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Perspectivism and the Metaphysics of Knowledge

ABSTRACT: The paper starts from an observation, that perspectivism—the notion that objectivity of knowledge can be squared with the evident multiplicity of possible takes on the same subject-matter—pushes the envelope of the classical philosophy of science insofar as the latter envisages epistemology and methodology of science as standalone enterprises which do not require any metaphysical grounding. The paper utilizes a modified version of Aristotle's hylomorphism and his fourfold classification of causes to lay foundations for a relational metaphysics of knowledge, and adds on top of that some elements of dynamical systems theory to work out a phasic approach to cognition according to which human agents' interactions with the world go through different stages roughly corresponding to the kinds of causal relationships listed by Aristotle. Finally, it is shown that objectivity in the strict sense of the word is a product of integration of different perspectives as developed toward the conclusion of the first phase of the cycle.
KEYWORDS: perspectivism • metaphysics of knowledge • relational metaphysics • integration • causes • hylomorphism

Introduction

Perspectivism is a position advanced within general epistemology,[1] semantics,[2] and philosophy of science,[3] which attempts to defend objective validity of knowledge claims based on the assumption that there is more than one valid outlook on a given subject-matter, or more than one valid approach to a given problem. In a word, we are called to distinguish between the relativism of truth, according to which plurality of outlooks is inconsistent with a notion of objective truth, and the relativism of perspectives, on which each perspective taps onto something that is objectively, if only partially, true.

[1] E. Sosa, *Knowledge in Perspective*, Cambridge (MA) 1991.
[2] R. B. Brandom, *Making it Explicit: Reasoning, Representing, and Discursive Commitment*, Cambridge (MA), 1994.
[3] R. Giere, *Scientific Perspectivism*, Chicago 2006.

Of note, perspectivism comes into play in the aftermath of the collapse of the transcendentalist model of the development of science. In a nutshell, the transcendentalist project—henceforth referred to as *methodological transcendentalism*—aimed to separate the formal (universal) aspects of science (*qua* 'methods' or 'methodological norms'[4]) from the contingent factors to do with the content of fallible scientific theories.[5] That is, the idea was that were one to articulate universal criteria of assessment of epistemic merit of scientific theories—already preselected among all ideas currently in circulation based on the criterion of demarcation[6]—one would be in a position to always pick out the best corroborated theory among many alternatives.[7] The procedure would be applicable to both successive theories (like classical physics versus relativity theory) and concurrently used paradigms dealing with similar issues.[8]

All in all, the hallmark of methodological transcendentalism is the rejection of the methods of the classical, pre-Kantian epistemology, as presented in the writings of Aristotle, Francis Bacon, John Locke, David Hume, etc., which did not (entirely) eschew from making assertion concerning what the subject and the world must be like for the epistemic relation between them to hold, even if, as in the case of Hume, such relation was to be eventually be deemed rather tenuous.[9] Simply put, *differentia specifica* between transcendentalist and classical epistemology lies in the former's denial that epistemology presupposes any substantive view of the world and the subject's place in it.

There is no room here to spell out in detail all the steps that have led the majority of philosophers of science to eventually lose faith in the

[4] K. R. Popper, *The Logic of Scientific Discovery*, trans. K. R. Popper, London–New York 2002.

[5] Concerning how deeply neopositivism is indebted to Neo-Kantianism, see A. Coffa, *The Semantic Tradition from Kant to Carnap: To the Vienna Station*, ed. L. Wessel, Cambridge 1991. Joseph Rouse refers to the whole endeavor as the legitimization project in the philosophy of science *(Engaging Science. How to Understand its Practices Philosophically*, Ithaca (NY) 1996.).

[6] K. R. Popper, *The Logic…*, pp. 11–14.

[7] K. R. Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge*, London–New York 1963/2002.

[8] M. Massimi, "Perspectivism", in: J. Stasi (ed.), *The Routledge Handbook of Scientific Realism*, London–New York 2017, pp. 164–175.

[9] To be clear, the *differentia specifica* between the transcendentalist and classical epistemology does not in my opinion lie in the very methods they use to substantiate certain substantive claims concerning the subject and object of knowledge, but in the former's denial that epistemology presupposes any substantive view of the world and the subject's place in it.

transcendentalist project. What is critical to understand is that perspectivism does not represent a yet another position within the transcendentalist tradition. Put another way, validity of perspectivism does not rely on the validity of the transcendentalist framework since, as even the most superficial presentation of the tenets of perspectivism makes it clear, perspectivism does not presuppose content-neutrality *qua* a strict demarcation between the formal-universal and contingent-material aspects of knowledge, which, I claim, forces us to revisit the fundamentally metaphysical question of the relationship between the subject (*qua* agent) and the world.[10]

In this paper I purport to show that perspectivism presupposes a relational metaphysic, that is, such a metaphysic that does not locate objectivity in the subject-independent reality per se, but without denying that such a reality exists, it nonetheless takes the very relationship between the object and subject of knowledge, who is always-already part of the world, as the critical factor as far as the epistemic validity. I further propose that the relationship between the subject and the object lends itself to a treatment in terms of a modified—and hopefully refined—version of Aristotelian hylomorphism. The refinement consists in adding dynamical components to the Aristotelian model by assimilating certain aspects of dynamical system theory, which will ultimately allow me to present a pattern according to which different perspectives first become established, and then integrated into a dialogical system of scientific practice.

Perspectivism: What is at Issue and What is at Stake[11]

The idea that objectivity of scientific knowledge does not only clash with, but can in fact be explained by the multiplicity of valid viewpoints, only became a possibility after a shift that has taken place in philosophy of science from an understanding of theory as a system of propositions to a conception of theory as a model. As already mentioned, methodological transcendentalism draws a thick demarcation line between subjective and objective components

[10] The alternative to methodological transcendentalism is methodological naturalism (e.g., L. Laudan, *Science and Values. The Aims of Science and Their Role in Scientific Debates*, Berkeley 1984; P. Kitcher, *The Advancement of Science. Science without Legend, Objectivity without Illusion*s, Oxford 1993), i.e. the idea that methodological norms change as a function of scientific progress. In this view, science comes across as a spatiotemporally extended, historical, pluralistic processes. The subject does not control the course of scientific development in any interesting sense (*cf.* J. Rouse, *Engaging Science*…). Simply put, methodological transcendentalism and naturalism represent the opposite poles of a single transcendentalist project.

