the stimuli acting on it do not operate by themselves but always in conjunction with the process called forth by the preexisting excitatory state, it is obvious that the response to a given combination of stimuli on two different occasions is not likely to be exactly the same. Because it is the whole history of the organism which will determine its action, new factors will contribute to this determination on the later occasion which were not present in the first. We shall find not only that the same set of external stimuli will not always produce the same responses, but also that altogether new responses will occur.[57]

Sensitvity to Initial Conditions

It is significant that Hayek notes that "there are several fields in which practical difficulties prevent us from thus elaborating known explanations of the principle to the point where they would enable us to predict particular events. This is often the case when phenomena are very complex, as in meteorology."[58] Indeed, consider the case of MIT meteorologist Edward Lorenz. In 1960 Lorenz created a primitive weather simulator using 12 variables. Through the observance of dramatic fluctuations based on minute variations in initial values, Lorenz concluded that long range weather forecasting was doomed. No one listened, and by the 1980s millions of dollars and manhours had been spent in an attempt to program a Cray supercomputer to predict the weather. A network of measuring stations was established and the resulting half a million variables were input into the computer. The result was no better than using satellite photographs; "beyond two or three days the world's best forecasts were speculative, and beyond six or seven days they were worthless."[59] But suppose that even more data could be inputted into the computer. "[S]uppose the Earth could be covered with sensors spaced one foot apart, rising at one foot intervals all the way to the top of the atmosphere. Suppose every sensor gives perfectly accurate readings of temperature, pressure, humidity, and any other quantity a meteorologist would want. The computer will still not be able to predict whether Princeton, New Jersey, will have sun or rain on a day one month away."[60]

The inherent impossibility of such long-range weather forecasting is the result of the fact that weather systems are extremely sensitive to initial conditions. That is to say, if

the calculated temperature inputted into a weather-forecasting computer is 75.000 F, but the actual temperature is 75.001 F, then this slight miscalculation in conjunction with others will evolve over time into prediction-wrecking size. Accordingly, the lighting of matches and the opening of refrigerator doors in Richmond, Virginia today would have to be taken into account to accurately predict the weather in Williamsburg, Virginia next month.

In Hayek's view, the human mind's sensitivity to initial conditions is no different. Even a slight variation in the initial condition of your "sensory order" means that you are beginning from a different point than that calculated. Subsequently, at each moment your understanding is evolving under different circumstances and each new experience carries you further from what you expected. Moreover, large collections of sensory experiences may exhibit seemingly random behavior. Like all complex systems, the mind is extremely sensitive to minute influences. The sight of a familiar face, therefore, can trigger an abrupt shift in one's thought pattern and a corresponding shift in one's awareness.

The role of minute variables is thus essential to Hayek's view, especially regarding "more highly organized or essentially complex phenomena as we encounter in the realms of life, *mind*, and society."[61] There are, he notes, many examples in nature that elucidate the property of sensitivity to initial conditions. For example:

We can never produce a crystal or complex organic compound by placing the individual atoms in such a way that they will form a lattice of a crystal or the system of bezol rings which make up an organic compound....What does in these instances determine not only the general character of the crystal or compound that will be formed but also the particular position of any one element in them? The important point is that the regularity of conduct of the elements will determine the general character of the resulting order but not all the details of its particular manifestation. The particular manner in which the resulting abstract order will manifest itself will depend, in addition to the rules which govern the actions of its elements, on their initial position and on all the particular circumstances of the immediate environment to which each of them will react in the course of the formation of that order. The order, in other words, will always be an adaptation to a large number of particular facts which will not be known in their totality to anyone.[62]

Another example from physics is in some respects even more instructive of Hayek's view on the role of minute influences on complex phenomena.

