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Critical realism as a fractal philosophy

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ABSTRACT

There are two overarching questions that guide this paper: What are some potential issues with the criterion for judgemental rationality as developed by Bhaskar? How can critical realism itself be justified without foundationalist assumptions or an infinite regress of justification? The paper considers how Bhaskar's criterion for theory choice – developed in the natural sciences – can also be applied in the social sciences, how a criterion developed within epistemic relativity can be applied to overcome judgemental relativity, and explores justification of critical realism and of research inspired by this philosophy of science. It will be argued that a fractal form of justification can be an important approach to justify critical realist philosophy *and* its meta-philosophy (or 'the philosophy of philosophy'). I also seek to demonstrate that such fractal justification, and insights from other fractally coherent philosophies, can be helpful to provide answers to several of the issues with Bhaskar's criterion for judgemental rationality that are presented.

Introduction

I have previously argued that critical realists in general do not give sufficient attention to Bhaskar's elaboration of judgemental rationality, and indeed misrepresent it (Isaksen 2016). That paper can be considered an immanent critique of critical realist use of and writings about judgemental rationality: Even though the various writers align themselves with the critical realism of Bhaskar they make their own versions of judgemental rationality, and do so without reference to Bhaskar's. That paper did not question Bhaskar's work on judgemental rationality but used it as the point of departure to discuss critical realist discussions of the topic. In this paper I want to critically discuss aspects of judgemental rationality as developed by Bhaskar. There are two related questions that will guide this paper:

(1) What are some potential issues with the criterion for judgemental rationality as developed by Bhaskar?

(2) How can critical realism itself be justified without foundationalist assumptions or an infinite regress of justification?

This is thus a conceptual paper, dealing with epistemology and philosophical method – though it will attempt to connect the abstract discussions to a broader critical realist audience. After presenting and discussing the first question I will attempt to demonstrate how one answer to the second question can help answer the first. Before turning to the questions, however, it is useful to briefly outline what I consider to be Bhaskar's discussion of justification because seeking 'hermeneutic adequacy' of the topic under critical discussion is an important principle in critical realism (Bhaskar [1986] 2009, 87; Hartwig 2007, 106), and I agree: Critically discussing a straw man helps no one. It is by noting omissions, unsupported leaps, and potential implications in Bhaskar's work on judgemental rationality that I seek to develop it.

Bhaskar's judgemental rationality

In his *Scientific Realism and Human Emancipation* Bhaskar spells out an initial criterion for choosing one theory or causal explanation over another, even if they are considered to be of the incommensurable type ([1986] 2009, 73, emphasis in the original):

> [the initial criterion, inspired by Imre Lakatos]: a theory T_c is preferable to a theory T_d, even if they are inc[ommensurable], provided that T_c can explain *under its descriptions*, almost all the phenomena that T_d can explain under its descriptions, plus some significant phenomena that T_d cannot explain.

Bhaskar gives the example of Newtonian mechanics being superseded by Einstein's theory of relativity because Einstein's theory could account for a greater amount of phenomena (80). Bhaskar used this example because he was carrying out an 'immanent refutation' of Kuhn's argument for scientific incommensurability (78), and Kuhn ([1962] 2012, 98–103) used this historical example in *his* arguments. Bhaskar explains that despite this relatively clear historical case of rational development in science, 'Normally, matters will be more complicated than this … ' ([1986] 2009, 80). He points out that new theories, such as Einstein's may be able to explain more phenomena overall, but the new theories similarly have their own anomalies and may, in addition, completely disregard phenomena that earlier theories both gave attention to and could explain that the new theories cannot. Note that according to Bhaskar's criterion we should accept one theory even if it cannot explain *all* the phenomena that another theory can as long as it can explain '*almost* all … *plus* some significant phenomena that theory T_d cannot explain'. Bhaskar argues that theory development is, even if rational in terms of this criterion, not necessarily a matter of simple additive growth, as represented in the figure below (Figure 1).

He points out five further issues with his conceptualization of rational theory choice so far,

> (1) it does not indicate the significance of either the phenomena explained, or their explanations; (2) it does not severalize distinct modes of intra-theoretical conflict; (3) it does not budget for suspended commitment; (4) it is non-dynamic; and (5) it does not allow for the possibility of conflicting assessments by the theoretical protagonists. (81)

Taking the first point first, Bhaskar explains that the criterion inspired by Lakatos alone will not do. He argues that simply counting the number of phenomena which the theories or
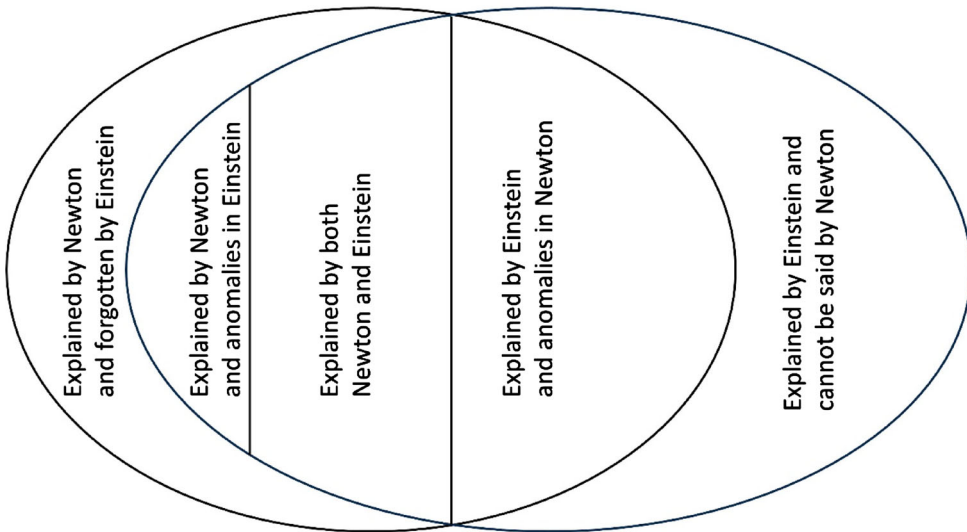
Figure 1. Greater explantory power of Einstien over Newton (based on Diagram 1.3 in *Scientific Realism and Human Emancipation* (Bhaskar [1986] 2009)).

explanations can explain is insufficient and, 'the appropriate direction of scientific work will be determined as much by the *significance*, as the "quantity", of phenomena explained or problems resolved ... ' (81, emphasis added). On this point he continues,

> But in any evaluation of the [competing] theories, even more important than the quality or significance of the phenomena explained, and often directly determining it, will be the significance of their *explanations*. And the most important of these considerations will relate to *ontological depth* and/or *comprehensiveness* of the conflicting theories. (81, emphasis in the original)

It will be noted that he has mentioned the importance of 'significance' in three various instances; directly in the Lakatosian inspired criterion where we choose one theory over another if it can explain *some additional significant phenomena*, secondly in terms of the competing theories' abilities to explain *the most significant phenomena*, and finally in terms of which has the *most significant causal explanations*. Because significance is decided by *someone*, we can ask in each of the three cases, 'significant to *whom*?' This question is important because if competing theories have competing views on what is most significant it is difficult to see how this criterion for theory choice can be useful to adjudicate between competing positions. Bhaskar does touch on this, as I shall shortly explain, but I think he leaves it underdeveloped in terms of the social sciences and so I return to this point in greater detail later. Since Bhaskar critiques Lakatos for his empiricism and argues for the additional significance of ontological depth and retroduction as a means of explanation, he adds the following qualifying clause to the Lakatosian inspired criterion:

> [Qualifying clause]: especially, or even only if it can either (a) identify and/or describe and/or explain a deeper level of reality; and/or (b) achieve a new order of epistemic

(explanatory and/or taxonomic) integration, or at least show grounded promise of being able to do so. (82)

After presenting this criterion for theory choice – inspired by Lakatos and with a qualifying clause – he argues that such a criterion is of little use if there is not a person who is capable of applying it, and he therefore discusses the theoretical and practical needs for one or more person(s) to apply such a criterion (74–75 and 85–91). In this he firstly immanently critiques Kuhn and Feyerabend when they say they know that no one can know two incommensurable theories well enough to judge between them. The rhetorical question can be formulated as follows: 'How is it possible that *you*, Kuhn and Feyerabend, know two commensurable theories well enough to know that *no one* can know both?' Bhaskar is then careful to state that the immanently derived theoretical possibility of applying the criterion for judgemental rationality does not mean that it *necessarily* happens in scientific practice, nor that it is a simple procedure. For example, a proponent of Einstein's theory of relativity may be able to 'see' that their theory better fulfils the criterion, and that it is therefore rational to accept Einstein's theory over Newton's, but what if a proponent of Newton's cannot 'see' this? Who then is to judge? Bhaskar even opens up for there being a difference of opinion about whether the criterion for theory choice that he proposes would be accepted by proponents of competing scientific theories (87). What Bhaskar does argue for is the importance of individual researchers to develop what he calls 'bi-theoretic-linguality' – the ability to understand two competing theories on their own terms – and to seek common understanding of the competing theories of the object under study (though he stops short of arguing for the importance of immanent critique in research – a point which will become important later). Bhaskar concludes this issue of person(s) applying the criterion with the following:

