# EMERGENCE THEORIES AND PRAGMATIC REALISM

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**Abstract**

The tradition of pragmatism has, especially since Dewey, been characterized by a commitment to non-reductive naturalism. The notion of emergence, popular in the early decades of the twentieth century and currently re-emerging as a central concept in metaphysics and the philosophy of mind, may be useful in explicating that commitment. The present paper discusses the issue of the reality of emergent properties, drawing particular attention to a pragmatic way of approaching this issue. The reality of emergents can be defended as a pragmatically-useful ontological commitment; hence, pragmatism can be employed as a tool in the debate over the structure and reality of emergence. This strategy of justifying ontological commitments is examined through historical and systematic discussions of the pragmatist tradition. It turns out, among other things, that while classical pragmatists did not specify any technical notion of emergence in the contemporary sense, their non-reductively naturalist views are relevant to the more recent emergence discussions – especially because they rejected the metaphysical realism typical of today's ontologically-oriented emergence theories.

## 1. What are the problems at stake in the emergence debate?

The debate about the concept of emergence has recently re-emerged (Kim 1999, Pihlström 2002, El-Hani 2002). This concept has been increasingly employed in fields like Artificial Life and neuroscience, but a rigorous debate concerning how it might be explained or defined is often lacking. In this paper, we intend to put into question some of the basic premises on which this debate has been grounded.

The re-emergence of the emergence debate is related to the great development of the sciences of complexity, interdisciplinary fields of research concerned with the complex properties of life and mind, in the 1990s (Emmeche 1997). Another reason for the strong comeback of this philosophical doctrine lies in the collapse of positivistic reductionism and the related ideal of an unified science since the 1970s. We can think of the fortunes of reductionism as inversely correlated with those of emergentism, and, thus, the fading away of reductionism and the enthronement of non-reductive materialism as a new orthodoxy would simply amount *to* the resurgence of

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emergentism (Kim 1999:5). The revitalization of the emergence debate is also related to a number of emergentist hypotheses about mind and consciousness that have been proposed (*e.g.*, Sperry 1969, 1983, 1991; Searle 1992; Baas 1996). The very term 'emergence' and its derivatives have become popular in the context of computer models of non-linear dynamical systems, complex systems research, Artificial Life, consciousness studies etc. As the concept of emergence is increasingly used, it becomes more and more important to keep the exact meaning of the central ideas involved clear. Moreover, it is crucial to discuss in detail what kinds of metaphysical commitments are *necessarily* involved in emergentist thinking, inasmuch as many scientists and philosophers still think that emergentism is incompatible with basic metaphysical commitments of the current scientific discourse. In fact, there are now at least two different research programs dealing with the notion of emergence (or, at any rate, using the term 'emergence'), one which is clearly materialist and naturalist, and another which aims at the alleged synthesis of science and religion that some classical emergentists, as Lloyd Morgan, dreamt about (Blitz 1992). Several examples of papers affiliated with this latter research program can be found in *Zygon*, a journal devoted to the examination of the relationships between science and religion (*e.g.* Polkinghorne 1991; Peacocke 1991, 1993, 1994, 1999; Ashbrook 1996; see also Hasker 1999).

A narrative about the origins of life will allow us to delineate the problems at stake in the emergence debate. Imagine, first, a pre-biotic world, where chemical evolution gave rise to a soup of chemical and physical resources, including complex molecules formed by the polimerization of simpler molecules. In that chemical soup, nothing lived, and, if there was something we could call 'evolution' (*cf.* Sterelny 2001:17), it would not be the same as biological evolution, as those chemical substances changed through time as individual entities, in a *transformational* rather than a *variational* process (Lewontin 1983). Then, something genuinely new under the sun happened. A replicator, by chance, came into existence. A replicator is a molecule that shows the property of making copies of itself (Dawkins 1976), or, generally speaking, any structure that in the right environment can act as a template for its own copying (Sterelny 2001). A current influential hypothesis about the nature of the first replicators states that they were RNA molecules, possessing both genetic memory and enzymatic activity. This is the basis for the hypothesis of a 'RNA world' as the first stage in the evolution of life.

Now, we have to say something more about the meaning of the term 'emergence' and its derivatives. This will lead us to a first, quite intuitive understanding of emergence. To have a first grip of the emergence concept, let us go back to the source, Lloyd Morgan's *Emergent Evolution* (1923). Morgan characterizes 'emergent evolution' as follows: "Evolution, in the broad sense of the word, is the name we give to the comprehensive plan of sequence in all natural events. But the

orderly sequence, historically viewed, appears to present, from time to time, something genuinely new. Under what I here call emergent evolution stress is laid on this incoming of the new“ (Morgan 1923:1). He also states that “... the emergent step [...] is best regarded as a qualitative change of direction, or critical turning point, in the course of events“ (Morgan 1923:5). Emergent events are related to the “... expression of some new kind of relatedness among pre-existent events“ (Morgan 1923:6), and “when some new kind of relatedness is supervenient (say at the level of life), the way in which physical events which are involved run their course is different in virtue of its presence – different from what it would have been if life had been absent. [...]. I shall say that this new manner in which lower events happen – this touch of novelty in evolutionary *advance – depends on* the new kind of relatedness which is expressed in that which Mr. Alexander speaks of as an emergent quality“ (Morgan 1923:16. Emphasis in the original).

We could quote many more relevant passages from Morgan’s works on emergence, but we think these quotations contain the basic claims we need to explain the reasons why phenomena, properties, events, etc. can be characterized as ‘emergent’. First, when they are something genuinely new[1], *i.e.*, something that never happened before in the course of evolution. Second, when they are closely connected with the appearance of a new kind of relatedness among pre-existent events or entities. Third, when they change the mode of evolution, as the way pre-existent events run their course is altered in the context of that new kind of relatedness.

Does the origin of the first replicator qualify as an emergent event on the grounds of these basic ideas? We do think so. As Sterelny (2001:17-18; also Morgan 1923:7) writes, “the formation of the first active replicator is a world-shaking event. It is truly something new under the sun, for it introduces natural selection and hence evolution in the world”. The appearance of the first replicator can be regarded as an emergent event, because, first, it was something really new, that never happened before, and, second, because it changed all future evolution, introducing a new kind of evolutionary process in the world, variational evolution, based on natural selection. It is not difficult to argue, also, that the first replicator amounted to a new kind of relatedness among the pre-existent molecular entities. The first replicator was a stable pattern of atoms that never existed before on Earth and can be regarded as an ‘emergent’ configurational pattern (*cf.* Alexander [1920]1979), *i.e.*, a molecule is a replicator because the atoms composing it are organized in a certain configuration, relate with one another in a certain way, reciprocally constraining their activities so that the molecule as a whole shows some characteristic properties.

Two of these properties are particularly relevant to the issue of the origins of life: a replicator should have the property of being an enzyme and the property of being a template for its own replication. This latter property is a typical example of an ‘emergent property’. It is a genuinely

new property, never observed on Earth before the first replicator appeared. It is closely connected with the way the atoms relate to and constrain each other in a self-replicating molecule. And, finally, it is an essential feature of each and every system classified as a 'replicator'. The nature of the relationship between the property of being a template and the conditions observed in the micro-structure of a replicator is such that: (i) that property is instantiated when, and only when, the micro-structure of the replicator is such that satisfies the specific kind of relatedness that makes it possible for the molecule to act as both a template and an enzyme; and (ii) whenever this kind of relatedness is instantiated, the property of being a template for its own copying will be also instantiated (see below). In short, this property can be consistently interpreted as an emergent property, realized by the way the atoms composing a replicator relate to each other, and the reason why such a property is instantiated lies in the way the physical and chemical events run their course in the context of the new kind of relatedness observed in a replicator. The first step in our narrative about the origins of life can be regarded as a typical example of an 'emergent' phenomenon or event, involving 'emergent' configurational patterns or kinds of relatedness and 'emergent' properties.

Let us consider, now, other important steps in the early evolution of life: the appearance of the first cells and organisms. Until now, we have been discussing a world of 'Naked Replicators' (Sterelny 2001:19-22). In that world, the same entity acted both to secure resources and as a genetic memory. There was both replication and interaction with the environment, but no specialization of roles. The first self-replicating molecules were both replicators and interactors.[2] Molecular properties of the replicators themselves were the objects of natural selection. In that world, there is only selection for fidelity, fecundity and longevity of the replicators (Dawkins 1976). It is important to notice, however, that, although the same entity was both replicator and interactor in that stage of biological evolution, conceptually there is an important difference between what it is to be a replicator and what it is to be an interactor.[3] This conceptual difference became clearer when a specialization of roles appeared in living beings. In our world, genes only occasionally interact directly with the environment. Rather, they are parts of organisms that, generally speaking, are the interactors. In a world where replicators are embedded in organisms, natural selection does not result simply in better replicators, but in better-adapted interactors.

The origins of the first cells and organisms provide another good example of emergent phenomena. The combination of replicators into the physically and functionally united 'alliances' that we identify as the first cell-like structures was another world-shaking event, bringing into existence something which was as new as the naked replicators were. The appearance of such structures changed once again the mode of evolution, since evolution by natural selection came to

involve, then, an interaction between proto-organisms and their environment. As Sterelny (2001:23) sums up, "the 'invention' of the organism, perhaps even of the simplest cells, changes the character of both evolution and selection. [...]. ... after the organism threshold is crossed, natural selection typically acts directly on organisms and indirectly on replicators. Moreover, it selects replicator *teams*, the whole vehicle-building genome, rather than individual replicators". To demonstrate this, it is enough to call attention to the issue that better-adapted higher-level interactors are the products of this new mode of evolution, not only more reliable, fecund and stable replicators. Moreover, the first cells and organisms obviously amounted to new configuration patterns, new kinds of relatedness among the pre-existent molecular entities. It is clear, then, that their appearance can be properly qualified as 'emergent' phenomena.

We hope this narrative about emergence in the early evolution of life will contribute to make the problems at stake in the emergence debate clear. How should we understand the appearance of something genuinely new in evolution, if, from a materialist standpoint, everything in the world is formed by the very same basic entities? What is the relationship between the emergence of new kinds of relatedness and the emergence of new properties? What does it exactly mean to say that something is 'emergent'? What are the consequences of emergent phenomena such as the origins of life or the origins of mind and consciousness for the way evolution takes place? And so on. It is not necessary to make a detailed argument for the relevance of these problems for both natural sciences and philosophy. But we wish to say something more about a feeling that may be present in some readers: emergence is not a concept which seems particularly hard to understand. If this feeling is present in some of our readers, we will rejoice, since this was the main goal of this section. Nonetheless, it also brings to light a perplexing aspect of the emergence debate. If emergence is really not so hard to understand, why is the history of this concept characterized by so many controversies? Else, why have emergence failed until now to become a visible part of the problematics of the mainstream philosophy of science, despite its obvious and direct relevance to central issues in the philosophy and methodology of science?

