Introduction

From Infinity to Givenness: Kant's Apperceptive Faculty Psychology and His Top-Down Approach to Intuition

Distinguishing the sensible from the intellectual aspects of our knowledge is the keystone of Kant's critical enterprise. In his practical philosophy, it is our amphibious status as rational yet sensible beings that makes us subject to, and simultaneously authors of, ethical imperatives. And in his theoretical philosophy, Kant argues that a proper account of sensibility and understanding – and their associated representations, intuitions and concepts – reveals both the possibility of human knowledge and its inherent limits (*Critique* A44/B61–62, A271/B327). Now Kant is hardly the first to contrast "sense" with "intellect" or to distinguish "lower" from "higher" cognitive capacities. Yet the conclusions he bases on this distinction are so heterodox that his conceptions of its disjuncts must diverge significantly from traditional accounts.

Kant's most notorious heterodoxy is, of course, his "transcendental idealism": the twin claims that (a) spatiotemporal objects and properties are mere "appearances", i.e. mind-dependent or "transcendentally ideal" phenomena, and that (b) human knowledge is restricted to such appearances and does not extend to things in themselves. But the Kantian heterodoxy that precipitated the present project is even more unorthodox than his idealism: namely, his claim that we can represent the mathematically infinite not *despite* but *in virtue of* the sensible, intuitive aspects of our cognition.

This is a view unprecedented in the history of philosophy. Rationalists and empiricists alike agree that *if* we are capable of knowledge involving mathematical infinity, such knowledge cannot have a sensible foundation. They take this to follow from the undeniable finitude of human sense perception. Some phenomena are just too small or too faint, others too large or too intense for our sensory apparatus to register or perceptually discriminate. So empiricists such as Hobbes, Berkeley, and Hume argue that, since all knowledge must be grounded in sense perception, which is finite, cognition of mathematical infinity is impossible, and we should

instead develop a strictly finitistic geometry based on *minima sensibilia*.[1] Inverting this reasoning, rationalists such as Descartes, Spinoza, and Leibniz point to the mathematical limitations of human sense and imagination as proof of a higher power of intellect, which they make responsible for infinitary cognition.[2] Kant is unique in denying their shared assumption: that sensible, intuitive representation must be finite.

Now Kant does recognize the obvious limits on sense perception. He insists, however, that "the form of possible experience has nothing at all to do with their [sc. the senses'] coarseness" (A226/B273). The mathematical properties of space and time, including their infinite divisibility, must be exhibited in our empirical intuitings (A165f./B205f.), even if these properties outstrip our sensory or phenomenological acuity. Indeed, Kant seems to treat the representation of mathematical infinity as a defining characteristic of intuition: "Space is represented as an infinite **given** magnitude. [. . .] Therefore the original representation of space is **intuition** and not **concept**" (B39–40, Kant's bold, my underlining).

This poses an interpretive puzzle: What conception of sensible intuition would allow for the intuitive representation of mathematical infinities, while respecting the undeniable finitude of sense perception and retaining the latter as the paradigm case of intuition? And what philosophical rationale could Kant have for rejecting the traditional, finitistic conception of sensibility in favor of one that makes a single capacity responsible for

[1] Hobbes rejects the very idea of infinity on the grounds that our senses are finite (*Leviathan* 1.3, 11). He advocates a materialist (corpuscularian) geometry in his 1655 *De Corpore* and a variety of mathematical treatises (see Jesseph 1999, esp. chs. 4 and 6). Berkeley argues that no genuine ideas are communicated by infinitary terms in his 1707 essay "Of Infinities" and later attacks the foundations of infinitesimal calculus in *The Analyst* (1734). He outlines a finitistic geometry based on *minima sensibilia* in §§ 123–131 of the *Principles of Human Knowledge* (1710). Jesseph (1993) remains the authority on these aspects of Berkeley's philosophy of mathematics. Hume's finitism emerges in his treatment of our ideas of space and time in book 1, part 2 of *Treatise* (1739) and in *Enquiry* part 2, §12 (1748). Jacquette (2001) offers a sympathetic reconstruction of Hume's finitism.