> What makes the problems of meaning, and cognitive (which is also always practical), diversity and change and of the (formal) underdetermination of rational choice appear less pressing and to be so uniquely (if not painlessly) resolved, within the span of a generation or two, in the province of natural science and technology are: (1) the existence of a common world (ontological realism); (2) certain very general shared human interests in it, stemming from our nature as biologically constituted beings[…]; (3) the world-historical existence and spread of capitalism as the bearer (or carrier) of certain specific forms of natural science and technology; (4) the existence of a continuous scientific tradition incorporating a distinctively post-Galilean 'style of reasoning' (I. Hacking), oriented to augmenting explanatory power and characterized by a measure of consensus on the general character of decision procedures (e.g. recourse to empirical, and wherever possible, experimental test). (89–90)

It will be noted that Bhaskar here suggests causal explanations of why theory choice in the natural sciences and technology are 'uniquely (if not painlessly) resolved' but does not reference the social sciences and the humanities. This omission I discuss below in section three.

The final point on Bhaskar's judgemental rationality that I will focus on here is that he explains that the use of any such criterion as he proposes should not be understood as an all-or-nothing matter. Sometimes we are not yet in a position to make a definitive argument for one theory or causal explanation over another, and sometimes we may, because of new research outcomes, find new support for a theory or causal explanation that was previously disregarded (83–85).[1]

Greater explanatory power in the social sciences?

Bhaskar ([1978] 2015, 3) has argued that philosophical analyses of natural sciences cannot be transposed to the social sciences without further investigation, however that seems to be what was done in terms of the criterion for theory choice that he laid out, important as it is for the *possibility* of judgemental rationality.

As mentioned above, an important part of the criterion, whether in the more limited or expanded form, is that of 'significance' of phenomena and explanations. This is already problematic in the natural sciences, but Bhaskar allays some of the worries about this by reference to a shared ontological referent and relatively shared culture of research methodology in the natural sciences. This is much more problematic in the social sciences where the ontological referents are social and there is no generally agreed upon methodology.

It seems to me that part of the reason that Bhaskar did not mention these added difficulties is that when he introduced this criterion, he was arguing immanently against Kuhn who used natural scientific cases. Bhaskar's argument was effective in that it could demonstrate that based on the very examples Kuhn had chosen that rational development had in fact occurred. It is here important to understand that the physicists prior to Einstein had already been noting anomalies in Newton's physics, and in many regards were agreed on what the significant phenomena were (e.g. Harper 2007 on the history of 'The famous perihelion problem, which led to the demise of Newton's theory', on pages 936–938). With such agreement of what constitute significant phenomena applying the criterion is less problematic. In social science, finding agreement on what is significant is a much more difficult task, and it is not clear to me that Bhaskar's criterion, being developed in relation to the natural sciences, can necessarily be extrapolated to the social sciences 'as is'. If the idea is to have a criterion that can adjudicate between social theories from radically different paradigms, which includes the possibility of fundamentally different ideas on what is 'significant', then it would seem strange to have relative significance to be a central part of the criterion. Bhaskar, however, did not seem to have recognized this at the time and presented comparative explanatory power, including the importance of relative significance, as relevant to social science without any further analysis of this criterion in the social sciences (Bhaskar [1986] 2009, 168).

A further problem with 'significance' in the criterion, already present in the natural sciences, but again made more conspicuous in the social sciences, is that the criterion is meant to adjudicate between competing incommensurable theories but can itself be interpreted differently by competing paradigms. For example, note the extended use of 'and/or' in the qualitative clause of the criterion for theory choice:

> … especially, or even only if it can either (a) identify and/or describe and/or explain a deeper level of reality; and/or (b) achieve a new order of epistemic (explanatory and/or taxonomic) integration, or at least show grounded promise of being able to do so. (82)

Suppose we have three incommensurable theories, where the first theory can identify one deeper level of reality, another theory can identify and explain a second proposed deeper level of reality, and the third theory shows grounded promise of being able to achieve a new order of epistemic integration. Each theory is supported by reference to the same

criterion but consider different parts of the criterion as the most significant. Which interpretation of the criterion should we choose?

In summary, 'significance' plays an important role in Bhaskar's criterion for rational theory choice for the possibility of judgemental rationality, but in at least four separate instances we can ask, 'significant to whom?':

(1) ' … plus some significant phenomena that T_d cannot explain'.
(2) ' … the appropriate direction of scientific work will be determined as much by the significance, as the "quantity", of phenomena explained or problems resolved … '
(3) ' … even more important than the quality or significance of the phenomena explained, and often directly determining it, will be the significance of their explanations'.
(4) There are various parts of the criterion, and each part can be deemed most significant.

The epistemic relativity of the criterion for judgemental rationality

There is a further difficulty with the comparative explanatory power criterion that I now turn to. There is an interesting quote by Bhaskar in his *The Possibility of Naturalism* ([1978] 2015) which may seem to undermine the value of the comparative explanatory power criterion by situating the criterion itself within epistemic relativity. This is the position that ' … all beliefs are socially produced, so that all knowledge is transient, and neither truth-values *nor criteria of rationality* exist outside historical time' (57, emphasis added). This was nearly verbatim reiterated a few years later in *Scientific Realism and Human Emancipation* (Bhaskar [1986] 2009, 72).

It might be thought that the comparative explanatory power criterion would *have* to be some non-relative objective measure to provide for the possibility to rationally choose between competing theories, explanations, and interpretations. It is clear here that Bhaskar is being consistent with his own relative epistemology when he said that criteria of rationality do not exist outside historical time, and thus cannot be some a-historic foundational ideal. That said, how can a criterion that exists and has been developed within epistemic relativity possibly be used to deal with epistemic relativity so we don't end up with judgemental relativism? Bhaskar's passage in his *Plato Etc.* (Bhaskar [1994] 2010) makes the issue of criteria for rationality within an overarching epistemic relativity even more pointed:

> My story is obviously only a story of western philosophy, so we have to ask to what extent the history of philosophy, indeed philosophy itself, is Eurocentric. For, on the one hand, there is evidence, most dramatically portrayed in Martin Bernal's *Black Athena*, of the African and Asian roots of Greek culture, including its mythology and poetry out of which the origins of Greek philosophy, as I indicated in Chapter 9.1, arose. Then, on the other, there are traditions, such as that of Indian philosophy, of remarkable power and subtlety with striking affinities and parallels to those in western philosophy. Then again it could be asked why should we take western thought as our point of reference. What of African philosophy? Or Confucianism? *Lurking around here are questions of criteria of rationality*. It seems we only take 'western' criteria of rationality for granted because global geo-history has turned up with certain cultural milieux causally related to dominant power$_2$ relations [understood as power over others, as opposed to power$_1$ which is the general ability to do something]. Is this necessity? Or accident? Or a combination of both? … What has been marginalized,

subordinated, fragmented, omitted or occluded in a philosophical account? … What are its characteristic biases, blindspots, voids? (160–161, emphasis added)

Following this Bhaskar writes, 'All this is matter that raises questions of metacrique$_2$ [critique of philosophical assumptions] which I will treat in my forthcoming *Philosophical Ideologies*' (161). Unfortunately, Bhaskar never did publish this book which seemed so relevant to discussing criteria for the possibility of judgemental rationality, although it was a project which was initially considered as a companion volume to *The Possibility of Naturalism* back in 1978 (Bhaskar [1978] 2015, viii–ix). In an email correspondence with Mervyn Hartwig I was told that Bhaskar had said *Philosophical Ideologies* was almost complete in 1994/1995 and that, 'As his literary executor (with Hilary Wainwright) I've been trying to find this manuscript, so far without much success (only highly promising bits of it have been found). If it does turn up, it will of course be published' (pers. comm., February 2, 2017). I hope the work will be discovered and published. In the meantime, I have a couple of potential answer to this quandary where comparative explanatory power was meant as a criterion of rational theory choice to allow for the possibility of judgemental rationality, even though the criterion is itself a historical construct and so developed within epistemic relativity.