Although the notion of emergence has an undeniable intuitive appeal, it is often regarded with suspicion, for at least four reasons: (1) various formulations of this notion have been imprecise and not obviously reconcilable with one another; (2) it is not always obvious if a phenomenon is emergent 'in the eyes of the beholder' or 'in itself' (Baas 1996, Baas & Emmeche 1997); (3) this notion seems to violate the maxim that you can't get something from nothing (O'Connor 1994); (4) the commitment of many emergentist philosophers to the idea of downward causation (DC) seems to entail a violation of the physical causal closure (Kim 1992, 1996). The first problem does not require a rejection of the notion of emergence, but rather a critical appraisal of its previous

formulations. The second problem can be avoided if one considers that any object of scientific investigation, and not only emergence, is a theoretical entity presupposing a frame of observation and description.[4] The latter objections are more serious. Many emergentist thinkers (but not all of them) are ontological physicalists, *i.e.*, they believe that there are no concrete existents in the world other than physical fields and material bodies, *i.e.*, aggregates of the basic physical particles recognized by our best current physics. Such a materialistic monism confers to the physical level a kind of priority, since the diversity of things should necessarily result from different arrangements of the very same basic constituents. This means that many emergentists will endorse the generality of physics vis-à-vis the special sciences, although not the classical reductionist account captured in many usual references to 'the unity of science' (*e.g.*, Oppenheim & Putnam [1958]1991), *i.e.*, the view that all the special sciences reduce, in a strong sense of 'reduction', to physics, which is a much stronger and less plausible thesis than the generality of physics (Fodor 1974[1991]). The generality of physics is properly expressed in the hypothesis of *the inclusivity of levels*, claiming that the relation between levels is such that (1) a higher level (*e.g.*, the psychological level) is built upon lower levels (say, the biological and physical levels), and (2) allows, at distinct places in the universe, the existence of separate types of higher levels, defining different local ontologies, yet all of which are included within the physical level and non-violating physical laws (Emmeche *et al*. 1997:93; Emmeche *et al*. 2000:14-15).[5] Emergentist materialists face a fundamental problem: as they recognize that all higher-level events, states, and properties are realized by physical events, states, and properties, how can they explain that genuine novelties ever arise? The suspicion that emergence violates the maxim that you can't get something from nothing seems to be justified. Several emergentists, however, claim that this problem can be adequately solved by taking DC into account (*e.g.,* Sperry 1969, 1983, 1991; Salthe 1985; O'Connor 1994; Emmeche *et al*. 1997, 2000; El-Hani 2002; El-Hani & Pereira 1999, 2000; Andersen *et al*. 2000; El-Hani & Emmeche 2000; El-Hani & Videira 2001). But this leads to the last problem: we have to deal with the difficulties involving DC, for instance, the possibility that it entails a violation of the physical causal closure. A tempting possibility (which we will discuss later) is simply to cast DC aside and try to formulate emergentism without appealing to this notion. Nonetheless, one has to argue, in this case, against the general belief among emergentists that DC is of crucial importance in understanding causation. Kim (1992) developed an argument to demonstrate that both upward and same-level causation presupposes the possibility of DC. This argument can be used as a basis for claiming that DC is an indispensable notion in our theories of causation.

Two additional features are related to the controversies about emergence. First, a major reason for suspicion about emergentist philosophies lies the strong influence of logical positivism

(Blitz 1992, Kim 1999), with its hyper-empiricist and anti-metaphysical view of science. This influence is still an important feature of much Anglo-American analytical philosophy, although few philosophers subscribe to the doctrines of logical positivism any longer. Second, a burdensome load of confusion about the metaphysical aspects of the concept of emergence has always characterized the debates concerning it.

We intend in this paper to critically appraise some assumptions underlying the emergence debate and to examine some unorthodox proposals discussed by the authors in some recent papers, which open, in our view, some hitherto insufficiently explored pathways in emergentist philosophies. We will discuss, first, Kim's critique of emergentism, in order to make clear what the assumptions we wish to examine are. Second, we will discuss the above-mentioned unorthodox approaches. Third, we will deal with the issue of the reality of emergents and the implications of pragmatic realism to the controversies over emergence. Fourth, a historical survey of the development of concepts close to emergence in the pragmatist tradition will be presented. And, finally, we will emphasize some issues concerning the kind of realism assumed by emergentists and their critics to which we think emergence theorists should pay more attention.

**2. Kim on emergence**

If we combine Kim's (1992:122-124; 1996:227-228; 1999:20-22)[6] several statements about the central doctrines of emergentist philosophies with Blitz's (1992:1/175), we can describe emergentism as consisting of the following claims:

(i) [Ontological physicalism] All that exists in the space-time world are physical fields, and the basic particles recognized by physics and their aggregates;[7]

(ii) [Qualitative novelty] Evolution is a universal process of change that produces qualitative novelty in all domains of reality;

(iii) [Emergence of complex higher-level entities]: Systems with a higher level of complexity emerge from the coming together of lower-level entities in new structural configurations (the new 'relatedness' of these entities);

(iv) [Property emergence] Qualitative novelties appear when material systems attain an appropriate level of organizational complexity, instantiating a genuinely new kind of relatedness which realizes, by its turn, genuinely novel properties at the level of the system as a whole. Two features should be stressed in the relationship between emergents and their basal conditions: (a) a given set of emergent properties (which can be unitary) is instantiated when, and only when, certain appropriate basal conditions are

satisfied by the micro-structure; (b) a given set of emergent properties (which can be unitary) must, as a matter of law, be instantiated when the right kind of relatedness is present in a material system, so that whenever those basal conditions are satisfied, that specific set of emergent properties should be observed (*cf.* Kim 1992:131; 1999:21);

(v) [Theory of levels] Reality can be *described* as a structure of irreducible levels, each level consisting of systems characterized by at least one emergent property (*cf.* Kim 1999:19-20);

(vi) [Irreducibility/unpredictability of the emergents] Emergent properties are irreducible to, and unpredictable from, the lower-level phenomena from which they emerge;[8]

(vii) [Downward causation[9]] Higher-level entities manifest genuinely novel causal powers, so that lower-level events take place differently within them.[10]

Kim (1992) claims that there is a parallelism between emergentism and non-reductive physicalism, arguably the current orthodoxy on the mind-body problem. Non-reductive physicalists typically attempt to combine a physicalist ontological monism with a dualism of physical and psychological properties.[11] Kim [1995](1989) argues, however, that non-reductive physicalism is not a stable position. It would collapse into either reductionism or more radical forms of dualism. In his view, a physicalist has only two genuine options, eliminativism and reductionism. It is hard, indeed, to give a proper explanation to the idea that mental properties are something 'over and above' their physical/biological bases, that the instantiation of a mental property is something more than the instantiation of its neural substrate. In the absence of such an explanation, mental properties cannot be regarded as ontologically irreducible without breaching fundamental tenets of physicalism (Kim 1993, 1998; Bickle 1998). It follows, then, that non-reductive physicalism would not be sufficiently strong as a philosophical position and some kind of identity theory would be the most attractive option for a physicalist philosopher of mind. But couldn't non-reductive physicalism or, broadly speaking, non-reductive naturalism be defensible not as a purely ontological doctrine, in terms of property dualism, but, rather, as a more epistemological and methodological stance? One might argue, for instance, that the understanding of mentality, normativity, or human agency demands other perpectives than reductionism (and even physicalism). Influential philosophers like Charles Taylor (1995) and Hilary Putnam (1994, 1999) have resisted the basic physicalist idea that a scientific and naturalistic perspective would be adequate to understand features peculiar to human life and practices. Our interpretation of ourselves as conscious, ethically responsible persons seems to require, according to these thinkers, an irreducibly normative account of the practices we engage in, and such an account cannot be grounded, in their views, on a physicalist world-view.[12]

Most non-reductive physicalists are usually committed to a positive account of how mental and other 'non-physical' properties relate to physical properties. Two approaches have been widely used to explicate the relations between higher-level and physical properties: supervenience and realization (Kim 1992, 1993). Supervenience, not emergence, is the choice of many authors when they engage in characterizing interlevel relationships. Many philosophers have argued that physicalism can be properly couched in some form of the supervenience relation, often associated with two basic ideas concerning the relations between sets of properties, dependence and determination (Davidson 1970; Hellman & Thompson 1975; Kim 1993; Chalmers 1996; Horgan 1982, 1993; Bailey 1999).[13] Others have insisted, however, that emergence, not supervenience, is the better alternative regarding the understanding of ontological relations between levels (*e.g.* Humphreys 1997). Still others have argued that a combination of these notions is an attractive philosophical alternative to define an interlevel relationship meeting the double requirement of dependence and nonreducibility (Van Cleve 1990; O'Connor 1994; El-Hani & Pereira 2000; El-Hani & Emmeche 2000; El-Hani 2002).

A major part of the philosophical attractiveness of supervenience is related to the prospect of discovering a relationship that might give us determination, or dependence, without reducibility. Supervenience seemed to be, at least for some time, exactly what non-reductive physicalism required, a dependence relation that could do justice to both physicalism and antireductionism. Nonetheless, the concept of supervenience does not seem to support by itself a cogent formulation of non-reductive physicalism. Kim (1996:222-225) concluded that it is an unsettled issue whether supervenience physicalism in the form of strong supervenience is a viable form of non-reductive physicalism. Global supervenience, by its turn, does not seem to provide a dependence relation strong enough to support a physicalist stance without entailing local strong supervenience (Kim 1993; Kim 1996:225-226). It is not so easy to derive non-reducibility from supervenience as it was originally thought. Kim nicely states the dilemma concerning supervenience as a relation intended to be both non-reductive and physicalist:

> "... if a [supervenience] relation is weak enough to be nonreductive, it tends to be too weak to serve as a dependence relation; conversely, when a relation is strong enough to give us dependence, it tends to be too strong – strong enough to imply reducibility" (Kim 1993:276).

Instead of deriving, as usual, non-reductive theses from supervenience physicalism, Kim (1993, 1996) advocates that this doctrine resuscitates a quite different stance, token identity physicalism (see also El-Hani & Emmeche 2000). In view of the difficulties faced by supervenience physicalism as a non-reductive stance, we have to search for alternative paths to the middle road between substance dualism and reductionism that many philosophers find attractive. In this

connection, it is worth investigating if a combination of supervenience and emergence might fulfill the double requirement of dependence and determination, on the one hand, and non-reducibility, on the other.

If emergent properties are characterized as particular kinds of strong supervenient properties, it will be tempting to conclude that they can be thus regarded both as dependent on, and determined by, the micro-structure – meeting a crucial requirement on interlevel relationships in a physicalist view –, and as irreducible higher-level properties – fulfilling the basic requirement in a non-reductive stance. But one should not lose from sight the above-mentioned difficulties facing the prospect of defining a non-reductive interlevel relationship based on supervenience. Supervenience naturally turns, in the context of level theories, into "the thesis that properties of a whole are determined by the properties and relations that characterize its parts" (Kim 1997:278), 'determination' meaning that "what higher-level properties a given entity has are totally fixed by the lower-level properties and relations characterizing its parts" (Kim 1996:222). When we characterize an emergent property as a strong supervenient property, the very notion of 'emergence' is at risk. It is not an easy task to explain how the claim that emergents are dependent on, or determined by, the micro-structure from which they emerge can be reconciled with the idea of irreducibility.