[2] In the sixth Meditation, Descartes distinguishes pure intellect from imagination by observing that our inability to form a distinct quasi-perceptual image of a chiliagon does not hinder us from mathematically demonstrating its properties (AT 7:72–73). On Descartes's notion of infinity, see Schechtman (2018, 2019). Leibniz deploys the chiliagon example to distinguish symbolic from intuitive knowledge in his 1684 "Meditations on Knowledge, Truth, and Ideas" (G 4:423, AG 24–25) and again in his 1705 *New Essays* to distinguish ideas from images (II.xxix.13, A 6.6:261–262). Similarly, for Spinoza, a principal source of confusion about infinity is the "failure to distinguish what we can apprehend only by the intellect and not by the imagination, and what can also be apprehended by the imagination" (Letter 12, G 4:53, SM 787; cf. *Ethics* 1p15s.). For Spinoza's influence on Leibniz's views about infinity and infinitary cognition, see Nachtomy (2011).

such contrary cognitive achievements – viz. the representation of infinitary structure and the production of finite sense perceptions?

Interpreters sometimes try to resolve this difficulty by "charitably" minimizing Kant's commitment to the intuitive representation of infinity. Intuitions, they suggest, exhibit only a *potential* infinity: We represent space merely as open-ended, not as actually endless; as indefinitely divisible, not as containing an actual infinity of distinct spaces. Moreover, what holds for mathematical abstracta need not hold for perceptible concreta or their representations.

Perusal of Kant's texts undermines these responses, however, as recent scholarship has shown.[3] Kant resolutely maintains that space and time, as forms of sensible intuition, are actually infinite in the large and in the small. Indeed, the potential infinities to which some commentators propose we retreat are possible, according to Kant, only insofar as they are grounded in actual infinities, of which we have an "original representation" in our form of sensible intuition.[4] And Kant insists that the mathematical properties of the form of intuition are inherited by all intuitive representations bearing that form (A165–166/B205–206). Thus, to come to grips with Kant's epistemology and philosophy of mind – based as it is in his distinction between sensibility and intellect, intuition and concept – we must recover a conception of sensible intuition for which the representation of mathematical infinities is a constitutive possibility, despite the undeniable sensory and phenomenological limits on the sensitivity, scope, and acuity of human sense perception.

[3] See, for example, Büchel (1987, 185–220); Carson (1997); Friedman (2000, 2012, 2020); Domski (2008); Posy (2008); Patton (2011); Onof and Schulting (2014, 2015); Smyth (2014, 2023 [2021]); Tolley (2016); Chaplin (2022); Rosefeldt (2022); and Winegar (2022). Kemp Smith emphasizes Kant's acceptance of actual infinity in his discussion of the first Antinomy (1992 [1918], 486–487). But his was a minority opinion. Kant's clearest endorsement of the actually infinitary character of intuition appears in *On Kästner*. And Kant's authorship of this text was discovered only in 1890, with Dilthey's analysis of the Rostock *Nachlass*. By then, finitistic interpretations of Kant were too entrenched to be overturned. The few *fin-de-siècle* scholars who even registered Kant's commitment to actual infinity dismissed it as an inconsistency in his position (Vaihinger 1892, 253–261) – a view that still has advocates today (Guyer 2018). The idea that actual infinity is a consistent and essential feature of Kant's conception of sensible intuition remained a minority view, especially in Anglophone discussions, well into the 1990s. It has many champions today.

[4] When Kästner (1790) challenges Kant on this point, arguing that geometry requires only potential infinities, not actual infinities, Kant responds: "[To claim that] a line can be extended into infinity amounts to saying that the space in which I describe the line is greater than every line that I can describe in it; and thus the geometer grounds the possibility of his task of enlarging a space (of which there are many) into infinity upon the original representation of a unitary, infinite, **subjectively given** space" (*On Kästner* 20:420, cf. 421). For discussion, see Smyth (2023 [2021], section 2) and Section 5.4.1.