The first guiding question of this paper has been, 'What are some potential issues with the criterion for judgemental rationality as developed by Bhaskar?' To this I have answered there are at least four issues of 'significance' in the criterion for theory choice, and, in addition, the meta-conceptual issue of how to defend a criterion for theory choice to support the non-relative adjudication of theories when the criterion itself is developed within an all-encompassing epistemic relativity. I turn now to the second question, 'How can critical realism itself be justified without foundationalist assumptions or an infinite regress of justification?' I will seek to demonstrate that some answers to this second question can help answer issues brought up in the first.

The need for meta-philosophical justification

When I was about six years old, I was in the car with my father who was driving. I remember asking him a question, about what I do not now remember. My father provided an answer to my question. His answer to my question seemed to make sense, but it also opened up a new question. I asked him *why* that is. He provided some reason for his answer. I remember reflecting on his reasoning and again asked, 'why is that?'. He gave me an answer to this new question, and again after some reflection I asked, 'why?' After what I remember as a brief moment, he gave me an answer to the third 'why' that I had asked. Perhaps there was something in his voice, or the delay, or my own developing ability to put myself in others' perspective, but I remember thinking to myself, 'I wonder if it will be annoying if I ask "why" again'. I attempted. He replied, 'oh _____, stop asking why!' I learned that yes, it can be annoying to be asked 'why' all the time.

This issue, the possibility of constantly asking 'why' is known in epistemology as the epistemic regress problem (Klein 2009). Each statement requires support, which support itself requires support, and so on, possibly *ad infinitum*. We encounter the same in any research conclusion, whether this is at the end of, for example, an article or a doctoral dissertation. The first questions posed to the conclusion will usually be,

'Which methods did you use?' and 'How did you analyze your data?' In short, the questions asked are about justification of the conclusion. This is because we are usually not content with just the conclusion; we want to know something about *how* the researchers arrived there. For example, we want to ask, 'Why did you use that particular methodology to guide your research methods and mode of analysis?' This is a question which can been justified by reference to some generally respectable methodology book (e.g. Blaikie and Priest (2017), Bryman (2016) and many others). As philosophically oriented researchers, critical realists however often want to go deeper and request justification for the chosen methodologies. Here we come to the realm of philosophy of science, which in critical realist terms is considered an 'underlabourer' of the sciences. Philosophy of science provides justification for methodologies, providing justification for research methods and modes of analysis, which in the end provide justification for our research conclusions.

The question of justification can go deeper, however. Why should we accept critical realism (or some other philosophy of science) as the correct philosophy of science, other than it fits with our beliefs and seems to make sense? In the same way that research conclusions require methodological justification, so too do the philosophical conclusions (Bhaskar [1986] 2009). Here we arrive at what is called meta-methodology, or the methodology of philosophy. Here it seems we are far removed from practical (social) research and its conclusions, yet the final research conclusions are dependent upon trustworthy justification all the way down. A six-year-old or other annoying philosopher may request further deepening of the justification; for just as research methodology is justified by an ontology and epistemology, so too is a philosophical methodology itself justified by a meta-ontology and meta-epistemology. Meta-methodology (Fox 1996), meta-epistemology (Carter and Sosa 2022), and meta-ontology (Eklund 2006) are all a part of meta-philosophy or the philosophical study of philosophy (Joll 2017).

So, we now have a meta-ontology and meta-epistemology providing justification for a meta-methodology, providing justification for an ontology and epistemology, providing justification for research methodology, providing justification for research methods and analysis, and in the end providing justification for a research conclusion. This string is getting quite long, but the obvious next questions are, 'What meta-meta-methodology can justify the meta-ontology and meta-epistemology?' and 'What meta-meta-ontology and meta-meta-epistemology can justify the meta-meta-methodology?', and so on *ad infinitum*. Drawing on the work of Nancey Murphy (1993), I will in this paper propose a 'fractal' form of justification for critical realism that provides a way out of either epistemic fundamentalism (e.g. 'critical realism is obviously true') or of an *infinite* chain of justification which is not feasible (Hasan and Fumerton 2022). It will be suggested that a fractal form of justification can come about by finding justification for the meta-philosophy not by reference to some meta-meta-philosophy, but through the meta-coherency of the philosophy with its meta-philosophy.

The argument I shall provide is that critical realist ontology and epistemology and its meta-ontology and meta-epistemology, and the critical realist methodological recommendations and its meta-methodology, can together provide a fruitful meta-coherency. The coherency between the meta-philosophy and philosophy can as a whole be viewed as a 'fractal', and it is the *fractal form* – rather than some meta-meta-philosophy, and so on – which can provide justificationary support to both the philosophical and

meta-philosophical levels. In terms of a 'fractal' critical realism, Figure 2(a) represents the four levels as spelled out by Bhaskar and Figure 2(b) include the additions I consider required to provide a meta-coherent structure. Figure 2(c) represents the fractal justification that can be derived from the meta-coherence.

Critical realism as a fractal philosophy

It is well known that Bhaskar concluded for (a) the necessity of ontological realism, (b) the actuality of epistemic relativity, and (c) the possibility of judgemental rationality (Hartwig 2007). These are at the level of philosophy of science. But it seems to me that these were also the meta-ontological and meta-epistemological assumptions necessary to make sense of his philosophical methodology. He explicitly stated that his meta-methodological approach was immanent critique and greater explanatory power which provided better, but not final, philosophy of science; e.g. 'My argumentative strategy is designed to show that *the sponsoring theory cannot sustain the intelligibility of the sponsored activity*, but that a *transcendental realist analysis can render the activity … readily intelligible*. The reader should be cautioned that *I am not claiming certainty* or uniqueness for my analyses, merely that they are *demonstrably superior* to the irrealist accounts currently in vogue'
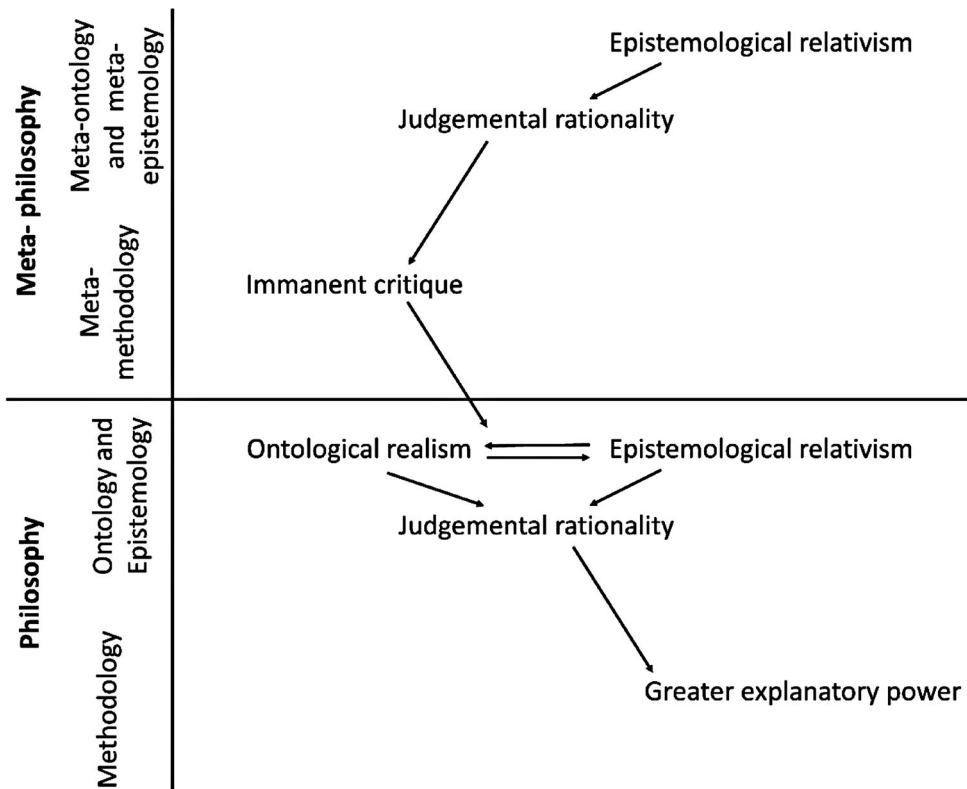
Figure 2. (a) Four levels as spelled out by Bhaskar, (b) Meta-coherent form of critical realist philosophy and meta-philosophy, and (c) Intra- and meta-coherence for fractal justification of critical realist philosophy and meta-philosophy.
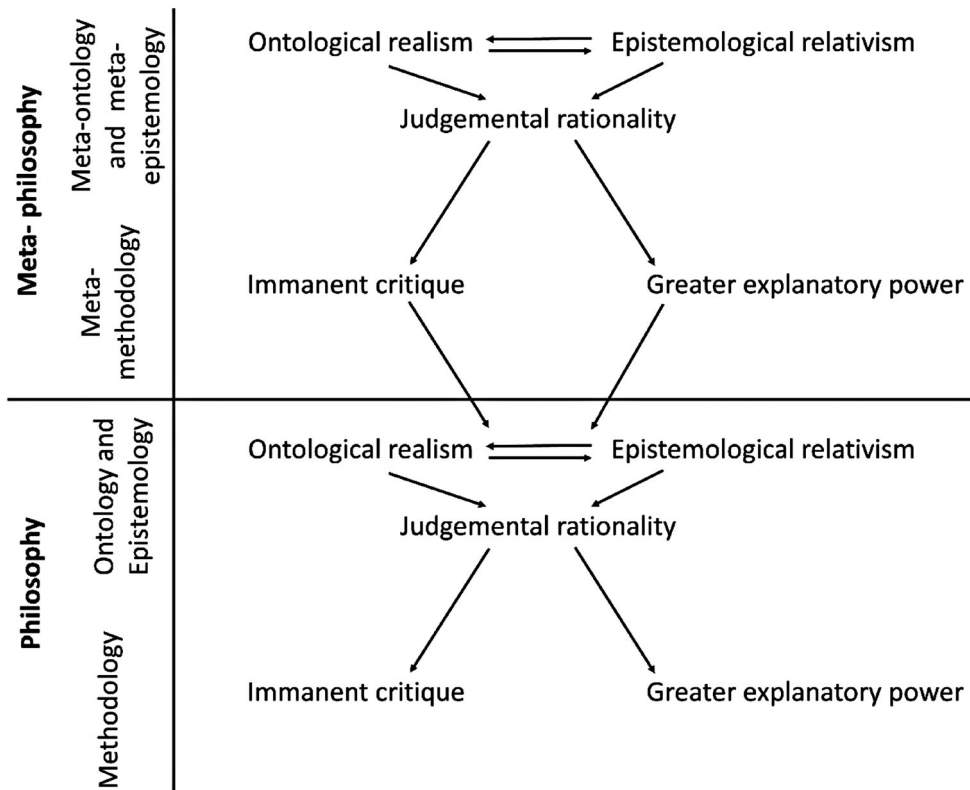
Figure 2. *Continued.*