In the familiar school experiment in which iron filings on a sheet of paper are made to arrange themselves along the lines of force of a magnet placed below, we can predict the general shape of the chains that will be formed by the filings hooking themselves

together; but we cannot predict along which ones the family of an infinite number of such curves that define the magnetic field these chains will place themselves. This will depend on the position, direction, weight, roughness or smoothness of each of the iron filings and on all the irregularities of the surface of the paper. The forces emanating from the magnet and from each of the iron filings will thus interact with the environment to produce a unique instance of a general pattern, the general character of which will be determined by known laws, but the concrete appearance of which will depend on particular circumstances we cannot fully ascertain.[63]

In short, although the general function of a complex system might be discovered, explanation of its motion is precluded by the impossibility of accumulating all the information that contributes to its specific manifestation.[64]

Irreducibility

At one point Hayek claims that the mind must "remain forever in a realm of its own...we shall never be able fully to explain or to 'reduce' [it] to something else."[65] This assertion is particularly relevant to the properties he identifies in the operation of the "sensory order." According to Hayek, each sensory event's identity is defined not by itself as a discrete unit, but by its relations to other sensory events, events that are *not* occurring. The elements are "linked" with one another in such a way that they actually determine what the others are through their interconnections. The mind, in other words, is an interconnective order: "its actions are determined by the relation and mutual adjustment to each other of the [multiple] elements of which it consists"[66] and the many connections, "proceeding at any one moment, can mutually influence each other."[67]

The implication of this interconnectivity is that a sensory experience cannot be analyzed without regard for the *other* contents of the mind that contains them; that is, to describe a sensory experience *all the way through*, one must describe its relations to other bits of information which in turn are related to further bits, and so on in an infinite regress. Logically, any attempt to describe a sensory experience would have to take into consideration the complete "sensory" order that arises from each person's previous sensory experiences. Moreover, to demand that one sensory experience be removed means to change all the others in some subtle way, and to demand that one sensory experience be added means causing all the resulting connections to occur.

As a result of this interconnectivity, the "sensory order" cannot be broken down into component sensory events. No sensory experience is autonomous. Rather, all sensations are embedded in a complex of relations to other sensations or, as Umberto Eco might put it, a sensory event becomes different when it is connected to another. "The connection changes the perspective" so that "every detail of the world, every

voice, every word written or spoken has more than its literal meaning, it tells a *secret*."[68] It "resonates" with what Jaques Derrida might call "traces" of something "other."[69] Consequently, where one part ends and another begins is undecidable. There is only sensory information in intersubjective relations with other sensory information; their essence lies in their relation to the others and their interpenetration of the same. Recognizing this, Hayek concludes that the "sensory order" is irreducible. Its elements cannot be broken down into linear, A causes B terminology and reassembled into an explanation of the whole.

Unpredictability

Given the properties of iteration, sensitivity to initial conditions, and irreducibility, the question that inevitably arises for Hayek is whether one's "sensory order" can be predicted. The position he arrives at is that the variables that would have to be taken into account are too numerous and cannot be grasped finitely. Because of these factors, it is impossible for person or machine to accumulate and compute all the facts that contribute to the exact behavior of a "sensory order." Although we may have an idea how the "sensory order" functions through the process of "linking," this

will rarely if ever enable us to predict the precise result of any situation. While we can explain the principle on which certain phenomena are produced and can from this knowledge exclude the possibility of certain results, for example, of certain events occurring together, our knowledge will in a sense only be negative; that is, it will merely enable us to preclude certain results but not enable us to narrow the range of possibilities sufficiently so that only one remains.[70]

With this conclusion Hayek distinguishes between "explanations in principle" and "explanations in detail." The former are designed to explain *kinds* of events or processes; the latter explain *particular* events or processes.[71] Indeed, "explanations in detail" refer to the logical structure of the unique manifestation of an event or process. Unlike an "explanation in principle," an "explanation in detail" would have to account for the properties of iteration, sensitivity to initial conditions, and irreducibility in a phenomenon. Hayek argues, however, that because we cannot account for these properties, we are inhibited from giving an "explanation in detail" of a mind's working. "If it should turn out," he explains, "that it is basically impossible to state or communicate all the rules which govern our actions...this would imply an inherent limitation of our possible knowledge and, in particular, the impossibility of ever fully explaining a mind of the complexity of our own."[72] Given this *terra incognita* of the mind, Hayek concludes that we are in no better position to predict the specific future motions of the mind than we are "able to predict the shape and movement of [a] wave that will form on the [surface of the] ocean at a particular place and moment in

time."[73] This conclusion, however, is not without implications for the market system, implications Hayek expressly understands.

