Canadian Journal of Philosophy (2026), 56: e31, 1–6
doi:10.1017/can.2026.10097

SYMPOSIUM

Remarks on Sutherland, *Kant's Mathematical World*

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Abstract
The main idea in Daniel Sutherland's Kant's Mathematical World is a strong claim about the immanence of mathematics in the world: Mathematics is literally true of objects of experience because it conditions the possibility of experience, and thereby the objects of experience. Sutherland grounds this claim on an insightful treatment of the general theory of magnitude that outlines constraints on magnitude's representation. That representational task also gives rise to a regress problem, which Sutherland addresses by appeal to continuous successive synthesis. The result bears on recent debates between conceptualist and nonconceptualist readings of Kant's theory of cognition.

Keywords: Kant; philosophy of mathematics; theory of magnitudes; strict homogeneity; nonconceptualism; concepts; intuition

It is very rewarding to engage with Daniel Sutherland's new book, *Kant's Mathematical World*, which is full of illuminating ideas that have transformed the way I think about Kant. Despite the present framework of "Author Meets Critics," not much of what I have to say is critical. Instead, I hope to lay out some main ideas of the book, raise a few questions for Sutherland, and highlight some of the issues where scholars can benefit from further engagement with the space of inquiry his new work has opened up.

The big idea of the book is the *immanence* of mathematics in the world of appearances as Kant understands it. As Daniel puts it in his conclusion,

> Kant's account of mathematics is not an abstract and independently grounded body of knowledge *applied to* the world as we experience it; it is *immanent* in the world as we experience it; the *Critique* is not simply providing an account of our cognition of everyday experience, with a nod to the applicability of mathematics to those objects. Kant's theory of magnitude *fuses* our cognition of experience with all mathematical cognition, pure and applied … (Sutherland, 2022, p. 283; emphasis mine)

This is a powerful observation about the critical philosophy, and it underwrites compelling approaches to Kant's central arguments in the Transcendental Analytic, especially those concerning the relation between mathematics and the conditions of possible experience in the "Axioms of Intuition" and "Anticipations of Perception" chapters. I have pushed a similar line about Kant's theory of experience (Anderson, 2001), emphasizing that Kant's (1998) arguments for the applicability of mathematics to objects of experience rest on the idea that the synthesis through which we represent a given magnitude is the *same synthesis* through which we cognize an appearance with that magnitude (B 203). In my view, this "same synthesis" move is the key, weight-bearing thought driving Kant's (1998) argument in the "Axioms," and it is reprised in analogous versions at many

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https://doi.org/10.1017/can.2026.10097 Published online by Cambridge University Press

other points in his theory of experience, including in the decisive programmatic claim about the relation between judgment and intuition at A 79/B 104–5. Sutherland's account, however, is both more careful and detailed than mine, as well as more cautious about limits on the implications of the "fusion" claim. What is radical and powerful about Kant's thesis of the immanence of mathematics in nature is the idea that the world of our experience is *literally* a world of mathematical structures. That said, as Sutherland observes in the book and reinforces in his replies for this symposium, it remains true that empirical cognition is not mathematical cognition. Mathematical cognition has distinctive features—most notably its ability to rely on free (i.e., elective/arbitrary—*willkürlich*) construction in pure intuition—which separate it from empirical cognition. My own early gesture at Kant's "same synthesis" strategy did not do enough to reinforce the importance of this distinction.

Sutherland's book grounds its big idea on a rigorous, deeply developed account of Kant's general theory of magnitude, which supplies critical philosophical foundations for mathematics. This theory of magnitude has a number of key elements, several of which occasion separately significant scholarly insights from Sutherland. Probably the most important of these is his account of strict logical homogeneity in mathematical cognition, first explicated in a seminal 2004 *Philosophical Review* paper (Sutherland, 2004). Objects are logically homogeneous if they all fall under some given concept (X), allowing them to be represented together as a certain number of Xs (or a certain amount of X-stuff). But such logical homogeneity is insufficient for a fully general and abstract mathematical theory of magnitudes. The great advance of the Eudoxian theory of proportions was its use of proportions to attain a meaningful representation of quantitative relations *between* ratios, even where the ratios being compared themselves treat magnitudes of *different* sorts (falling under different concepts). For example, a proportion can achieve quantitative comparison between, say, a ratio of numbers and a ratio of lines (thus, even when the two ratios are *not* logically homogeneous). Logical homogeneity by itself always deploys a substantive common genus as the "counting concept," so it does not capture the full generality needed for this abstract theory of magnitudes. Sutherland therefore works out a strengthened idea, strict logical homogeneity (or in the book, just "strict homogeneity"), which excludes all heterogeneity as such, and thereby offers a standard for the representation of composable elements that remain numerically different despite *complete* specific identity. This permits us to represent magnitudes that combine to constitute *more* of the *same*; (without numerical difference, we could not have *more*, and without specific identity, they would not be the *same*).

