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[Abstract] The question I will address in this paper is whether or not F.A. Hayek's *The Sensory Order* contains a theory of evolutionary psychology. That question has been answered affirmatively, including by myself. On further reflection, however, the matter is not so straightforward. The qualifications that will be suggested here concern two aspects of the question. The answer to the evolutionary part will be: "no, but". A further and farther-reaching qualification regards the question whether *The Sensory Order* is a theory of psychology at all.

F.A. Hayek's *The Sensory Order*

An evolutionary perspective¹

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DRAFT

Introduction

The question I will address in this paper is whether or not F.A. Hayek's *The Sensory Order* contains a theory of evolutionary psychology. That question has been answered affirmatively,² including by myself. On further reflection, however, the matter is not so straightforward. The qualifications that will be suggested here concern two aspects of the question. The answer to the evolutionary part will be: "no, but". A further and farther-reaching qualification regards the question whether *The Sensory Order* is a theory of psychology at all.

Hayek's theory and its history

In the preface of *The Sensory Order*, Hayek writes that for a long time he had a solution without knowing exactly what the problem was.³ This strikes us as curious in a man who in all his other work gives a clear definition of the problem he wants to solve and then designs the research programme that is needed to find a solution.⁴ What is the problem as Hayek saw it in 1952? The whole of the first chapter is dedicated to answering this question. The following is perhaps the briefest summary: "it is the existence of a phenomenal world which is

¹ I thank Bruce Caldwell for permission to quote from unpublished texts in the Hayek Archives of the Hoover Institution at Stanford University. I am very grateful to dr. Heinzpeter Stucki, the archivist of the University of Zürich, for a copy of the 1919-20 course calendar of the University of Zürich and many other important details, For similar help with calendars etc. of the other academic institution in that city, the Eidgenössische Technische Hochschule, I wish to express my thanks to dr. Corina Tresch De Luca of the ETH archives.

² Cp. for instance Smith 2003, which is an extended version of his Nobel lecture.

³ "[In 1920] ... though I felt I had found the answer to an important problem, I could not explain precisely what the problem was." (*The Sensory Order*: v).

⁴ Perhaps in the ms. Hayek *did* try to develop a psychology of perception, but it evolved more or less spontaneously into a mind-body theory without Hayek being fully aware of this. What pleads against Hayek's not knowing what the purpose of the ms. was (and so against his own admission in the preface of *The Sensory Order*), is the title of the ms.: "Beiträge zu einer Theorie der Entwicklung des Bewusstseins".

different from the physical world which constitutes the main problem.” (*The Sensory Order*: 1.84). The reason why this is a problem for Hayek is that he wants to give an explanation of the mind, or of consciousness, exclusively in terms of the laws of physics. That is why he describes the problem just quoted alternatively in terms of the reproduction of the “macrocosm”, *i.e.*, the physical order (“out there”, we might add) by the “microcosm” of the mind (or sensory order), which obeys the same laws as those governing events in the macrocosm. From the mind’s point of view (so to speak), the correspondence between mind (“microcosm”) and the physical order (“macrocosm”) is often described as the relationship of intentionality, which is one important aspect of the mind-body problem. Another aspect which we find in the quotation is the existence of a subjective, phenomenal realm that is different from the macrocosm. This problem is also known as the qualia problem. I quote Ed Feser:

“Qualia are considered philosophically problematic insofar as it is difficult to see how their subjectivity can be explained in terms of the objective features of the brain and nervous system. Facts about the subjective feel of conscious experience seem clearly to be facts over and above the facts, however complex, about firing patterns of neurons in the brain, the wiring of the nervous system, or indeed physical facts of any kind; increasing knowledge of the latter would seem never to add up to knowledge of the former, to knowledge of *what it’s like to experience* pain, the scent of a rose, the taste of coffee, or what have you. The mind would thus seem to be something non-physical, something existing over and above the brain; yet how could it be, given the evident dependence of mental events on brain events, and in particular the causal relations holding between the two?” (Feser 2003: 3; italics in original, footnote deleted)

Hayek speaks of the sensory *order* on purpose: sense impressions in particular and mental phenomena (including consciousness) in general acquire their subjective meaning only by virtue of their location in a structure of neural connections.

