

Kant's Argument for the Principle of Intensive Magnitudes

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Abstract

In the first *Critique*, Kant attempts to prove what we can call the 'principle of intensive magnitudes', according to which every possible object of experience will possess a determinate 'degree' of reality. Curiously, Kant argues for this principle by inferring from a psychological premise about internal sensations (they have intensive magnitudes) to a metaphysical thesis about external objects (they also have intensive magnitudes). Most commentators dismiss the argument as a failure. In this article I give a reconstruction of Kant's argument that attempts to rehabilitate the argument back into his broader transcendental theory of experience. I argue that we can make sense of the argument's central inference by appeal to Kant's theory of empirical intuition and by an analysis of the way in which Kant thinks sensory matter constitutes our most basic representations of objects.

Keywords: Kant, intensive magnitude, sensation, perception, empirical intuition, transcendental idealism

1. Introduction

In the section of *Critique of Pure Reason* titled Anticipations of Perception, Kant attempts to prove what we can call the 'principle of intensive magnitudes' (PIM).¹ According to the PIM, every possible object of experience will, as a matter of *a priori* and transcendental necessity, display some determinate 'degree' (*Grad*) of 'continuous' or 'intensive magnitude' (*intensive Größe*) of 'reality' (*Realität*). An intensive magnitude is a measure of how an object 'fills' (*erfüllt*) space or time. Kant's official formulation of the principle reads, 'In all appearances, the real, which is an object of the sensation, has intensive magnitude' (B207).²

Intensive magnitudes quantify the *matter* in an object and vary independently of ‘extensive magnitudes’, which quantify spatiotemporal *form*. The principle of *extensive* magnitudes (the ‘PEM’, defended in the Axioms of Intuition: see A162/B202ff.) and the PIM are ‘mathematical’ principles dealing with how an intuited object is constituted and quantified.³ By articulating the PIM as distinct from the PEM, Kant is claiming that one cannot give an exhaustive mathematical description of an object by appeal to its size and shape alone. The thesis that one could give an exhaustive description of an object through size and shape alone was held by Kant’s mechanist predecessors (both the atomists and the Cartesian plenimists) and it was in opposition to these theories that Kant developed his own ‘dynamical’ theory of matter in the *Metaphysical Foundations of Natural Science* (MFNS) of 1786.⁴ According to the dynamical theory, two bodies can have the exact same size and shape (i.e. have identical extensive magnitude) and yet still differ in their density, and hence contain different quantities of matter. If Kant’s argument for the PIM is successful, then this aspect of Kant’s physical theory would have a transcendental basis in the doctrine of the *Critique*.⁵ This fact alone makes the task of interpreting Kant’s argument in the Anticipations an important one.

Yet it cannot be denied that the argument for the PIM is somewhat peculiar. Its central premise is a psychological claim about sensations: sensations are intensive magnitudes. From this premise, Kant infers that the reality in the objects of experience must also be intensive magnitudes. This conclusion is the PIM itself, which is a metaphysical thesis about objects. In short, from a psychological premise about sensations, Kant infers a metaphysical thesis about objects.

Perhaps unsurprisingly, this argument has met with a great deal of scepticism in the literature. Most commentators pass it over in silence, and the few who do say anything typically dismiss it as unsalvageably flawed and they conclude that the PIM is not a legitimate part of the transcendental system. For instance, Guyer concludes that, ‘the principle of intensive magnitudes seems to lack any a priori basis, let alone a clear place in Kant’s theory of time-determination or even in the official schematism of the categories’ (Guyer 1987: 204). Warren suggests that, ‘it seems very possible that, at the time of the writing of the *Critique*, Kant had not fully worked out his views about how [the claims of] the Anticipations are possible as a priori knowledge, i.e., about what he would call its “transcendental” ground’ (Warren 2001: 16). Wolff (1973: 238) and Bennett (1966: §§42–3) make similarly pessimistic appraisals.

The purpose of this article is to show that these pessimistic appraisals of the argument are unwarranted. I will attempt to show what would be necessary to read the argument for the PIM as sound within Kant's system, and thereby show how the PIM can be rehabilitated back into the transcendental theory of experience. What most stands in need of clarification is Kant's inference from the intensive magnitudes of sensations to the intensive magnitudes of objects. While most commentators have interpreted Kant to mean that the intensive magnitudes of sensations causally depend on, and hence are evidence for, intensive magnitudes in objects, I will argue that Kant sees things the other way around: realities in objects have intensive magnitudes *because* sensations do, and it is this dependency relation that grounds Kant's inference. That is, Kant is arguing that certain of the basic metaphysical determinations that we must represent in empirical objects (namely, their intensive magnitudes) depend on basic psychological facts about the sensory data out of which the representations of these objects are constructed (namely, *their* intensive magnitudes). Interpreting the Anticipations along the lines I propose provides a way of situating that chapter within Kant's broader transcendental project, and it fills in an important part of the story regarding what the sensory matter of our representations contributes to the cognition of physical objects.