When we put the notions of 'irreducibility' and 'supervenience' together[14], emergent properties show a seemingly paradoxical relation with the properties and relations of a system's parts. If an emergent property supervenes on these properties and relations, we can conclude that it is both *dependent on*, and *determined by*, the latter. Nonetheless, if the very same emergent quality is also an irreducible property, it *cannot*, as such, *be totally fixed* by the lower-level properties and relations, as the notion of supervenience seems to entail. There is a critical tension between the acceptance of strong supervenience as a way of characterizing the dependence relation between an emergent and its micro-structure and the idea that emergents are irreducible. It is necessary to explain in what sense, exactly, emergence can be thought of as a species of strong supervenience, while microdeterminism, which follows from mereological supervenience, does not hold. Maybe the notion of DC can help us solve this paradox, as it has been argued by El-Hani & Emmeche (2000) and El-Hani (2002). DC might explain in what sense an emergent property can be irreducible, and yet dependent on, and determined by, the micro-structure from which it emerges.[15] Nonetheless, as Kim (1992:137, 1999:25) argues, the combination of upward determination and DC may threaten the coherence of emergentism, even though he himself (1999:33) conceives of a conceptual approach to DC which might avoid the issue at stake. Pihlström (2002) considers, by his turn, that a non-causalist approach is a better way to understand emergentism than the habitual

appeal to DC found in emergentist thinkers (section 4). Anyway, if we intend to discuss what are the prospects and limitations of employing the notion of DC, we have to take in due account Kim's criticism of it.

Kim's arguments against DC are basically focused on the problem of causal/explanatory exclusion (Kim 1993, 1996, 1998, 1999). Kim derives a general principle that he calls 'the principle of downward causation' (Kim 1999:24) from his arguments about inter- and intra-level causation in the context of a layered model of the world: To cause any property to be instantiated, you must cause the basal conditions from which it arises.[16] When we consider that any higher-level property has, according to the supervenience concept, a supervenience base (or realizer) that is sufficient to bring about its instantiation, the problem of causal/explanatory exclusion enters the scene: considering that for any single event there can be no more than a single sufficient cause, if both a higher-level property *Q* and its physical supervenience base *P* are sufficient causes of another physical property *P** and, hence, of its supervenient property *Q**, one of them must be excluded from this causal picture. It is reasonable to claim that the role of *Q* in the causation of *P** (which is an instance of DC) should be preempted by *P*, so that we end in a picture that Kim calls the model of supervenient causation: *P* causes *P**, and *Q* supervenes on *P*, and *Q** supervenes on *P**. This model takes causal processes at the micro-level as fundamental and considers all events of macro-causation (including DC) as supervenient, or dependent, on micro-causation.[17]

Although Kim (1996:151-152) claims that this model differs from an epiphenomenalist model, it is not that easy to release it from its epiphenomenalist implications, as the following remark suggests:

> "In the case of the presumed *Q*-*Q** causation, the situation is rather like a series of shadows cast by a moving car [...]. The moving car represents the real causal process, and the series of shadows it casts, no matter how regular and lawlike it seems, does not constitute a causal process" (Kim 1995:7-8).

If mental causation, for instance, is regarded as supervenient on physical causation, this will mean that all the genuine causal work is done by the physical processes underlying the shadowy mental ones. The model of supervenient causation makes it difficult to understand what could possibly be the function of mental causation:

> "Given the assumption implicit in this model [of supervenient causation] that fundamental causal processes occur at the physical level, the causal role imputed to *M* in relation to an event at the physical level should strike us as something mysterious, and we should wonder what purpose could be served by this shadowy 'supervenient cause' that accompanies the physical cause" (Kim 1993:361).

This model poses a serious problem for the emergentist's interpretation of DC as a causal power that could change the mode of occurrence of lower-level events. In this approach, the causal

powers of higher-level properties and entities, including both same-level causation and DC, are utterly derived from the causal powers at the micro-level. There can be, accordingly, no new causal powers at the higher level over and beyond the causal powers observed at the physical level. This is clearly contrary to the emergentist's claim that emergent properties are related to novel causal powers, irreducible to the causal powers of the micro-structure from which they emerge.

Given the problem of causal/explanatory exclusion, if the emergentist wishes to insist on the idea of irreducible DC, a violation of the physical causal closure will seem to follow. The basic idea is that irreducible DC would be a "causation of physical processes by nonphysical properties" (Kim 1996:232). One should be cautious, however, when claiming that a given process, event or property is 'non-physical', so as to avoid being committed to a too narrow notion of 'physical', that does not take due account of the idea that all levels of reality are contained in the global physical level, *i.e.*, the thesis of the inclusivity of levels. Supervenience physicalists, for instance, usually designate all higher-level properties as 'non-physical' properties. It is not necessarily the case that an emergentist advocates, as Kim (1999:20-21) argues, "... the idea that some of the properties of complex systems, though physically grounded, are nonphysical, and belong outside the physical domain". Rather, a more cogent way of understanding the central doctrines of emergentism is that, given the inclusivity of levels, emergent properties are also, but not exclusively (as they demand higher-levels of description and explanation), physical properties. Given that a higher level, say, the psychological one, is built *on* the lower biological and physico-chemical levels, it is not adequate to call a property described at that level 'non-physical'; rather, to be coherent with the inclusivity of levels, one should regard it as something which is, *at the same time*, a psychological property and a quite complex set of biological and physico-chemical properties and relations. It is in this sense that a mind is in the same place and time a physico-chemical, biological, and psychological system. The inclusivity of levels is such that a mind *remains* physical/chemical/biological, and is *also* a psychological system, when neural structures and processes are so arranged that they show the qualities usually identified as mental ones.

Here we are getting close to what might be labeled *pragmatic pluralism* regarding different approaches to the human mind. For some particular purposes, especially explanatory ones, it may be useful to stick to a physical or biological (or, more generally, natural-scientific) perspective in our attempt to make our mentality intelligible. Adopting such a perspective does not make the mind any less mental or psychological, insofar as other perspectives are equally legitimate. If we are not primarily interested in scientific explanations but attempt in broader terms to understand human life in its normatively structured (individual and social) surroundings, we should, instead of any reductive scientific accounts, stay on the level of folk psychology or, perhaps, of what John

McDowell ([1994]1996) calls our 'second nature', *i.e.*, an irreducibly normative 'space of reasons' that is not anything non-natural but cannot be reduced to nature construed as a realm of natural laws (see Pihlström 1999a, 2002). Such different pictures of the mind have their own criteria of adequacy. One's position is dangerously reductionist only if one claims absolute priority to some specific picture or perspective (typically the natural-scientific one). More 'humanistic' approaches should, of course, admit the legitimacy of scientific investigation of the mind, *e.g.*, of the neural bases of mental operations, reminding scientists that the mind remains psychological (and also intersubjective in the sense of being normatively rooted in the cultural environment in which a human *person* lives and acts)[18] even when its capacities are neurally or physiologically explained. Thus, no one approach essentially defines the mind; for an anti-reductionist pragmatist, all these different perspectives can happily coexist. The inclusivity of levels should be interpreted in this pluralistic manner.

If emergentism is to be taken as an ontologically physicalist stance, DC cannot be interpreted in a sense that allows physical laws and organization principles to be violated. This follows from the inclusivity of levels. It is in this scenario that we must face the problems posed by Kim: how can we make sense of DC without committing ourselves to a violation of the physical causal closure? How can the problem of causal/explanatory exclusion be avoided, so that one may claim that novel and irreducible causal powers appear in the higher-level entities, changing the behavior of the component parts at the lower level? Kim (1993:356) claims that the only plausible solution would be some form of reductionism, allowing us to discard, or at least moderate, the claim that mental properties (or, generally speaking, higher-level properties) are distinct from their underlying physical properties. Kim's arguments against DC, which convey the more forceful difficulty faced by contemporary emergence theories, can be seen as a powerful *modus tollens* against the causalist picture which recent emergentists like Stephan adopt (Pihlström 2002).

We will explore in the next section two different unorthodox arguments developed independently by the authors as responses to Kim's and Stephan's contentions. This will eventually lead us to pragmatism: it is on the basis of pragmatic pluralism that one can argue for the idea that we should use several different notions of causation to account for all the modes of causation we appear to need in our (scientific and commonsensical) world-view. No monistic reduction of the notion of causation to a single metaphysically privileged mode is acceptable for a pragmatist thinker. For some purposes it is better to employ the standard physicalist notion of effective causation; for some others one may adopt an 'Aristotelian' variant; for still others one might prefer a non-causal account. This pluralism liberates us from the dilemma to which Kim has led us, although, admittedly, some tensions do remain between the positions we propose.

**3. Aristotelian and non-causalist approaches to the issue of DC**

Kim understands DC as an instance of ordinary *efficient causation*, and this in part explains why he argues that, as long as we are committed to irreducible DC, we should accept a violation of the physical causal closure (El-Hani & Emmeche 2000). We believe that Kim's arguments must be taken as essentially correct, if one claims that DC occurs independently of the activity of the microproperties *and* can be understood as an instance of efficient causality. In this sense, DC would inevitably be excluded by the efficient causal powers of the object's microstructure or, if not so, it would breach the physical causal closure.

DC seems to be a hopeless problem for a picture allowing only strict efficient causation (Emmeche *et al*. 2000; El-Hani & Emmeche 2000; El-Hani & Pereira 1999, 2000; El-Hani & Videira 2001). Emmeche and coworkers (2000) suggest that an Aristotelian understanding of causality may help us grasp the nature of the causal influence of the whole over its parts. An emergentist framework would demand, thus, a revaluation of classical causal notions, resulting in a sort of neo-Aristotelian approach. They reinterpret the Aristotelian causal modes as follows: (a) efficient causality is a cause-effect relation involving an interactional exchange of energy pertaining to entities of a given level and resulting in a temporal sequence of causally interrelated states; (b) material causality refers to the immanent properties in the entities of a given level; (c) formal causality corresponds to the form or pattern into which the components of a given entity or process are arranged; (d) functional causality amounts to the role played by a part within an integrated processual whole, or the purpose of a behavior as seen from the perspective of a system's chance of remaining stable over time.[19] They identify three versions of DC, based on different interpretations of the causal modes at stake (strong, medium and weak DC). In the medium version, DC is understood as a kind of formal causality. As the set of possible relations among the components is always *constrained* when they become part of a higher-level system, the *modification* suffered by a complex system's parts can be understood as a *constraint implied by being part of a pattern* (Emmeche *et al.* 2000; El-Hani & Pereira 2000; El-Hani & Emmeche 2000; El-Hani & Videira 2001; El-Hani 2002). Two assumptions are central in medium DC:

(i) A higher-level entity (and its environment) *constrains* the development of lower-level processes throughout its temporal evolution by *selecting* the particular set of relations among the parts that will be instantiated in each time $t_i$, among all the possible sets that could be selected in that time;

(ii) A *single* set of entities at the lower level may be the starting-point for the *realization* of *different* entities at the higher level.

This interpretation leads to an understanding of mereological dependence as a *symmetric* relation *in virtue of the conjunction of two distinct dependence relations, both asymmetric: supervenience and DC*. While efficient interactions between the components *realize* the form or pattern of structures and processes observed at the higher-level entity, the form *constrains* the efficient interactions that will realize the following state instantiated by the system. Thus, we can arguably reconcile DC with supervenience.

A specific set of properties emerges in a given system *for the simple fact that it is that kind of system*, *constrained to that particular region of a state space*. Or, else, emergent properties appear in a system *because its parts are organized in that particular state of relatedness (form)*. According to this approach, nothing more is required to explain property emergence but the fact that a given system always instantiates a particular subset of its possible states, and, thus, a number of properties which are not found in the parts themselves or in other regions of the state space, where different modes of organization are instantiated. Emergence is a phenomenon that can be explained and, maybe, even predicted. Nonetheless, the explanation or prediction of an emergent property does not eliminate it, since the fact remains that a system is always constrained to a particular region of the state space and realizes a specific set of properties, qualitatively different from those realized in other regions.

