

THE MICRO IS NOT ENOUGH: SOME PLURALISTIC RESPONSES TO MICROPHYSICAL REDUCTIONISM

*O MICRO NÃO É SUFICIENTE: ALGUMAS RESPOSTAS
PLURALISTAS AO REDUCTIONISMO MICROFÍSICO*

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Abstract

As the basis for metaphysical explanations, microphysical properties are generally seen as fundamental properties. In this context, we rarely doubt that the microphysical properties used to determine resemblance among objects or to distinguish them from others operate at a different level than macrophysical properties. This article addresses several inclusive and pluralistic perspectives developed in response to reductionist explanations that prioritize microphysical properties. The first of these is the view

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known as microphysical manyism, which implies that when considering levels of properties, they should not be evaluated independently of the physical foundations of objects. The second inclusive perspective, pragmatic pluralism, insists on an explanatory framework consistent with the intuitiveness of causal and mereological explanations. Both perspectives are important because they challenge the privileged status of microphysical reductionism. To examine this debate, the article explores approaches that explain some details by drawing on resemblance nominalism and trope theory, while also analyzing the justifications behind perspectives that equate natural properties with sparse properties.

Keywords: Microphysicalism. Properties. Concrete Particulars. Levels. Metaphysics.

Resumo

Como base para explicações metafísicas, as propriedades microfísicas são geralmente vistas como propriedades fundamentais. Nesse contexto, raramente duvidamos de que as propriedades microfísicas utilizadas para determinar semelhanças entre objetos ou para distingui-los uns dos outros operam em um nível diferente das proprie-

dades macrofísicas. Este artigo aborda diversas perspectivas inclusivas e pluralistas desenvolvidas em resposta às explicações reducionistas que priorizam as propriedades microfísicas. A primeira dessas perspectivas é a visão conhecida como microphysical manyism, que implica que, ao se considerar os níveis das propriedades, elas não devem ser avaliadas de forma independente dos fundamentos físicos dos objetos. A segunda perspectiva inclusiva, o pluralismo pragmático, insiste em um quadro explicativo coerente com a intuitividade das explicações causais e mereológicas. Ambas as perspectivas são importantes porque desafiam o status privilegiado do reducionismo microfísico. Para examinar esse debate, o artigo explora abordagens que esclarecem alguns detalhes recorrendo ao nominalismo das semelhanças e à teoria dos tropos, ao mesmo tempo em que analisa as justificativas por trás das perspectivas que equiparam propriedades naturais a propriedades escassas.

Palavras-chave: microfísicalismo. propriedades. particulares concretos. níveis. metafísica.

There are many different debates about how to draw metaphysical distinctions among concrete objects. The question of how concrete particulars can be regarded as distinct entities from one another raises a fundamental issue. From an essentialist perspective, the answer often involves a haecceity to entities (Kriegel, 2021, p. 97). Although we possess useful theories for treating concrete particulars as distinctive objects, it is not always easy to explain their resemblance in terms of shared properties through universals. In particular, some nominalist approaches introduce philosophical challenges to universalist positions when attempting to account for the distinctness or unity of concrete particulars (Morganti, 2007, p. 165).

Some of these problems rise maintaining that the naming and categorization used to classify concrete objects by resemblance are fundamentally hypothetical. Accordingly, it is controversial whether the sets formed on the basis of certain resembling properties among objects possess genuine ontological reality. From this perspective, one might reject the view that the existence of shared properties among objects corresponds to concrete reality in the form of sets or categories to which those objects belong. This kind of resemblance nominalism holds that the properties enabling resemblance among objects are merely abstract notions serving linguistic or classificatory convenience and therefore lack ontological reality. Thus, the conceptual structures underlying metaphysical distinctions among concrete objects are not independent entities existing in the real world, but rather ways in which the human mind organizes that world (Ehring, 2011).