I will proceed as follows. In section 2 I explain how Kant understands the concept of reality and give a rough taxonomy of the kinds of things we can judge as realities. This will give a clearer picture of what Kant takes himself to be proving in the Anticipations. In section 3 I lay out Kant's argument for the PIM as articulated in the B-edition of the *Critique*, showing where interpretative work needs to be done if sense is to be made of the argument. In section 4 I offer a defence of Kant's premise that sensations have intensive magnitudes. This will put us in a position to analyse the relationship between sensation and the real in appearance that corresponds to it. In section 5 I reject an interpretation of the argument according to which the argument is based on an inference about the cause of sensation. I will show that this interpretation lacks an adequate textual basis and imputes an obviously bad argument to Kant. In section 6 I present my preferred interpretation, according to which Kant is arguing that all objects of experience must be represented as intensive magnitudes because the sensory matter out of which their representations are constituted are intensive magnitudes. Unlike the causal interpretation, this interpretation of the argument takes into account the full range of Kant's remarks about the relation between sensation and the real in appearance, and each of its premises

can be defended with resources from Kant's broader transcendental theory. In section 7, I respond to objections and draw out several important consequences of the interpretation.

2. The Category of Reality

The concept of reality (*Realität*) is the first category under the heading of quality (A80/B106) and it corresponds to the affirmative form of judgement (A70/B95). The closest⁶ we get to a definition of reality comes in the Schematism chapter, where Kant says that 'Reality is in the pure concept of the understanding that to which a sensation in general corresponds, that, therefore, the concept of which in itself indicates a being (in time)' (A143/B182, cf. A175/B217). The correspondence between reality and sensation will be addressed at length later. Regarding the category's representation of a 'being', Kant means simply that any particular concept will fall under the category of reality if it is a representation of a positive determination of the existence of an object, as opposed to a representation of what is absent or lacking in the object (e.g. weight or redness, as opposed to weightlessness or colourlessness, which would fall under the category of negation).⁷ Just as a judgement is affirmative when it makes a positive predication (or 'affirmation') of a subject concept (see *Vienna Logic*, 24: 929 and *Jäsche Logic*, 9: 103), a conceptualization represents an object's reality when it represents a positive determination of the object.⁸ In general, we can say that a concept expresses a kind of reality when it explains how an object has being, or that in virtue of which it is.⁹

Kant insists that concepts of reality are not all or nothing affairs. A full characterization of the reality of an object will not simply involve specifying *whether* a given reality is instantiated by the object, but also *to what extent*. As Kant attempts to demonstrate in the Anticipations, the quantification of reality is given in terms of 'intensive magnitude' or 'degree'. Intensive magnitudes are capable of continuous variation, such that between any two intensive magnitudes, there will be a third. Extensive magnitudes (distances and durations) are specified in terms of the successive addition of homogeneous units (cf. A161/B202ff.), and thus 'the representation of the parts makes possible the representation of the whole (and therefore precedes the latter)' (A162/B203). Intensive magnitudes, by contrast, are those 'which can only be apprehended as a unity, and in which multiplicity can only be represented through approximation to negation = 0' (A168/B210). Because they can only be grasped 'as a unity', they are grasped as wholes first, and any multiplicity or 'parts' within these magnitudes can be thought only abstractly

through the imagined possibility of a continuous change from one degree of intensity to another. This epistemological point about the priority of the apprehension of the whole is meant to indicate something about realities themselves, namely that (unlike extensive magnitudes) they are entirely and wholly present at a point. Hence the intensity of a reality cannot be made smaller or greater through division or composition, but only through continuous diminution or increase.

Thus far we have seen that the concept of reality describes an object insofar as it (a) possesses a positive determination and (b) to a certain (intensive, continuous) degree. Given this general characterization, what sort of 'positive determinations' does Kant typically have in mind when he refers to realities in objects? The examples he gives are few but varied, and their range is instructive. First, sensations (*Empfindungen*) are said to possess reality. Kant refers to the 'real of sensation' (B207), arguing that 'every sensation has a degree or magnitude, through which it can more or less fill the same time' (A143/B182). The 'real' of sensation that possesses intensive magnitude is simply the quality displayed by the sensation, i.e. its sensory 'feel' (whether chromatic, haptic, gustatory, etc.).

Kant also lists the sensible qualities of objects as examples of realities: 'Every color, e.g., red, has a degree, which, however small it may be, is never the smallest, and it is the same with warmth, with the moment of gravity, etc.' (A169/B211). These basic perceptible features of objects mark positive determinations of the objects, which can be instantiated across a continuum of possible degrees.