([1986] 2009, 26–27, emphasis added). Most recently Bhaskar explained that 'Immanent critique is an essential part of the *method* of critical realist philosophy. It specifies that criticism of an idea or a system should be internal, that is involve something intrinsic to what (or the person who) is being criticised' (Bhaskar 2016, 2–3, emphasis added). Even the approach of retroduction to potential generative mechanisms, often cited as central to critical realist research, was initially applied by Bhaskar as part of his meta-method for a realist ontology *because* it had been *Kant's* meta-method for his idealist ontology (____). Bhaskar was arguing against Kant's transcendental idealism using his own meta-method.

Bhaskar argued for immanent critique and comparative explanatory power as the correct meta-methodology *because* he accepted the actuality of epistemic relativity of his own thought and of the possibility of judgemental rationality at the meta-epistemological. And, as will be remembered, he argued that relativity of thought only makes sense considering a realist ontology somewhat distinct from thought ([1986] 2009, 51–52), so a realist meta-ontology was also at least implicitly a part of his meta-philosophy.

It is this realist meta-ontology and relativist meta-epistemology which can be seen as justifying his meta-methodology of immanent critique and comparative explanatory power, which was used to justify his philosophical conclusions for the necessity of
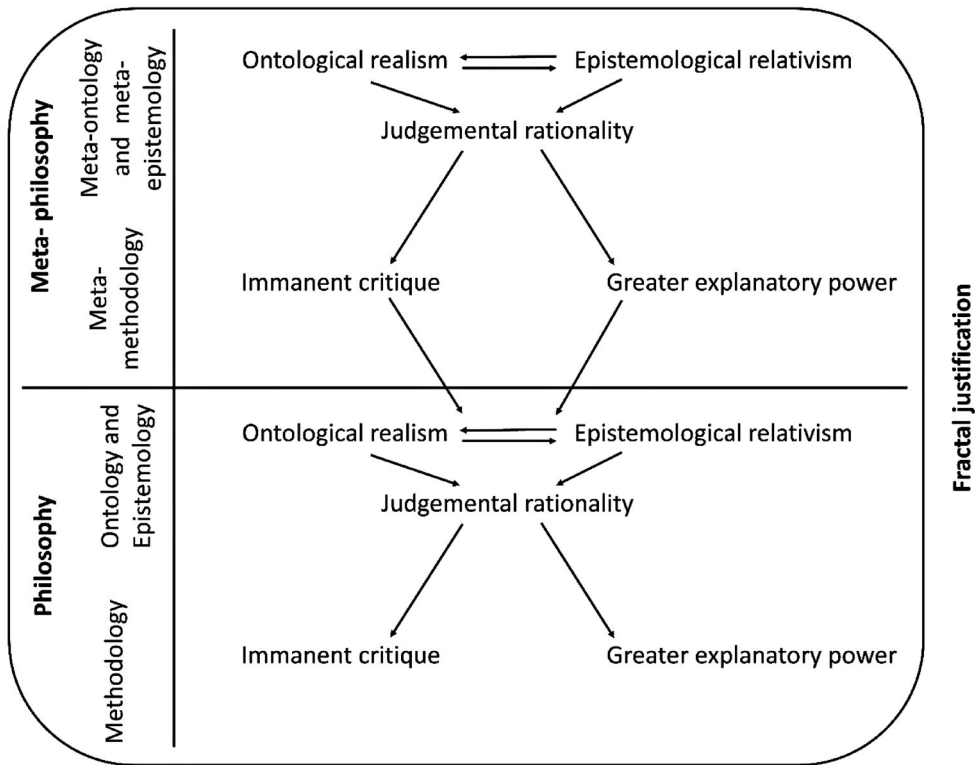
Figure 2. *Continued.*

ontological realism, the actuality of epistemic relativity, and the possibility of judgemental rationality. A question can be posed about whether Bhaskar having his philosophical conclusions as support for his meta-methodology is a healthy consistency or a bad form of circularity. The philosophical problem here is akin to a social researcher using their research conclusions to develop their research methodology. Though all this talk of meta-philosophy is very abstract it is also centrally important to critical realist inspired research, and to the possibility of rationality of any science from a critical realist perspective: If Bhaskar's philosophical methodology is merely a consequence of his philosophical conclusions, then the philosophical methodology *and the philosophical conclusions* may be problematic to use as justification for research conclusions.

In the first edition of *A Realist Theory of Science* Bhaskar ([1975] 2008) argued for the general features of a critical realist ontology and epistemology at the level of philosophy. This included the insight that ontological realism necessarily leads to epistemic relativism, and that epistemic relativism is best explained by reference to a realist ontology (hence the two-way arrows). In the second edition he added that the argument was an immanent critique meant to provide greater but not final conclusions (252). In *Scientific Realism and Human Emancipation* (Bhaskar [1986] 2009) he further articulated that his philosophy of science was developed via immanent critiques *because* of his epistemic relativism at the level of meta-philosophy. In this book he also spelled out in the greatest detail the criterion of comparative explanatory power that he suggested for adjudicating

between competing scientific accounts, focusing on competing paradigms in the sciences.

Figure 2(b) adds immanent critique to the methodological suggestions for science (including social science), the criterion of comparative explanatory power is explicitly added in his meta-methodology, and his ontology is added to his meta-philosophy. Bhaskar argued for the importance in the methodology of science to develop the capacity to understand competing paradigms, which is a requisite first step to immanent critique. Though Bhaskar did not explicitly mention immanent critique at this level, it could be argued that something like immanent critique is implicit in Bhaskar's methodological recommendations and further that I see no argument he or critical realists would have against including it here. Similarly, though Bhaskar did not explicitly state that the comparative explanatory criterion as spelled out for science was what he used in arguing for ontological realism instead of empiricism, for example, it is apparent that his argumentation followed such a criterion. Finally, though Bhaskar did not spell out his meta-philosophy as meta-coherent with his philosophy, only explicitly mentioning epistemic relativism, just as his methodological recommendations are supported by his ontology and epistemology, so his meta-methodology can here be supported by a selfsame meta-ontology and meta-epistemology.

Such a meta-coherent form can help make sense of the first questions that came from my critique of the comparative explanatory power criterion. At the level of (social) scientific methodology the questions of 'significant to whom?' becomes 'significant to the other', following the idea of immanent critique. This is so whether there is a generally shared methodology as Bhaskar claimed in the natural sciences, or whether it is in the social sciences where there are often radically different notions of what is significant.