“The contention that all the attributes of sensory qualities (and of other mental qualities) are relations to other such qualities, and that the totality of all these relations between mental qualities exhausts all there is to be said about the mental order, corresponds of course, (perhaps we should say follows from) the conception of mind itself as an order of events.⁵ And with the recognition that mind itself, and all the attributes of mental events, are a complex of relations, there disappears of course the need for any peculiar kind of things which by themselves have attributes which constitute them [*sic*] a peculiar ‘substance’.” (*The Sensory Order*: 1.105)

The briefest summary of Hayek’s theory can be found in the first sentence of chapter 2, where he writes that “the sensory qualities known to us from our subjective experience form a self-contained system so that we can describe any of these qualities only in terms of its relations to other such qualities.” For explaining the system of these “qualities”, *i.e.*, sense impressions and other mental phenomena, “it will be necessary to show *how in a physical systems known forces* can produce such differentiating relationships between its elements that an order will appear which strictly corresponds to the order of the sensory qualities.” (*The Sensory Order*: 2.1, italics in original). So, in addition to being structuralistic, Hayek’s theory of the mind is also a physicalistic theory. These two aspects take us back to the period in which Hayek started working on his theory of the mind.

Its first documented appearance dates from September 1920: a manuscript that is now in the Hayek archives at the Hoover Institution. It contains the results of Hayek’s studies during the Winter term of the academic year 1919-20, when he spent “about six to eight weeks” (Kresge & Wenar 1994: 63) in Zürich. He had returned from the war the year before, at age 20. During his service as a medical soldier in the front lines of the Piave River he had seen head wounds (“the exposed brain”) that made him curious about the functioning of the human

⁵ Notice that this suggests that Hayek also means a temporal order. That fits the developmental or “dynamic” character of his theory. Cp. *The Sensory Order*: 2.21.

brain.⁶ After the war, he started studying the relevant literature, and in Zürich he attended the brain-anatomy laboratory conducted by Konstantin (or Constantin) von Monakow⁷ (Kresge & Wenar 1994: 64). We also know (*ibid.*) that he attended lectures during one of which he heard about Moritz Schlick's recently published book on epistemology (*Allgemeine Erkenntnislehre*, 1918).

The structuralism of Hayek's theory of mind⁸ is something it shares with Schlick's theory of knowledge. The ms. does not contain any reference to Schlick, and neither does *The Sensory Order*. But in the book it is listed as one of the publications that influenced Hayek's ideas most. The description of mental phenomena in structural terms is one element that enables Hayek to break away from what was then one of the most influential theories of perception and knowledge, Ernst Mach's neutral monism. According to that theory, there exists a one-to-one correspondence between sensory stimuli and subjective perceptions and knowledge. It was precisely this aspect that Hayek criticized and which led him to develop an alternative theory.⁹

Hayek's discovery of Schlick during his stay in Zürich posed a challenge: could I discover who the lecturer was who had drawn Hayek's attention to Schlick? To find that out, I contacted dr. Heinzpeter Stucki, the archivist of the University of Zürich.¹⁰ He let me know that Hayek was not officially registered as a student, but he could have attended lectures as "Hörer". That led me to ask for the complete list of lectures during the semester of Hayek's stay. The most likely candidate seemed to me to be Gotthold Lipps, who lectured on psychophysics, a subject that plays a prominent role in Hayek's ms. (and in *The Sensory Order*). What pleads in favour of this hypothesis is that Hayek uses examples from developmental psychology, a subject Lipps discusses in his published work and which he also lectured on (he taught courses of didactics). Two facts, however, plead against it. First, Lipps is the author of a small book on psychophysics,¹¹

⁶ This is what he told Axel Leijonhufvud in an interview (private communication).

⁷ The University of Zürich calendar shows that this practice was held daily.

⁸ Ed Feser, in his excellent PhD thesis (1999), calls it a structural theory.

⁹ Cp. De Vries 1994.

¹⁰ To whom I was kindly directed by Ernst Fehr.