In addition to sensations and the sensible properties of bodies, Kant also indicates that the very material of physical bodies is a kind of reality and hence possesses an intensive magnitude.¹⁰ This is implicit in his treating of 'the matter of appearance' and 'the real of appearance' as synonymous: both are said to 'correspond to sensation' (see A20/B34, A165, B207, A175/B217, A581/B609, A723/B751) and both are said to be that in virtue of which an object fills space (see B18, A174/B216, A413/B440, *MFNS* 4: 496).

As indicated in section 1, this claim about physical matter marks a sharp break with most of Kant's predecessors. According to the Cartesian mechanists, matter is to be identified with extension, and consequently the quantity of matter in an object will be a direct function of its extensive magnitude only. As Descartes put it: 'The nature of body consists not in weight, hardness, color, or the like, but simply in extension'

(Descartes 1985: §4). The atomists (e.g. Gassendi and Boyle), by contrast, rejected the identification of matter and extension, insisting instead on an atomism that reduced all bodies to absolutely solid atoms interspersed with empty void. What both of these schools shared was the claim that density, strictly speaking, is an absolute feature of matter and not something that could come in degrees. The *appearance* of differences in density between two bodies (rarefaction) was explained by appeal to the porosity of the bodies in question.

Against these theories, Kant argues that the mechanists falsely ‘assume that the real in appearance is always equal in degree and differs only in aggregation and its extensive magnitude’ (A173/B215). He thinks they are especially wrong if they pretend to assume this ‘on the basis of a principle of understanding a priori’ (A175/B216). Kant elaborates his own physical theory in *MFNS*, tying it to the categories of quality discussed in the Anticipations:

First the real in space (otherwise called the solid), is the filling of space through repulsive force; second, that which, in relation to the first ... is negative, namely, attractive force ... ; third, the limitation of the first force by the second, and the determination of the degree of filling of a space that rests on this. (MFNS 4: 523)

Elsewhere, Kant argues that these forces are intensive magnitudes that can come in continuum-many degrees (*MFNS* 4: 499, 525). According to Kant’s ‘dynamical’ theory of matter, solid bodies result from the interaction of these two forces, and physical density is subsequently determined by the interaction of attractive and repulsive forces. Since the degrees of the two forces can vary continuously, the density of matter can also vary continuously.

Or so at least Kant would have us believe. That the reality in the objects of experience (whether their sensible qualities or the matter itself) can be known *a priori* to possess intensive as well as extensive magnitude is the conclusion of the argument for the PIM. In order to see why Kant thinks this metaphysical theory about objects has a basis in transcendental philosophy, we will need to give a careful reconstruction of the argument of the Anticipations.

3. The Argument

In this section I will lay out the argument as Kant presents it in order to clarify its basic structure and determine where interpretative work

needs to be done if sense is to be made of the argument. I focus on the B-edition reformulation of the argument that Kant added to the beginning of the chapter because this is his clearest and most focused statement of the argument. I quote the argument in its entirety, and then explain how it should be carved up.

[1] Perception is empirical consciousness, i.e., one in which there is at the same time sensation. [2] Appearances, as objects of perception, are not pure (merely formal) intuitions, like space and time (for these cannot be perceived in themselves). [3] They therefore contain in addition to the intuition the materials for some object in general (through which something existing in space or time is represented), i.e., the real of the sensation, as merely subjective representation, by which one can only be conscious that the subject is affected, and which one relates to an object in general. [4] Now from the empirical consciousness to the pure consciousness a gradual alteration is possible, where the real in the former entirely disappears, and a merely formal (a priori) consciousness of the manifold in space and time remains; thus there is also possible a synthesis of the generation of the magnitude of a sensation from its beginning, the pure intuition = 0, to any arbitrary magnitude. [5.1] Now since sensation in itself is not an objective representation, and in it neither the intuition of space nor that of time is to be encountered, it has, to be sure, no extensive magnitude, but yet it still has a magnitude (and indeed through its apprehension, in which the empirical consciousness can grow in a certain time from nothing = 0 to its given measure), thus it has an *intensive magnitude*, [5.2] corresponding to which all objects of perception, insofar as they contain sensation, must be ascribed an *intensive magnitude*, i.e., a degree of influence on sense. (B207–208; numerical markers added)

Sentences 1–3 assert that perceptions, as well as the objects of these perceptions (appearances), possess a matter in addition to a form; the matter is associated with sensation and the form with space and time. Sentence 4 makes an observation about the possible continuous diminution and vanishing of any given sensation, and 5.1 asserts that sensations must therefore be intensive magnitudes. Lastly, 5.2 makes the inference from sensations having intensive magnitudes to the objects corresponding to them having intensive magnitudes.