[11] I am borrowing a phrase from Joseph Rouse (J. Rouse, *Engaging Science*…)

of scientific practice and development, that is, between the conception of an idea and its validation via empirical corroboration. In contrast, the model-based approach to science implies activity of the subject of knowledge.

An important step in the development of perspectival realism was an observation by Nancy Cartwright in her provocatively entitled book, *How the Laws of Physics Lie*,[12] to the effect that, far from providing a view from 'no-one in particular',[13] formulation of scientific laws hinges in the theorist's decision concerning which factors to include and which to exclude from view. That is, scientific laws are idealizations valid only *ceteris paribus*. We could say that in Cartwright's view, laws are indexical rather than genuinely universal. Cartwright's insights correspond well with Ian Hacking's thesis on the autonomy of laboratory science as advanced in his work *Representing and Intervening, Introductory Topics in the Philosophy of Natural Science*.[14] In the latter's view, the scientist essentially co-creates (lower level) laws via specific experimental designs. That is, an experiment entails a coupled system comprising the experimenter and the aspects of nature he or she is interested in investigating or activating, whereby certain tendencies dormant in nature—and in the experimenter herself, one may add—become amplified at the cost of others getting suppressed.

Ronald Giere brought these kinds of insights together under the heading of perspectival realism. Giere pursues an analogy between perception (more specifically, human senses) and scientific instruments (measurements), concluding on this basis that each scientific theory yields an objective, if limited (perspectival), view on the subject matter.[15] He writes: "[T]he strongest claims a scientist can legitimately make are of a qualified, conditional form: 'According to this highly confirmed theory (or reliable instrument), the world seems to be roughly such and such.'"[16]

One can immediately notice that Giere's conception is quite traditional in presupposing the product versus process distinction. That is, Giere is looking at theory as an object to which certain properties, such as conceptual coherence, predictive reliability, level of empirical corroboration, etc., may or may not be attributed. This circumstance has been brought up by Giere's

[12] N. Cartwright, *How the Laws of Physic Lie*, Oxford 2003.

[13] A. Fine, *The Viewpoint of No One in Particular*, in: W. Egginton and M. Sandbothe (eds.), *The Pragmatic Turn in Philosophy: Contemporary Engagements between Analytic and Continental Thought*, Albany (NY) 2004, pp. 115–129.

[14] I. Hacking, *Representing and Intervening, Introductory Topics in the Philosophy of Natural Science*, Cambridge 1983.

[15] R. Giere, *Scientific Perspectivism*, esp. Chapters 2 & 3.

[16] *Ibidem*, pp. 5–6.

critics. Chirimuuta, for example, critiqued Giere's use of perceptual metaphor and suggested its replacement with a haptic one.[17] Essentially, the haptic metaphor suggests that cognition consists not so much in a passive pattern contemplation as in active perception and perceptually guided exploration.[18]

In the spirit of relational epistemology, others have argued that that science reveals dispositional[19] or relational[20] properties of its objects. That is, depending on how we interact with the object, it will 'tell' us different things about itself. Note, however, that the notion of dispositional/relational properties entails more than mere interaction. Relational epistemology cannot be based on some random affectability but implies orderliness or lawfulness of the subject-object interactions. What this means is that interestedness, partiality, and interaction—the aspects of perspectivism as listed by Chirimuuta[21]—are necessary but not sufficient conditions of the *epistemic* relation between the subject and the world. In fact, the replicability itself is insufficient in that regard since it merely implies instrumentalist as opposed to a fully fledged realist interpretation of science.[22]

It seems, then, that we must press the issue even further. A number of authors operating within a broadly perspectival understanding of science have pointed to the requirement of integration of perspectives as a warrant of objectivity. As shown by Sandra Mitchell,[23] for instance, many an explanatory challenge in system biology require integration of different perspectives without any of these being stripped of their identity. At the heart of integrative pluralism, according to Chirimuuta, lies the assumption that

> […] different perspectives are often complementary to one another, with one view compensating for the deficiencies of another, and cooperation across perspectives occurs when there is a practical challenge that cannot be addressed with one approach alone. Integration does not entail subsumption of one perspective by another; the various

[17] M. Chirimuuta, "Vision, Perspectivism, and Haptic Realism," *Philosophy of Science*, Vol. 83, 2016, pp. 746–756.

[18] *Cf.* F. J. Varela, E. Rosch, E. Thompson, *The Embodied Mind: Cognitive Science and Human Experience*, Cambridge (MA), 1991.

[19] A. Chakravartty, "Perspectivism, Inconsistent Models, and Contrastive Explanation," *Studies in History and Philosophy of Science*, Vol. 41, pp. 405–412.

[20] P. Teller, "What is Perspectivism and Does it Count as Realism?," in: M. Massimi, C. D. McCoy (eds.), *Understanding Perspectivism. Scientific Challenges and Methodological Prospects*, London 2020 , pp. 49–64.

[21] M. Chirimuuta, "Vision, Perspectivism…"

[22] M. Morrison, "One Phenomenon, Many Models: Inconsistency and Complementarity," *Studies in History and Philosophy of Science*, Part A 42.2, 2011, pp. 342–351.

[23] S. Mitchell, "Integrative Pluralism," *Biology and Philosophy*, Vol. 17, 2002, pp. 55–70.