This fractal form is not only neat and self-referentially consistent but may in addition be conceptualized as providing justification for critical realist philosophy and meta-philosophy not through an infinite supply of justification or via some foundational premise, but that the meta-coherence of the whole provides important justification for the parts. The fractal justification of the whole *and* the parts can be seen as a type of 'justificationary emergence', though I am not prepared to argue for its ontological status as *actual* emergence. Figure 2(c) visually represents the idea of how justification for one's meta-philosophy need not come from a further meta-meta-philosophy, nor that it is foundationalist, but rather that justification can come from the fractal form of the whole.

Nancey Murphy (1993, 508) summarizes well the problem of justification for philosophy of science, and the value of a 'fractal' approach as has been suggested here:

> My suggestion is that when philosophers do take seriously the historical conditioning of epistemology itself [as Bhaskar does] there are four possible responses.
>
> The two- or three-layered philosophical arguments we have examined here are one possible response, whose essential aspect is the move to a metaphilosophy with an identical structure.
>
> A second possibility would seem to be to invent a different metamethodology, but this strategy would be either self-stultifying or would call for an infinite regress of metamethods.
>
> A third possibility is to declare one's own stage in the development of historical consciousness to be the point toward which history has been moving-a Hegelian absolutism [or some other fundamentalist position].

The fourth option, and the one most often chosen, is relativism. Some accept it with great reluctance; others (such as the deconstructionists) celebrate it. However, critics of deconstructionism point out that deconstruction is self-referentially incoherent: the only way to accept the theory and use the method is by exempting one's own thought from the method.

I suggest that fractal philosophy offers the best chance of evading relativism with regard to standards of rationality. It is an attempt (similar to that of chaos theorists) to find order on a higher level of analysis and – this is the crucial factor – the higher-level findings exhibit coherence rather than self-stultification. In light of the other options, whatever circularity there is in the reasoning appears virtuous rather than vicious. Perhaps this type of philosophical analysis will turn out to be our generation's most important contribution to reflection on the nature of rationality.

Such fractal coherency can therefore be one way to deal with the meta-conceptual issue of having a criterion for theory choice developed within epistemic relativity: Yes, the criterion for theory choice is not outside of historical time or social context, but by being equally relevant at the philosophical and meta-philosophical level it is at least meta-coherent and can be supported by its fractal form. In addition to this fractal argument for the value of the comparative explanatory power criterion, Murphy (1993) discusses the meta-coherent argument that Lakatos (1970) used for justifying the criterion for theory choice despite it being developed within an overarching relativist epistemology. When Bhaskar ([1986] 2009, 73) introduced Lakatos' criterion for theory choice for critical realism he did not present Lakatos' own defence for it, but this can certainly be of interest to critical realists wishing to consider the possible justification for criteria of justification.

Murphy (1993) mentions two other fractal philosophies which may similarly be relevant to critical realist fractal philosophy: Theo Meyering's fractal argument for ontological realism and philosophical naturalism, and Alasdair MacIntyre's fractal justification for immanent critique. These insights, broadly aligning with the critical realist fractal philosophy, can be valuable resources to consider for critical realist justification. I call them potential *resources* for a fractal critical realism because I do not think that the insights and positions of Lakatos, Meyering and MacIntyre can simply be inserted 'as is'. There must be a closer analysis of assumptions, beliefs and arguments (as has been done with other theoretical 'resources' in critical realism, for example of Marx, Hegel, Aristotle, etc.). However, I include them here because I do believe they can provide valuable resources for critical realist justification. These also provide three further examples of fractal philosophy in practice.

Fractal philosophies *for* critical realist justification

Lakatos

Lakatos's (1970) argument can be summarized as follows: Philosophy of science must have a correct understanding *of* science to be a useful philosophy *for* science. Science and the development of scientific knowledge are best understood as occurring in space and time and should therefore, at least in part, be studied through a historical method (91–92). This brings up the question of which historical methodology – historiography – should be applied to history of science (92–108). This in turn brings up the question of which philosophy of science should be used to justify the chosen historical methodology (108–116). Lakatos' argument is that the comparative explanatory power

criterion can be used at the level of methodology for (natural) science and for history, and at the level of meta-methodology, *and* that this meta-coherence provides further support for the criterion (116–122) (Figure 3).

At the level of the history of science there has, for example, been a move from Newton's theory of gravity to that of Einstein. This can be justified by reference to the criterion for theory choice by means of greater explanatory power at the level of scientific methodology and rational theory choice. This criterion can in turn be justified by reference to the history of philosophy of science, from positivist verificiationism, to Popper's falsificationism, and then to Lakatos' research programmes with comparative levels of explanatory power. Positivism with its verificationist principle faced the problem of induction and was self-defeating (Godfrey-Smith 2021), and which issues Popper's criterion for falsification could sidestep. However, Popper's criterion also faced problems, for example that it was itself 'falsified' by reference to actual historical examples where scientists did not do as Popper claimed they should (ibid). Lakatos research programmes, in turn, could account for why scientists continued with a theory even though it had anomalies (or falsifications in Popper's term). It can be seen that Lakatos is here applying the criterion of comparative explanatory power, first developed to account for rational theory development in the sciences, at the level of meta-methodology. His criterion for theory choice in philosophy of science had itself greater explanatory power than the philosophies of science before
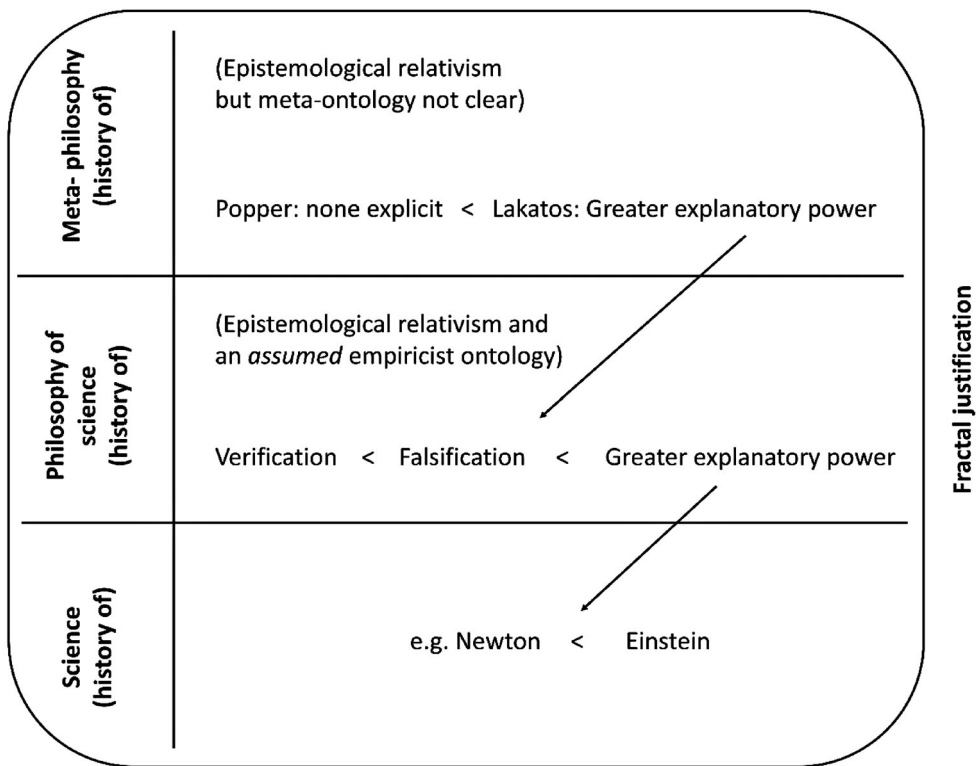
Figure 3. Fractal form of Lakato's justification for the greater explantory power criterion.

it. However, this criterion for theory choice in philosophy of science was, according to Lakatos, not the final truth, it 'only' had greater explanatory power than those before it.

In this way Lakatos provides comparative explanatory power as a criterion for theory choice at the level of methodology for the sciences (including history) and for meta-methodology of philosophy of science, while also accepting that the criterion is itself historically conditioned and developed. Murphy (1993, 502) argues further that the meta-coherent form provides a fractal justification for the criterion at both levels. I argued above that one part of the justification for the comparative explanatory power criterion can come from its meta-coherent form in critical realism which provides fractal justification. Lakatos' and Murphy's arguments here provide further justification in that it is the best criterion we have *to date* and is also meta-coherent with the history of science. In this way, it can make rational sense to apply the criterion to deal with epistemic relativity while acknowledging that it is itself historically developed and conditioned.