We can simplify the argument as follows:

(A₁) Sensation corresponds to the real (i.e. the matter^{TT}) in appearance. [1–3]

(A₂) Sensation has intensive magnitude. [4–5.1]

Therefore, (PIM) the real in appearance has intensive magnitude. [5.2]

This simplified version of the argument is plainly invalid. Its form is: A corresponds to B, A is F, therefore B is F. If any good sense is to be made of this argument we will need to determine what sort of correspondence Kant had in mind in A₁ such that the inference to the PIM is licensed. In section 5, I will discuss one of the only interpretations of this correspondence in the literature; after rejecting it, I will be in a position to present a different, better interpretation (sections 6–7). However, before addressing the correspondence described in A₁, a remark is in order about A₂ and the claim that sensations are intensive magnitudes (since this premise is common to both of the interpretations to follow).

4. Sensations as Intensive Magnitudes

In the fourth sentence of the argument, Kant asserts that any sensation can diminish in a continuous decrease to nothing (or in a continuous increase from nothing to something). I will refer to this as the continuity thesis. From the continuity thesis, he concludes that sensations are intensive magnitudes (which claim I have labelled A₂). The continuity thesis is an assertion of a psychological fact, and Kant does not give any indication that he took the claim to be controversial or open to debate. Likewise, he does not seem to think that the inference to A₂ is controversial either. Not everyone has been willing to go along with him so easily though.

Jonathan Bennett disputes the apriority of the continuity thesis on the grounds that the claim does not express a necessary fact. He writes,

[the continuity thesis] merely says that our sensations are like that: it states an empirical fact, and has no place in Kant's apparatus of a priori principles. He provides no arguments for the impossibility of a world in which nothing is ever dim or in-between, in which there is only one level of pain, say, and only three degrees of saturation for each color. (Bennett 1966: 172)

If the continuity thesis is contingent, then A₂ is also contingent, and Bennett takes this to undermine the transcendental necessity of the argument.

It is true that Kant provides no argument against the alternative scenario described by Bennett, but it is a mistake to think that he needs to. Although Kant claims that it is an *a priori* fact that sensations (for us) come in continuous degrees, he is not saying, nor does he need to say, that this is an absolutely necessary fact. Although the continuity of sensation is *a priori*, this fact may very well be contingent, and no argument can be given for it other than to point out that it is true (for us).

It may sound strange to assert of a fact that it is both contingent yet *a priori*, and in most cases Kant will treat the necessary and the *a priori* as coextensive. However, this would not be the only place in the *Critique* where such an assertion is made: that space and time are the forms of human intuition is both *a priori* yet contingent. Space and time happen to be the forms of human sensibility, but it did not have to be this way, and Kant acknowledges the possibility of other creatures with different forms of intuition.¹² If we are not bothered by the contingent status of this *a priori* fact about the (human) forms of intuition, then we need not be bothered when certain facts about the structure of sensation have the same status. Another way to put the point is that, although *for us humans* it is necessary that space and time be the forms of intuition and that sensations come in continuously variable degrees, this necessity does not hold for all possible cognizers.¹³ Thus the appropriate question to ask about the continuity thesis is not whether the claim is absolutely *necessary*, but simply whether it is *a priori true*.

Daniel Warren worries about this latter question because he thinks Kant owes us a better argument (Warren 2001: 15–16). He notes that the only support for A2 given in the Anticipations is the continuity thesis. But elsewhere Kant seems to argue in the opposite direction, i.e. from A2 to the continuity thesis.¹⁴ Warren thus sees a circularity in the justifications for the continuity thesis and for A2 and he is not optimistic that a satisfactory (non-circular) justification for either claim can be found.

Fortunately, we do not need to follow Warren's pessimism. The conclusion we should reach instead is that the move from the continuity thesis to A2 should not be read as an *inference* at all. Rather these two claims should be understood as equivalent: A2 is not *proved* by the continuity thesis, but is rather a specification of what the continuity thesis means. To be continuously variable in intensity is to be an intensive magnitude, and to be an intensive magnitude is to be continuously variable in intensity. Further, neither claim stands in need of

proof, because Kant thought their truth to be self-evident. In his introductory remarks to the System of Principles, Kant distinguishes the epistemic status of the ‘mathematical’ principles (the Axioms and the Anticipations) from that of the ‘dynamical’ principles (the Analogies and the Postulates). He argues that the first two ‘are capable of an intuitive certainty’ while the other two ‘are capable only of a discursive certainty’ (A162/B201). Unlike the dynamical principles, the mathematical principles rest on the self-evident structure of intuition (which includes the form of space and time as well as the ‘anticipated’ continuity of ‘sensation in general’: A167/B209), which is given immediately and *a priori* and which need not be inferred.

In short then, the continuity thesis and the claim that sensations are intensive magnitudes (A2) should be taken together as a single *a priori* fact about the structure of sensation: whatever specific empirical qualities sensations happen to instantiate, they are known *a priori* (‘anticipated’) to be capable of continuous variation in intensity, i.e. they possess intensive magnitude.