Medium DC cannot be consistently ascribed to emergent qualities as such. The idea that it is the higher-level entity as a whole which has a formal influence over its parts seems both reasonable and natural. If this interpretation is accepted, it will follow that downward macrodetermination does not stem from emergent properties; rather, new properties emerge because of the constraining action of wholes over parts. This idea is quite different from the usual claim "that the emergents bring into the world new causal powers of their own, and, in particular, that they have powers to influence and control the direction of lower-level processes from which they emerge" (Kim 1999:6. *cf.* also Kim 1999:22). Making explicit his commitment to a strong realist stance, Kim (1999:19) states that the claim that emergents have causal powers is entirely natural and plausible *if one believes that there are such properties*; there would be no purpose in insisting on the existence of emergent properties if they were mere epiphenomena with no causal or explanatory relevance. Nonetheless, there is more to explanatory relevance than simply causal powers, as indicated by the arguments about the prospects of a non-causalist approach in explaining human mentality and rationality (see below). Emergent properties can play an important conceptual role in our understanding of the world, even

if their causal powers are basically inherited from their realizers, according to Kim's 'causal inheritance principle' (*e.g.,* Kim 1999:16). Moreover, once DC is not ascribed to emergent qualities, at least part of its supposed incoherence and paradoxical nature vanishes (*cf.* Kim 1999:25).

Following Alexander ([1920]1979) and taking medium DC as a ground for their arguments, El-Hani & Emmeche (2000) and El-Hani (2002) claim that a given emergent property, say, a mental property *M*, should be identified with a state of relatedness at the micro-level, or, in Alexander's terms, a 'configurational pattern', $S_p$. *M* is instantiated simply because $S_p$ is that kind of neuronal pattern.[20] We can thus moderate the claim that mental properties (and arguably other higher-level properties) are distinct from their underlying physical bases, as Kim (1993:356) urges us to do. El-Hani & Emmeche (2000) and El-Hani (2002) argue that this stance, even though it may not be non-reductive enough for many philosophers, maintains most of the fundamental gains of a non-reductive physicalist stance, while avoiding a significant shortcoming of this position, namely, property dualism, which seems to be incompatible with a physicalist position worthy of the name.[21]

Another possibility to face Kim's dilemma would be to maintain the natural-scientific understanding of causation as efficient causation and to argue that a causal vocabulary is not appropriate for an adequate account of human mentality and agency from the point of view of what McDowell ([1994]1996) calls our second nature. Faced by the DC dilemma, one may be tempted to challenge the basic causal picture of the mind-body relation presupposed by Kim, Stephan, and others. If we take the idea of emergence seriously in the realm of human mentality and rationality, we may argue not that these 'higher levels' can be causally efficacious but that human life cannot be thoroughly conceptualized in terms of causal concepts, which are primarily appropriate to the lower (*i.e.*, physical) level(s) – that is, without taking into account the levels that cannot be included in the causal system of the natural world.[22] These higher, emergent, domains would accommodate human beings' *rational* or *normative* relations to each other and to the rest of the world they try to understand through their perceptions and thinking. It seems that physicalists have not told us how it is possible to reductively 'naturalize' normativity.[23] To adopt the non-causalist approach would in a sense be to give up, partly, the physicalistic principles introduced above (however non-reductive they are designed to be). Yet, in an important sense, nothing would be lost, except scientistic prejudices not needed in true naturalism.

This suggestion cannot be discussed here in any detail (*cf.* Pihlström 2002). Our unorthodox proposal is a thesis about the inadequacy of viewing human life from an exclusive causal-physicalist perspective, a perspective not sufficiently problematized either by emergentists or their critics. While a causal (*e.g.*, neurobiological) vocabulary is probably necessary in accounting for the complexities of human life, it is by no means sufficient for understanding the normative aspects

naturally belonging to that life. Thus, instead of attacking any particular field of scientific research, we wish to locate a philosophical issue concerning the perspectives from which we should approach reality. This introduces an epistemic and pragmatic element to our emergence discussion.

Furthermore, if we take Kantian ideas seriously, we may wonder whether the notion of causation should not be relativized to the human mind as a category of understanding structuring the world into an intelligible shape. Putnam (1990) has argued against reductively physicalist construals of causation, insisting that causation is an interest- or purpose-relative concept whose application depends upon the context of explanation and description in which it is used. *If* this is an option for a non-reductive naturalist or emergentist, then there is room for doubts about the strength of Kim's dilemma as an argument against emergentism. Yet, far from denying the importance of the DC problem for *a* (physicalistically-oriented) notion of emergence, it should be argued merely that some areas of the emergence discussion, those most intimately related to human ontology, need not be troubled by this problem, if we are willing to embrace a pragmatic pluralism regarding different pragmatically-workable notions of emergence. The non-causalist alternative can be taken seriously only if weaker notions of emergence, for which DC certainly is a major issue, are allowed their own area of relevance.

We must leave it open whether it is necessary to choose between the proposals described in this section. In the spirit of pragmatic pluralism, it may not be impossible to defend both. But we may now turn Kim's dilemma into a trilemma: either one should (i) accept Kim's arguments, giving up genuine (non-epiphenomenalist) DC and embracing reductionism or eliminativism instead, or (ii) one should modify one's notion of causation along Aristotelian lines, or (iii) one should give up causally explanatory notions when investigating the ontological realms traditionally considered relevant in the emergence discussion. These, it seems, are the options we have.

We should, however, move on to a pragmatic treatment of the issue of realism as applied to emergent properties.

## 4. The reality of emergents

Emergentists are typically property dualists, claiming, say, that the relation between mental and neural properties is a matter of two distinct properties lawfully covarying with one another. This is a central idea in many other non-reductive physicalist or naturalist approaches too. Antony (1999:37-38), for instance, emphasizes that, to be a non-reductive materialist, it is not necessary to claim that higher-level properties are irreducible in explanatory, predictive, and ontological respects. She holds that higher-level properties are irreducible only in the ontological sense, accepting both that there must be microphysical explanations of all non-basic properties and laws,

and that these properties and laws can be predictable from the knowledge about the microstructure. A 'non-ontologically-reductive' materialism might be coupled, thus, with explanatory reduction. In contrast, El-Hani (2002) conceives that, although the instantiation of a mental property typically does not correspond to the instantiation of a monadic neural property, it is identical with the instantiation of a state of relatedness among neuronal groups (see also El-Hani & Emmeche 2000). But this poses the following problem: If emergent properties are *identified with* configurational patterns, is there any cogent reason for preserving them in our descriptions and explanations of reality?

One possible answer is that mental 'properties' should be understood as second-order nonrigid property designators or descriptions that pick out first-order rigid physical properties, often disjunctively (to account for multiple realizability). Or, else, that they are second-order concepts, not properties (Kim 1997:287-289). It is easy to see that Kim's view assumes a strong metaphysical realism: genuine properties are to be carefully distinguished from (first- or second-order) concepts or descriptions that, correctly or incorrectly, designate or identify them (see our remarks below about different forms of realism and about the distinction between properties and concepts).

El-Hani (2002) discusses this issue in an alternative way, taking as a starting-point Dennett's (1991) arguments about the reality of patterns. He emphasizes that it is important, in this connection, to overcome any simple opposition between realism and anti-realism, as well as the strong realist stance usually found in the emergence debate. Dennett's mild realism provides a radically different point of view from which to examine the central problems in emergentist philosophy, and this should be taken to be its chief contribution. What is most important, as we have both argued (*cf.* Pihlström 1999b, 2002; El-Hani 2002), is to put into question the general issue of realism, as a neglected background of emergentism, and not to choose one specific form of realism as a putative way out of the several problems concerning the reality of emergents.

Dennett (1991:27) challenges the dichotomy between realism and eliminativism as regards the status of beliefs, by exploring the feature that beliefs are abstract objects. He argues that the reality of abstract objects can be discussed along 'metaphysical' or 'scientific' avenues. The former concerns the reality of those objects in general, while the latter considers their scientific utility. Dennett (1991:30) chooses the scientific path, considering that what is generally at stake is not the ultimate metaphysical status of concrete or abstract objects, but whether beliefs and other mental states are *as real as* electrons or centers of gravity. He claims that centers of gravity are real because they are *good* abstract objects, as they are scientifically useful (Dennett 1991:28-29).

He takes Chaitin's (1975) definition of 'mathematical randomness' as a basis for grasping the idea of a real pattern: A series (of dots, numbers, etc.) is random if and only if the information

required to describe the series is *incompressible*, *i.e.*, nothing shorter than a verbatim bit map will preserve it (Dennett 1991:32). We can deduce, then, that a series is *not* random, showing a *real pattern*, if and only if there is a more efficient way of describing it than the bit map (Dennett 1991:34).

Dennett's discussion of Conway's Game of Life unveils an interesting approach to the problem of discerning levels in a set of data. In that game, one finds a 'physical' level, where individual cells and their patterns of change according to a set of simple rules are described, and a higher level, where we find a series of distinct configurations:

> "... there are the eaters, the puffer trains, and space rakes, and a host of other aptly named denizens of the Life world that emerge in the ontology of a new level. [...]. Note that there has been a distinct ontological shift as we move between levels; whereas at the physical level there is no motion, and the only individuals, cells, are defined by their fixed spatial location, at this design level we have the motion of persisting objects [...]" (Dennett 1991:39).

Those two levels are *different descriptions of the same set of data*, albeit an ontological shift can be perceived when we move from one descriptive level to another. When we ascend to the higher level in the Life world, adopting its ontology, we can predict the behavior of configurations or even systems of configurations without computing the physical level. Those higher-level configurations can be regarded as *real patterns*: they are more efficient than the bit map as concerns the transmission of information in the Life world. This argument helps us understand the relation between matter and form. A system in the focal level (Salthe 1985) is *matter* relative to the immediately higher-level systems and *form* relative to the immediately lower-level systems. As Emmeche *et al.* (1997:106) state, matter and form are opposing but not contradictory points of view of the same reality. When we describe a mereological system 'from above' or 'from below', we obtain *different descriptions of the same thing*. Both can be regarded as *real*, given that their utility is well-defined. When the system is seen 'from above', form is emphasized, while the material components recede to the background. When it is seen 'from below', matter is accentuated while form is in the background.

In a strong realism, it is hard to maintain that both descriptions are equally real. A common mistake is to see the views emphasizing form as superficial and subjectivist, making questions of form difficult, or even impossible, to grasp for science (Emmeche *et al*. 1997:106). Reductive approaches are often related to value-judgements concerning what is more 'real' or more 'fundamental' (Midgley 1995:135-137). The idea that explanations framed in the vocabulary of physics are to be preferred frequently stems from the thought that this science stands nearer to an ultimate account of matter. Many physicists no longer believe that physics deals with the 'ultimate

building-blocks' of matter, but lay people and also some scientists still seem to feel, on these grounds, that physics will someday provide the only proper explanation of everything. Physicalistically-inclined philosophers, in particular, cherish this view. A milder realist is in a better position to claim that we should investigate how can we combine multilevel descriptions of the world in a single explanatory picture, instead of trying to reduce all descriptions to the smallest chunks of the world. This stance allows us to drift towards the perspective that different ways of talking about the phenomena are philosophically more interesting than a single reductionist description (El-Hani & Pereira 2000).