Bhaskar has argued that Lakatos' empiricist assumptions for the criterion need to be critiqued from a realist perspective, and hence the need for the qualifying clause ([1986] 2009, 84–85). I would add a further aspect, which is that Lakatos does not consider immanent critique. He accepts immanent critique as a method (for example he accepts that historical 'falsifications' of Popper's falsificationism are a justified approach), yet he does not consider it as a central part of his meta-methodology. He argues, *from his admittedly biased position* (Lakatos 1970, 107), that his position on science and philosophy are improvements on other positions. This differs from the idea of being an improvement on others positions *from their position*. In terms of ontology and immanent critique, Bhaskar improves upon Lakatos.

Meyering

Where Lakatos argues that any philosophy of science assumes a history of science (which assumes a historical methodology and a philosophy of historical research), Meyering argues that *also* any philosophy similarly assumes a history of philosophy (which assumes a historical methodology and a philosophy of historical research, and then again a meta-methodology). There is not room here to go into detail on all his specific arguments as his project is very ambitious, and I therefore instead present the overall form of his argument.

In his *Historical Roots of Cognitive* Science (Meyering 1989), he writes a history about the empirical study of perception, from the theories of Aristotle to Helmholtz (a central thinker to the rise of modern cognitive science). However, it is quickly clear that this historical work has important implications for epistemology, ontology, and meta-philosophy. Meyering demonstrates through the historical analysis that the various empirical investigations of perception of the epochs have been an important resource for epistemological and ontological reflections of the time, and also that the ontology and epistemology of various epochs have provided important resources for the empirical understandings of perception. Drawing on Lakatos' theory of research programmes, Meyering seeks to demonstrate that even though there often was mutual support to be found between the empirical studies of perception and the philosophies of the day there also arose 'anomalies', both within empirical theories of perception and within the philosophies of the day, *and also* between the empirical theories of perception and the philosophies,

which in time paved the way for better and more comprehensive understandings of both perception *and* of philosophy. Meyering argues that this culminates in an understanding of a perceptual theory in modern cognitive science that mutually supports, and is supported by, a philosophy of ontological realism and epistemic relativity (Meyering uses the term 'hypothetical realism' to describe this partial but incomplete access to an actually existing reality, and is argued in contradistinction to Kant's transcendental idealism (208–225)). In addition to being mutually supportive, the perceptual theory of cognitive science and the broadly critical realist philosophy of science are better able to deal with anomalies in past empirical theories of perception and in philosophy.

Meyering argues that this mutually supporting perceptual theory and philosophy naturally has implications for the methodology of philosophy (meta-methodology). For example, though analytical philosophy today generally considers epistemology as 'first philosophy' – i.e. that epistemology is the most important and the one we need to ground first by *thinking* – Meyering demonstrates through historical analysis that this Cartesian idea of the centrality of epistemology both *came from and* mutually *supported* the scientific understanding of perception at the time. His argument is that analytical philosophy, whose meta-methodology is to seek to ground epistemology and philosophy of science in *a priori* concepts, is considered to make sense as a meta-methodology in large part because of the philosophical tradition following from Descartes. However, it is the Cartesian theory of perception that was historically used to justify this meta-methodology, which theory of perception has since been improved upon. Not only has the underlying conception of perception been improved upon, a realist ontology – argues Meyering – can also improve upon the anomalies brought about by the non-realist ontology in analytic philosophy.

Based on the conclusions of his historical analysis, Meyering argues for the importance of a naturalistic meta-methodology in philosophy (xvi). A naturalistic approach to philosophical methodology considers philosophical reflection and scientific empirical observations as importantly connected, and which Bhaskar referred to as the important '*methodological circle*, [the] twinscrewing philosophy and science' ([1986] 2009, 19, emphasis in the original). This is in opposition to philosophy as categorically distinct from and prior to science. The naturalistic idea of continual improvement through time, building on the best, but not absolute, understandings we have at the time, is fully continuous with Lakatos' criterion for theory choice, and which Meyering applied. Indeed, Meyering argued that the demonstration of his own [hopefully insightful] historical study of empirical studies of perception and of philosophy individually, *and in conjunction*, provides further evidence of the relevance both of a naturalistic approach to philosophy and of Lakatos' criterion for theory choice in science, in history of science, and in philosophy. A naturalistic approach is – following Bhaskar – also continuous with immanent critique, something which Meyering did not consider. Meyering argues that *from his position* he can explain anomalies and faults that he observes in analytic philosophy and can improve upon them. He justifies *his* position through the meta-coherency and apparent performative applicability of his meta-methodology.

Figure M is an attempt at demonstrating how Meyering argues for the greater explanatory power of a cognitive scientific theory of perception over that of Descartes' theory of perception, which again was an improvement upon the Aristotelian theory. These are related to the philosophies of the day, which also have seen an improvement through
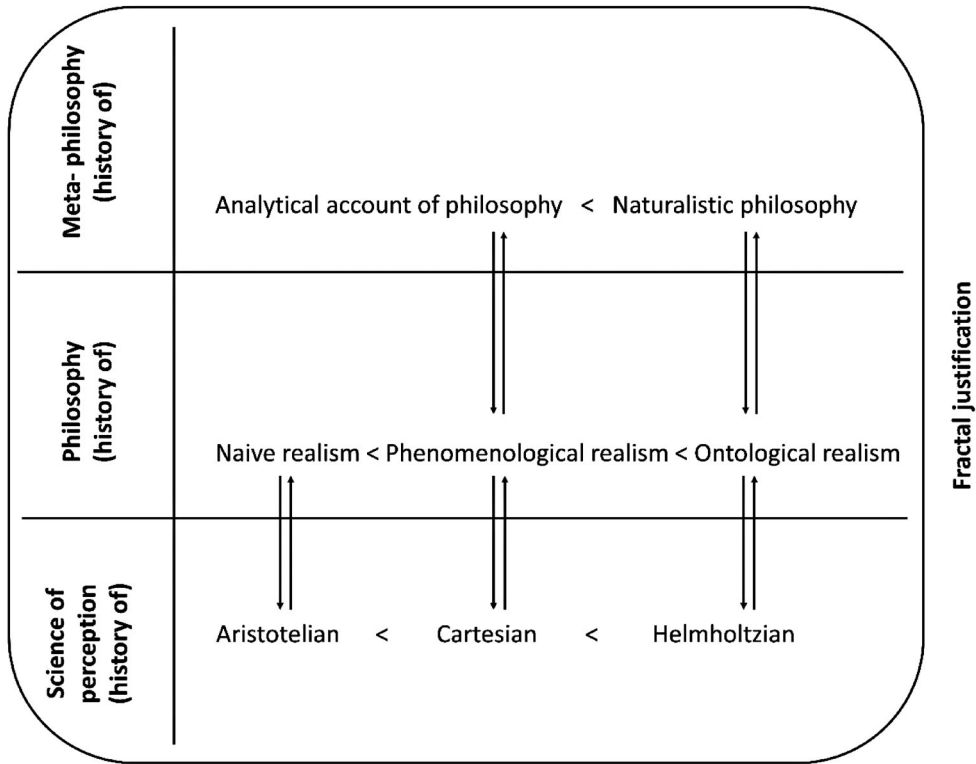
Figure 4. Fractal form of Meyering's justification for naturalistic philosophy and ontological realism.

time from one theory to another for greater explanatory power. Finally, these also relate to the improving meta-philosophies that Meyering argues for through time. This meta-coherency is in turn viewed by Murphy (1993) as a fractal form of justification for the theory as a whole (Figure 4).

Meyering's meta-coherent approach to the study of the history of philosophy can be relevant both to provide support together with Lakatos for the comparative explanatory power criterion as a criterion for rational theory choice thought developed within epistemic relativity and it can be used as resource to inform a critical realist historiography of philosophy. It will be remembered that Bhaskar explained that a history of philosophy would be relevant to discuss western criteria of rationality (such as the comparative explanatory power criterion), but such a project has not yet materialized.

MacIntyre

Even though they both touch on immanent critique and provide resources that can be used to justify immanent critique, Meyering and Lakatos are clear that their meta-coherent arguments are from *their* perspectives (and my respects to them for their epistemic humility). Murphy (1993, 508) also takes this 'internally' coherent approach, arguing for the importance of meta-coherent arguments which are justified by their fractal form. Though such fractal arguments are elegant, and I have here argued for the value of

them, they are however insufficient for rational adjudication of one position over another because you could end up with two or more philosophies that disagree but are equally meta-coherent. Kuhn's ([1962] 2012, 147–149) argument of two competing paradigms that seem to make sense according to the criteria *within* their own paradigms is an example of such purely 'internal' coherence at work. There needs to be a genuine connection between competing positions, which is what immanent critique attempts to secure.