My argument in *The Boundlessness of Sense* is that this heterodox, infinitary conception of sensible intuition arises from an aspect of Kant's philosophical method that has fallen into disrepute: his "faculty psychology", i.e. his approach to the mind as a seat of diverse but coordinated cognitive capacities.[5] A capacity is defined through its characteristic function, its contribution to a specified output or achievement. In the case of Kant's transcendental epistemology, the output relative to which capacities are identified and discriminated is human knowledge of objective reality.[6] Since cognitive capacities are defined by their function, i.e. their contribution to knowledge, any representation that fulfills the cognitive role of an intuition *just is* an intuition, whatever its intrinsic properties may be. This is the first step toward solving our interpretive puzzle. For it makes room for the possibility that a representation could play the distinctive cognitive role of an intuition without exhibiting the intrinsic limitations (sensory, phenomenological, or whatever) that are characteristic of human sense perception and incompatible with infinitary structure. I argue that, for Kant, our representations of space and time do just that: they fulfill the cognitive function of intuitions while surpassing the sensory and phenomenological limits associated with human sense perception.

So what is the defining cognitive function of sensible intuition for Kant? And how does he go about identifying it? What sorts of arguments, what sorts of evidence are dispositive in Kant's faculty psychology? Kant's Early Modern predecessors recognized two complementary methods for theorizing the mind and its powers: (i) "empirical psychology", which relied on

[5] I use the neutral term 'capacity' because Kant reserves 'faculty' for *spontaneous* capacities. Kant classifies sensibility not as a *faculty* (*facultas*, *Vermögen*) but as a *capacity* (*potentia*, *Fähigkeit*) and, specifically, as a passive capacity or *receptivity* (*receptivitas*, *Empfänglichkeit*). See R3588 (1773–1778) 17:75.

[6] Recent interpreters stress that Kantian cognition (*Erkenntnis*) cannot be identified with knowledge (*Wissen*); see Watkins and Willaschek (2017, 2020 [2017]). I agree that there are important distinctions here, but they are of a peculiar kind. Kant's aim in the *Critique* is to vindicate the possibility of human *Wissen* (and, ultimately, *Begreifen*: comprehension). It is in service of this goal that Kant introduces such terms as "*Erkenntnis*", "*Kenntnis*", "*Anschauung*", "*Sinnlichkeit*", "*Empfänglichkeit*", and so on. I take these terms to have a "focal meaning", expressing a more or less intimate relation to human knowledge in its highest form. Thus, I take all Kantian cognitive capacities and acts to be epistemic in that their essential function is to promote knowledge (*Wissen, Begreifen*). In characterizing a representation as an intuition, or as a cognition, Kant is highlighting the features of that representation that have the potential to contribute to *Wissen*. This is not to deny that the representation may have other, non-epistemic features or that the intrinsic properties that serve an epistemic function may also serve non-epistemic functions. Nor is it to deny that acts of cognition often fall short of the *Wissen* that is their defining aim. What it does mean is that it will not be necessary, for our purposes, to contrast cognition with knowledge in what follows. I regret that I cannot devote to this contentious issue the attention it deserves. The rudiments of my position are outlined in Sections 2.3 and 2.4.

"observation and analysis" (as in Wolff, Baumgarten, or Tetens), and (ii) "rational psychology", which applied antecedently established metaphysical first principles to the special case of the soul, as thinking substance (as in Leibniz, Wolff, or Baumgarten). I argue that Kant charts a third course. The principal claims of Kant's faculty psychology – and, in particular, the fundamental characterizations of sensibility and understanding that lead to some of Kant's most interesting and heterodox views – constitute a special sort of self-knowledge, akin to the first-personal knowledge one has of one's intention in performing certain kinds of intentional action.

In order to issue an apology, for instance, or bind one's troth in marriage, one has to enjoy an internal, first-personal awareness of what one is up to. This awareness is "internal" in that it is a constitutive part of performing the action: It is impossible to perform the action unawares. Nevertheless, my awareness of my intention may only be implicit, despite being internal to my performance. I needn't actively attend to my intention as I proceed in order for a first-personal awareness of it to inform what I am doing. Indeed, I may struggle to accurately characterize my true intention or to distinguish it from subtly different motives I might have had. But when I enjoy an internal awareness of my intention, I can, in principle, make that awareness explicit to myself through first-personal reflection. Doing this constitutes a special sort of self-knowledge. My suggestion is that the faculty psychology at the heart of Kant's transcendental epistemology is based on a similar sort of self-knowledge.