> models, methods, and representations that constitute a perspective will retain their distinct identities.[24]

Interdisciplinary research is another obvious place where something akin to the integrative pluralism approach is necessary. Melinda Fagan, for example, attributes the possibility of integration to each agents' ability to understand her relationships with other positions/perspectives in a field, to thereby establish a sort of 'self-other' location. Fagan is building upon Michaela Massimi's distinction between the context of use and the context of assessment.[25] The context of use comprises a set of explanatory goals (or cognitive interests), and associated criteria of assessment pertaining to a given model/perspective, whereas the context of assessment amounts to an "assessment of one's own model in terms of its relation to another."[26]

But there is an even more basic argument for integration of perspectives to be made. For one, each visual representation hinges on an integration of perceptual data coming from different angles. That is, our precepts (perceptual models) are themselves products of a dynamical organization; integration is presupposed by the very notion of visual—or more broadly, perceptual—representation. Further, as we have said already, Giere's stance entails an awareness of the perspective from which one is looking at an object, but to understand where the limits of one's perspective lie, one must be able to contrast it with another perspective, which implies some common ground and mutual awareness and understanding. We may say that according to perspectivism, rationality in science lies in the ability to discriminate between different viewpoints and to adjust one's explanatory strategy accordingly. All in all, it appears that integration is presupposed by perspectivism as both a possibility and requirement (i.e., something to strive at).

All this presents us with the following challenge. Clearly, perspectivism is pragmatic in its basic orientation: it entails that the subject of knowledge is first and foremost an agent. We must therefore explain what makes it possible for the subject to emerge out of the world it is a part of as an autonomous entity and then allows him or her to overcome the partiality of his outlook by way of integration of various perspectives and joint practice.

[24] M. Chirimuuta, "Charting the Heraclitean Brain: Perspectivism and Simplification in Models of the Motor Cortex," in: M. Massimi, C. D. McCoy (eds.), *Understanding Perspectivism*, pp. 141–158.

[25] M. B. Fagan, "Explanation, Interdisciplinarity, Perspectives," in: M. Massimi, C. D. McCoy (eds.), *Understanding Perspectivism…*, p. 43; M. Massimi, "Three Tales of Scientific Success," *Philosophy of Science*, Vol. 83, pp. 757–767; *idem*, "Four Kinds of Perspectival Truth," *Philosophy and Phenomenological Research*, Vol. 96, 2018, pp. 342–359.

[26] M. B. Fagan, "Explanation, Interdisciplinarity…", p. 43.

Hylomorphism and Relationality

As demonstrated, perspectivism confronts us with the issue of relationality. Relationality treats objectivity as a feature of not so much the mind-independent reality as of the very relationship between the object and the subject who is considered as always-already a part of the world toward which it epistemically orients himself.

Taking relationality as our starting point, we arrive at the most basic form of objectivity—let's call it objectivity$_1$. That is, objectivity$_1$ is a conclusion of a reflective argument showing that knowledge must be grounded in that which connects or encompasses the subject *and* the object. Once we have established that, another problem immediately arises: how is it that the agent distinguishes him- or herself from the environment sufficiently to be able to refer to it as an object, without at the same time disrupting or distorting the connection between them, which would render knowledge an impossibility?[27] At issue, in other words, is the agent's presumed ability to balance autonomy with participation which grounds the specifically *epistemic* relation between the agent and the world.

I propose to answer this question by sketching out a dynamical model of the relationship between the subject and the object, inspired by Aristote's physics and psychology. The proposal is as follows: How about, instead of assuming that the relationship between subject and object can be either reduced to a causal connection (aka methodological naturalism)[28] or deemed as entirely non-causal (methodological transcendentalism or idealism), we adopt a standpoint of another, higher-order form of perspectivism, namely, the perspectivism of causes or modes of relationship? By perspectivism of causes—aka perspectivism of modes of relationships or, simply, of relationality—I mean the proposition to the effect that not only do we have to deal with complementarity of various schemas of causal explanation, but in addition to that, there are also different and complementary modes of relating to or interacting with the world, epistemic relationship being one of a few interdependent relationships between the agent and the world. In short, I claim that Aristotelian approach, in allowing us to distinguish between different types of innerwordly relationships aka causes, grants us

[27] That knowledge is in fact an impossibility is a position of Arthur Schopenhauer and contemporary 'radical' enactivists: A. Schopenhauer, *The World as Will and Representation*, trans. J. Norman, A. Welchman, C. Janaway, Cambridge 2010; R. Menary, "What is Radical Enactivism?", in: R. Menary (ed.), *Radical Enactivism: Intentionality, Phenomenology and Narrative. Focus on the Philosophy of Daniel D. Hutto*, Amsterdam–Philadelphia 2006, pp. 1–12.

[28] See note 10.

insight into the way in which perspectives become differentiated and then integrated into a system of self—other that underlies scientific practice and warrants objectivity.

Fourfold Causation and Relationality of Knowledge

There is no room here to delve deeply into Aristotelian corpus, which appears to be undergoing a renaissance in terms of scholarly interest these days.[29] The critical issue for us is this: although hylomorphism is the foundation of Aristotle's understanding of nature, it seems strictly applicable only to the realm of psychology as distinguished from natural science. By way of reminder, psychology for Aristotle[30] was not an investigation into subjectivity (as in modern 'psychologism') but a study of souls aka living (biological) beings in that only the latter have forms intrinsic to them. So, the distinction between form and matter of a 'thing' makes full sense only in the realm of biological life and its derivatives, such as *poiesis* and *techne*. At the same time, the biological is anchored in the physical as represented by a material body from which the soul is inseparable.[31] Already we can see the attractiveness of this framework vis-à-vis methodological transcendentalism: form and matter are distinguished by a distinction without a difference rather than separated.

The well-known fourfold classification of causes by Aristotle makes this sufficiently clear.[32] It is convenient for our purposes to divide the four causes into two groups. The first group, to which we will simply refer as *material causation*, comprises Aristotle's material cause (the substratum of things) and efficient cause (forces and energies, in the modern parlance). The second group of causes, to which we will refer jointly as *formal causation*, is made up of forms and teloses of (living) things. We can see, then, that the physical world is explainable in terms of material factors, while biological life requires reference to both groups of causal factors.