Murphy (1993, 507–508) focuses on the fractal nature of MacIntyre's narrative approach to both science and philosophy as found in his *Whose Justice? Which Rationality?* (MacIntyre 1988), and though this can be of interest, I instead here focus on the meta-coherent nature of his work which has relevance to immanent critique. His *Three Rival Versions of Moral Enquiry* (MacIntyre 1990) is a book about the epistemological foundations of various value systems. MacIntyre's focus was on morality and how to argue for one moral theory over another. However, he was aware that what is justified as morally correct in one tradition or culture is dependent on their standards and criteria for justification. Therefore, the question of how to rationally adjudicate between the standards and criteria for justification which support the competing moral theories became a central question to him. In critical realist terms we could say he was aware of epistemic relativity, both his own and that of humanity generally, and that similarly to critical realists he was interested to move beyond judgemental relativism. In his case this was about moral theories. In the book he analysed three distinct types of rationality belonging to competing worldviews: Enlightenment rationality, postmodern 'rationality',[2] and a tradition-based form of rationality. The tradition-based form of rationality is very reminiscent of immanent critique.

> [This book has] as one of [its] aims to show that … an admission of significant incommensurability and untranslatability in the relations between two opposed systems of thought and practice can be a prologue not only to rational debate, but to that kind of debate from which one party can emerge as undoubtedly rationally superior, *if only because exposure to such debate may reveal later that one of the contending standpoints fails in its own terms and by its own standards.* (5, emphasis added)

He explains how this relates to rivalry over standards of rationality and criteria:

> [S]o far as large-scale theoretical and conceptual structures are concerned, each rival theoretical standpoint provides from within itself and in its own terms the standards by which, *so its adherents claim*, should be evaluated, [therefore] rivalry between such contending standpoints *includes rivalry over standards*. There is no theoretically neutral, pre-theoretical ground from which the adjudication of competing claims can proceed. (172–173, emphasis added)

MacIntyre explains that a dialectical synthesis of two radically different positions, *including competing standards of rationality* (which are at the level of meta-methodology), can be seen in the work of Thomas Aquinas who synthesized the competing Aristotelian and Augustinian systems of his day. This was accomplished by understanding each position on their own terms and arguing immanently to demonstrate the lack in both positions, *on each their own terms*, and that Aquinas' synthesis of the two positions could, *according to the standards of rationality in each position*, be seen as an improvement. No doubt an impressive feat. MacIntyre uses this historical example to counter the postmodern claim that incommensurability necessarily means it is impossible to rationally choose one

standpoint over another, and, based on this, he argues, 'So we also need to proceed by raising critical questions for [enlightenment rationality] and [postmodern rationality], not in our terms, but in theirs' (173). MacIntyre explains the dichotomous positions of enlightenment and postmodern rationality as follows: '*Either* reason is thus impersonal, universal, and disinterested *or* it is the unwitting representative of particular interests, masking their drive to power by its false pretensions to neutrality and disinterestedness' (59, emphasis in the original).[3]

And so instead of arguing from *his* position for the correct form of rationality, MacIntyre argued for each position using *their own* form of rationality. In fact, he did more than this, he also argued *against* each of the three standpoints (including his own) using all three standpoints. By self-referentially using the three forms of rationality he observed that only the tradition-based form of rationality was internally consistent and therefore, by a process of elimination, should be preferred over the others. It was also the only rationality at the level of meta-methodology which could carry out an analysis of distinct forms of rationality *on their own terms*, i.e. without meta-methodological dogmatism (for example, postmodernism cannot take enlightenment rationality seriously on its own terms, precisely because it is the enlightenment idea of rationality as such to which the postmodern opposes). In MacIntyre's argument we can see immanent critique as both a conclusion at the level of meta-methodology and as a self-coherent meta-methodology informing the meta-methodological conclusions – thus providing a fractal form (Figure 5).

As will be remembered, Bhaskar justified the use of immanent critique as meta-method because of epistemic relativity (at the level of meta-philosophy), and I argued for its justification because of its fractal form in the critical realist system. MacIntyre's argument here provides a further useful resource for a critical realist fractal philosophy through the self-coherent and fractal justification for immanent critique over other forms of rationality *on their own terms*.

MacIntyre's analysis also brings to the fore that moral theories are (or should be) intimately related to theories of justification (such as immanent critique) because moral arguments are justified in *some* way, and the modes of justification are made
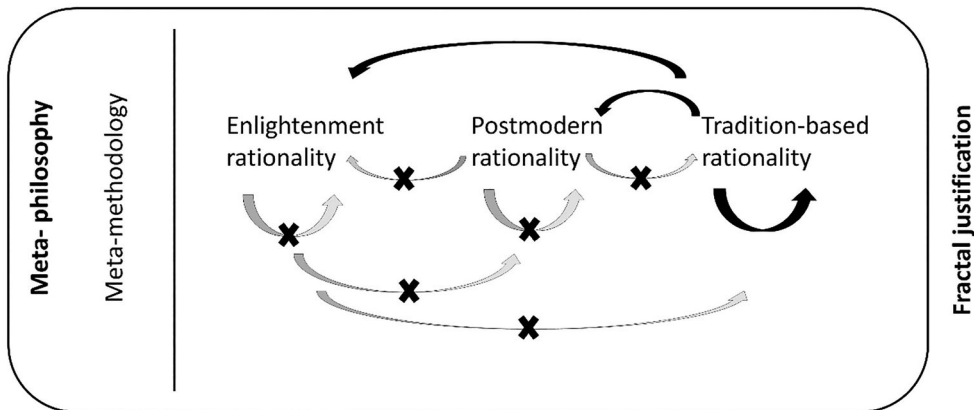
Figure 5. Fractal form of MacIntyre's immanent justification for immanent critique.

sense of within entire worldviews. I have in this paper primarily argued for the value of meta-philosophical justification in regard to research inspired by critical realism. However, the value of meta-philosophical justification can be seen as having equal importance to critical realist discussions on moral theory. It might be a worry among some critical realists that all this discussion on epistemology and meta-philosophy slows us down and takes away attention from more pressing moral issues and real needs in the world. However, how to rationally adjudicate between competing modes of justification and of worldviews is (or should be) a central concern for moral discussions because without such rational justification (and rational justification of the justifications) it is difficult to see how moral theories can be more than mere conclusions of dogmatic assumptions and premises. I am of the position that we need reflective practice, which includes active engagement in moral and political issues *and* deep thought about abstract philosophical matters.

Such an approach as outlined above also has relevance for contemporary ethical discussions about knowledge(s) and power as found in the literature on epistemic injustice (e.g. Kidd, Medina, and Pohlhaus 2017): Immanent critique (meeting others on *their* terms) and greater explanatory power at the level of philosophy and meta-philosophy can open for accepting a broad understanding of knowledges (i.e. the actuality of epistemic relativity) without *a priori* concluding that all knowledges are equally correct (i.e. the possibility of judgemental rationality).

Conclusion

There have been two related questions that guided this paper:

(1) What are some potential issues with the criterion for judgemental rationality as developed by Bhaskar?
(2) How can critical realism itself be justified without foundationalist assumptions or an infinite regress of justification?

It was observed that there are at least four issues of 'significance' in the criterion for theory choice proposed by Bhaskar. It was argued that it is not clear how it would be possible to adjudicate between competing theories by use of the comparative explanatory power criterion when 'significance' – a central part of the criterion – is decided *by someone*, and there may be competing opinions on significance by proponents of competing theoretical positions. It has been suggested that by conceiving of immanent critique as equally relevant to critical realist research methodology as is has been argued for critical realist meta-methodology the questions of 'significant to whom?' becomes 'significant to the other'. This is so whether there is a generally shared methodology as Bhaskar claimed in the natural sciences, or whether it is in the social sciences where there are often radically different notions of what is significant. MacIntyre provides a valuable immanent justification of immanent critique, which can be used in conjunction with Bhaskar's meta-epistemological justification for immanent critique.

A second issue that was noted with the criterion is that it exists and has been developed within epistemic relativity, and it is not entirely clear how it can then be used to

deal with epistemic relativity. To this it has been argued that while the criterion for theory choice is not outside of historical time or social context, by being equally relevant at the philosophical and meta-philosophical level it is at least meta-coherent and can receive justificationary support via its fractal form. In the same way that Bhaskar applied Lakatos' criterion as an important starting point to his own, so too can we use Lakatos' meta-coherent historical justification of the criterion to provide an answer as to how something that has developed within epistemic relativity, including historical conditioning, can yet be rationally used to handle the worry of meta-judgemental relativism. To Lakatos' meta-coherent argument for the comparative explanatory power criterion, we can add Murphy's argument for its fractal justification. Meyering's meta-coherent justification of philosophical naturalism (of which Lakatos' criterion is an example) and his [hopefully insightful] *application* of the criterion can provide further justification of the criterion.