Conclusion

As we have seen, Hayek's "linkage" model of the mind demonstrates that the unified subject, far from being a self-certain foundation, is a fiction, a historically contingent construct beneath whose apparent unity teems a welter of non-conscious microlevel activity. It is out of this material, says Hayek, that all economies arise and change. They result from the complex interaction of preferences and motivations as they manifest in millions of emerging "sensory orders." Economies, in other words, are the composites of supporting and counteracting actions and reactions of individual "sensory orders," amalgams of multiple relations in motion. Accordingly, all economic phenomena, from local economies to international trade, are the byproducts of the interplay of motivations of individual human beings. Economies emerge directly from the composite of individuals' dealings with each other. The views people form of each other and things thus form the basis of the economy. Consequently, when we speak of a particular economy, we are not talking about a unitary thing. Instead, "economy" is just a shorthand way of referring to an interactive collection of people's motivations, opinions, preferences, ideas, negotiations, associations, agreements, and tacit understandings, and to speak of an economy as if it were a unitary whole obscures all the complex relationships that contribute to its overall manifestation.

Hayek's view that the evaluations and opinions of individuals trigger the economic sphere contrasts sharply with the view that economies are the products of human reason. Indeed, Hayek claims that the orderly structures we find in economies "are the product of the actions of many men, but are not the result of human design."[74]Order, he explains, arises "spontaneously" through the complex interplay of millions of "sensory orders." It is an arrangement that evolves in a gradual and decentralized way and that constitutes an unintended result of the motivations and actions of many interacting individuals—not human design. Ultimately, the conclusion that flows from Hayek's theory of mind is not that an economy is a rigid form, but that it is a shifting and unsteady mass comprised of a multitude of decentralized interactions among many emerging "sensory orders."

To begin to get appreciate how Hayek's theory of mind provides a defense of the market system, we must understand what he calls the "knowledge problem."[75] The "knowledge problem" arises because economic behavior does *not* stem from'objective' facts, but from the subjective movements of individuals' emerging "sensory orders," where the key variables are the manifestations of particular

motivations in individuals. Because human action does not exist separate from this subjective element, a scientific examination of human action must fail.

To elucidate the point, consider an illustration taken from Joel Schwartz: "When I roast a leg of a lamb over a fire until it is a charred pile of ashes, I may be conducting an unsuccessful barbecue, but when Odysseus does the same thing he may be conducting a successful sacrifice." In fact, "Odysseus is not 'roasting' at all since 'roasting' only has meaning internal to the activity of food preparation. Nor are we in fact 'doing the same thing,' although behavioral descriptions or pictures of the movements of our bodies may be identical."[76] In his book on Hayek, G. R. Steele is even clearer about the subjectivity of human action:

Human action is never centered upon objective facts. For example, a barometer is capable of giving...information about the physical world; but a barometer becomes changed as a fact once the purpose for which it can be used is known; and this information is an abstraction from the physical attributes of the barometer, which might serve as a paddle, a weapon, or as an instrument to gage air-pressure. In other words, the facts of the social sciences are the opinions held by the people whose actions are studied.[77]

As a result of the subjectivity of human action, explains Hayek, it is impossible to describe an economy thoroughly without accounting for people's emerging "sensory orders." Indeed, because all perceptions, judgments, and attitudes arise from a subjective cognitive framework, people may react to the same stimuli in different ways and to different stimuli in the same way. Accordingly, to describe an economy accurately an economist would have to acquire all the "knowledge" of how individual "sensory orders" operate and why each human being acts a certain way under certain circumstances. An accurate representation of any economic phenomenon must therefore take into account the mindsets of the people who comprise the economy. It must take into account the subjective valuations that arise from cognitive activity. Hence, an explanation of economic phenomena is complete only if it accounts for the cognitive operations of human beings and provides an explanation as to how things become meaningful and worthwhile to them.