Now, formal factors can be conceptualized in terms of self-organization as the concept is used in life sciences today. Self-organization conveys the idea that all that we encounter in the world, especially the biological beings and systems, have a certain 'shape' (i.e., a pattern of arrangement of parts or

[29] C. Shields, "Aristotle's Psychology", *The Stanford Encyclopedia of Philosophy* (Winter 2020 Edition), E. N. Zalta (ed.), https://plato.stanford.edu/archives/win2020/entries/aristotle-psychology/

[30] So, the presence of form presupposes telos.

[31] Aristotle, *De Anima*, II, 1, 413a3–5.

[32] Aristotle, *Physics*, I, 7–8.

elements) that they aim to sustain ('telos') by developing proper tendencies and mechanisms.

Early formulations of the self-organization principle tended to treat it in a rather mechanistic manner, as applicable to all things, and therefore could in principle be explanatory of the origins of life itself *qua* an emergence of the organic from the inorganic matter.[33] But this seems to have changed recently, with the concept of self-organization beginning to be used more narrowly, with reference to biological phenomena exclusively, that is, to only those 'things' (beings) whose existence is characterized by some form of implicit purposiveness.[34] The discussion is ongoing,[35] it is quite clear by now, though, that the concept of self-organization as a pattern of organization (or arrangement) of matter—of 'form' subordinated to an implicit purpose ('telos')—is very Aristotelian.

Both the contrast and connection between formal and material causation become even more apparent when we consider the application of the self-organization principle to human development, i.e., the process whereby an individual, provided an appropriate level and quality of emotional nurturance, gradually increases her adaptive capacity construed as the ability to retain its identity (or shape) in face of environmental challenge caused by all manner of material contingency.[36] In this case, intrinsic telos of development manifests itself *qua* the being's orientation toward ever-greater adaptability and relational capacity (see below), and can be identified very early on as an unrealized (potential) form.

Based on the above, we can distinguish four layers of *reality as experienced by human agent*. Each of these ontological layers will be interpreted as representing specific type of the environmental challenge for the agent/knower, which essentially pre-empts the treatment of this realm in subjectivist terms. Overall, I propose to treat Aristotelian causes as denoting, first and foremost, possible modalities of relationality between the agent and

[33] H. R. Maturana, F. J. Varela, *Autopoiesis and Cognition: The Realization of the Living*, Dordrecht 1980. For a review of the development of the dynamical system approach in biology, see R. Sheldrake, *Morphic Resonance: The Nature of Formative Causation*, Rochester–Toronto 2009, Chapter 6.

[34] F. Varela, "Laying Down a Path in Walking," in: W. I. Thompson (ed.), *Gaia: A Way of Knowing. Political Implications of the New Biology*, Great Barrington (MA) 1987, pp. 48–64; F. J. Varela, E. Rosch, E. Thompson, *The Embodied Mind…*; E. Thompson, *Mind in Life*, Cambridge (MA), 2007.

[35] J. Rust, "Precedent as A Path Laid Down in Walking: Grounding Intrinsic Normativity in a History of Response," *Phenomenology of Cognitive Science*, Vol. 23, 2024, pp. 435–466.

[36] A. N. Schore, *Affect Regulation and The Origin of The Self: The Neurobiology of Emotional Development*, New York–London 2015.

the world within what we have called objectivity$_1$, rather than as properties of 'things' belonging to a set of externalities (to which we will refer to as objectivity$_2$). Simply put, the below-listed levels delineate realms of possible interaction rather than levels of being aka the hierarchy of 'souls' (although the latter is implied by the former). Alternatively, our approach represents a phenomenologically reinterpreted Aristotelian physics and psychology.

By way of first approximation, *Level 1* could be taken to comprise physical reality as understood by modern physics (i.e., matter and energy). Matter and energy in and of themselves do not have a form, strictly speaking,[37] but nonetheless the laws of physics describe, more or less accurately, the possible forms matter and energy can manifest. Therefore, physical reality as seen through the lenses of Aristotelian metaphysics isn't entirely amorphous: it must be treated seriously as that which provides critical constraints in terms of what and when can transpire.

As far as interactions are concerned, however, Level 1 must be understood more broadly as comprising all manners of contingency, that is, all the elements of the environment which appear pre-established, pre-arranged, and inert *from the perspective of* the agent's purposes.

In other words, Level 1 signifies *objectivity$_2$*, defined as all that (things, objects, state of affairs) which is external with respect to a given teleological system, usually oppositional with respect to its current goals, or transcendent with respect to the system in representing the state the system 'desires' to be in. In a word, objectivity$_2$ represents the elements of the environment able to exert a 'veto-power' over human designs.[38] Note that typically, this level of reality is the sole concern of epistemology and philosophy of science. In our model, however, objectivity$_2$ is embedded in an even larger sphere of objectivity$_1$ which encompasses all levels of interaction. We may say that objectivity$_2$ is the first, critical challenge relative to which the following levels arise as responses (see the next section).

Accordingly, the environment itself must be defined more broadly, as containing all factors that define the current range of opportunities from the agent's standpoint, including cultural and institutional factors that, despite having inherent teloses built in, constitute for the agent at this point a mere material from which he or she will have to construct his or her own infrastructure, and thereby also a set of laws (regularities) he or she will have to capture to be able to act purposefully. This dynamic will be explained in more detail in the next section.

[37] Recall that there could be no form without an accompanying telos in that it is telos which regulates the activity aimed at the preservation and development of form.

[38] J. Habermas, *Truth and Justification*, trans. B. Fultner, Cambridge (MA) 2002, p. 150.

Level 2 represents a qualitative change in the agent's relationship with the world. In Aristotle's system, Level 2 of the ontological ladder corresponds to the most basic form of biological self-organization, to do with nourishment and reproduction (the so-called 'nutritive soul').[39] This level is essential as it is here that we can see the full-blown form as a combination of shape and telos, together constituting a pattern of dynamical organization with an intrinsic telos of self-organization and self-preservation vis-à-vis the environmental change.