Even though regarding the properties used to categorize objects as mere labels is considered a reasonable position within contemporary metaphysics, disagreements arise about the levels of such properties. For instance, calling two objects “red” simply indicates that they share a certain surface hue; however, how decisive redness is for the identity or ontological constitution of objects remains debated. For some philosophers, properties like color are not fundamental qualities that objects possess ontologically; rather, they are superficial, contingent, or context-dependent. At this point, the discussion of sparse properties becomes relevant in contemporary metaphysics. Sparse properties are those that determine the identity and ontological status of objects and they generate real and fundamental distinctions between them (Elgin, 2022, p 163). For example, for a table, having a certain volume or a specific degree of hardness could be considered basic and sparse properties that define its nature, whereas being “red” would be regarded as a common and superficial property outside this category (Shumener, 2020, p. 2074).

Hence, the assumption that resemblance among concrete particulars is grounded in property-bearers appears quite reasonable. Alternatively, trope theory—

which dispenses with the need for property-bearers. According to this view, objects consist not of universals but of particularized instances of properties—tropes. However, such accounts raise further difficulties. The most important is that tropes, while invoked to explain resemblance, can equally be invoked to explain difference. As Hakkarainen note, “if two tropes (t and t) are exactly similar but numerically distinct, then there must exist between them both a relation of resemblance and a relation of difference. Since these two internal relations are distinct in kind, tropes themselves must already contain a form of internal differentiation or complexity” (Hakkarainen et al., 2017, p. 650). Therefore, if the internal structure of tropes that constitute resemblance sets among objects already entails complexity, we may need a simpler ontological account. Consequently, neither the concept of resemblance nor the perspectives of trope theory may be sufficient to determine the ontological status of properties.

When we examine how trope theory and resemblance nominalism categorize objects, we tend intuitively to focus on higher-level or macrophysical properties. Of course, both theories can be extended to include micro-level properties as well. Yet, doing so is far more difficult than defining sparse properties as the primary basis of resemblance. Indeed, novel perspectives have emerged that argue that objects belonging to the same class under resemblance nominalism can establish such relations through natural properties, and that these natural properties can be positioned precisely as sparse properties (Demirli, 2025, p. 110). In short, whether we appeal to a specific version of nominalism, to an approach reducing to trope resemblance, or to one that privileges only the most natural sparse properties while excluding abundant ones, all share a common question: What are the levels of these properties? When establishing resemblance among objects, how does it matter whether these properties are microphysical or macrophysical, sparse or abundant?

From this standpoint, for someone who endorses property realism, this question is not unanswerable. That is, the claim—expressed through nominalism, trope theory, or other frameworks—that properties or resemblance sets are unreal still fails to convince us. For the phenomenon of resemblance could be real even if only certain properties are real, allowing genuine classes to emerge. Guigon calls this view *resemblist realism*: it accepts the reality of similar properties and of the classes enabled by this resemblance, without reducing resemblance to nominalist convention (Guigon, 2009, p. 173).

Hence, the point at issue may not be genuine or *ad hoc* ontology, nor whether resemblance can be captured through tropes or reduced to natural sparse properties. The crucial issue is, rather, where to situate the level of properties for a physicalist.

For if we conduct the debate on the assumption that the property-bearing substratum (disregarding trope theory) has physical existence, we may be strongly inclined to expect that properties can only be natural (Alvarado, 2014, p. 152). In this case, the focus of discussion shifts from the ontological status of resemblance to the level at which properties are grounded within physical reality; thus, from a physicalist perspective, the assumption that properties are exclusively natural appears to be the most coherent and explanatory option (Schaffer, 2008, p. 254). From this, it follows that properties may have two distinct levels: macrophysical and microphysical.

Levels and Supervenience

Supervenience emphasizes that any event occurs at at least two levels. For example, when we propose a proposition such as "the cause of mental events depends on events in our brain," we emphasize that the events occurring here develop within the framework of two levels. Thus, neural changes occurring within our brains somehow affect our consciousness, resulting in certain mental changes (Kim, 1982). Therefore, in a metaphysical context, supervenience is closely related to the concept of change. This is because changes at the lower level, brought about by changes at the higher level, constitute an event that manifests holistically as changes occurring in two different places. We could also refer to the levels we are discussing here as the microphysical and macrophysical levels. The microphysical level refers to a physical level we cannot directly penetrate through our intuition in everyday life (Moran, 2022, p. 405).