An emergent property can be regarded as real to the extent that it provides a more efficient description (for some purpose) of the configurational pattern with which it is identified than a micro-level description of that same configuration. From this perspective, to identify emergent properties with configurational patterns does not entail that they should be eliminated from our descriptions of the world. Even if such an identity is held to obtain, many things need saying that cannot be said in a language that never refers to higher-level, emergent properties. Certainly, this is not an approach as strong as property dualism, since it does not claim that higher-level properties are something over and above lower-level properties, but a milder stance, to the effect that different theoretical objects are useful for dealing with different levels of complexity.

When emergent properties are identified with configurational patterns, some may be tempted to say that such an account means that one is giving up an emergent property *E* as a 'genuine' property and only recognizing the expression '*E*' or the concept *E*. It would amount, thus, to a kind of eliminative reduction, recommending "the elimination of *E* as a property, retaining only the concept *E* (which may play a practically indispensable role in our discourse, both ordinary and scientific)" (Kim 1999:17). But can we easily distinguish 'genuine' properties from 'mere' concepts? To advocate such an easy distinction may be tantamount to assuming a pre-Kantian and pre-Wittgensteinian metaphysical stance (Pihlström 2002). 'Pre-Kantian' in the sense that, briefly, Kant's account of the nature and limits of human understanding presents a watershed for metaphysics that cannot be ignored, conceiving 'things-in-themselves' as entities in a reality which must be assumed to underlie and in some way be responsible for experience, though remaining unknowable. In this sense, Kant's metaphysics can be thought of as a 'metaphysics of experience', a substitute for traditional metaphysics which makes it difficult to support a convincing distinction between something that is a 'genuine' property and something that is 'merely' a concept. 'Pre-Wittgensteinian', very briefly, because it conceives properties which are not, at the same time, concepts, or, in other words, which are not always conceptualized. Especially for the later Wittgenstein, there is nothing that escapes the linguistic domain. It is hard to maintain a duality

between properties and concepts in a philosophical position taking due account of the consequences of Kant's and Wittgenstein's ideas. Once we assume that the experienced, cognized world is always conceptualized, insofar as it is a world of human experience (scientific or otherwise), it becomes problematic to draw a sharp distinction between 'real' properties and 'mere' concepts.

This raises a problem regarding Kim's understanding of mental 'properties' as simply second-order concepts (see above). He seems to presuppose a metaphysically realistic conception of reality, according to which there are absolutely independent metaphysically existing properties out there, and it is the task of our conceptualizations to pick up, or approximate, those real properties – a task in which we can succeed or fail. On an alternative, more mildly realistic view, we can slice the world differently by employing different conceptual schemes, identifying different properties. There is no way to separate our conceptual contribution from the contribution of the world as it is in itself. This metaphysical distinction is impossible to draw, because we could never measure the adequacy of our conceptualizations against an independent, unconceptualized reality.

Dennett's mild realism suggests that property *E* can be retained in our pictures of the world exactly if it plays an indispensable role in our discourse. It is not simply the case of arguing for the reality of emergents in *metaphysical* terms; rather, one can advocate the *scientific* (or otherwise) utility of emergence as a modeling/explanatory tool. Instead of simply worrying about "what emergent properties [...] can *do* – that is, how they are able to make their special contributions to the ongoing processes of the world" (Kim 1999:22), we can ask what emergents can do in our theories about the world. This, at least, should be the important question for pragmatist emergentists who take Kantian and Wittgensteinian views seriously. In such an approach, it is not the case that, if emergent properties do not have causal powers of their own, they should be explanatorily inert, and, thus, largely useless for the purpose of our theorizing (*cf*. Kim 1999:33).

It is quite clear that this way of understanding emergence is entirely different from the strong scientific or metaphysical realism that both emergentists and their critics usually assume as a metaphilosophical stance. Strong emergentists usually try to demonstrate that there *really* are emergent properties in the basic structure of the world, while weaker emergentists and non-emergentists typically attempt to show the opposite. By assuming here a different kind of realism, we simply ask different questions concerning emergence, not being particularly interested in the issue of whether there really are emergent properties or not in the basic structure of the world.

Considering that the experienced, cognized world is always conceptualized, we are entirely content with Kim's conceptual approach to save DC:

> "... we may try to salvage downward causation by giving it a conceptual interpretation. That is, we interpret the hierarchical levels as levels of concepts and descriptions, or levels within our representational apparatus, rather

> than levels of properties and phenomena in the world. We can then speak of downward causation when a cause is described in terms of higher-level concepts, or in a higher-level language, higher in relation to the concepts in which its effect is represented. [...]. The conceptual approach may not save real downward causation [...]; however, it may be a good enough way of saving downward causal explanation, and perhaps this is all we need or should care about" (Kim 1999:33).

We do not think that the discrimination between levels of concepts and descriptions and levels of properties and phenomena is as absolute as Kim suggests. But we agree with the idea that to save downward causal explanation is all we need, inasmuch as the notion of 'real' DC brings with it the very issue we want to put into question in this paper. Nothing more is required to account for DC than the idea that it should be described in a higher-level language, in relation to the concepts in which its effect is represented. We see no point in arguing for any approach to DC which might be non-conceptual.

We have been discussing up to this point the contributions of Dennett's mild realism to a critical appraisal of the strong realist assumptions embodied in the emergence debate. Nonetheless, there is much more to the critique of realism than Dennett's approach. Many pragmatist philosophies put strong realism into question. In the next section, we will discuss the contribution of pragmatic realism to the understanding of emergence.

**5. Pragmatism and realism**

Rejecting a sharp dichotomy between properties and concepts,[24] we may say that the cognizable world (to which, if anywhere, the notion of emergence may be usefully applied) is always already conceptualized through our practices of predication and inquiry. Those who favor this line of thought are tempted to argue that Kim's (and many other recent authors') metaphysical realism must be rejected as a basis of emergence theories. The tradition of pragmatism, in particular, has strongly emphasized the practice- and discourse-embeddedness of the real world and its properties that we take our discourses and theories to be about. It is meaningless to speak about the reality of emergents absolutely independently of human theories and conceptualizations. Pragmatism might, then, serve as a background philosophical framework supporting the kind of 'mildly realist' interpretation of the reality of emergents defended in the previous section. Emergent properties are not metaphysically real independently of our practices of inquiry but gain their ontological status from the practice-laden ontological commitments we make.

This is not to deny that emergence is, primarily, an ontological notion; rather, it is to say that ontology is not clearly separable from epistemology, because it concerns a humanly structured conceptualized reality (*cf.* Pihlström 2002, El-Hani 2002). Any ontological commitments, whether

to emergent or to non-emergent properties, must be assessed in terms of their pragmatic efficacy, which, in the scientific case, primarily means the need for such commitments in theory-formation and the empirical testing of theories, but can be interpreted more broadly in order to include various non-scientific pragmatic effects our commitments may conceivably have.

In seeking a pragmatic conception of ontological commitment, we might turn our attention not only to Dennett but also, for instance, to Putnam's (1990, 1994, 1999) much discussed views on realism. It is from Putnam that we adopt the pragmatist idea that ontological commitments depend on the conceptual frameworks within which they are made, frameworks which in turn depend on the human purposes and interests they serve. Such a defense of 'conceptual relativity' has for several years played an important role in Putnam's critique of metaphysical realism.[25] As Putnam (1994:302) puts it, no description of the world is the world's or Nature's own. All descriptions – all conceptualizations of properties – are human constructions, and insofar as the structure of the world itself is inseparable from those conceptualizations, the world and its properties are equally human constructions. We are not copying a language- and theory-independent world; factual and conventional aspects of our world-picture are inseparably interwoven (Putnam 1994:250-251). Moreover, certain ontological commitments may, for specific human purposes, be better than others (Putnam 1990:103). Conceptual relativity does not imply an uncritical 'anything goes' relativism. The ontologically-committed conceptualizations of the world that we construct by means of engaging in scientific (and non-scientific) practices can be challenged and critically assessed from the point of view of another framework of commitments. What matters is the pragmatic value of our ontological decisions.

According to this pragmatist approach, not even basic ontological notions such as existence have one fixed metaphysically privileged meaning or use (see, *e.g.*, Putnam 1990:96-97). Our language and mind "*penetrate so deeply into what we call 'reality' that the very project of representing ourselves as being 'mappers' of something 'language-independent' is fatally compromised from the very start*" (28; emphasis in the original). What counts as 'objects' or as 'properties' is as much up to us as it is up to the world, partly depending on how we use these words in the language-games within which our ontological structurings are created.

Putnam's position is indebted to Kant and Wittgenstein but also to the pragmatist views defended by philosophers like William James and John Dewey.[26] James ([1907]1975), in particular, drew our attention to how human purposes are at stake when we try to determine what is to count as an object for us. Objects of the world are as much 'made' by us as 'discovered' as they are independently of our purpose-laden schemes of classification. Although neither early pragmatists nor more recent ones like Putnam discuss the reality of emergent properties in this connection, their

suggestions can be applied, *mutatis mutandis*, to that problem. There is no pragmatic sense in asking whether emergent properties are real in some metaphysical sense independently of our pragmatic purposes and interests in the light of which we structure the world we investigate and live in. There is much more pragmatic sense in asking whether a particular ontological commitment to the reality (or unreality) of certain emergent properties (*e.g.*, mental ones) serves certain particular purposes or not. Such contextualized pragmatic questions are the true core of ontological debates.

We may see Putnam's critique of metaphysical realism as a modification of the *pragmatic method* James ([1907]1975: chapter 2) inherited from his friend Charles S. Peirce, the founder of pragmatism. In the Jamesian formulation, this method encourages us to look and see what kind of practical consequences might result from (our believing in) the truth of some particular metaphysical view – *e.g.*, the reality of emergent properties such as mental states – in comparison to our rejecting that belief. In Putnamean terms, it is on the basis of pragmatic criteria that one should choose whether to slice up the world so that emergent properties turn out to be real or so that they turn out to be unreal. As there is no sense in claiming that the world in itself contains or fails to contain emergent properties, we should keep our ontology of emergence epistemologized in the sense of being tied to human practices of inquiry. The scientific approach to emergence with which this paper has been concerned is an example of this strategy, which may be extended to non-scientific areas of pragmatic evaluation as well.

Pragmatic realism is an inherently pluralistic and anti-reductionistic position. For some purposes it might be better to adopt an ontological scheme in which there are emergent properties; for some other purposes it might be better to adopt another scheme in which emergents do not exist. Moreover, different notions of causation – or, indeed, of emergence itself – may be acceptable in different schemes. One may define a variety of different notions of emergence (or of supervenience); the exciting issues are pragmatic. When confronting a definition, we should pragmatically ask what kind of philosophical work can be done with the concept, and how the proposed definition helps us in understanding, reformulating and (possibly) solving our philosophical dilemmas, such as the mind-body problem. It is *partly* a terminological issue what kind of properties or structures are called 'emergent'. But terminological or conceptual issues are not unimportant in philosophy, as philosophical problems and views are constituted by the traditions within which they are spoken about. Pragmatists encourage us to turn our attention to such problems, in order to find out what we are actually claiming when we advocate, say, that certain properties are emergent.