As was discussed earlier, however, there is a *terra incognita* of the mind. If this view is valid, then the economic planner faces a fundamental obstacle to economic planning. Put more precisely, without the direct apprehension of people's cognitive operations, economic planners are effectively denied access to quantifiable causal imputations of each "sensory order," and hence economic phenomena. Indeed, the economic planner can never decipher or untangle the connective process of their human subject matter and discover the 'causes' of an economy. As the Nobel Prize-

winning neuroscientist David Hubel puts it: "There is an input: Man's only way of knowing the outside world. There is an output: man's only way of responding to the outside world...[a]nd between input and output there is *everything else*...memories, thought, and whatever else makes man human."[78] In Hayek's estimation, this "*everything else*" is not explicable. The patterns of the "sensory order," he says, comprise an intricate tensional network of crosspoints and junctions that support and counteract each other. Where these crosscurrents are interwoven, the emergent cognitive landscape is unknowable to even the most inquisitive economic planner.

The implication for economics of this view is that economies cannot be planned centrally. Because the basic source of human behavior—the human mind—eludes thorough inspection, economic planning based on social scientific explanations is doomed to err. It is a fatal conceit, Hayek contends, to believe that the technical knowledge necessary to plan an economy is accessible to the central planner. At best, a central planner can acquire limited knowledge about their human subject matter, knowledge that by the time it is compiled and analyzed is no longer contemporaneous. Moreover, a planner cannot possibly collect thorough data or "knowledge" on each of the millions of subjective "sensory orders" that underlie an economy. People's motives are known only to themselves and not understood properly even by them. The idea that the relevant information necessary to plan an economy efficiently can be concentrated into the calculations of a central planning board is thus absurd.

Inasmuch as the central planner cannot possibly calculate all the supplies and demands that will manifest via the comprehensive interaction of millions of subjective "sensory orders," a planned economy has no ongoing means of communicating to consumers and producers the actual supplies and demands that emerge at a given point in time. The only way consistently to determine this, and to make full use of all the diffused information contained in everyone's "sensory order," is through the distributed cognition of the market. Indeed, only out of the interaction of all "sensory orders" in a market do prices spontaneously arise to communicate supplies and demands at a given moment in time. In Hayek's view, changes in supplies and demands are communicated through price movements tell us to modify our buying and selling; that is, price movements reflect changes in relative scarcities and signal consumers and producers to adapt their resource allocations. Without such a freely adjusting price, *effective coordination of resources cannot proceed and economies cannot operate efficiently*.

At the end of the day, then, Hayek's theory of the "sensory order" provides us with a compelling defense of the market system. A he explains: Into the determination of prices

there will enter the effects of particular information possessed by every one of the participants in the market process—a sum of facts which in their totality cannot be known to the scientific observer. It is indeed the source of the superiority of the market order, and the reason why, when it is not suppressed by the powers of government, it regularly displaces other types of order, that in the resulting allocation of resources more of the knowledge of particular facts will be utilized which exists only dispersed among uncounted persons.[79]

Unlike the market, then, central planners do not use all the dispersed information embodied in our "sensory orders." Central planners instead compress individuals into formulae. Consequently, they use less information than concretely animates an economy. They assume the "knowledge problem" away and, says Hayek, "disregard everything that is important and significant in the *real* world."[80] They remove the economic world from its given unconformability and impose an explanatory grid prostrate over the fluid media of subjective individuals that comprise the economy. Central planners thus do not deal with human life. They move from any possible economic world to an intellectual fantasy in which human beings are abolished and all that remains are statistical monads. In other words, to paraphrase Roland Barthes, in attempting to capture economic life, the planner actually sees dead.[81]

To recap, we have seen that Hayek's writings uphold the claim that we are unknown to ourselves. We have seen also that Hayek demonstrates that our "linking" mind is subject to the properties of iteration, sensitivity to initial conditions, and irreducibility; properties that forbid prediction of the cognitive processes that culminate in the conscious self. Based on this *terra incognita* of the mind, Hayek rejects economic analyses that force the subjective and complex entities that are humans beings into unbending and inactual explanatory grids. Instead, Hayek's theory of the "sensory order" restores economies to their original unconformability and provides us with a compelling defense of the market system.