Level 3 in Aristotle's sense is represented by beings that utilize complex perceptual apparatuses to achieve the goal of self-organization and self-preservation, which in turn grants them more behavioral flexibility. In other words, it is at this level that we encounter the fundamental form of embodied cognition, shared by animals and humans, i.e., a system of functions and capabilities allowing the agent to purposefully engage the environment. As far as the agent is concerned, this level represents more active forms of opportunities and resistances than Level 1, which motivate both alliance formation and rivalry. Levels 2–3, as we shall see, shape the dynamic of the second stage of cognitive process.

Finally, we can designate as Level 4 of the dynamical organization those beings—humans—that manifest the most advanced perceptual, cognitive, and behavioral capacities which translate into the highest possible level of adaptability. In other words, humans are endowed with the power to affect the dynamical organization of large swaths of the environment. As already stated, however, the telos of dynamical organization is most clearly manifested in human development, so clearly subordinated to the principles of complexification and self-regulation, which is to say that humans, as a rule, are capable of entering many complex relationships without compromising their own physical and psychic integrity.[40]

It seems fitting, then, to conceptualize the highest form of cognition—knowledge—as somehow associated with Level 4. Let me explain.

Aristotle's epistemology treats mind (i.e., theoretical mind, *nous*) as, essentially, a sensory organ, on which various objects can imprint their forms.[41] In this view, animals may be capable of more basic types of (embodied, practical) cognition, but only rational beings can have knowledge properly understood, that is, only humans can move past interactive patterns (habits) to arrive at the essence of things. It is largely over against the passivity implied

[39] Aristotle, *De Anima*, II, 4.

[40] A. N. Schore, *Affect Regulation*…

[41] The mind picks up 'signals' coming from the intelligible realm. Aristotle, *De Anima*, III, 4, 429a13–18.

in this view, and the presumption of epistemic relation being unproblematic and self-validating, that methodological transcendentalism sets up its own agenda. Also, the idea that a knower can get straight to the presumed essence of things—and hence that a form of object can in fact be separated, if only in the knower's mind, from its material composition—creates a rupture in the system of causes.

We, however, have submitted that the Aristotelian causes may be used to represent different *modalities of the relationship* between the agent and the world. So, Level 4 can be taken to signify a formal type of causation. Critically, as will be shown in more detail shortly, formal causation is not to be understood straightforwardly as a relation between the subject and the form of an object, i.e., as a representation of the object in the subject's mind. Instead, formal causation must be linked with the human capacity to internalize a system of *interactions* among different agents (and perspectives represented by them) concerning a given object. In other words, advanced forms of cognition entail mutual recognition *among* agents, that is, require the ability to conceive of another agent's agenda as just as valid as one's own, and thus also motivate a refinement in one's grasp of others as compared with the previous stage. Conversely, in that view, object is a totality of dispositions revealed in the process of perspectival modelling and integration (*objectivity*$_3$).

As suggested by our exposition of the ontological ladder, we can forge a connection between the formal and material causation—and hence avoid sliding into idealism when employing Aristotle's epistemology—by marrying hylomorphism with perspectivism via dynamical system approach. Accordingly, in the next section, cognition will be presented as a phasic process which involves, at every point, all four kinds of causes (here interpreted as modalities of relationality) working together, although organized by way of oppositionality between dominant and recessive factors rather than by means of strict synchronicity.

Dynamics of Causation in the Cognitive Domain

A dynamical approach to cognition considers it to be first and foremost an intentional (purpose-guided) *activity*[42] rather than a logical (semantical) relation (i.e., a relation between the mind and a certain content).[43] This implies that, as the modern enactivism stipulates, cognition in its fundamental form is to do with the exchanges between the agent and its environment. Still,

[42] F. J. Varela, E. Rosch, E. Thompson, *The Embodied Mind*…

[43] F. Brentano, *Psychology from an Empirical Standpoint*, London 1874/1995.

there appears to be something peculiar to human cognition, which tends to take the form of knowledge. A dynamical system approach offers an interesting perspective on the process of human cognition in allowing us to conceptualize it as a dynamical, phasic relationship between the agent and its environment, alternating between passive and active moments, i.e., moments when agent is acted upon versus moments when he or she is exerting influence on their environment. So, this approach suggests that a whole cycle represents regular changes within an overarching sphere of relationships, previously designated as objectivity$_1$.[44]

We can picture the cognitive cycle by simply bringing to mind a circle divided in half by a vertical line. Each half represents one of the two critical phases, where the material causation dominates the first phase of the cycle and the formal type of causation dominates the second one. If we add a horizontal line, we get four quadrants representing four stages: phase I is now divided into stage 1 and 2, and phase II is divided into stage 2 and 4.

Drawing on developmental psychology,[45] we may say that phase I is a process of differentiation of interests and perspectives (or, more broadly, identities) through direct, 'online' interaction with the immediate environment. Accordingly, phase II represents the process of integration (or unification) of these into a complex field (system) of 'Self–Others–Things'[46], whereby the environment, which in phase I acted like a system of constraints for the expression of agency, now itself becomes transformed, optimally in the direction of higher-order complexity.[47] Importantly, this model entails that each phase highlights one set of factors at the expense of the other—material over formal and vice versa—without presupposing that at any point, any of the causes may be entirely absent. As the presentation to follow should make clear, it is more convenient to envisage the relationship between the causal groups along the lines of implicit–explicit dynamics or dialectic.

[44] Conversely, we can say that objectivity isn't a system of things or of state of affairs but a field of resonance (R. Sheldrake, *Morphic Resonance…*)

[45] W. Köhler, *Gestalt Psychology. An Introduction to the New Concepts in Modern Psychology*, New York 1947; R. W. Thatcher, "Cyclic Cortical Reorganization: Origins of Human Cognitive Development," in: G. Dawson, K. W. Fischer (eds.), *Human Behavior and the Developing Brain*, New York 1994, pp. 232–266; K. Meyer, A. Damasio, "Convergence and Divergence in a Neural Architecture for Recognition and Memory," *Trends in Neuroscience*, Vol. 32, 2009, pp. 376–382.