The similarity is not accidental. According to Kant, what enables me to have this special self-knowledge of my intentions is precisely the fact that intentional actions are exercises of practical *reason*. Kant conceives our intellectual powers to be essentially self-conscious or "apperceptive".[7] The self-conscious character of the intellect's operations means that the intellect acts only insofar as it can represent itself as thus acting. Acts of the intellect are like the kinds of intentional action that one cannot perform without a first-personal grasp on what one is doing. This implies that the intellect must possess some conception of the kinds of acts it can perform. For it can only engage in those acts insofar as it is able to *represent itself* as engaging in them. It is, for example, essential to any act of judging that one knows, at least implicitly, that one is *judging* (rather than, say, *musing*

[7] I use the term 'intellect' to cover all higher, spontaneous, cognitive capacities, including the faculties Kant calls *Verstand* and *Vernunft*. This, I take it, is the sense of the term 'Reason' in the title of the *Critique*.

or *hoping*). Yet I can represent myself as specifically *judging* (as opposed to *musing* or *hoping*) only if I know, at least implicitly, what judgment involves: i.e. only if I have a conception of the essential features that constitute a bit of mental activity as an act of judging. By reflecting on these implicit self-conceptions and gathering them into an explicit concept, which is susceptible to further analysis, the intellect can form a theory of its own cognitive functions: i.e. a faculty psychology. I call this Kant's "apperceptive method" and argue that it provides the basis for the accounts of our cognitive capacities he offers as part of his critical inquiry into the possibility and limits of human knowledge.[8]

It is not immediately clear, however, how this apperceptive method might yield a theory of *sensible intuition* as a cognitive capacity. Sense perception is inarguably a paradigm case of sensible intuition. Yet it is far from obvious that, in order to perceive something, I must be able to self-consciously represent myself *as perceiving*. But the interpretation I advocate does not require that our acts of sensible intuiting are essentially self-conscious (though it also does not rule this out). For the intellect's apperceptive grasp on its constitutive functions includes an appreciation that its activities are not, on their own, sufficient for full-fledged knowledge.

Implicit in my apperceptive knowledge of myself as *judging* is the recognition that merely judging that *p* does not generally guarantee that *p*. Judgers know, simply in virtue of being judgers, that judging is not (yet) knowing. The intellect is thus able to reflect on the cognitive functions it presupposes but cannot perform, such as the capacity to verify (e.g. by perceiving) that *p*. The theory of intuition that I reconstruct on Kant's behalf is, as it were, the shadow cast by the intellect's self-illumination, a byproduct of the intellect's self-understanding. In recognizing that there are specific prerequisites for knowledge – particular cognitive functions – that the intellect cannot fulfill, we posit a non-intellectual cognitive capacity to satisfy them. Intuition is introduced to pick up the intellect's cognitive slack.[9]

[8] Despite renewed interest in Kant's methodology, too few commentators emphasize the centrality of apperception to Kant's critical philosophy. This is because commentators tend to focus on the method of Kant's critical *metaphysics*, which he prominently contrasts with the method proper to mathematics (e.g. Marshall 2014; Gava 2015, 2018). Once we shift our attention to the methodology of Kant's critical *epistemology* (including his faculty psychology), the centrality of apperception is more evident (see Ferrarin 2019; Schafer 2020a; Land 2021 [2018]).

[9] The possibility of such an account has been remarked by Engstrom (2017, 36–37) and Schafer (2020a, 14–17). The present work is an attempt to realize these suggestions.

Somewhat paradoxically, then, the same apperceptive method that gives the intellect insight into its *own* cognitive functions also gives it insight into the functions of a distinct, non-intellectual cognitive capacity that must act as its partner in generating knowledge. The intellect's knowledge of *itself* thus includes an indirect cognition of intellect's *Other*. And it is this paradoxical aspect of Kant's methodology in theorizing the mind that accounts for the unprecedented features he attributes to sensible intuition. I thus trace Kant's doctrinal heterodoxy back to his revolutionary methodology.