NOTES

1. Ernst Mach, *The Analysis of Sensations* (Chicago: Open Court, 1902); quoted in Robert P. deVries, "The Place of Hayek's Theory of Mind and Perception in the History of Philosophy and Psychology," *Hayek, Coordination and Evolution: His Legacy in Philosophy, Politics, Economics and the History of Ideas* ed. Jack Birner and Rudy Van Zijp (London: Routledge, 1994), pp. 316-317.

2. Ibid., p. 317.

3. Robert P. deVries, "The Place of Hayek's Theory of Mind and Perception in the History of Philosophy and Psychology," *Hayek,Coordination and Evolution: His*

Legacy in Philosophy, Politics, Economics and the History of Ideas, ed. Jack Birner and Rudy Van Zijp (London: Routledge, 1994), p. 317.

4. Ibid.

5. Friedrich Hayek, *The Sensory Order* (Chicago: University of Chicago Press, 1952), pp. 4-5.

6. In particular, see David Hume, *An Enquiry Concerning Human Understanding* (Le Salle, IL: Open Court, 1966).

7. Friedrich Hayek, "Philosophical Consequences," *The Essence of Hayek* ed. Chiaki Nishiyama and Kurt Leube (Stanford: Stanford University Press, 1984), pp. 229.

8. This "linkage" model seems to have some basis in modern neuroscience. Neuroscientists maintain that neural connections are worn by experiences, especially recurrent or traumatic experiences. What results is a process called long-term potentiation, or LTP. The LTP process involves a change in the efficiency of synaptic transmissions along pathways that link neurons—in other words, electrochemical signals travel more easily along LTP pathways. According to this theory, these electrochemical pathways connecting neurons possess a class of postsynaptic excitatory amino acid receptors known as NMDAs. NMDA receptors are activated each time the brain is confronted by the same sensory event. Over time the receptivity of neurons with worn NMDA is enhanced. The ability of the brain to comprehend sensory information is thus shaped by the historical "links" seared into the neural network.

9. Friedrich Hayek, "Philosophical Consequences," p. 229.

10. Ibid.

11. Hayek, *The Sensory Order*, p. 173. Emphasis added.

12. Hayek, "Philosophical Consequences," p. 235. Emphasis added.

13. John Dunn, *Locke* (Oxford: Oxford University Press, 1984), p. 78. Emphasis added.

14. In Locke's words: "External objects *furnish* the mind with the ideas of sensible qualities" and "external objects *convey* into the mind what produces there...perceptions." John Locke, *An Essay Concerning Human Understanding* (New York: Dover Publications, 1959). For more on the difference between Hayek and

Locke see: Chandran Kukathas, *Hayek and Modern Liberalism* (Oxford: Clarendon Press, 1989), pp. 47-48.

15. William James, *Some Problems of Philosophy* (New York, Longmans, 1940), p. 51.

16. Hayek, "Philosophical Consequences," p. 227.

17. Hayek, *The Sensory Order*, p. 110.

18. Ibid., p. 42.

19. Hayek, "Philosophical Consequences," p. 226.

20. Friedrich Hayek, *The Counter-Revolution of Science: Studies in the Abuse of Reason* (Indianapolis: Liberty Press, 1979), p. 46. Emphasis added.

21. Hayek, "Philosophical Consequences," p. 235.

22. Friedrich Nietzsche, *Daybreak: Thoughts on the Prejudices of Morality*, trans. R.J. Hollingdale (Cambridge: Cambridge University Press, 1992), § 117. Emphasis in original.