[46] M. Merleau-Ponty, *Phenomenology of Perception*, trans. D. Landes, London 2012, p. 50.

[47] *Cf.* A. N. Schore, "Early Organization of the Nonlinear Right and Development of a Predisposition to Psychiatric Disorders," *Development and Psychopathology*, Vol. 9, 1997, pp. 595–631.

The phasic model, as already mentioned, is predicated on the premise that in involving some measure of creativity, cognition must go through a material—or *quasi*-material[48]—phase. Simply put, for finite beings, creativity entails confrontation with contingency and novelty whereby the current arrangement of material components, representative of past formation (culture) and learning (internal 'culture' aka habits), is being challenged in a controlled rather than sweeping fashion. By way of analogy, let's imagine an animal engaged in foraging. When an animal, say a squirrel, is driven out of his hole by hunger, it must confront itself with the current state of the environment that he cannot fully control. A knower—e.g. a researcher—begins in similar circumstances: he or she is motivated by a problem—often a left-over from previous intellectual activity (see the description of stage 4, below)—which is as nagging as it is obscure. What is frequently omitted in analyses of intellectual pursuit is that initially, a researcher experiences difficulties even formulating the problem, simply because the problem signifies that which cannot be contained within the existing framework.

What this means is that to solve an intellectual problem, one must challenge the intellectual habits that are products of past learning and as such represent adaptation to conditions no longer obtaining. But to do that, one must nonetheless utilize some preexisting material to work out a new conceptual framework, which is to say that the field of existing concepts that one must rework in order to solve one's problem represents an environmental contingency for him or her.

Clearly, then, at stage 1 the agent is a patient—he or she is acted upon rather than exerting influence in her environment. Although one isn't not acting intentionally in the strict sense of the word yet—i.e., in being rather passive and passible, one cannot be said to pursue a well-defined goal—an intrinsic telos is already present nonetheless as that which limits the range of exposure to environmental stimuli, thus preventing disintegration of purpose (i.e., form of the endeavor).

The interplay between the agent and her environment marks the beginning of a learning process. One now assesses, rather intuitively (i.e., affectively), the incoming stimuli from the perspective of his or her values. One, we may say, faces at this point objectivity$_2$ in the crudest form, as that which is largely beyond one's control, but which one might, granted certain effort, master.

[48] See the definition of material causation given in the previous section.

The tables turn at the next stage, where one establishes a relatively stable foothold for further pursuit. During foraging, this may mean coming up with a strategy or finding or manufacturing of a proper tool with which to grasp the now much better-defined object. In other words, this stage is where the haptic metaphor is the most apropos; it signals the first level of mastery over the material causes one has exposed himself to at stage 1. Accordingly, we may say that stage 2 marks a preliminary stabilization of pursuit owing to agent's having been able to bend the existing resources (be it objects or ideas) to his will.

What can we see play out up to that point is the dominance of material factors as defined earlier. At the first stage, one is oriented toward obtaining a source material for one's future intellectual construction (data, concepts), so that at the stage to follow, one can engage the efficient causes at work within the environment by interacting with it in a more deliberate, controlled way, to see whether and to what extent the provisionally delineated region of the world is responsive to a certain kinds of interventions.[49]

The whole stage 1 can be described as an emergence of basic phenomenological field markers during a cautious exploration of the environment. At the beginning of stage 2, an agent is situated within a phenomenological field—a field of subject-object interactions encompassed by objectivity$_1$—organized by a hierarchy of distinctions. At the first step, a line is being drawn between that which is important, given the agent's purposes, and what can safely be ignored in the environment. Relative to thus delineated region, a figure-ground dynamics plays itself out whereby the field further breaks up into focal and subsidiary themes, only one of which can be consciously attended to at a time. Simultaneously, objects and occurrences are categorized as good, bad, or neutral from the perspective of the current endeavor.

As contemporary analyses indicate,[50] in science the preliminary stabilization of intellectual pursuit takes place when a central metaphor has emerged from a variety of data and concepts. Examples include the imagery of struggle for survival being used to describe change of form of biological species over time, the imagery of magic bullets to describe the putative causal mechanism behind neuroleptics (a model borrowed from antibiotic

[49] Panksepp describes how upon mastering the use of a lever for a certain purpose, the rat will typically explore its potential further uses. J. Panksepp, *Affective Neuroscience: The Foundations of Human and Animal Emotions*, New York–Oxford 1998, p. 145.

[50] *Cf.* e.g., E. Fox-Keller, *The Mirage of a Space between Nature and Nurture*, Durham (NC) 2010.

research),[51] the model of atom as a miniature planetary system, etc. Many of these models will be incompatible with each other.[52]

Since each of the just-listed dimensions (salience, valence, central versus subsidiary) represents possible perspectives and associated agendas, such a categorization creates a primitive version of the Self–Others–Things system. What this means is that the agent (here: a scientist) will tend to divide other researchers, based on the perspectives imputed to them, into three categories: (1) those whose agendas are unrelated to one's own (neutrality); (2) those whose agendas are at odds with and rival to one's own; (3) those whose perspectives are deemed a handy instrument in developing one's own perspective (e.g., the relationship between biology and chemistry).

To sum up, stage 2 is a moment in a pursuit when a steady pattern of the relationship between the agent and its environment has been established, and now the agent is about to explore its full potential. The stabilization has been accomplished by mediation of a tool (be it a physical instrument, behavioural sequence, or a conceptual model). The problem is that each tool is both underdetermined and overdetermined with respect to its purported use: it usually promises more than it is able to deliver, whereas some of its potential uses remain dormant. This circumstance is, I think, the most basic, structural, one must say, argument for integration.