¹¹ Lipps 1921, which is the third edition.

with excursions into the theory of knowledge, in which Schlick is not even mentioned. Second, he was a full professor, which does not correspond to Hayek's recollection of a young lecturer (Kresge & Wenar: 64). This also seemed to exclude A. Wreschner, another full professor, who taught a course of natural philosophy. Two likely candidates seemed left, both "Privatdozenten": K. Dürr, who taught an introductory course in philosophy, and J. Suter, who taught a course on "the philosophical literature 1918-19". For this reason the latter seems the most plausible candidate, but for lack of further evidence my progress was stopped as far as the University of Zürich was concerned.¹²

Things were no better when I looked into the possibility that Hayek attended lectures at the Eidgenössische Technische Hochschule. He was not registered there, either, but may have sat in on lectures anyway. Conclusion: Hayek may have heard about Schlick from many people, either at the University or at the Polytechnic, perhaps even from Albert Einstein,¹³ who knew Schlick. It may have been from Monakow himself, who is still known today for his "structural" theory of the functioning of the brain. Von Monakow is the discoverer of diaschisis, a condition in which the lesion of one part of the brain impedes the functioning of others.¹⁴

In attendance of the discovery of further (auto)biographical material such as letters, I have to let the matter rest. Fortunately, that does not change anything about the argument of this paper. What emerges clearly from this historical excursion are the strong "structuralist" influences on Hayek: Schlick and Monakow. Another matter that my brief voyage back in time made clear was that Hayek could have made a worse choice than Zürich: it was one the most

¹² In n. 24 of the ms. Hayek refers *Psychologie* by William James, translated by M. Dürr. I have not had the occasion to check whether this is the same Dürr mentioned in the text (in which case the initial would be mistaken).

¹³ On p. 39 of the course calendar of the University of Zürich Einstein is mentioned as being in charge of a course ("Lehrauftrag") without being part of the staff. Since 1914 he was director of the Kaiser Wilhelm Physical Institute in Berlin and professor at the university there.

¹⁴ According to Von Monakow (1853-1930), the brain consists of one widespread neural network, functioning as a whole, without specific functions being located in specific areas (<http://www.coe.tamu.edu/epsy/faculty/CRiccio/EPsy621notes-riccio.html>, accessed 5 November 2003).

advanced and renowned centers of scientific education and research in the world during the post-war period.

Is *The Sensory Order* a theory of psychology?

An aspect of Hayek's theory that I have deliberately left a bit in the shadow concerns the question what it is a theory of. As I said in the introduction, authors usually consider *The Sensory Order* to be a theory of psychology. I have done so myself, but that was a bit one-sided. Though I have always presented *The Sensory Order* as a theory of the mind-body problem,¹⁵ my question about "the surprising place of cognitive psychology in Hayek's research programme" (1999) concentrates only on the psychological aspects of *The Sensory Order*. That question was ill-conceived. It is true that the ms. of *The Sensory Order* contains a theory that gives an explanation of sensory perception. Its main purpose, however, is to answer a different question. That question is: "what is mind", or "how does consciousness arise out of purely physical processes in the brain". *The Sensory Order* is not primarily a book on psychology but on the theory of the mind.¹⁶ Hayek writes that he had chosen the analysis of perception as an *instance* of how the brain works; it is not the main subject of the book, but an illustration of his solution of the mind-body problem:

"What has been attempted here might be described as a sketch of a 'theoretical psychology' in the same sense in which we speak of theoretical physics or theoretical biology. We have attempted an explanation of the principle by which we may account for the peculiarities which are common to *all* processes which are commonly called mental."
(*The Sensory Order*: 8.65, italics added)

¹⁵ For instance in Birner 2001 and 1995.

¹⁶ Popper never thought otherwise; cp. the critical letter he wrote to Hayek after receiving a copy of *The Sensory Order* (I discuss it in my 1999a). In the preface, Popper is one of the people whom Hayek thanks for commenting earlier drafts (the others are Ludwig von Bertalanffy and John Eccles). Feser 1999 contains an sophisticated analysis of Hayek's mind-body theory.