23. Friedrich Hayek, "Two Types of Mind," *New Studies in Philosophy, Politics, Economics and the History of Ideas* (Chicago: The University of Chicago Press, 1978), pp. 52-53. Emphasis added.

24. Friedrich Hayek, *Individualism and Economic Order* (London: Henley and Routledge, 1949), p. 68. Emphasis added.

25. Hayek, *The Sensory Order*, pp. 6-7.

26. Ibid., p. 143.

27. Ibid., p. 16

28. Anna Galotti, "Individualism, Social Rules, Tradition: The Case of Friedrich Hayek," *Political Theory* (May 1987), p. 170.

29. Hayek, "Philosophical Consequences," p. 228.

30. Ibid., p. 232.

31. Gerard Radnitzky, "The Evolution of the Extended Order: Reflections on Hayek's Theory and Its Political Implications," *Organization and Change in Complex Systems*, ed. Marcelo Alonso (New York: Paragon House, 1990), p. 184.

32. Hayek, "The Primacy of the Abstract," *New Studies in Philosophy, Politics, Economics and the History of Ideas*, p. 43.

33. Friedrich Nietzsche, *The Will to Power*, trans. Walter Kaufmann and R.J. Hollingdale (New York: Random House, 1967), § 503.

34. Hayek, "Philosophical Consequences," p. 233.

35. Hayek, *The Sensory Order*, p. 165.

36. Ibid., p. 42.

37. Immanuel Kant, *The Critique of Pure Reason* trans. N.K. Smith (New York: St. Martin's Press, 1961), *passim*.

38. Hayek, "Philosophical Consequences," p. 228.

39. deVries, "The Place of Hayek's Theory of Mind and Perception in the History of Philosophy and Psychology," pp. 320-321.

40. Karl Popper, *The Self and Its Brain*, Part I (New York: Springer-International, 1977), pp. 129-131.

41. Hayek, "Philosophical Consequences," pp. 246-247.

42. Hayek, *The Sensory Order*, p. 19.

43. Ibid., p. 191.

44. Daniel Dennett, *Brainstorms: Philosophical Essays on Mind and Psychology* (Cambridge: The MIT Press, 1981), pp. 150-151.

45. Hayek, "The Primacy of the Abstract," p. 45.

46. Ibid.

47. Ibid.

48. Ibid., p. 46.

49. Hayek, *The Sensory Order*, p. 192.

50. Hayek, "The Primacy of the Abstract," p. 39.

51. Tracy Strong, *Friedrich Nietzsche and the Politics of Transfiguration* (Berkeley: University of California Press, 1975), pp. 63-72.

52. Roger Lewin, *Complexity: Life at the Edge of Chaos* (New York: Macmillan Publishing Company, 1992), pp. 9-14.

53. Steven H. Strogatz and Ian Stewart, "Coupled Oscillators and Biological Synchronization," *Scientific American* (December 1993), p. 103.

54. J. Richard Eiser, *Attitudes, Chaos and the Connectionist Mind* (Oxford: Blackwell, 1994), pp. 225-229.

55. Roger W. Garrison, "The Kaleidic World of Ludwig Lachmann," *Critical Theory* (Summer 1987), p. 78.

56. Hayek, "Philosophical Consequences," p. 234.

57. Hayek, *The Sensory Order*, p. 123.

58. Hayek, "Philosophical Consequences," p. 243.

59. James Gleick, *Chaos: The Making of a New Science* (New York: Penguin, 1987), p. 20.

60. Ibid., p. 21.

61. Friedrich Hayek, *Law, Legislation and Liberty: A New Statement of the Liberal Principles of Justice and Political Economy, Vol. I: Rules and Order* (London: Routledge & Kegan Paul, 1973), p. 41. Emphasis added.