Kant's apperceptive method leads to what I call a "top-down" approach to intuition – that is, one that theorizes the "lower" cognitive capacity of sensible intuition on the basis of an independent (viz. apperceptively grounded) account of the "higher" cognitive capacities of understanding (*Verstand*) and reason *(Vernunft*). This contrasts with the "bottom-up" approach to intuition that is typical of Kant's predecessors and that remains widespread among Kant's commentators. Bottom-up approaches start from fundamental premises about sensible intuition itself, such as claims about the physiology or metaphysics of sensation, the phenomenology of perception, or the semantics of direct reference or singular representation. While there is much to recommend these approaches both philosophically and interpretively, they tend to elevate finitistic truisms (e.g. about our sensory, perceptual, or phenomenological acuity) into theory-constraining criteria of intuitive representation, which makes a mystery of Kant's commitment to infinitary intuitions. And even when bottom-up approaches manage to leave room for the idea that intuition may be infinitary, they cannot explain Kant's conviction that it *must* be. Only a top-down approach that foregrounds the cognitive needs of the intellect and that construes intuition as its cognitive complement can capture Kant's rationale for treating infinity as a *constitutive* feature of intuition.

Kant's rationale is this: The hallmark of the intellect, as revealed through apperceptive reflection, is its "spontaneity" – that is, its ability to produce representations through its own activity, in the form of novel concepts, judgments, and inferences. But not all representational contents can be generated through the spontaneous activity of a *discursive* intellect such as ours. So the human mind must also possess a "receptive" cognitive capacity that accounts for the representations that our discursive intellect cannot spontaneously generate but which are required for objective knowledge (or that we de facto find ourselves with). This receptivity, conceived as the functional complement of discursive spontaneity, is sensible

intuition. Representations that must be "given" to the mind in order to be thought at all are eo ipso intuitive. Spatiotemporal representations must be given in this sense. Indeed, they must be given precisely because they are infinitely complex. For discursive representations are structured in hierarchies of genera and species. Such hierarchies are always finitely complex, no matter how much one multiplies genera and species. So our discursive intellect cannot account for the infinitary features of representations. If we do enjoy infinitary representations – and Kant thinks pure mathematics and Newtonian physics requires us to – they must have their source in receptive, sensible intuition.

For Kant, therefore, representations of infinitary contents must be intuitive, since (i) they are essential to our knowledge of objective reality; yet, (ii) the apperceptively validated functions of our discursive intellect cannot account for them. Human sense perceptions will count as intuitive for the same reason: namely, because they present the mind with contents that the spontaneous powers of discursive thought cannot fully account for. This solves our interpretive puzzle about why Kant credits a single capacity – sensible intuition – with both the representation of infinitary structure and the essentially finite deliverances of human sense perception. Both types of representation satisfy the same fundamental criterion of intuitive cognition, as specified by the intellect's apperceptive reflection on its cognitive functions and, in particular, its cognitive needs. That criterion is *givenness*. Sense perceptions and infinitary representations each present the mind with contents that spontaneous, discursive thought cannot account for and that must therefore be *given* to the mind.

The infinitary features of Kantian intuition thus serve as the ratio cognoscendi of my interpretation: as our first clue to the strangeness of Kant's views and a helpful corrective in reading his texts. But the ratio essendi of my interpretation is Kant's faculty psychology and the apperceptive, top-down methodology it pursues. It is his revolutionary methodological approach to our cognitive capacities that accounts for Kant's doctrinal heterodoxies about human sensible representation. The bulk of my argument, therefore, does not focus on issues surrounding infinitary magnitudes and their representation.[10] Resolving our interpretive puzzle only takes center stage in Chapter 5. My abiding aim is rather to explore Kant's rationale for advancing such a peculiar and unprecedented conception of sensible representation.

[10] I address these topics in Smyth (2023 [2021]).