In the light of this, there is nothing surprising about the fact that Hayek did not use his theory of perception in his economics, where the perceptions of individuals are a central explanatory factor.¹⁷

Empiricism

What Hayek shared with Mach, and Schlick, was their empiricism. But he did not feel they had solved the problem posed by Kant, viz. that we need a pre-existing mental framework that makes consciousness and knowledge about the world possible:

“There is ... 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.”
(*The Sensory Order*: 8.18)

But rather than criticizing empiricism from the outside, Hayek says that he has led it to its logical conclusion:

“in so far as we have been led into opposition to some of the theses traditionally associated with empiricism, we have been led to their rejection not from an opposite point of view, but on the contrary, by a more consistent and radical application of its basic idea. Precisely because all our knowledge, including the initial order of our different sensory experiences of the world, is due to experience, it must contain elements which cannot be contradicted by experience.” (*The Sensory Order*: 8.27)¹⁸

¹⁷ Hayek explicitly rejects a reduction of economic phenomena to psychological mechanisms. The reasons lie in the “philosophical consequences” (the title of the last chapter of *The Sensory Order*) he draws from his theory of mind. This is discussed in Birner 2010.

¹⁸ This idea already clearly represented in the ms.: “Gewiss ist es ein auf die Spitze Treiben des Empirismus wenn wir auch das Verhältnis der Empfindungen untereinander durch die Erfahrung entstehen lassen; aber gerade dadurch werden viele seiner Härten gemildert, da danach die uns mittels dieser Empfindungen vermittelten Erfahrungen sich immer innerhalb dieser Verhältnisse halten müssen und diese daher einen gewissen apriorischen Charakter erhalten.“ (p. 40).

To a modern cognitivist, the explanation of how this experience-based framework has come about would take the form of an evolutionary explanation. But when Hayek wrote *The Sensory Order* that was far from obvious. That leads me to the following question.

Is *The Sensory Order* an evolutionary theory?

After having discarded the idea that *The Sensory Order* is only a theory of psychology, I am left with the other half of my main question: is it an evolutionary theory? For that purpose, it is useful to distinguish two meanings of “evolutionary”. One meaning is the neutral “developmental”, and in this sense Hayek’s theory of the mind is an evolutionary theory. That is already the case with the ms., which discusses how the neural networks that constitute our mind develop and how the functioning of the mind consists in their development. The brain/mind functions through the process of establishing structural relationships. Whereas random variation is not involved, a form of selective retention is present in the form of the strengthening of neural pathways. But this happens under the influence of their repeated activation. He speaks of the strengthening of pathways that are most often excited, without saying anything about the elimination of others.

“Sense experience (..) presupposes the existence of a sort of accumulated ‘knowledge’, of an acquired order of the sensory impulses based on their past co-occurrence; and this knowledge, although based on (pre-sensory) experience, can never be contradicted by sense experiences and will determine the forms of such experiences which are possible.” (*The Sensory Order*: 8.8)¹⁹

He does, however, mention that new incoming sense impressions may give rise to (ontogenetic) revisions of our knowledge (*The Sensory Order*: 5.26-29, for

¹⁹ This is an elaboration of an idea in the ms. (p. 29), where this “conservation principle” is expressed in stronger and cruder terms; Hayek says there that he finds it encouraging that nothing at all of anything we have experienced ever gets lost: “Die Vorstellung dass dies [the existence of intuition] darauf beruht, dass auch scheinbar entschwundene Kenntnisse weiterwirken, dass also nichts, gar nichts, dass wir einmal erfahren haben, ganz verloren geht, is überaus ermutigend.”

example). The passage quoted indicates a separation between the (largely phylogenetic) development of the “pre-printed” mental framework on the one hand, and the ontogenetic formation of the neural connections that apparently constitute its more adaptive part.

“Evolutionary” in the different, neo-Darwinian biological sense refers to processes of random variation and selective retention. Applied to mental phenomena, this type of evolutionary theory should offer an explanation of the contribution of mental processes to the survival of the organism. There are some hints of this in *The Sensory Order*. It may be read into the passage where Hayek says that the mind forms a partial reproduction of the environment and “thereby enables the organism which contains such a partial reproduction of the environmental order *to behave appropriately towards its surroundings.*” (*The Sensory Order*: 1.49, my italics). The most evolution-spirited chapter is the fourth, where we find a couple of slightly stronger hints (there are none in the 1920 ms.²⁰): “The question what determines (or what is meant by) purposiveness is in the last instance really the same question as that of *what ensures the continued existence of the organism.*” (*The Sensory Order*: 4.13, italics mine).