5. The Causal Interpretation

We are now in a position to address the most puzzling aspect of Kant’s argument: the claim that sensations somehow correspond to the real in appearance, and that this correspondence justifies the inference to the PIM. According to one of the only worked out interpretations of the argument for the PIM in the literature, the argument turns on an inference regarding the cause of sensations. I will refer to this reading as the ‘causal interpretation’. This interpretation is inspired by Kant’s repeated characterization of sensation as the effect of an object on the senses (e.g. A20/B34 and A50/B74). In the Anticipations itself, Kant seems to equate an object having an intensive magnitude with it being ‘ascribed ... a degree of influence on sense’ (B208) and he says that, through sensation, ‘one can only be conscious that the subject is affected’ (B207). Given these remarks about realities as causes and sensations as effects, proponents of the causal interpretation take the relevant correspondence between sensation and the real in appearance to be a causal relation.

Guyer endorses a version of this interpretation when he claims that according to ‘the inference of the *Critique* ... if a degree of intensity is assigned to a sensation, *only* a degree of efficacy can be assigned to the reality which produces it’ (Guyer 1987: 200). On this view, the inference from the continuity of sensation to the continuity in the matter of

appearance is an *evidential* one (this is my term, not Guyer's). Similarly, Falkenstein argues that:

The real of appearance is a 'consequence' of the real of sensation in the sense that we ascribe a certain degree of reality (a certain attractive force or impenetrability) to the appearance corresponding to the degree of reality (the intensity of sensible quality) evidenced by the sensation. We make this ascription because we take the reality of the appearance to be the cause of the reality of the sensation, so that, in ascribing reality to the appearance as a consequence of the reality of sensation, we are reasoning back from effect to cause. (Falkenstein 1995: 117)

This suggestion that we 'reason back from effect to cause' is what is essential to the causal interpretation. This interpretation of the argument can be expressed as follows:

- (C1) Sensation has intensive magnitude.
 - (C2) The intensive magnitudes of sensation could only be caused by other intensive magnitudes.
 - (C3) The real in appearance is the cause of sensation.
- Therefore, (PIM) the real in appearance has intensive magnitude.

C1 is identical to A2 and was discussed in section 4. C3 asserts that the correspondence relation between sensation and the real in appearance (initially stated as A1 above) is to be understood as a *causal* relation. Later (section 7) I will give reason to think that C3 is, strictly speaking, false. For now, however, I will argue that problems with C2 are fatal for the causal interpretation of the argument, and that C3, whether true or not, does not seem to do any real work in the argument as Kant presents it.

Kant himself never asserts anything like C2, and there is good reason to think he would have rejected it. The problem with this premise (as Guyer himself notes, 1987: 199–200) is that intensive magnitudes in objects are not the only possible explanations of the intensive magnitudes in sensations. As Guyer points out, Kant will often explain the difference between the intensities of two sensations of the same type by appeal to facts about the *extensive* magnitudes of their causes.¹⁵ For instance, it is possible that the continuous change in the intensity of my sensation of a light-source is due only to continuous change in the visible surface area of the light-source (a change merely in extensive

magnitude). Or perhaps the intensity of my sensation of the light-source is a function only of my distance (an extensive magnitude) from the light-source (in accordance with the inverse-square law). In general, there are possible explanations of the continuity of sensation that are independent of any variation in the intensity of the reality causing the sensation, and thus C₂ is false.¹⁶

Another problem with this interpretation is that C₃, whether true or not, does not seem to do any real work in the argument. Between the two editions of the Anticipations, there are only three references to sensation as effect or reality as cause. At A168/B210, Kant says the real in appearance can be ‘regarded’ (*betrachtet*) as the cause of sensation, but he immediately remarks that this issue is tangential to the task at hand – ‘I touch on this here only in passing’ (A169/B210) – because causality is not to be discussed until the Analogies chapter. In the B-edition argument, he remarks that sensations are ‘merely subjective representations, by which one can only be conscious *that* the subject is affected’ (B207, emphasis added). Sensations tell us *that* the subject is affected, but not *by what*, and hence Kant seems to be ruling out the suggestion that we could infer anything about the causes of sensations on the basis of the fact that something caused them (which is also further evidence against C₂).¹⁷ Lastly, when Kant remarks at the end of the B-edition argument that ‘all objects of perception ... must be ascribed (*beigelegt*) an intensive magnitude, i.e., a degree of influence on sense’ (B208), he seems only to be specifying what it means to understand an object as having an intensive magnitude. Part of the content of my representation of an object’s reality is that this reality exerted an influence on me. Or, to put it in other terms, if I represent a sensed object as an intensive magnitude, then I may represent it as having a causal influence on sense. However, the fact that I may ‘ascribe’ causal efficacy to the real in appearance does not seem to do any heavy lifting in the argument as Kant presents it.

So C₂ is false and C₃ does not seem to do any work in Kant’s argument. A final problem with the causal interpretation is that it would entail that the PIM rests on an empirical premise, and hence could not have a proper place in Kant’s transcendental theory. For if the PIM is proved on the basis of the *empirical* effects of objects on us, then we cannot have knowledge of the principle prior to our actually having sensations. The sense in which the argument is based on an *a priori* ‘anticipation’ would be lost. The PIM would thus be an empirical principle, not a transcendental one as Kant thinks it must be.