We can also put it thus. The initial state of the environment relative to a certain pursuit is characterized by ambiguity from which arise a variety of opportunities (as well as threats, of course). Depending on their personal interests and skills, each agent will organize the field differently and some of these emergent organizing principles, once developed toward the end of stage 2, are bound to clash at some point. The clash may be due to each researcher's proposing alternative explanations for the same phenomenon, or be caused indirectly, by the implications of the respective explanations or models designed to deal with different issues. The latter scenario has been succinctly described by Kuhn in the following way:

> If the physicist's electron can leap from path without crossing the intervening space, then the chemist's electron should have the same ability, and the philosopher's concept of matter and space demands reexamination. Every fundamental innovation in a scientific specialty

[51] R. Whitaker, *Anatomy of Epidemic. Magic Bullets, Psychiatric Drugs, and the Astonishing Rise of Mental Illness in America*, New York 2010.

[52] E.g., M. Chirimuuta, "Charting the Heraclitean Brain…"

> inevitably transforms neighboring sciences and, more slowly, the worlds of the philosophers and the educated layman.[53]

Besides that, conflict may also arise within an individual agent. During every pursuit, an agent is setting up a new paradigm, with associated goals and strategies which may clash with his or her own personal 'traditions'.

Overall, this shows that it makes sense to call for, as Paul Feyerabend once did, a proliferation of perspectives in science[54]—the analysis thus far explains why a variety of standpoints indeed increases the chances of getting things right, on the condition that such a proliferation of outlooks takes place in the first phase. Once these perspectives have been established, however, it is equally fitting to insist that these perspectives be integrated, so that the partiality pertaining to the context of use can be transcended by the establishment of the context of assessment spanning across them. Whereas the multitude of unintegrated perspectives provides a leaven for power struggles and resultant chaos, the dominance of one of them is equivalent to institutionalization of bias. What we should aim, then, toward the end of stage 2, is for all the thus far developed perspectives/models to enter a mutually corrective relationship with one another.

That is, within the overall process (objectivity$_1$), objectivity$_2$ arises first because of the emergence of a variety of organizing principles whose partiality must at certain point be transcended by giving rise to a higher-order form, to which we have been referring to as objectivity$_3$. The vector representing objectivity$_3$ roughly corresponds to Charles S. Peirce's unlimited scientific community of researchers,[55] except we must make sure to couch it in concrete-psychological rather than abstract-transcendental terms.

This is the point at which the dynamical system approach enters the picture more explicitly. Dynamical systems theory aids considerably in understanding what integration consists in and how it is brought about. According to the dynamical system approach, integration is accomplished by means of synergic exchanges.[56] Synergic exchanges are intense exchanges

[53] T. Kuhn, *The Copernican Revolution. Planetary Astronomy in the Development of Western Thought*, Cambridge (MA) 1957, p. 230.

[54] P. Feyerabend, "How to Be a Good Empiricist: A Plea for Tolerance in Matters Epistemological," *Philosophy of Science: The Delaware Seminar*, Vol. 2, New York 1963, pp. 3–39.

[55] Ch. S. Peirce, *Writings of Charles S. Peirce: A Chronological Edition*, Vol. 3, ed. M. Fisch et al., Bloomington (IN) 1982, pp. 242–337.

[56] A. N. Schore, *Affect Regulation…*; R. R. Vallacher, A. Nowak, J. Kaufman, "Intrinsic Dynamics of Social Judgment," *Journal of Personality and Social Psychology*, Vol. 67, 1994, pp. 20–34. For a very apt example of synergy in interdisciplinary research, see A. D. Stone, "The Experience of the Tacit in Multi- and Interdisciplinary," *Phenomeno-*

of both content and energy which grant the participants access to what is otherwise, due to various practical and cognitive limitations, outside the scope of perception or understanding. This means one can, at least momentarily, view one's own position from the standpoint of another person, whereby shortcomings of one's perspective can be exposed and eliminated. Critically, synergic exchanges are advantageous to all involved in that the gaps which result from such a pruning can be almost immediately filled in thanks to the insights that are also provided by the alternative perspectives.

All in all, integration via synergic exchanges gives rise to a new form, or norm, which represents an increase in ordered complexity relative to each individual position. Importantly, the norm is not an abstract pattern but describes the manner in which different perspectives shape one another by both posing restraints on each other's activity (e.g., "Here's the limit of your metaphor") and providing inspiration for one another ("But this is where you may want to push it further"). The expected net result is precise scope definition of each of the models.

The higher-order form (and norm) thus created can be compared to a creation of a new ecosystem (or ecological niche) out of the preexisting elements. An ecosystem is typically understood as a system of relationships among different species and individuals in a given spatiotemporal region. The possible relationships include: (1) antagonism, which corresponds to the dynamics of mutual constraints, (2) symbiosis, which represents mutual support, and (2) neutrality (as well as different kinds of mediated relationships).[57]

At difference with other ecosystems, however, which are strictly distributed over many individual contributors, human ecosystems exist both *inside* and *outside an individual agent* (i.e., are both *spatially distributed* and *internally differentiated*). That is, human agents are challenged to at once develop, sustain, and negotiate relationships with other people and with their own alter-egos.[58] Accordingly, synergic exchanges occasion a differentiation of individual selves, accompanied by a develop awareness of one's own position vis-à-vis another. Put another way, the patterns of relationships

logy and Cognitive Sciences, Vol. 12, 2013, pp. 289–308; *cf.* A. Martin, "Shared Agency In Complex Settings," *Filozofia i Nauka. Studia Filozoficzne i Interdyscyplinarne*, Vol. 13, 2025, pp. 133–152.

[57] See Fagan's typology of self–other relationships: M. Fagan, "Explanation, Interdisciplinarity, Perspectives," pp. 38–41.