For example, the mass of objects is a natural property of that object, and some visible properties arise from changes in these microphysical level. On the other hand, these characteristics can also be considered macroscopic properties. Therefore, the concept of supervenience here represents a multi-layered relationship established between the microphysical and macrophysical levels. This relationship is essential not only for a philosophical analysis but also for scientific modeling and understanding. Science often establishes causal patterns and their explanations from lower to higher levels when explaining events. Therefore, supervenience helps us understand the metaphysical basis of these causal relations. In this context, the concept of supervenience will become useful not only for providing explanations for the mind-body problem or the fundamental problems of the philosophy of mind, but also for understanding the causal patterns of microscopic and macroscopic properties. For example, what makes a vase fragile is the microscopic structure of its molecular components, which explains why it breaks when dropped (Kistler, 2012, p. 119).

Based on this, the temporal changes in properties become dependent on their physical configurations, and at this stage, microscopic properties gain complete control over macroscopic properties. However, for our everyday human intuition, the value of macroscopic properties may still remain at the same level. For example, the observable stability or shape of a physical object depends on the underlying order and interactions of its microphysical components. According to Lewis' explanation, the validity of all physical phenomena (natural laws and causal patterns) depends on the general distribution of intrinsic properties in space-time (Busse, 2009, p. 450). In this sense, the macrophysical properties of objects can be seen as structured outcomes of these microphysical distributions. Therefore, the relationship between microphysical and macrophysical properties reflects not two separate domains of existence, but two descriptive levels within a single ontological continuum: the former grounds the structure of physical reality, while the latter expresses the structure of physical reality.

Are Microphysical Properties “More Fundamental”?

Assuming that all concrete objects we refer to are conceived as mereological sums—and setting aside the deeper problems this assumption may raise—it becomes easier to claim that any object possesses properties of both levels. For this, the object must in some sense be presupposed as a mereological aggregate, since the carriers of the instantiations of macrophysical and microphysical level properties require such aggregates (Forrest, 2002, p. 5). If the existence of properties belonging to both macro and micro levels is real, then the question of how these levels differ becomes crucial. Consequently, two hypotheses can be proposed concerning the value of micro-properties relative to macro-properties: a weak and a strong hypothesis.

Weak Hypothesis:

Micro-properties are rarely represented in ordinary language and experiential conceptual maps. Most of these properties affect macro-level phenomena only indirectly or are entirely epiphenomenal—i.e., they play no causal role by themselves. Therefore, even though micro-properties are ontologically more fundamental, their contact with phenomenal reality is weak.

According to Khalidi this can be seen by examining the structure of our concept of causation, which is historically shaped by the commonsense, human-scale world and thus does not align perfectly with the micro-level reality revealed by modern science (Khalidi, 2011, p. 1159). When the causal determinations of

concrete particulars are reduced solely to the microphysical level in this regard, the relevance of these determinations may be at risk of being valid only at the discursive or linguistic level.

Strong Hypothesis:

Microphysical properties primarily represent natural properties; hence, compared to complex macro-level bundles, they offer a more economical and ontologically pure structure. Because they are directly connected to the laws of nature, they constitute the most fundamental—and thus the “more real”—level of reality. Consequently, for example, micro-level sparse properties possess the highest ontological priority in metaphysical explanations.

To defend the strong hypothesis regarding the ontological value of microphysical properties, one must presuppose an ontology privileging natural properties, as frequently emphasized by Lewis (Lewis, 1986, p. 60). Unless supported by such a view, the weak hypothesis may appear more plausible. It is not necessary to include only microphysical properties in the class of natural properties; nor are sparse properties always microphysical. Yet, from Lewis’s standpoint, one can regard sparse properties as the basis of natural properties. Doing so would render the earlier debate over resemblance nominalism largely obsolete, for we would have discovered a kind of joint-carving property degree that genuinely constitute resemblance among objects.