An evolutionary hypothesis is stated in 4.23:

“We must probably assume that, in the course of evolution, the original direct connexions between particular stimuli and particular responses are being preserved, but that control mechanisms are being superimposed capable of inhibiting or modifying these direct responses when they are inappropriate in view of other simultaneously acting stimuli.”

The strongest hint at a biological-evolutionary perspective can be found in 4.5 After explaining that the purpose of this chapter is to analyze the central nervous

²⁰ What Hayek does discuss in the ms. is a form of competition between sense impressions. Only those that arouse the most widely connected neural pathways become part of consciousness (ms.: 25). In his late work, competition is mentioned as a basic mechanism of evolution (for instance, in *The Fatal Conceit*).

system as a system of control superimposed upon a living whole rather than as a self-contained and fully centralized system of its own, Hayek writes:

“At the same time it should be pointed out, however, that in one respect in which the task we are undertaking is most in need of a solid foundation, theoretical biology is only just beginning to provide the needed theoretical tools and concepts. *An adequate account of the highly purposive character of the action of the central nervous system would require as its foundation a more generally accepted biological theory of the nature of adaptive and purposive processes than is yet available.*” (*The Sensory Order*: 4.5; my italics)

Hayek develops his own ideas in this direction – but not until much later.²¹ Neither *The Sensory Order* nor the ms. discuss the development of the complex, multilayer neural networks that constitute the mind in terms of random variation and selective retention. True, *The Sensory Order* is about learning (see, for instance, the summary of the theory in 8.12 – 8.16), and learning involves adaptation. But whereas every theory of evolutionary psychology is, or should be, a theory of learning, not every theory of learning is a theory of evolutionary psychology.

An additional argument is that, if Hayek had wanted to present an evolutionary theory right away, he would have concentrated more on the phylogenetic aspects of mental evolution. Instead, he finds the description of the ontogenetic mechanisms sufficient for illustrating the principles according to which the mind functions.²²

Nevertheless, following Hayek’s hints at an evolutionary framework in chapter 4, it would not be difficult to read the last chapter through evolutionary spectacles. If we did so, we would come to the conclusion that the discussion of the

²¹ And when he did, he eventually distanced himself from Darwinism, preferring a Lamarckian explanation of evolution in *The Fatal Conceit*. For a discussion, cp. Birner 2001.

²² But Hayek mentions as a reason for abstracting from the phylogenesis of the mind that not enough was known about it at the time (*The Sensory Order*: 4.7).

empiricist character of the theory in chapter 8 does not come into its own unless and until it is placed in an evolutionary perspective. Without it, the empiricism of Hayek's theory of mind would presuppose a static world in which past experiences continue to be useful for the mental guidance of current and future behaviour. But this applies to *every* empiricist doctrine, and such doctrines have been around for thousands of years without addressing evolution. Hayek started doing so only in his later work, not in *The Sensory Order*. *The Sensory Order* is evolutionary only in the sense that it contains the first sketches of *an evolutionary research programme*. It was worked out further in publications. "Rules, Perception and Intelligibility" (1963) gives a description of how human perception and behaviour is guided by rules, how these rules are learned and communicated, to what extent these processes involve an implicit or tacit framework. Whereas this publication concentrates on the function of rules, in "Notes on the Evolution of Systems of Rules of Conduct. The Interplay between Rules of Individual Conduct and the Social Order of Action" (1967) the emphasis lies on their evolution. But what Hayek discusses there is not the evolution of mind, but cultural evolution. Another elaboration of Hayek's evolutionary ideas is contained in *The Fatal Conceit* (1988). I have discussed these elsewhere.²³ I now want to discuss the physicalist character of Hayek's theory.

Physicalism, materialism and reductionism

That the "mental research programme" Hayek started pursuing in 1920 has by no means been completed (or even made much progress) can be deduced from David Chalmers' introduction to one of the sections of the proceedings of the *Third Tucson Discussions and Debates* with the theme *Toward a Science of Consciousness* (Hameroff et. al. 1999):

It is natural to hope that an explanation of consciousness might be a physical explanation. Physical explanations have had extraordinary success elsewhere in science... Given this track record, one might well expect that a physical explanation of consciousness is on its way. And

²³ In Birner 2001.

indeed, investigation of the neurophysiological basis of consciousness has already yielded many insights into the phenomenon.