Thus the causal interpretation fails to make good sense of Kant's argument for the PIM. The basic assumption of this interpretation was that the correspondence between sensation and the real in appearance was to be understood in terms of a (causal) dependency of the intensive magnitude of sensation on the intensive magnitude of the real in appearance. In the next section, I will argue that, if we invert the dependency relation, we can understand why Kant took the inference to the PIM to be justified. I will argue, that is, that Kant thinks that the intensive magnitude of the real in appearance depends on the intensive magnitude of sensation (and not the other way around).

6. The Sensory Constitution Interpretation

In order to give a proper analysis of Kant's argument for the PIM, we are going to need a better understanding of the correspondence between sensation and the real in appearance, so let us look more closely at what Kant actually says about this correspondence in the Anticipations. In the formulation of the PIM itself, Kant states that, 'the real' in the appearance is 'an object of sensation' (B207).¹⁸ And when establishing the correspondence between sensation and the real in appearance, he writes, 'appearances, as objects of perception, ... contain ... the materials for some object in general (through which something existing in space or time is represented), i.e., the real of sensation' (B207). So the relation between sensation and the real in appearance has to do with the real in appearances being the 'objects' of sensation and of perception, and with these objects somehow containing 'the real of sensation', which materially constitutes appearances.¹⁹ On their own, the meaning of these claims is far from transparent. However, I propose that if we import what we know about Kant's theory of empirical intuition, we can make good sense of these remarks.²⁰

In the Transcendental Aesthetic, Kant claims that intuitions are 'empirical' when they refer to their objects 'through sensation'; these objects are 'undetermined' and are identified with appearances (A20/B34). Further, 'that in the appearance which corresponds to sensation [is] its matter' (ibid.). Lastly, Kant indicates that intuitions are analysable into their form (space and time) and their matter, which is 'everything that belongs to sensation' (A22/B36).²¹

So sensations constitute intuitions as their matter, they are necessary for an intuition's reference to appearance and they correspond to the matter of appearance. These claims about sensation, appearance and *intuition* in the Aesthetic directly parallel what Kant says about

sensation, appearance and *perception* in the Anticipations. In both cases, sensations materially constitute the representation, they enable the representation's reference to the appearance, and the matter of the appearance is defined in terms of sensation. Thus I argue that, where Kant refers to 'perception' in the Anticipations, 'empirical intuition' can be read in its place.²²

Reading 'empirical intuition' in place of 'perception' allows us to import what we know about empirical intuitions and their representational content as we attempt to make sense of Kant's argument. In what follows, I will show that, on a proper understanding of Kant's theory of how sensations constitute empirical intuitions, the objects of empirical intuitions ('undetermined' appearances in space and time) are themselves constituted by the sensory qualities initially presented in sensation. This interpretation will allow us to make sense of the otherwise mysterious claim that appearances 'contain sensation' (B208). As the crucial elements of this interpretation depend on, first, the constitution of intuitions by sensations, and, second, the constitution of the objects of intuition by the qualities given in sensations, I will refer to this interpretation of the argument as the 'sensory constitution interpretation'.

I will here present the argument as I understand it and then give a detailed discussion of each step.

(SC₁) Sensations (specifically, the qualities thereof) have intensive magnitudes.

(SC₂) The qualities of the sensations constituting an intuition are identical to the qualities represented by the intuition.

(SC₃) The qualities represented by the intuition are identical to the real in the appearance.

Therefore, (PIM) the real of appearance has intensive magnitude.

The basic idea here is that, if the entities that come to be conceptualized as physical realities in space are identified with something which, prior to and independently of being conceptualized as such, are continuous intensive magnitudes, then when those objects are conceptualized in judgement, conceptual determinations of intensive magnitude can be made with objective validity. SC₁ is effectively equivalent to A₂ (discussed in sections 3–4); I add the remark that it is the *qualities* of sensations that display intensive magnitudes because this fact will be important for my reading of the argument, but this caveat was already

implicit in the claim that sensations are intensive magnitudes.²³ SC₂ and SC₃ each require substantial elaboration.

SC₂ asserts an identity between the qualities of the sensations constituting an intuition and the qualities represented by that intuition. I base this identification on Kant's account of the representational content of empirical intuitions. An empirical intuition is a representation that refers non-conceptually²⁴ to a manifold of sensible qualities arrayed in space (A₂₀/B₃₄). Kant elucidates the function of sensation in constituting the representational content of intuition when he remarks that sensations are 'ordered and placed' (A₂₀/B₃₄) within the *a priori* representation of space, and that they are thereby represented 'outside and next to one another' (A₂₃/B₃₈). In making these claims, Kant can't mean that sensations are *literally* in space: this would be absurd, for sensations are mental and mental entities cannot be in space. He also cannot mean that sensations are represented *as* sensations in space: representing something as both mental entity and in space is conceptually impossible.²⁵ Rather, Kant must mean that the qualities of sensations are projected into and thereby represented in the representation of space. In other words, in an empirical intuition, sensory matter is synthesized with the form of space to yield a representation of a manifold of sensory qualities in space.