This representational capacity is indispensable for even elementary mathematics. That result leads to a second important and specific point proper to the Kantian theory of magnitude. Given the logical resources available to Kant, concepts alone cannot represent such strictly numerical difference. Instead, intuition is required. The basic idea is that concepts (as Kant and the Leibnizians understood them) represent things precisely by means of specific differences. Given that the representation of homogeneous mathematical magnitudes requires strict homogeneity—and thus, the representation of numerical difference *without* any specific difference—concepts so understood can never suffice. Some representation of a fundamentally distinct logical type is required, and *intuition* plays this role for Kant. Thus, immediate intuition is necessary for mathematical cognition.

A third major insight follows. The intuition of strictly homogeneous magnitudes enables the representation of the *equality of nonidenticals* that is essential to mathematics, and this fact points toward the importance of a theory of measurement for the foundations of mathematics. The notion of equality is the key idea in the theory of measurement. A strictly mereological theory of magnitudes and their composition underwritten by Kant's theory of extensive magnitudes is in principle insufficient, without an explicit theory of measurement, to ground the rich mathematical theory of the full Eudoxian theory of proportions, because it imposes only partial ordering of magnitudes based on their part-whole relations. The representation of equality fills a key gap by permitting the transformation of that partial ordering into a total ordering. One place I found myself wishing for (even) more in the book concerned the connections between the core notion of

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equality of nonidenticals and the Kantian notion of intuition. Like the requirements for the representation of composition leading to more of the same, the representation of the equality (in homogeneous magnitude) of nonidenticals would seem to depend on merely numerical difference, and thus to require intuition, given the limited resources of Kant's logic of concepts. Sutherland does indicate this connection, but I felt that the book could have benefitted from further discussion of the role of intuition in representing equality. In his response paper in this volume, Sutherland takes up this issue with characteristic clarity, and draws some illuminating connections to Kant's argument in the "Amphiboly" chapter.

But again, the big idea of the book is that all this is *not merely* an account of Kant's philosophy of mathematics, considered as some specialized subsidiary problem area. On the contrary, the intuition that permits the representation of essentially synthetic mathematical structure and the intuition that enables us to represent external objects are *fused* within our experience of the world, and this is crucial to Kant's argument that mathematical cognition provides objectively valid knowledge of the objects of experience. After all, the a priori objective validity of mathematics is justified on the basis of Kant's (1998) demonstration that it is a condition of the possibility of experience, and his argument runs essentially through the claim that "the conditions of the **possibility of experience** … *are at the same time* conditions of the **possibility of the *objects* of experience**" (A 158/B 197; emphasis mine). It follows that the world of objects we know *just is* a system of continuous homogeneous magnitudes that is a proper object for mathematical knowledge (even though, again, mathematical cognition itself must be distinguished from empirical cognition, even while the full dress empirical cognition comprises mathematical structure as a kind of constituent, through the "fusion"). In that sense, the book of the Kantian world is "written in the language of mathematics" in a stronger and more foundational sense than was true for the Galilean world.

It follows that Daniel's insights about intuition have controlling power not only for our understanding of Kant's theory of mathematics but also for the broader Kantian theory of cognition and experience. One salient place where this consequence comes to the surface concerns a regress problem for Kant's theory of intuition and perception. The regress arises directly from Kant's account of the representation of extensive magnitude. Kant (1998) defines an extensive magnitude as "that in which the representation of the parts makes possible the representation of the whole (and therefore necessarily precedes the latter)" (A 162/B 203), but at the same time, he holds that the parts capable of composing a magnitude are themselves magnitudes—a part without magnitude (e.g., a point) is a mere limit. Such limit-parts cannot combine to yield a greater magnitude. But if the parts of an extensive magnitude are themselves extensive magnitudes, then they, too, can be represented only on the basis of their parts, which must be magnitudes in turn, and a regress is off. Given the connection I have been emphasizing between mathematical cognition and experience of objects, the regress threatens not only Kant's account of mathematical cognition of magnitudes but also his story about the intuitive representation of magnitude in empirical perception.