But some have argued that any purely physical explanation of consciousness will be incomplete. (p. 1)

Further below, Chalmers still finds it necessary to make a distinction that Hayek had introduced eight decades earlier:

Theorists of consciousness are divided both on whether there is an explanatory gap, and on what follows. Some deny that there is any gap, or suggest that it has been closed. It is probably fair to say, however, that most think that there is at least a *prima facie* explanatory gap. From here, some go on to argue that consciousness is not a wholly physical phenomenon, while others resist this conclusion. (p. 1)²⁴

For Hayek consciousness *is* a physical phenomenon. That raises several problems. One was put to Hayek by Popper, who holds an indeterministic and dualistic interactive mind-body theory. He objected that since *The Sensory Order* seemed to offer a theory of mind that was not only physicalistic but also deterministic, it would not be able to explain the descriptive (and hence explanatory) and critical functions of language.²⁵ A closely related problem is that of explanation: if the mind is identical to the (physical) brain, how can it explain its own working? Hayek devoted a paper to these problems that was never published (and apparently never finished), “Within System and about Systems; A Statement of Some Problems of a Theory of Communication”. In its first paragraph Hayek virtually repeats the conclusion he had reached in *The Sensory Order*, viz. that “any apparatus of classification must possess a higher degree of complexity than is possessed by the objects which it classifies...

²⁴ Feser mentions Chalmers as one of the two philosophers (except for Feser himself; the other one mentioned is Howard Robinson) who recognize (and reject) the combination of a structural theory of the external world with a structural theory of the mind that one finds in Hayek. Feser himself, on the other hand, endorses Hayek’s theory as a very important and original innovation. Cp. Feser 2003: 6-7.

²⁵ In “Language and the Body-Mind Problem”, in Popper 1974. The same criticism is also made in Popper & Eccles 1977: 57 ff. These passages do not explicitly refer to Hayek, but they are directed against his theory of the mind, as I argue in Birner 1999a.

[T]herefore, ... the human brain can never fully explain its own operations.” (*The Sensory Order*: 8.68).- In the “Systems” paper, however, the argument is not only about the mind; it is generalized to all causal systems.

In developing this argument in “Systems”, the ontological and epistemological aspects of Hayek’s theory of mind become very closely intertwined. In *The Sensory Order* he claimed that his theory is less materialistic than dualistic theories because it does not assume the existence of a separate mind-substance: “While our theory leads us to deny any ultimate dualism of the forces governing the realms the mind and that [*sic*] of the physical world respectively, it forces us at the same time to recognize that for practical purposes we shall always have to adopt a dualistic view” (*The Sensory Order*: 8.46). That is because we cannot produce a complete description or explanation of the processes that constitute our mind and its relationships with the physical order without including a description of the subset of those same processes that do the describing and explaining, *i.e.*, the mind itself. That again is because, as Hayek repeats in 8.44, his theory is not a double-aspect theory. The complete order of all neural processes, “if we knew it in full, would ... not be another aspect of what we know as mind but would be mind itself.”

The Sensory Order is an identity theory of the mind; rather than denying the possibility of reducing the sensory order to the physical order, that theory implies that there is *no need to do so*. Here, as in many other matters, Hayek is a faithful follower of Schlick.²⁶ In the physical order, events are similar or different to the extent that they produce similar or different external effects. In the sensory order, events are classified according to their sensory properties. The two ways of describing mental phenomena, in physical and in subjective terms, are two alternative ways of describing the same phenomena. Whereas for the practical purpose of describing the mind Hayek may be called a dualist in the

²⁶ Cp. Schlick 1974: 299: “The resulting relationship between immediately experienced reality and the physical brain is then no longer one of causal dependency but of simple *identity*. What we have is one and the same reality, not ‘viewed from two different sides’ or ‘manifesting itself in two different forms’, but designated by two different conceptual systems, the psychological and the physical.”

sense that we use different ways of *describing* the mental and the physical; the ontological order, however, is one.