62. Ibid., 39-40.

63. Ibid.

64. Because Hayek's account of the the properties of the "sensory order" resemblet that we observe in physical phenomena we are brought to confront his position regarding physicalism. Physicalism is the view that objects of cognition are only the result of underlying material activities. According to this view, your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free

will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules. Hayek subscribes to this physicalist view. He argues that the mind is simply the byproduct of the interaction of brain material. The mind, he argues, "operates on the physiological events and arranges them into a structure or order that becomes the basis for their mental significance." Or, more explicitly, the mind's networking process is governed by "connections created in the nervous system by past linkages" and the ordering process is "determined by the system of connections by which impulses can be transmitted from neuron to neuron." In short, "Mind is the order prevailing in a particular part of the physical universe—that part of it which we call ourselves."

Moreover, in Hayek's physicalism, he is led to a conclusion that is the opposite of the one that normally follows from it; namely, predictability. Hayek subscribes to what is called a token identity theory of the mind. The token identity theory holds that each psychological state corresponds to a physical state. While preserving a commitment to physicalism, the token identity theory, however, does not insist that the same mental state in two separate individuals has the same physical identity—only that each mental state corresponds to a physical state. Hayek makes this qualification because he recognizes that which is remarkable about the human brain is not its universally present material, but the unique connections that emerge within this material. To put the idea another way, consider what is called the idea of "grandma neurons." Suppose everybone's idea of "grandma" were universally determined by the same physical collection of neurons in everyone's brain. If those "grandma neurons" died in one person's brain, not only could that individual not say "grandma," he or she could not think of her even if she were present. Although neurons die and malfunction with regularity, nothing like this has ever been observed. The implication of this matter is that humans do not universally share the same physical state when they share the same mental state; that is, there are not neurons in each person's head that correspond to the idea of "grandma." Instead, similar mental states have a different sort of physical manifestation; they arise from the historical connections that are woven into our individual brain material. The token identity theory of the mind thus allows Hayek at once to claim that the mind is a physical phenomenon, and yet not to concede any sort of uniformity or predictability from mind to mind.

65. Hayek, "Philosophical Consequences," p. 251.

66. Friedrich Hayek, "Notes on the Evolution of Systems of Rules of Conduct," *Studies in Philosophy, Politics and Economics* (Chicago: University of Chicago Press, 1967), p. 73.

67. Hayek, *The Sensory Order,* p. 112

68. Umberto Eco, *Foucault's Pendulum*, trans. William Weaver (New York: Harcourt Brace Javanovich, 1989), p. 378. Emphasis in original.

69. Jaques Derrida, *Of Grammatology*, trans. Gayatri Spivak (Baltimore: Johns Hopkins University Press, 1976), *passim*.

70. Hayek, *The Counter-Revolution of Science: Studies in the Abuse of Reason*, p. 74.

71. Hayek, "Degrees of Explanation," *Studies in Philosophy, Politics and Economics*, pp. 6-7.

72. Hayek; quoted in John Gray, *Hayek on Liberty*, 2d ed. (Oxford: Basil Blackwell, 1988), p. 22.

73. Hayek, "Philosophical Consequences," p. 243.

74. Hayek, *Law, Legislation and Liberty*, pp. 36-37.

75. Friedrich Hayek, "The Use of Knowledge in Society," *The American Economic Review* (September 1945), *passim*.

76. Joel D. Schwartz, "Participation and Multisubjective Understanding: An Interpretivist Approach to the Study of Political Participation," *Journal of Politics* (1984), p. 119.

77. G.R. Steele, *The Economics of Friedrich Hayek* (New York: St. Martin's Press, 1993), p. 80.

78. David Hubel, "The Brain," *Scientific American* (September 1979), p. 32. Emphasis added.

79. Hayek, "The Pretense of Knowledge," *New Studies in Philosophy, Politics, Economics, and the History of Ideas*, p. 27.

80. Hayek, "The Use of Knowledge in Society," p. 530.

81. Neville Wakefield, *Postmodernism: The Twilight of the Real* (London: Pluto Press, 1990), p. 3.

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