The same regress has become an important topic in Kant's broader theory of cognition, because it has been deployed as an argument in favor of "nonconceptualist" interpretations of Kant's theory of perception. The thought is that the regress can be stopped only by denying any role for conceptual synthesis in the representation of the parts of a magnitude, and then postulating some *nonconceptual* representation of the parts to do the needed work. On this picture, the synthesis of an extensive magnitude is conceptual (and thereby determinate) because and insofar as it proceeds part to part. If we are not to have a regress, therefore, the presupposed parts must be given directly to (nonconceptual) intuitive apprehension. Because such parts are not conceptual, they need not be determinate and do not depend on a prior synthesis, stopping the regress. The suggestion is therefore that the elementary intuitions, or (loosely) perceptions, involved in our cognition of objects must be non-conceptual.

Sutherland agrees with the broad observation behind this argument, to the effect that the regress must be avoided by a distinction between the *determinate* and *indeterminate* representation of

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magnitudes. The determinate representation of extensive magnitudes is part to part, and rests on a synthesis that combines prior parts; those parts, meanwhile, are represented as magnitudes, but only in some *indeterminate* way that does not presuppose explicit representation of *their* parts. He also observes, however, that the nonconceptualist account of the regress stopper makes an awkward fit for pure mathematical cognition, where the representation of extensive magnitude is obviously especially salient. (Here, the failure to take sufficient account of differences between mathematical cognition and cognition generally shows one of its dangers.) Here is the problem. In order for parts to be distinguished from one another and then combined via synthesis, we must be able to represent them separately. Nonconceptualists like Allais typically hold that intuitively given parts gain the needed distinctness and internal unity by being grounded in direct perceptual acquaintance with objects. But this cannot work for pure mathematics; after all, in that context "the manifold of intuition is uniform and homogeneous, and presents no distinguishing features" (Sutherland, 2022, p. 110). As a result, the only way to represent *pure* mathematical parts as distinct from one another so as to combine them would be to deploy a mathematical concept, thereby determining a part of the homogeneous manifold. Therefore, *pure mathematical* parts would seemingly have to be determinate and conceptual, and nonconceptualism cannot work to stop the regress.

There must therefore be a different way to resolve the extensive magnitude regress. Sutherland argues persuasively that Kant's actual solution rests on the claim that we must engage in a *continuous successive synthesis* that underlies every representation of extensive magnitude. In such synthesis—for example, when we "draw a line in thought"—the parts are all represented *in and through* the synthesis itself. They are prior to the ultimate whole in one important sense; after all, there could be no line without the continuous synthesis of its parts, so the line depends on its parts. But the parts are not separately and determinately represented *as* parts, prior to the synthesis itself. On the contrary, they are first represented *through* it. Any specific proper part of the line, moreover, could be determinately specified only subsequently, by dividing it out of the line. Whether or not this continuous synthesis is itself conceptual is a separate, further question. Thus, the important insight here (viz., that an *indeterminate* prior representation of the parts is the key to stopping the regress in the representation of extensive magnitude) does not yet settle issues about conceptualism one way or the other, contrary to some non-conceptualist arguments in the recent literature.

Notably, though, Sutherland thereby shows definitively that the problem of the extensive magnitude regress is connected in deep ways to the conceptualism/nonconceptualism debate about Kant's theory of cognition, even though its implications for that debate are not as obvious as has been thought. In fact, he is just as careful to observe (Sutherland, 2022, p. 108, 110) not only that nonconceptualism fails to follow from the regress problem but also that neither his objections to the prominent nonconceptualist strategy for resolving the regress, nor his own preferred resolution, by themselves amount to any decisive argument *against* nonconceptualism. In the book, Sutherland carefully prescinds from any effort to arrive at a conclusive view about the bearing of the theory of magnitude on the debate over conceptualism (Sutherland, 2022, p. 108). I confess to having been disappointed not to find out the answer here that would resolve all my uncertainties about this important issue! At the San Francisco American Philosophical Association session that formed the basis for this symposium, I made it my first question to ask Sutherland to go beyond the scope of the book and indicate his thoughts about the implications of Kant's theory of magnitude for the question of conceptualism/nonconceptualism. What he offered at that time was to chart the landscape of the difficulties facing any view on the issue. A significant role in that mapping was played by the difference I have now mentioned several times between pure mathematical and empirical cognition. I hope that in future work Sutherland will explore this constellation of questions in some detail, since getting to the bottom of it promises not only to enhance our understanding of the conceptualism/nonconceptualism debate, but also to clarify an important issue that arises from Sutherland's own work—namely, how should we understand the relation between mathematical cognition and empirical cognition, given that they are supposed to be

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"fused" (Sutherland, 2022, p. 283), but that they also remain distinct from one another in kind in crucially important respects.