We can express this model of empirical intuition more precisely. Say a given intuition is constituted by a manifold of sensations, s_1, \dots, s_n . Each of s_1, \dots, s_n will possess a sensory quality to some intensive degree, which can be described by the ordered pairs: $\langle q_1, i_1 \rangle, \dots, \langle q_n, i_n \rangle$. In the intuition, $\langle q_1, i_1 \rangle, \dots, \langle q_n, i_n \rangle$ will be assigned or 'mapped' onto some volume ('represented outside and next to one another'), which is a range of spatiotemporal coordinates l_1, \dots, l_n . The content of the intuition is exhausted by the representation of those qualities at these coordinates, for example, $\langle q_1, i_1 \rangle$ at l_1 , $\langle q_2, i_2 \rangle$ at l_2 , and so on.²⁶ Since the $\langle q_1, i_1 \rangle, \dots, \langle q_n, i_n \rangle$ represented at l_1, \dots, l_n are the very same $\langle q_1, i_1 \rangle, \dots, \langle q_n, i_n \rangle$ possessed by s_1, \dots, s_n , it follows that the qualities of the sensations constituting an intuition are identical to the qualities represented by the intuition, which is what SC₂ asserts.

At this point, a brief disambiguation is in order.²⁷ For there are different ways one could understand the identification made in SC₂ (namely, the identification of the $\langle q_1, i_1 \rangle, \dots, \langle q_n, i_n \rangle$ possessed by s_1, \dots, s_n with the $\langle q_1, i_1 \rangle, \dots, \langle q_n, i_n \rangle$ represented at l_1, \dots, l_n by the intuition), and although I wish to remain officially uncommitted to any particular

interpretation of transcendental idealism in my presentation of the sensory constitution interpretation, how one understands transcendental idealism will determine how one understands this identification. Specifically, one could take the identification as a token identity or a type identity. If the identification is taken as a *token* identity, then the very same (i.e. numerically identical) qualitative sensory states constituting the intuition also constitute the object intuited. This reading of SC₂ would take very literally Kant's claims that 'the objects of perception ... contain sensation' (B208) and that 'every outer perception ... is itself the real [in space]' (A375). Such a reading would fit best with a phenomenalist interpretation of transcendental idealism according to which Kant would share with Berkeley the thesis that the objects of experience are constructions of sensory states.²⁸ If, on the other hand, one were uncomfortable with phenomenalist readings of transcendental idealism, one could take the identification in SC₂ as a *type* identity. On such a reading, the qualities constituting the intuition would be qualitatively but not numerically identical to the matter of the object intuited. Nevertheless, the qualities of the matter of the intuited object would still depend on the qualities of the sensations constituting the intuition. In this case, the sensations would 'inform' (as it were) the intuition, determining its representational content: the reason the intuition represents *this* specific object (and not another) is because the intuition is composed of *these* specific sensations (and not others). I suspect that most of Kant's readers would be inclined to read the identification in SC₂ in terms of type identity, but, again, I take no stand on this question here.²⁹

SC₃ says that the sensible qualities represented in empirical intuitions are identical to the real in appearance. In a certain respect, this claim was already implicit in the account I gave of SC₂. For the appearance, considered just as object of intuition, is nothing more than a manifold of sensible qualities represented in a volume. Thus, combined with SC₁, we could say already that the matter of the intuited appearance has intensive magnitude. However, this is not sufficient to establish the PIM as Kant intends it. For the PIM, as a pure principle of *understanding*, is a thesis about the conceptual representations through which we *judge* objects, not simply a thesis about the intuitions through which we *sense* them. The PIM will only be established once it is shown that the objects of experience are necessarily *conceptualized* as intensive magnitudes, and so 'the real of appearance' described in SC₃ must be understood in terms of the appearance's conceptual determination in judgement. Fortunately, given the setup thus far, this will not be difficult to

establish. For the object (or 'target', if you will) of a judgement about an object's reality is just the matter of the appearance presented in intuition, which is what SC₃ asserts. Although intuitions and judgements of reality represent their objects through radically different contents, their objects are the same: they both represent, in their own ways, the $\langle q_1, i_1 \rangle, \dots, \langle q_n, i_n \rangle$ 'ordered and placed' in l_1, \dots, l_n . Where the intuition presents these qualities immediately and indeterminately to consciousness, the understanding specifies in judgement how these qualities should be understood as determinate realities in the object.³⁰

Once the identifications in SC₂ and SC₃³¹ are established, the final inference to the PIM comes easily. Since it has already been established (by SC₂ with SC₁) that the matter of appearance *in fact* possesses intensive magnitude (irrespective of it being represented as such), it follows that the understanding must apply determinations of intensive magnitudes to the matter of appearance if it is to conceptualize it with objective validity.