Hence, pragmatism might help us in adopting a relaxed, pluralistic and context-sensitive attitude to the notion of emergence. Perhaps a notion of emergence based on non-reductive

physicalism *à la* Stephan and others does some interesting, pragmatically valuable work in certain specific fields, *e.g.*, in the philosophy of biology – possibly in accounting for the relation between biological and physico-chemical properties. But when we move on to other ontological regions, particularly the mental and cultural realms, we do not seem to have a sufficiently clear idea of how the program of non-reductive physicalism could be carried through (with or without emergence). A stronger notion of emergence than the weak ones currently used is needed for an adequate account of our self-image as consciously acting, free, responsible agents – for an account we might want to give of ourselves as human beings, irreducible to physics or even biology (*cf.* section 3). We might, then, have use for at least two different concepts of emergence: a relatively weak one to be employed within the factual realm in which humans are undeniably parts of physical and biological nature, and a stronger one to account for the qualitative difference between this factual level of investigation and the normative one that is our second nature. The applicability of such concepts of emergence would of course have to be assessed in more detail.

The possibility of adopting a pragmatic perspective on the notion of emergence should not only lead us to conclude that ontological commitments to emergent properties may be acceptable within some practice-laden schemes while being unacceptable within others, but also that commitments to a certain specific meaning of 'emergence' may be useful in certain contexts while requiring modification in others. Emergence no more has its metaphysical essence than reality or existence does. It is an open, practice- and context-relative matter how emergent properties are to be distinguished from non-emergent ones. Some construals of emergence may be better equipped to serve some of our purposes (*e.g.*, the defense of non-reductive physicalism) than some others. Insofar as the employment of any notion of emergence presupposes some reaction to the issue of DC, the plurality of relevant notions of causation will be manifested in the corresponding plurality of different notions of emergence. Pragmatists should tolerate this plurality instead of trying to reduce it to some fixed totality of metaphysically-privileged notions.[27]

One pragmatic consequence of our pluralistic, tolerant approach is that we should neither essentialistically define emergentism as an ontologically and/or methodologically anti-reductionist position or refuse to so define it; there is plenty of room for both anti-reductionist notions of emergence and weaker notions that are easier to fit in a reductive naturalist picture. On the other hand, most reductionists would be unwilling to subscribe to this tolerant view, inasmuch as it is anti-reductionist on the meta-level, regarding our entitlement to both reductive and non-reductive construals of emergence.

A deep problem will inevitably disturb anyone tempted by the above-described pragmatist manner of thinking. *How* dependent, exactly, is the structure of the world, or the properties things

have, on human conceptualization, language-use, and practices? Is it possible to say, for instance, that in some sense any 'structure' the world possesses is a human construction instead of being the world's own but that even so there is a physical world out there that we did not make in any literal sense? Can we draw such a distinction between the world itself (amounting to something like Kant's *Ding an sich*) and its structures, and claim that only the latter depend on our conceptualizing abilities and practical engagement? In order to retain even a mild realism within our pragmatism, we should claim that we do not, after all, just make up the world. There is at least something out there we do not make. On a general metaphysical level this issue will remain undecided. What is relevant to our concerns is simply the realism issue as applied to emergent properties. In this case, it is easier to maintain the idea that emergents are parts of ontological structurings of the world based upon human interests and purposes, above all (but not exclusively) scientific ones. In this sense, emergent properties depend on human ontological classifications, although we should, in the spirit of reasonable naturalism, say that they have (diachronically) 'emerged' out of the non-human world. It is compatible with this to say that they also 'emerge' out of human practices of making ontological commitments within various areas of life, including science.

**6. Pragmatists on emergence: a brief historical survey**

We have found some resources in the pragmatist conception of ontological commitment for successfully dealing with the ontology of emergents. This result should encourage us to take a quick look at the pragmatist tradition from the perspective of emergentist ideas. Several pragmatists (*e.g.*, Rosenthal 1982, 1990) have loosely referred to something resembling emergence, without making the concept clear. The classical tradition of emergentism arrived at its culmination somewhat later than the pragmatist tradition, whose flourishing period was during the first two or three decades of the twentieth century. Yet, concepts close to emergence – *e.g.*, novelty, creativity, chance – were widely used by pragmatists, and there was some mutual influence between pragmatism and emergentism, especially *via* the work of G.H. Mead, to which we shall return (see Blitz 1992).

Today both traditions appear to flourish largely independently of each other – although Joseph Margolis, a neopragmatist emergentist, is an exception. Characterizing human persons and other cultural formations (such as works of art) as emergent, embodied tokens-of-types, neither identical to nor reducible to their material composition, Margolis argues that our ontology of cultural entities ought to recognize these entities as real and emergent, while being compatible with materialism and allowing cultural entities to enter into causal relations and to support causal explanations (Margolis 1984:14). He thus favors a form of DC as an element of his emergentism. He does not worry about maintaining his treatment of emergence as either purely ontological or purely epistemological;

moreover, he distances himself from the unity-of-science attitude characteristic of both Nagelian (or Hempelian) epistemic and Bungean ontological analyses of emergence. Instead of reviewing his discussions of the concept in detail, we may quote from one of his recent books:

> "[C]ultural or Intentional entities (possessing incarnate properties) are **emergent**, in that: (i) their existence and 'generation' cannot be accounted for, causally or in any other way, in terms of the existence and the causal (or other generative) powers of the (non-Intentional) entities with respect to which they are emergent; and (ii) their existence and generation *can* be accounted for, causally (or in other ways), in terms of other entities and *their* causal (or other generative) powers, if and only if they belong to the same emergent 'level of reality'. Intentional entities are **culturally emergent**, then, in that the mode of their emergence and generation is specific to *that level of reality* at which their 'integrity' is and only is preserved, viz. the cultural" (Margolis 1995:219; emphases in the original).

> "By an **emergent** order of reality [...] I mean any array of empirical phenomena that (i) cannot be described or explained in terms of the descriptive and explanatory concepts deemed adequate for whatever more **basic level** or order of nature or reality the order or level in question is said to have emerged from, and (ii) is causally implicated and cognitively accessible in the same 'world' in which the putatively more basic order or level is identified" (257; emphases in the original).

Margolis's position is close to the Putnamean pragmatic attitude to the reality of emergents defended above. But his is by no means the first pragmatist elaboration on the idea of emergence. Some pragmatists explicitly discussed emergentism already in the 1920s and early 1930s.[28] The issue to be explored here is whether there has been (or should be), in the pragmatist tradition, any relevant discussion of the 'reality of emergents' on the basis of pragmatic criteria of ontological commitment.

In his recent exhaustive historical and systematic overview of the emergence debate, Stephan (1999:134-138) mentions John Dewey's and F.C.S. Schiller's critiques of emergentism, as well as G.H. Mead's and A.N. Whitehead's role in the development of emergentism (252-253).[29] However, he does not discuss William James;[30] nor does he mention Margolis as a leading contemporary emergence theorist, let alone lesser figures associated with pragmatism who commented upon emergentist theories in the early decades of the twentieth century.[31] It should not be forgotten that James's pragmatism, as well as his work in psychology, was influenced by Mill and Fechner, whom Stephan rightly regards as precursors of emergentism (1999: chapters 6 and 7), and that the notion of novelty plays a crucial role in James's dynamical experiential conception of reality (James [1911]1996). Dewey's evolutionary naturalism has also been interpreted as an "emergent theory of mind" (Tiles 1990: chapter 3; *cf.* Savery 1951, Alexander 1992). In short, the evolutionary character of pragmatist thought is well known, and this feature of pragmatism has been noted also in connection with emergentism (see, *e.g.*, Patrick 1922:701, Goudge 1973; *cf.* Tully 1981); still, little explicit scholarly work has been done on the pragmatists' actual conceptions of

emergence or on their relations to major emergentist thinkers, although, as Goudge (1973:133) notes, the pragmatists were "the first group of philosophers to work out in detail a philosophy of mind based on evolutionary principles".[32]

Some pertinent examples can be drawn from Dewey's and Mead's works. Dewey ([1929]1960:214-215) writes: "The intellectual activity of man is not something brought to bear upon nature from without; it is nature realizing its own potentialities in behalf of a fuller and richer issue of events." It would be interesting to work out in more detail Dewey's notion of emergence – of "nature realizing its own potentialities" – though, again, what we have here is an ordinary and commonsensical rather than a technical notion. What gradually emerges out of the inanimate world in Dewey's system is life, mind, and freedom. For Dewey, these emergent properties are "real features of […] complex systems which cannot be accounted for in terms that would be adequate if the same constituents were organized in a less complex way" (Tiles 1990:148). In an earlier study on Dewey, William Savery (1951:498) described his view by saying that "our perspectives [on nature and experience] are emergent natural events" which "have a continuous flow". Although Dewey was a naturalist, he rejected metaphysical realism. For him, the ontological structure of reality was a humanly established structure, itself emerging in the course of human experience and inquiry. In this sense his realism of emergents was thoroughly pragmatic.

Dewey was not entirely happy with the term 'emergence', however. Late in his life, jointly with Arthur Bentley, he argued that the "natural man" who talks, thinks and knows should not, "even in his latest and most complex activities", be surveyed "as magically 'emergent' into something new and strange" (Dewey & Bentley [1949]1989:45). He contrasted his 'transactional' view of emergence to previous views thus:

> "At a stage at which an inquirer wants to keep 'life,' let us say, within 'nature,' at the same time not 'degrading' it to what he fears some other workers may think of 'nature' – or perhaps similarly, if he wants to treat 'mind' within organic life – he may say that life or mind 'emerges,' calling it thereby 'natural' in origin, yet still holding that it is all that it was held to be in its earlier 'non-natural' envisionment. The transactional view of emergence, in contrast, will not expect merely to report the advent out of the womb of nature of something that still retains an old non-natural independence and isolation. It will be positively interested in fresh direct study in the new form. It will seek enriched descriptions of primary life processes in their environments and of the more complex behavioral processes in theirs." (121)

Thus, while being careful with the word 'emergence', Dewey did not reject the idea altogether but only what he saw as its magical overtones. He simply required scientific research on the emergence of life and mind.

Mead's pragmatism, influenced by Dewey's, includes a notion of emergence as something 'social' and an analysis of sociality as a character of emergent evolution. In his prefatory remarks to

the posthumous publication of Mead's *The Philosophy of the Present*, Dewey insisted that Mead took the doctrine of emergence "much more fundamentally" than "most of those who have played with the idea" (Dewey 1932:xxxviii). According to Dewey, Mead "*felt* within himself both the emergence of the new and the inevitably continuity of the new with the old" (xxxix).

For Mead, the problem of emergence is intimately connected with the notions of the past and the present. He defines emergence as "the presence of things in two or more different systems, in such a fashion that its presence in a later system changes its character in the earlier system or systems to which it belongs" (Mead 1932:69; see also 66).[33] An emergent property (or "the emergent") cannot, by definition, follow from the past "before it appears", but when it appears it always does this (2, 11). Emergent properties, pragmatically viewed, do not have any definite ontological status prior to our conceptualizing them in terms of past and present: the emergent, Mead says, "has no sooner appeared than we set about rationalizing it", showing that it can be found in the past (14). The emergent, then, is both a conditioning and a conditioned factor (15). Mead joins those emergentists who think that even exactly determined events can scientifically be thought of as emergent (17). As for Dewey, the emergence of life is an important theme for Mead, as it "confers upon the world characters quite as genuine as those it confers upon living beings" (35). In any case, the emergent arises out of conditions that make its arising inevitable:

> "What we seek in the environment [of experience] is a statement of the world out of which the emergent has arisen, and consequently the conditions under which the emergent must exist, even though this emergence has made a different world through its appearances." (42)[34]

Moving to the social aspects of emergence, Mead somewhat puzzlingly notes that the "social nature of the present" arises out of its emergence through a process of readjustment: nature "takes on new characters", *e.g.*, life, and this process of readjustment is what 'social' refers to (47). Such a social character can, he argues, "belong only to the moment at which emergence takes place, that is to a present" (48). This leads to an acknowledgment of the "social character of the universe".