My other questions in San Francisco went back to the big idea of the book—that the Kantian world is essentially mathematical, that mathematical structure is immanent in the world of appearances. Recent decades have seen a major "metaphysical turn" in the interpretation of Kant's theoretical philosophy, with many prominent scholars (e.g., Hogan, Jauernig, Chignell) finding important continuities between Kant's thought and the prior tradition of continental rationalist metaphysics (especially the work of Leibniz and his followers, but also more broadly). These detailed, historically grounded approaches have been complemented by an updated "moderate metaphysical" reading of Kant's idealism (Langton, Allais, Rosefeldt). Others, in contrast, have continued to follow the strand of interpretations, widespread in the late-19th and 20th century reception, that see Kant as a decisive pivot in the history of philosophy *away* from the conception of first philosophy as first-order metaphysical theorizing, and toward a conception of theoretical philosophy based on the "transcendental" method of analyzing the results of the exact sciences and other cultural practices. While I have myself emphasized the importance of Kant's relationship to Leibniz and Wolff (Anderson, 2015), I tend to follow this latter camp, taking Kant's criticisms and departures from these predecessors to be far more important than the continuities.

To my mind, Sutherland's work shows that the most fruitful way of articulating a broad-scope alternative to the new metaphysical readings of Kant is to highlight the essentially *mathematical* structure of theoretical philosophy, on the Kantian picture. In this respect, we might understand the landscape of debate in the coming decades as a contest between the new metaphysical interpretation, on the one side, and a *mathematical* interpretation, on the other. In those debates, Kant's "Amphiboly of the Concepts of Reflection," where he mounts foundational criticisms of the Leibnizian philosophy from his "critical" point of view, will become more decisive than it has been for most of the reception. Sutherland's fascinating and penetrating observations about the role of merely numerical identity in the Amphiboly's criticisms of Leibniz are already playing a key role in the core arguments of *Kant's Mathematical World*, as well as in his response paper for the present symposium, where he takes up issues surrounding intuition and the representation of equality. Sutherland's reading is thereby poised to play a key role in the coming debates.

That fact led me to my further questions, which asked Sutherland to expand on the insights of the book to point us toward any keys for the proper interpretation of the "Amphiboly," as well as to comment on the proper understanding of Kant's philosophical method, and the sense in which it is "critical." Particularly in connection with questions about transcendental idealism, Sutherland's answers at the meeting already indicated that the quick, broad-brush way I divided the landscape of available interpretations in the previous paragraphs is probably somewhat *too* quick and blurs some important distinctions among the views I alluded to. I will look forward to learning more from Sutherland's account of these matters through his future work.

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References

Anderson, R. L. (2001). Synthesis, cognitive normativity, and the meaning of Kant's question 'how are synthetic cognitions *a priori* possible?'. *European Journal of Philosophy*, 9(3), 275–305. https://doi.org/10.1111/1468-0378.00138

Anderson, R. L. (2015). *The poverty of conceptual truth: Kant's analytic/synthetic distinction and the critique of metaphysics*. Oxford University Press.

Kant, I. (1998) *Critique of pure reason*, trans. P. Guyer and A. Wood. Cambridge University Press. (Original work published 1781/1787) Cited using the standard A/B format referring to the pagination of the first (=A) and second (=B) editions.

https://doi.org/10.1017/can.2026.10097 Published online by Cambridge University Press

Sutherland, D. (2004). Kant's philosophy of mathematics and the Greek mathematical tradition. *The Philosophical Review*, 113(2), 157–201. https://doi.org/10.1215/00318108-113-2-157
Sutherland, D. (2022). *Kant's mathematical world: Mathematics, cognition, and experience*. Cambridge University Press.

Cite this article: Anderson, R. L. 2026. Remarks on Sutherland, *Kant's Mathematical World*. *Canadian Journal of Philosophy* 56: e31, 1–6, doi:10.1017/can.2026.10097

https://doi.org/10.1017/can.2026.10097 Published online by Cambridge University Press