It has been argued that a fractal form of justification for critical realism can come about, not by reference to some meta-meta-philosophy (and so on) or some fundamentalist position, but through the meta-coherency of the philosophy with its meta-philosophy. It is, following Murphy (1993, 508) 'to find order on a higher level of analysis'.

What does all this provide to the philosopher or young child who wants to keep asking 'why' for further justification, from research conclusions and down to the meta-meta-methodology and meta-meta-philosophy, and beyond? What this provides is an answer that what we find is a critical realist philosophy of science with meta-coherence, and one which proceeds immanently (i.e. it 'connects' with *other* thought and is not a purely 'internal' form of coherence). Note, however, that with all this support it is still not an absolutist position as it does not seek out an absolute and foundational premise for its arguments, and so the premises *can* be questioned. So too, the fractal form of justification *can* be questioned. And if the premises and justification can be questioned, then so too can the conclusions that are supported by these. Indeed, the questions brought up by Bhaskar about criteria of rationality that we usually use being developed in the West are still prescient, even while demonstrating that the criterion for, and mode of, rationality in critical realism is superior to important competitors in the West. Here the meta-coherency of Meyering's historiography of the empirical study perception and of philosophy could be a useful resource for a critical realist historiography and social scientific study of philosophy (and politics). Another potentially valuable line of inquiry would be to carry out immanent *critiques* of immanent critique, in addition to the immanent and fractal justification of immanent critique as found in this paper. In addition to further questioning our own position we can also question why the philosopher or child conceptualizes justification as being in the form of further supportive premises rather than 'emergent' justification. This can allow for a further discussion about justification of justification. In any case, the idea of fractal justification will likely confuse the child or philosopher, at least for a while, to stop asking 'why' all the time.

In summary, the fractal coherence of critical realist philosophy and meta-philosophy as discussed here can be considered to be *one* important approach to deal with meta-philosophical justification for critical realism and for explaining how a criterion for theory choice developed within epistemic relativity still can be used to deal with epistemic relativity.

Notes

1. I recommend to all who want to understand what Bhaskar said about incommensurability and theory choice in the sciences to read pages 73–92 in *Scientific Realism and Human Emancipation* ([1986] 2009). The book is also essential reading to understand Bhaskar's justification for his philosophy, as Hartwig writes in the introduction, 'As Bhaskar had noted in 1978, one of the chief lacks in his earlier account of transcendental realism was the absence of an explicit meta-philosophical justification of its transcendental procedure. This is now made good, in the context of the fullest account of his approach to philosophy anywhere in the Bhaskarian oeuvre' (Hartwig 2009, xxiv).
2. Though MacIntyre uses the term 'Genealogy' to refer to the approach taken by for example Nietzsche, Foucault, Deleuze and Derrida, I here follow Murphy's (1993) terminology as this, I think, will be clearer to a critical realist audience.
3. Jamie Morgan and Wendy Olsen have previously referenced MacIntyre's work to problematize Bhaskar's judgemental rationality because they understood Bhaskar's as a form of enlightenment rationality (Morgan and Olsen 2008, 118). I rather understand Bhaskar's immanent rationality as much closer to MacIntyre's tradition-based rationality than to his definition of enlightenment rationality, as exemplified in the quotes.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributor

There are three broad questions related to scientific knowledge that intrigue me: What is scientific knowledge and how is it attained? Can it be attained? How is scientific knowledge and philosophy of science best taught in higher education? What role does scientific knowledge play in western society, for example in relation to politics?

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References

Bhaskar, Roy. (1975) 2008. *A Realist Theory of Science*. 3rd ed. Abingdon, UK: Routledge.
Bhaskar, Roy. (1978) 2015. *The Possibility of Naturalism: A Philosophical Critique of the Contemporary Human Sciences*. 4th ed. Abingdon, UK: Routledge.
Bhaskar, Roy. (1986) 2009. *Scientific Realism and Human Emancipation*. 2nd ed. Abingdon, UK: Routledge.
Bhaskar, Roy. (1994) 2010. *Plato Etc.: The Problems of Philosophy and Their Resolution*. 2nd ed. Abingdon, UK: Routledge.
Bhaskar, Roy. 2016. *Enlightened Common Sense: The Philosophy of Critical Realism*. Abingdon, UK: Routledge.
Blaikie, Norman, and Jan Priest. 2017. *Social Research: Paradigms in Action*. Cambridge, UK: Polity.
Bryman, Alan. 2016. *Social Research Methods*. 5th ed. Oxford, UK: Oxford university.
Carter, J. Adam, and Ernest Sosa. 2022. "Metaepistemology." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta. https://plato.stanford.edu/archives/spr2022/entries/metaepistemology/.
Eklund, Matti. 2006. "Metaontology." *Philosophy Compass* 1 (3): 317–334. https://doi.org/10.1111/j.1747-9991.2006.00026.x.

Fox, J. F. 1996. "Towards Metamethodology: For the History and Philosophy of Science." *Australian Studies in History and Philosophy of Science* 12: 103–121. https://doi.org/10.1007/978-94-015-8607-8_7.

Godfrey-Smith, P. 2021. *Theory and Reality: A Introduction to the Philosophy of Science*, 2nd ed. Chicago, MA: University of Chicago.

Harper, William. 2007. "Newton's Methodology and Mercury's Perihelion Before and After Einstein." *Philosophy of Science*, 74: 932–942. https://doi.org/10.1086/525634.

Hartwig, Mervyn. 2007. "Holy Trinity." In *Dictionary of Critical Realism*, edited by Mervyn Hartwig, 238–242. Abingdon, UK: Routledge.

Hartwig, Mervyn. 2009. "Introduction." In *Scientific Realism and Human Emancipation*, 2nd ed., edited by Roy Bhaskar, xi–xli. Abingdon, UK: Routledge.

Hasan, Ali, and Richard Fumerton. 2022. "Foundationalist Theories of Epistemic Justification". In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta and Uri Nodelman. https://plato.stanford.edu/archives/fall2022/entries/justep-foundational/.

Isaksen, K. (2016). Reclaiming Rational Theory Choice as Central: A Critique of Methodological Applications of Critical Realism. Journal of Critical Realism, 15 (3), 245–262. https://doi.org/10.1080/14767430.2016.1169369

Joll, Nick. 2017. "Metaphilosophy." *The Internet Encyclopedia of Philosophy*. https://iep.utm.edu/con-meta/.

Kidd, Ian J., José Medina, and Gaile Pohlhaus Jr, eds. 2017. *The Routledge Handbook of Epistemic Injustice*. Oxon, UK: Routledge.

Klein, Peter D. 2009. "Contemporary Responses to Agrippa's Trilemma." In *The Oxford Handbook of Skepticism*, edited by John Greco, 484–503. Oxford: Oxford University. https://doi.org/10.1093/oxfordhb/9780195183214.001.0001.

Kuhn, Thomas, S. (1962) 2012. *The Structure of Scientific Revolutions*. 4th ed. Chicago, IL: University of Chicago.

Lakatos, Imre. 1970. "History of Science and Its Rational Reconstructions." *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association* 1970: 91–136. https://www.jstor.org/stable/495757.

MacIntyre, Alasdair. 1988. *Whose Justice? Which Rationality?* Notre Dame, IN: Notre Dame University.

MacIntyre, Alasdair. 1990. *Three Rival Versions of Moral Enquiry: Encyclopedia, Genealogy and Tradition*. Notre Dame, IN: Notre Dame University.

Meyering, Theo C. 1989. *Historical Roots of Cognitive Science: The Rise of a Cognitive Theory of Perception from Antiquity to the Nineteenth Century.* Dordrecht: Kluwer.

Morgan, Jamie, and Wendy Olsen. 2008. "Defining Objectivity in Realist Terms: Objectivity as Second-Order 'Bridging' Concept, Part II: Bridging to Praxis." *Journal of Critical Realism* 7 (1): 107–132. https://doi.org/10.1558/jocr.v7i1.107.

Murphy, Nancey. 1993. "Philosophical Fractals: Or, History as Metaphilosophy." *Studies in History and Philosophy of Science, Part A* 24 (3): 501–508. https://doi.org/10.1016/0039-3681(93)90041-H.