According to Goudge's (1973:142) interpretation, Dewey and Mead employed the notion of emergence in order to resist "the classical thesis that (1) since mental phenomena now exist, they must have been implicitly or potentially present in evolution from the very start; and (2) their potential presence played an active part in their later realization, and was not merely an abstract possibility". But the evolutionary emergence of mentality is not a sudden leap; it is "prolonged, successive" (142) – to the extent that one finds in these pragmatists' philosophy of mind "a conceptual tension between the category of emergence and that of continuity" (144). Goudge is probably right when he says that Peirce gave more priority to continuity in his metaphysics, while Mead emphasized emergence and Dewey remained somewhere in between.

It must be noted that Mead neither carefully analyzes the notion of emergence nor argues for the reality of emergents in any straightforwardly pragmatic manner. Nor does Dewey. We cannot here determine the correct interpretation of either Dewey's or Mead's emergentism, but their anti-reductionist naturalisms are so closely related to emergentist thought that they should be taken into account not merely as critics of emergentists (as Stephan considers Dewey to be) but as some of the most creative representatives of emergentism. More generally, the early pragmatist tradition is characterized by the frequent use (by philosophers like James, Dewey, Mead, Charles Hartshorne, Sidney Hook, and Ernest Nagel, among others) of notions such as creativity, freedom, evolution, and novelty, which quite naturally find a place in emergentism.[35] Among these thinkers, Nagel is known as a major figure of emergence literature – but he was, primarily, a logical empiricist rather than a pragmatist (or emergentist), although he transmitted some Deweyan naturalist ideas to analytic philosophy.[36]

It must be admitted that no pragmatist, perhaps excluding Margolis, has presented any careful conceptual treatment of emergence. Certainly, one of the differences between pragmatism, including Dewey's naturalistic pragmatism, and emergentism, as construed by Stephan and other recent authors, is the typically deterministic character of the latter (*cf.* Stephan 1999:30-31, 46, 56) in contrast to the indeterminism usually defended in the former.[37] But pragmatism surely need not amount to naive indeterminism and unscientific speculation on freedom and creativity. The kind of pragmatic discussion of the reality of emergent properties advanced in this paper might bring pragmatism and emergentism closer to each other, and bring both closer to broadly speaking Kantian themes (especially the idea that the world, *contra* metaphysical realism, is a humanly structured world rather than an absolutely independent world in itself), than they first seem to be.[38]

Among neopragmatists, Putnam has been a leading critic of reductive naturalism. Thus, we might see him as an ally in an attempt to develop a philosophically and scientifically useful notion of emergence. Putnam (1999:169-170) reminds us, in a more anti-Cartesian way than most contemporary physicalists, that mind "is not a *thing*; talk of our minds is talk of *world-involving capabilities that we have and activities that we engage in*". In order to avoid Cartesian and materialist conceptions of the mind, Putnam proposes not only a return to pragmatism and to the later Wittgenstein, but also to Aristotle (see Putnam 1994, 2000). Now, Aristotelianism is a form of naturalism, too, though a highly non-reductive and teleological one as compared to the causal materialism of reductive naturalists or physicalists.[39] Such a mild naturalism might provide us with resources for a reasonable pragmatic realism about irreducibly emergent features of the world (*e.g.*, mental features), just as Deweyan naturalism might.[40] Although Putnam is usually unwilling to

describe himself as a naturalist,[41] his attachment to Dewey and Aristotle might justify such a label, properly qualified as Deweyan naturalistic humanism (Munitz 2001:340).

Putnam believes we can eliminate the alleged mystery of consciousness (Putnam 1999:171-175). This mystery, Putnam says, is typically treated as a scientific issue, arising out of the idea that the mind is some sort of object existing in the natural world, capable of being scientifically explained, and the prospects of our being able to solve this mystery are regarded either as optimistic or pessimistic. The final goal, either to be achieved or to be avoided, is the reduction of this mystery to the world-view of fundamental physics, but this mistakenly presupposes that such a reduction makes sense. The recent literature on emergence is largely committed to the same project of coming to terms with this great mystery. Pragmatically, Putnam wants to give up the talk about mystery, as well as the metaphor of emergence, which he considers a bad metaphor:

> "It is a bad metaphor because it suggests that all the true statements expressible in the vocabulary of the 'basic' sciences of physics, chemistry, biology … might have been true *without* there being consciousness or intentionality. In short, it suggests that we might conceivably have all been Automatic Sweethearts,[42] and that it is 'mysterious' that we *aren't*." (174)

Accordingly, Putnam might not want to join us as an ally in the emergence debate. Instead of seeking a pragmatic account of the reality of emergents, he prefers giving up the concept. This, however, does not prevent us from employing (as we have done) his pragmatic ideas in our treatment of the ontological issues lying at the center of emergence discussions. Rejecting the mystery of consciousness need not destroy emergents. Pragmatically defined, within a pragmatic framework of ontological commitments, emergence should be acceptable for a Putnamean anti-reductionist thinker, whose conception of mind and the world is mainly derived from philosophers like Aristotle, Kant, James, Dewey, and Wittgenstein. Even Putnam himself has earlier appealed to the notion of emergence, at least in arguing against naturalized semantics and epistemology that "[t]ruth, reference, justification […] are *emergent*, non-reducible properties of terms and statements in certain contexts", though undeniably supervenient on physical properties (Putnam 1994:493; emphasis in the original).

A final word of warning is in order. We should not overlook a problem easily arising from a pragmatically-pluralist construal of emergence. Our pragmatic realism of emergents grounds the reality of emergent properties in human practices. More generally, pragmatic realism states that any properties, whether cultural, mental, or physical, emerge out of human practices. This may eventually make the notion of emergence trivial: *any* property, entity, law, or what not, will turn out to be emergent in relation to the practice-embedded points of view from which we make our ontological commitment to its reality. Ontology is human ontology. In a way this was already

observed by relatively early contributors to the discussion of pragmatism and emergentism. Alfred H. Lloyd (1927:309), unsatisfied with the materialist orthodoxy of emergentism, claimed that matter was also emergent: "[E]ven lifeless and, still more, unknowing and unthinking, quite hopeless and soulless matter has emerged with quite as much novelty and éclat as anything else […]." Drawing upon pre-Socratics, among others, but not unlike Putnamean pragmatists who abandon the gap between the metaphysically objective real world and subjective human perspectives, he argued that "[t]he 'objective,' material or natural […] is not original, but is as much an emergent as the subjective" (325). A few years later, J.E. Boodin, defending what he called functional realism (as an alternative to both 'naive' and 'critical' realism), explicitly held that all properties are emergent, as there is "no substance which has a character by itself", because nature "reveals itself as sense-aspects in its action upon human nature" (Boodin 1934:170), and perceived qualities and relations are "functions of objective nature and the percipient organism in perspective relation to one another" (147). In the spirit of James, he characterized 'things' as "the result of interest and conceptual interpretation" (151).

Insofar as *any* property or thing is a result of interpretation based upon human interests, or of (Deweyan) transactions between perceiving human organisms and their natural environment, nothing is non-emergent (not even transactions themselves). Is this the outcome of Putnamean pragmatic realism? Is this one of the reasons why Putnam regards emergence as an unhappy notion? The threat of trivialization, it seems, can be avoided only by carefully constructing several different notions of emergence applicable to different philosophically interesting cases. Thus, pragmatic pluralism might be an answer to the trivialization threat. The sense in which all properties or all things 'emerge' out of practices is different from the sense in which, say, mental properties emerge from physical ones. We hope to have been able to illuminate this need for a pluralistic attitude in this article, but further work is undoubtedly needed.

## 7. Conclusion

Emergence theorists, we may conclude, should pay more attention to (i) the realism issue, (ii) the pragmatist alternative to metaphysical realism, and (iii) the significance of both (i) and (ii) in the emergence debate, both systematically and historically. Such a renewed interest in the realism discussion might lead to a more nuanced treatment of the DC problem, as well as other problems debated in recent literature. However, more historical research is needed on the relations between pragmatism and emergentism. The loose notions of emergence employed by both early and late pragmatists might be reinterpreted along the lines of the more technical discussion of recent emergence theories. However, what will have to be given up, if one adopts any form of pragmatism,

is the purely ontological, metaphysically realist treatment of emergence typical of most contemporary approaches. Insofar as the reality of emergent properties is rooted in our pragmatic ontological commitments, it is also rooted in our epistemic circumstances. The ontology of emergents, like any ontological issue, is, then, irreducibly epistemologized, simply because it is embedded in our ontologically relevant practices.[43]

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## Notes

[1] Emmeche *et al.* (1997) offer an interesting discussion about the meaning of the key concepts ‘new’, ‘properties’ and ‘creation’ in the usual explanation of emergence as the ‘creation of new properties’. As Kim (1999:8) argues, the term ‘new’, as used by most emergentists, has an epistemological sense in which an emergent property is regarded to be ‘new’ because it is unpredictable. But notice that we do not explicate the idea of novelty as closely connected with the idea of unpredictability (see below). Kim also claims that that term has a metaphysical sense, connected with the idea that an emergent property brings with it new causal powers. But the idea that emergent causal powers might be ascribed to a monadic property in itself can be disputed (see below).

[2] An interactor (Hull 1981) is an entity which produces differential replication by means of directly interacting as a cohesive whole with its environment.

[3] The importance of the conceptual distinction between 'replicators' and 'interactors' becomes clearer when we take in due account that interactors, and not replicators, should be thought of as the units of selection. Interactors can be conceived as Darwinian individuals existing at several levels of organization, including genes, organisms, demes, and even species (Gould & Lloyd 1999). The first self-replicating molecules were, conceptually speaking, units of selection *qua* interactors, not *qua* replicators. In this issue, we disagree with Sterelny (2001:22).

[4] We shall return to the realism issue in relation to emergence in later sections of this paper.

[5] The hypothesis of the inclusivity of levels demands important qualifications in the understanding of the idea that "all objects and phenomena have each a unique place" in the hierarchy of levels (*cf.* Kim 1999:19). Such qualifications are particularly important when one tries to understand what is meant by the term 'physical' (see below).

[6] See also El-Hani & Emmeche (2000); El-Hani & Videira (2001).

[7] Kim (1997:276-277) states that the ontologically more basic level is usually thought to consist of elementary particles or whatever our best physics is going to tell us are the basic physical particles out of which all matter is composed. He also stresses that a level theory does not need to assume that there is a bottom level. It can be conceived as an infinitely descending series of levels (*e.g.,* Salthe 1985). Most classical emergentists, however, believed in non-emergent processes and events, rejecting this latter idea.