In modern mind-body literature, the problem that Hayek poses is often referred to as the “explanatory gap” (cp. the quotation from Chalmers above). Joseph Levine, for instance, observes that for a materialist consciousness and brain processes are ontologically identical:

“Metaphysically speaking, there is nothing to explain. That is, we are dealing with a brute fact and there is no further source (beyond the fact itself) responsible for its obtaining. The fact that we still find a request for an explanation intelligible in this case shows that we still conceive of the relata in the identity claim as distinct properties, or, perhaps, the one thing as manifesting distinct properties. We can’t seem to see the mental property as the same thing as its physical correlate. But though our inability to see this is indeed puzzling, it doesn’t show, it can’t show, that in fact they aren’t the same thing. For what is the case cannot be guaranteed by how we conceive of it.” (Hameroff *et. al.* 1999: 11).

This is exactly Hayek’s position.

Fundamental problems are raised here. According to Hayek, the fact that it is the mind which does the explaining means that it cannot give a full explanation of itself. This is posed as a problem of complexity, but that again may involve two different problems: the problem of self-reference and the practical impossibility to know all relevant initial conditions.²⁷ Therefore, “*to us* mind must remain forever a realm of its own which we can know only through directly experiencing it, but which we shall never be able fully to explain or ‘reduce’ to something else.” (*The Sensory Order*: 8.98, italics in the original). All we can provide are “explanations of the principle”. So, paradoxically, Hayek’s physicalistic theory of mind serves him to save the autonomous position of intentional phenomena and their consequences, including subjectivism in the methodological sense that

²⁷ Which partially coincide.

“the facts of the social sciences are merely the opinions, views held by the people whose actions we study. They differ from the facts of the physical sciences in being beliefs or opinions held by particular people, beliefs which as such are our data, irrespective of whether they are true or false, and *which, moreover, we cannot directly observe in the minds of people* but we can recognize from what they do and say merely because we have ourselves a mind similar to theirs.” (Hayek 1955: 28; italics added)

As we have seen, the problem of reducing the mental to the physical does not exist for Hayek. As far as we can speak of a reduction, it is the translation of a conceptual system describing the mind into one describing the physical order. This is possible in principle, *but not by us*, since that would inevitably involve our minds. We could, however, build an automaton (a computer) in order to carry this translation programme to its conclusion (*The Sensory Order*: 8.81). This, of course, would create the problem of how the automaton could communicate its results to us. This problem of communication is addressed in the “Systems” ms. It is us, humans, with our human minds, that stand in the way of a full physicalist description.²⁸ The basic facts of the social sciences are the opinions of the agents and there is no hope to reduce social science, *i.e.*, the study of human behaviour, to an analysis of mental processes.

In the last chapter of *The Sensory Order* Hayek draws the consequences from his analysis for social science:²⁹ from the fact that we can never achieve more than an explanation of the principle it follows that a complete unification of the sciences can never be achieved. “In the study of human action, in particular, our starting point will always have to be our direct knowledge of the different kinds

²⁸ If such a translation were considered to be the “reduction” of one conceptual system to the other, we would still have a form of reductionism. This raises difficult problems about reduction, description and explanation that I do not want to address here. I refer the reader to what Hayek says about reduction and “explanations of the principle in “The Theory of Complex Phenomena”, for example on p. 39 (Hayek 1964).

²⁹ It would be fairer to say that he reached this conclusion much earlier, or rather, adopted it from his predecessors in the Austrian School. In chapter 8 of *The Sensory Order* the conclusion is provided with an underpinning that is based in Hayek’s mind-body theory. I have deliberately not addressed the problem of the possible reciprocal influences between Hayek’s mental research programme and his methodology. They are discussed in Birner 1999.

of mental events, which to us must remain irreducible entities.” (*The Sensory Order*: 8.88). That the emphasis lies on “for us” has been argued above. The human mind enables us to achieve knowledge about the world but it also imposes limits to what we can know.