[58] H. J. M. Hermans, "The Dialogical Self: Between Exchange and Power," in: H. J. M. Hermans, G. DiMaggio (eds.), *The Dialogical Self in Psychotherapy*, New York 2016, pp. 13–28.

between different agents in a given system become *internalized* as a pattern of organization of the internal multitude.[59]

In other words, synergic exchanges do not simply lead to a production of a complex representation of different perspectives in mutual relationship to one another. Primarily, they establish a regulatory pattern which allows an individual agent to act in accordance with a shared telos also in the absence of other agents. That is, as far as human beings are concerned, the basic unit of psychic life isn't a single "I-position" (i.e., a position one identifies with, temporally or permanently) but always some internalized I–other dyad. Consequently, after the first phase, every single perspective has its own, virtual counterpoint which complements it and which must, at least periodically, be brought to one's conscious attention for the purpose of conduct modulation. In short, *the capacity for internal differentiation* allows human agents to establish a flexible pattern of relationality that will allow them to realize complex goals through joint action.[60]

What this also means is that after phase I has been completed, it becomes possible for agents to create a shared action plan, by which I mean a spatiotemporal organization of activity of many agents—or positions, more broadly, as this may apply to one's alter egos only—which permits them to distinguish between the circumstances under which it is advisable to seek support of another via a procedure of question and response, as when an expert turns to an expert in another field for a missing piece of information or explanation, and situations when two perspectives cannot be held in view simultaneously and when therefore it is recommended to act independently in a state of what we may call strategic disregard, such that each perspective acts as a set of implicit boundary conditions for the other.

In analogy with the evolutionary process, we could say that during the first half of the cycle, the agent is dealing with the prevailing material conditions with the view to establishing a new function (form and norm), whereas in the second half he or she is challenged to entrench it by creation of a corresponding niche, viz., a certain material culture (e.g., research infrastructure) which, by allowing more varied manifestation of the dispositional properties of the object, simultaneously grants the agents a correspondingly greater opportunity to express the range of their capabilities.

Schemas developed at stage 3 can be subsequently 'fed' back into the lifeworld as well-rounded paradigms that are intrinsically relational in the sense of instructing agents how to interact both with the world and with one

[59] A. N. Schore, *Affect Regulation…*
[60] A. Martin, "Shared Agency…"

another. Accordingly, halfway through phase II, a given complex research ecosystem becomes self-sufficient as a result of formation and dissemination of smaller patterns of intervention (paradigms), each with a well-defined scope of application. This applies to experimental setups in particular,[61] and all kinds of schemas of problem solving in general.[62]

The presented dynamic of cognitive engagement suggests that each cycle should be closed by self-reflection, by which I mean a disinterested viewing of the whole field made up of different, although now clearly interconnected, positions and perspectives. While at stage 3 one takes up a certain position and virtually adopts, and hence indirectly refers to, another, at the final stage of pursuit, one ceases to identify with any of the previously differentiated positions. This grants him or her broader insights into the achievements thus far. In particular, it allows them to discern broader ramifications of the framework they have worked out, identify unanswered questions and blind spots which will motivate them to open a new cycle.

All in all, we can say that the first half of the cycle leads from matter to (a new) form, the process being circumscribed by the forms already in operation (i.e., the results of previous learning). The second part, in turn, leads from the new form to a new pattern of material organization (be it new tools, buildings, synapses, or texts). In that way, form and matter remain separable but now are connected in a dynamic rather than static way. This view of cognition, then, does utilize some form of correspondence principle—expressed here as *objectivity*$_1$—but is able to marry it with the principle of active participation of the subject in the development of knowledge. The epistemic relation, as shown, presupposes a subject who both affects and is affected by the world around him.

Conclusions

We commenced from the observation to the effect that perspectivism pushes beyond the transcendentalist approach in the philosophy of science, here referred to as methodological transcendentalism, and its direct opposite, methodological naturalism. More specifically, perspectivism challenges the assumption that epistemology (qua methodology of science) is a self-standing enterprise that does not require grounding in a proper metaphysics.

As shown, perspectivism presupposes a relational metaphysics, which, however, cannot be construed in purely interactionist terms. To redeem the

[61] I. Hacking, *Representing and Intervening…*

[62] L. Laudan, *Progress and Its Problems*, London–New York 1971; P. Kitcher, *The Advancement of Science…*

claim to objective validity, we argued, different stands of knowledge must at some point be confronted with one another and integrated. We also noted that interdisciplinary research renders integration as an independent variable in scientific practice.

In response to the metaphysical problems posed by perspectivism, I offered a merger of Aristotelian hylomorphism with dynamical system thinking, which allowed me to show that cognitive process can be reconstructed as a cycle (spiral) where at each stage of the process, different types of causes first dominate and subsequently give way to others in a systematic way. I also distinguished between different, if interrelated, kinds or layers of objectivity corresponding to different kinds of causal relationships at different stages.

Also worth emphasizing is another corollary of the presented view, which is that while cognition is, broadly speaking, a relationship between the subject and the object—regardless of whether the object is a physical entity (or a state of affairs), an animal, or another human being—such a relationship isn't stable unless the epistemic subject's relationship with other subjects is included in the equation. Simply put, the relationship between different agents, as developed in the first phase of pursuit, is a condition of a fully-fledged epistemic relation. ~

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ANNA MARTIN – dr hab., profesor nadzwyczajny w Instytucie Filozofii i Socjologii PAN. Zajmuje się szeroko rozumianą filozofią nauki, ze szczególnym uwzględnieniem roli podmiotu w procesie poznawczym, metafizyki relacji podmiotu do świata, sposobów, w jaki świat życia jest przekształcany w świat badany, i odwrotnie, mechanizmów współdziałania (*joint action*) wielu podmiotów w kontekście rozwoju wiedzy naukowej oraz związku pomiędzy współdziałaniem różnych podmiotów poznania oraz obiektywnością wiedzy. Autorka książki *Norms, Facts, Ideals: Idealization and Self-regulation in Human Interactions* (IFIS PAN, Warszawa 2019). Obecnie pracuje nad monografią poświęconą zjawisku współdziałania z perspektywy teorii systemów dynamicznych, przedstawiającą sposób, w jaki wielość perspektyw i stanowisk, a także rozmaitość postaw, procesów, i doświadczeń charakteryzujących każdą aktywność intencjonalną stanowi z dynamicznego punktu widzenia większą całość.