[8] For Kim (1992:124; 1993:346; 1999:3), the doctrine of the irreducibility of higher-level properties is the most central tenet of both emergentism and non-reductive physicalism. He considers the unpredictability thesis along with the irreducibility thesis because the 'bruteness' of specific emergence relations is the common basis for both (Kim 1992:128). Although the (theoretical, not inductive. See Kim 1999) unpredictability of emergents is indeed advocated by many emergentist philosophers, some emergentists (*e.g.,* Bunge 1977a,b, 1979; Blitz 1992; El-Hani & Emmeche 2000; El-Hani & Videira 2001; El-Hani 2002) detach this idea from the hard core of emergentism. For them, unpredictability, as an epistemological issue, does not fit properly in the core definition of emergence, as an ontological concept. In their view, a rational understanding of emergence should not take it to be a brute phenomenon, to be accepted with 'natural piety' (Alexander [1920]1979), but rather must combine an acknowledgement of emergence with the thesis that emergence is at least explainable on the grounds of a system's micro-structure (Bunge 1977a,b, 1979). Emergentists such as Bunge and El-Hani even acknowledge that emergents can be reductively explainable, depending on the specific mode of reduction to be employed. We do not intend here to defend neither that emergents are unpredictable nor that they are unexplainable/irreducible, given that we think of emergence mainly as an explanatory/modeling tool, explicitly avoiding the strong realist commitments found in most emergentists and also in their critics. One should also consider that irreducibility can be understood in explanatory, predictive, and ontological respects (see below).

[9] Although the concept of 'downward causation' has a diffuse origin, being difficult to ascertain its first use, the term itself is usually attributed to Campbell (1974). Notice that, in contrast with Kim's and other authors' understanding, DC is ascribed in this characterization of emergentism to the higher-level entity as a whole, not to the emergent qualities themselves. When we discuss DC below, this claim will become clearer.

[10] There is a number of definitional issues in this characterization of emergentism, concerning, for instance, the concepts of 'irreducibility', 'downward causation', 'organization', and 'complexity'. Some of these issues will be discussed in this paper. In addition to the works cited in the text, see the comprehensive account of the characteristics of emergentism in Stephan (1999); and see the discussion in Pihlström (2002).

[11] The terms 'physicalist ontological monism', 'ultimate physicalist ontology', and 'physical monism' are used by Kim as synonyms of 'ontological physicalism'.

[12] We will cast this non-physicalist, non-causalist proposal aside for a moment, but we will return later to Putnam's views, in particular.

[13] The relation between the notions of supervenience and dependence/determination is not entirely clear (Kim 1993, 1997; Bailey 1999). For the sake of simplicity, we will follow here the customary usage of the concept, including both property covariance and the component of dependence/determination. In any case, we agree with Kim (1998) when he says that mind-body supervenience merely sets the central problem in the philosophy of mind instead of solving any traditional philosophical problem.

[14] For a similar discussion concerning O'Connor's (1994) notion of 'non-structurality', see El-Hani & Emmeche (2000), El-Hani (2002).

[15] What is at stake here is what Kim (1999:26) calls 'reflexive downward causation', observed when some activity or event involving a whole is a cause of, or has a causal influence on, the events involving its own micro-constituents.

[16] The only possible exception being same-level microphysical causation, assuming that the physical is thought of as the bottom level in the multilayered structure of the world.

[17] For useful discussions of Kim's argument, see Stephan (1997, 1999). Stephan points out that Kim presupposes that supervenient causation would have to be what is sometimes called 'superdupervenient' causation, *i.e.*, not only ontologically dependent on the basic (physical) causation but also robustly, materialistically, explainable on the basis of the latter. Stephan believes that by emphasizing the distinction between superdupervenience and supervenience one may

construct a sufficiently non-reductive notion of DC, but this attempt seems to us to be hopeless. For a more thoroughgoing engagement with Stephan's arguments, see Pihlström (2002).

[18] The notion of a person, as distinguished from the narrower notion of a mind, has been emphasized in relation to Wittgenstein and Ryle by Sprague (1999), who defends 'personism', as contrasted to 'mindism', by adopting an 'agent stance' (*contra* 'spectator stance') in a manner resembling pragmatism. We customarily use the term 'mind', but it is good to pay attention to the idea that minds are *activities* of (emergent) persons rather than individual objects.

[19] The Aristotelian notion of final causality is reinterpreted in this account as functional causality. This does not mean that 'function' should be identified with the Aristotelian 'final cause', nor that the notion of finality should be used at all. It is simply that one should use a set of causal concepts rich enough to deal with the complexity of living beings, including a concept of function close to that usually employed in biological explanations. This idea is somewhat close to the non-reductive naturalism one finds in the pragmatist tradition.

[20] This is basically consistent with Kim's approach to the relation between macro-properties and their basic micro-constituents (see Kim 1999:6-7). Consider, for instance, the following statement: "After all, an eddy is there because the individual water molecules constituting it are swirling around in a circular motion in a certain way; in fact, an eddy is *nothing but* these water molecules moving in this particular pattern. [...]. When each and every molecule in a puddle of water begins to move in an appropriate way – and only then – will there be an eddy of water" (Kim 1999:27). El-Hani (2002) intends to emphasize a feature whose consequences he thinks Kim does not sufficiently explore, namely, that the supervenience base of a higher-level property is often a lower-level state of relatedness. It is more likely that the consequences of this feature are fully explored when one assumes a more-pragmatically oriented and less strongly realistic stance than Kim assumes.

[21] For details, see the original papers.

[22] Even if we argue in this manner, we should be careful to avoid supernaturalist assumptions in our conception of the hierarchy of levels.

[23] See the discussion of this issue, with references to relevant literature, in Pihlström (1996, 1998).

[24] This dichotomy and its relatives are not rejected even by all those whom one might expect to reject them. For instance, David Bloor (2001:151), while abandoning naive realism and defending social constructivism, emphasizes the distinction between concepts and objects, claiming that it is only concepts, according to constructivists, that are "constructed". As no sane realist denies that we construct concepts (as distinguished from the objects or properties they represent), the opposition between realism and constructivism is hard to formulate clearly. But this may in effect be Bloor's point.

[25] We may ignore the changes in Putnam's views that have taken place in the course of his engagement with the realism issue. For critical discussions, see Pihlström (1996: chapter 4, 1998: chapter 3).

[26] For an analysis of Putnam as a neopragmatist, *cf*. the works cited in the previous note. We cannot here pay attention to the vast critical literature that has been produced on Putnam's critique of metaphysical realism since the late 1970s. Putnam's position does have its difficulties: as several critics have argued, his pragmatism may in the end become indistinguishable from idealism (does the human mind just create the world?) or from relativism (if there are many equally acceptable ontological frameworks, is there any rational way to exclude any particular framework?). These issues should be treated in connection with the emergence debate, but we cannot do this here. Let us just note that a number of philosophers have defended forms of realism much more robust than Putnam's: see, *e.g.*, Devitt (1991), Dreyfus & Spinosa (1999), and Niiniluoto (1999).

[27] This contextualization of emergence is *not* a return to the epistemic, theory-relative, non-ontological definitions proposed by logical empiricists and their followers (Nagel 1961). It is the very *ontology* of our world-picture that is here epistemologized and hence contextualized in a pragmatist framework. Sharp dichotomies between ontological and epistemological matters are not appealing to pragmatists.

[28] This can be seen from Shook's (1998) bibliography of pragmatism.

[29] As a personalist idealist, Schiller did not accept the emergentist idea that inanimate matter would be ontologically primary to experience and thought. Schiller (1930:243) judged the term 'emergence' as "an ambiguous insinuation that the alleged novelties are not truly new but have been lurking obscurely in the dark and waiting for an opportunity to break forth into the light of day", preferring the notion of novelty to those of emergence, evolution, or creation.

[30] On James's relation to naturalism and anti-reductionism, see Pihlström (1998).

[31] For relevant discussions in the 1920s and 1930s, see Patrick (1922), Lloyd (1927), Dewey ([1929]1960, 1932), Schiller (1930), Mead (1932), and Boodin (1934).

[32] Goudge's essay is a valuable introduction to Peirce's, Dewey's and Mead's evolutionary philosophies of mind. Goudge (1973:134-135) points out that, in the pragmatists' Darwinian picture, the mind "must have a causal capacity of its own" in order to be able to respond to goals or ends and to initiate purposive actions. He thus sees DC as an essential ingredient in the pragmatists' emergentism. In the spirit of our earlier suggestions, pragmatist interpretations of DC might, however, be construed in terms of levels of causality, based on the idea that – in Roy Wood Sellars's (1959:1) formulation – "the mode, or technique, of causality is tied in with pattern, or organization, and that, as evolution proceeds, the need for guidance leads to appropriate mechanisms to meet the need".

[33] In Stephan's (1998, 1999) terms, Mead's, like most pragmatists', emergentism is diachronic rather than synchronic, because temporality plays a key role in his position. Because of their dynamic attitude to metaphysics in general, pragmatists were not much interested in synchronic dependence relations, which contemporary emergence and supervenience theoreticians usually talk about.

[34] Here, Mead (1932:43-44) refers to Alexander's and Morgan's views.

[35] Other authors who recognize, but do not elaborate on, the connections between pragmatism and emergentism include Blitz (1992:133-135, 200), McLaughlin (1992:57), and Emmeche *et al*. (1997:89).

[36] Because of his epistemic and theory-relative definition of emergence, Nagel (1961) is classified by Stephan (1999) among the critics of emergence. This means that he rejected the ontological and 'absolute' (non-relative) construal of the notion, not that he rejected the notion altogether.

[37] There are indeterministic emergentists, too, *e.g.*, Popper (Popper & Eccles [1977]1986; *cf.* the critical comments in Stephan 1999).

[38] *Cf*. further Pihlström (1996, 1998).

[39] Putnam's neo-Aristotelian philosophy of mind might be compared to the suggestion that DC should be interpreted along the lines of Aristotelian formal causality instead of efficient causality (see section 3). Putnam's recent interest in Aristotelian ideas (*cf.* Putnam 2000) might be partly a reaction to Aristotle's rather pragmatic way of treating the different modes of causation on the grounds of the different ways the word 'cause' is used in different contexts. These usages correspond to different causal explanations; hence, a pragmatic reading of Aristotelian distinctions between various modes of causation would mix ontological and epistemological issues. We must, however, be careful in attributing pragmatist (or any modern) views to Aristotle; the goal of this paper is not to make any such interpretive claims.

[40] *Cf*. Putnam's (2001) discussion of commonsense realism in relation to Wittgenstein. Perhaps we can apply such a realism, as opposed to scientific realism, to the reality of emergents, too, insofar as we emphasize the non-scientific levels of reality corresponding to human normative concerns. Wittgenstein's (1953) philosophy of mind (or, better, of persons) could presumably be interpreted as a version of commonsense realism.

[41] Putnam occasionally admits that he is a naturalist in a harmless anti-reductionist sense (Putnam 1994: 289, 312). It is somewhat hard to see how this can be reconciled with his theism (*cf*. Pihlström 1996, 1998).

[42] The notion of an "automatic sweetheart" is an allusion to James, who imagined a soulless, mechanically constructed girl practically (observationally) indistinguishable from a real lovely young woman.

[43] Both authors are responsible for the entire paper, although sections 1-2 and 4 were primarily written by Charbel Niño El-Hani and sections 5-6 primarily by Sami Pihlström; sections 3 and 7 were written by both.