My title, *The Boundlessness of Sense*, is not quite true to the content of my argument: It is not *sense* that Kant thinks is infinite but *sensible intuition*. The title does, however, capture something important about my approach, inasmuch as I aim to provide a partial response to Strawson's pathbreaking study, *The Bounds of Sense* (1966). Strawson begins by distinguishing "Two Faces of the *Critique*". The first he approvingly terms an "analytic argument" – what we would now call a "transcendental argument". That is, a line of reasoning that premises a particular cognitive achievement or an accepted account of cognition and then "regressively" identifies certain necessary conditions as its presuppositions. In Strawson's words, "the investigation of that limiting framework of ideas and principles the use and application of which are essential to empirical knowledge, and which are implicit in any coherent conception of experience which we can form" (1966, 18, my underlining). The second "face" is one that Strawson famously derides as "the imaginary subject of transcendental psychology" (1966, 32). Kant's lucubrations about our cognitive faculties are, Strawson laments, unhappily and quite unnecessarily entangled with his more lucid, analytical reflections:

> It is true that Kant thought of himself as investigating the general structure of ideas and principles which is presupposed in all our empirical knowledge, but he thought of this investigation as possible only because he conceived of it also, and primarily, as an investigation into the structure and workings of the cognitive capacities of beings such as ourselves. The idiom of the work is throughout a psychological idiom. Whatever necessities Kant found in our conception of experience he ascribed to the nature of our faculties (1966, 19, my underlining).

I think Strawson is correct to distinguish Kant's analytical, transcendental arguments from the core claims of his faculty psychology. Strawson is also right that Kant views his faculty psychology as the "source" or explanatory ground of the "necessary general features of experience" identified in his transcendental arguments (Strawson 1966, 15). But I cannot agree that "there is no doubt that this doctrine [viz. that the necessary features of experience have their source in our cognitive constitution] is incoherent in itself and masks, rather than explains, the real character of Kant's inquiry" (1966, 15–16).

The Boundlessness of Sense aims to show that Kant's "capacities-first" approach to human cognition is neither incoherent nor obfuscatory, as Strawson contends.[11] I hesitate to say that I've hit upon "the real character

[11] I adopt the label "capacities-first" from Schafer (2020a). I owe countless refinements and reframings to Schafer's exceptional contributions.

of Kant's inquiry", but that is chiefly because I adopt a pluralistic interpretive stance toward Kant's corpus. Kant supports his signature doctrines in a variety of ways across his writings and even within a single text – apparently confident that this methodological and evidentiary diversity converges into a unified account. Different interpretive approaches emphasize different argumentative methods, respond to different sorts of considerations, and register different kinds of evidence. My aim in *The Boundlessness of Sense* is to highlight *one* line of argument in the *Critique* and related works – namely, Kant's apperceptive approach to our cognitive capacities and, in particular, his top-down approach to intuition. I argue that this is an underappreciated but important aspect of Kant's critical project and that it can yield remarkable results. But I claim neither that this dimension of Kant's thought exhausts his views on human sensible intuition, nor that I have identified the maximally illuminating, much less uniquely correct, way to interpret the texts I discuss. My aim is not to provide the last word on Kantian intuition, but an opening for a new conversation.

Even with this pluralistic caveat, however, the interpretation I advance suggests that Strawson's proposal to separate out Kant's "analytical argument" from his "transcendental psychology" is ill-conceived. By its very nature, an analytic, regressive, or transcendental argument presupposes a contentful conception of cognition or of a particular cognitive achievement. Otherwise, there is nothing to analyze. Yet Strawson devotes remarkably little attention to the "source" of the conception of cognition, or experience, that he proposes to analyze. Apart from disparaging Kant's "transcendental psychology", Strawson gives no positive account of the starting point for the "analytical argument" he finds so fruitful, nor does he explain our entitlement to presuppose it as the terminus a quo of our analysis.[12]

It is here that my account aims to improve on Strawson's by inverting it. Kant holds that we have an apperceptive grasp on the character of our discursive intellect. I argue that this gives us a special entitlement to certain kinds of a priori claims about the constitutive form of our intellect and suitably related cognitive capacities. These claims are well suited to serve as the basis *analysand* for subsequent "regressive" arguments about necessary and limiting conditions on experience. Far from undermining the respectable, "analytical argument" of the *Critique*, Kant's "transcendental psychology" is what generates and what legitimates the starting point of such

[12] For elaboration of this critique, see Cassam (2016).