Conclusion: mind, evolution and evolutionary psychology

An influential research programme in contemporary evolutionary psychology is associated with the names of Leda Cosmides and John Tooby. It is described by Barkow, Cosmides & Tooby in the introduction to their *The Adapted Mind*. One part of their approach is that “[e]volutionary psychology is simply psychology that is informed by the additional knowledge that evolutionary biology has to offer, in the expectation that understanding the process that designed the human mind will advance the discovery of its architecture.” (Barkow *et.al.* 1992: 3). The second part is that evolutionary psychology “unites modern evolutionary biology with the cognitive revolution in a way that has the potential to draw together all the disparate branches of psychology into a single organized system of knowledge.” (*ibid.*: 3) The third, very ambitious component is that “to clarify this new field, by focusing on the evolved information-processing mechanisms that comprise the human mind, [evolutionary psychology] supplies the necessary connection between evolutionary biology and the complex, irreducible social and cultural phenomena studied by anthropologists, economists and historians.” (*ibid.*: 3). The authors want to achieve for social science the “conceptual integration” they think this has already been reached in the natural sciences: the elimination of contradictions between the laws and data of the various disciplines. They call this mutual consistence.³⁰ The premises on which this programme is based are that there exists a universal human nature at the psychological level (and not necessarily at the cultural level); that the psychological mechanisms that constitute this nature are the result of selection

³⁰ I do not know whether this has been realized in science, and I find it difficult to understand how evolutionary psychology may help to make micro- and macro-economics mutually consistent.

and adaptation; and that those mechanisms are more likely to be adapted to Pleistocene hunter-gatherers than to the modern world (*ibid.*: 5).³¹

A second research programme in evolutionary psychology is proposed in Barrett, Dunbar & Lycett 2002. They divide the field of the study of human behaviour into two sub-domains. One is human behavioural ecology, which “focuses on measuring differences in reproductive success between individuals in relation to differences in the behavioural strategies they follow...” (Barrett *et.al.* 2002: 8). This is the domain to which culture belongs. They distinguish this from evolutionary psychology properly speaking, whose “aim ... is to identify the selection pressures that have shaped the human psyche over the course of evolutionary time, and then test whether our psychological mechanisms actually show the features one would expect if they were designed to solve these particular adaptive problems.” (*ibid.*: 10). The most ambitious part of Tooby and Cosmides' programme in evolutionary psychology aims at an integration of these two fields into one.

Hayek's purpose in *The Sensory Order* is not to give a theory of human behaviour.³² In *The Counterrevolution of Science* this was elaborated into a criticism of the idea that explanations in social science have to be based on, or are reducible to, any kind of psychology, including behaviourism.³³ The data of the social sciences are the subjective ideas of individuals, and these have to be accepted by us, social scientists, as irreducibly given. Nothing is to be gained by explaining them in psychological terms. This is the methodological conclusion that Hayek draws from his philosophy of mind.

³¹ This hides many problems. One is the speed of evolution. At the physiological and biological levels, evolution is (usually) rather slow. The speed of mental evolution is a more contested problem. If primitive hunter-gatherers have evolved a mind that is adapted to their situation, how fast has it evolved? Apparently (but here lurks the danger of circularity) fast enough to survive. But then, why should the evolution of our mind have lagged behind the evolution of culture? Cultural evolution is generally considered to be faster than biological evolution. Can it nevertheless be explained by neo-Darwinism?

³² Cp. *The Sensory Order*: 2.23

³³ “The point from which I could then [between 1946 and 1949] start was the conviction that the different attributes of mental entities - conscious or not - could be reduced to differences in effects as guides to human action. But the crudities of behaviorism (which I had in the meantime encountered in the social sciences) had too much repelled me (particularly in the person of the social science specialist of the Vienna Circle of logical positivists [Hayek means Otto Neurath - cp. Kresge & Wenar: 50] to make the effect on observable conduct more than a final visible outcome of a complex process we had to reconstruct.” (Hayek 1982: 289)

Hayek shares with Tooby, Cosmides and Barkow the ideas that human beings have the same basic psychological set-up which is the result of evolution, and that the human mind has stayed behind in the development of culture in the sense that it is more adapted to the environment of primitive hunters-gatherers than to modern society.³⁴ There are a couple of important differences, however. One concerns the model of the mind. Hayek's structural theory sees the mind as an all-purpose organ³⁵ instead of consisting of localized function or modules (the "Swiss army-knife model" of the mind, advocated by Cosmides and Tooby) and is consistent with Hayek's structural theory. The other difference is methodological, and concerns the relationship between mind and social science, or psychology human behavioural ecology. Here Hayek's ideas are more in agreement with Barrett, Dunbar and Lycett, who argue in favour of keeping the two fields separate.

³⁴ Cp., for instance, Hayek 1976, ch. 11, "The discipline of abstract rules and the emotions of the tribal society".

³⁵ Cp. also Bechtel & Mundale 1996

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