Some Pluralist Approaches to Levels

From this perspective, the level difference between microphysical and macrophysical properties may be both exclusive (in that they belong to different levels) and pluralistic (in that they coexist ontologically). One formulation of such pluralism is microphysical manyism, according to which every composite or higher-level object is merely a plurality of microphysical particles. These particles fulfill all the theoretical roles attributed to composite objects; thus, higher-level entities should be identified with these pluralities themselves (Thunder, 2024, p. 2239).

For those who hold a physicalist perspective, identifying macrophysical objects with pluralities of microphysical particles is both conceptually coherent and consistent with physical science. Accordingly, Thunder proposes an ontological framework that encompasses both microphysical and macrophysical reality without reducing one to the other or establishing any hierarchical superiority between them. This approach is compatible with a kind of Canberra plan that privileges function-

nal properties over ontological context in explaining the physical world and has the power to make metaphysics more relevant to intuitive reality. Such a framework not only aligns well with the holistic nature of the physical world but also fits seamlessly with physicalist intuitions, since it accepts that the regularities observed at the macro level are grounded in microphysical processes, while avoiding any reductionist hierarchy between explanatory levels (Thunder, 2024, p. 2257).

A different view that emphasizes a pluralistic coexistence between microphysical and macrophysical properties, rather than an ontological hierarchy between them, was proposed by A. Hüttemann. According to Hüttemann, perspectives such as microphysicalism is not confined to the frameworks discussed above—properties, mereology, and the like. The reason is that microphysicalism can be regarded as the ontological foundation that pervades large regions of metaphysics, extending into domains such as material composition (*micro-determination*) and causation (*micro-government*) (Hüttemann, 2003, pp. 8-9). Thus, conceiving of reality as multilayered provides a unifying explanatory basis applicable across the entire field of metaphysical inquiry.

For Hüttemann, however, the existence of this multi-layered structure appears excessively reductionist when explanatory privilege is granted solely to microphysicalism. Consequently, regularities at the macrophysical level become meaningless from such a perspective. Yet philosophical intuition renders macrophysical regularities highly significant. Moreover, apart from our intuitions, microphysicalism also weakens in the face of emergent properties. Since emergence implies, in a sense, that the whole may behave independently of its parts, it points to the irreducible nature of both microphysicalism and macrophysicalism (Hüttemann, 2003, p. 55). Hüttemann therefore advocates a pluralism in favor of the functionality of ontological explanation. This pluralism is grounded not in the hierarchy between microphysical and macrophysical properties but in highlighting the functionally relevant points that allow us to construct proper ontological explanations. Hüttemann calls this approach pragmatic pluralism (Hüttemann, 2003, p. 144).

Pragmatic pluralism holds that, regardless of which microphysical conditions causal or mereological reality depends on, the meaning of these conditions should always be sought in macrophysical contexts. Thus, rather than establishing a hierarchy between the two levels, adopting a functionally pluralist position in our ontological explanations is metaphysically more reasonable. Within this framework, Hüttemann's approach points to an ontological understanding that avoids reducing the multi-layered structure of nature to a single level and instead emphasizes the complementarity of microphysical and macrophysical levels, prioritizing functional

adequacy in explanation.

Conclusion

In conclusion, when faced with change or emergence at the macrophysical level, the ontological privilege accorded to microphysical properties may not be entirely satisfying from an intuitive standpoint. Therefore, treating microphysical properties as fundamental for a metaphysical explanation may not always be the most accurate or useful approach. When explaining resemblance or differences between concrete objects, the question of which properties are shared becomes important, especially if the discussion is not based on resemblance nominalism or trope theory. The relationship between natural and sparse properties, familiar from the Lewisian tradition, leads us to think that microphysical properties may appear more privileged in this respect due to their inevitable naturalness. However, giving ontological priority solely to microphysical properties is not the only valid option. Instead, Thunder's microphysical pluralism, which is compatible with the physicalist approach, can offer an ontological framework that is consistent with scientific reality and also coherent with everyday understanding. Additionally, Hüttemann's pragmatic pluralism aims to establish a pluralistic position between the two levels by accepting macroscopic properties as a basis for causal explanations and mereological theories without ontologically excluding them.

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