The sensory constitution interpretation is valid (its form is: $a = b$, $b = c$, a is F, therefore c is F), and I have shown how each of its premises is grounded in Kant's broader theory of experience. I thus claim that this reading of the argument is the best way to make sense of everything Kant says about the justification of the PIM. Before concluding I will consider three objections that might be raised against this interpretation. Addressing these objections will provide an opportunity to flesh out in greater detail the relation between sensations and the realities we judge to be in objects. It will also instruct us on how we should understand the consequences of the PIM for Kant's physical theory.

7. Objections and Clarifications

The cause of sensation

It might be argued that the model I have presented here cannot make sense of the causal relation between realities in objects and sensations. If a perceived object's realities depend on the qualities of the sensations constituting the intuition of the object, then it cannot also be the case that those realities caused the sensations. For this would imply that realities in the object depend on sensations while sensations simultaneously depend on realities in the object.³² These two claims are incompatible, and it might be argued that, since Kant refers to a causal relation between reality and sensation in the Anticipations, the sensory constitution interpretation must be rejected.

In response, I claim that it must simply be denied that sensations are caused by realities in appearances. A careful look at what Kant says in the Anticipations reveals that he never explicitly states that realities in objects *are* the cause of sensations. Rather, he says that ‘all objects of perception, insofar as they contain sensation, *must be ascribed* (*beigelegt*) an intensive reality, i.e., a degree of influence on sense’ (B208, emphasis added). And later he says only that one can ‘regard’ (*betrachtet*) reality as a cause of sensation (A168/B210).³³ Kant is not claiming that realities in appearances cause sensations, but that these realities may (in some cases, perhaps, *must*) be represented as the causes of sensation. The represented causal relation between reality and sensation is a necessary feature of the content of our representations of objects insofar as we represent these objects in relation to our perceptions of them. It is perfectly consistent to claim both that (i) the real in appearance depends on sensation and hence cannot, strictly speaking, cause it, and that (ii) I nevertheless represent the real in appearance as though it exerts an influence on my senses.³⁴

Sensory determination of judgements of reality

Another objection to the sensory constitution interpretation could arise from a misunderstanding of my characterization of the correspondence between sensation and the real in appearance. If, it might be argued, the sensible qualities of the sensations constituting an intuition are identical to the object judged in applications of concepts of realities, then the reality judged in an object will be determined by the qualities and intensities of the sensations constituting the intuition. For instance, if an intuition non-conceptually represents $\langle q_1, i_1 \rangle$ at l_1 , $\langle q_2, i_2 \rangle$ at l_2 , and so on, then the judgement of the reality of this object will apply conceptual articulations of these specific qualities (namely, by forming the concepts ‘ $\langle q_1, i_1 \rangle$ ’, ‘ l_1 ’, ‘ $\langle q_2, i_2 \rangle$ ’, ‘ l_2 ’,³⁵ etc., into the judgements ‘ $\langle q_1, i_1 \rangle$ is at l_1 ’ and so on). The claim that the contents of judgements of realities are determined directly by the qualities of sensations is, however, surely false. For instance, when I make a judgement about the colour of something, I take myself to be judging a relatively permanent feature of the object. If I see a blank sheet of paper in daylight I experience sensations very different from those I experience when seeing it under a dim lamp at night. In the one case I would have sensations of a very intense light grey, and in the other I would have sensations of a much less intense orange. Nevertheless, in both cases I apply the same concept – ‘white’ – to the object.

What this sort of example shows is that our conceptual representations of the realities in objects involve a great deal of interpretation of the

sensory data, and that these judgements are not simple 'readings off' of the qualities displayed by the sensations. However, nothing in the interpretation I have given should preclude this distinction between the quality represented in intuition and the conceptualization made of it in judgement.

Part of the reason why this distinction is possible is the non-conceptuality of intuitions. Since an intuition represents its object indeterminately, there is nothing in the content of the intuition to constrain the judgement such that the only possible judgement is one that matches the reality of the sensation itself. The 'spontaneous' understanding still has room to do work as a rational faculty aimed at conceptualizing the objective world of publically available objects. Such objective conceptualizations generally require treating objects as relatively stable in their properties. For example, the surfaces of objects generally remain physically stable through changes in illumination, and the understanding takes this sort of stability into account when 'deciding' (so to speak) how best to conceptualize the colour of the object. Such interpretations are typically unconscious and unnoticeably fast, but we can infer that they must take place because of a phenomenology that presents a relatively stable objective world that nevertheless appears to us through a wildly varying and variegated sensory stream. Generalizing, we can say that, if an *intuition* represents the qualities $\langle q_1, i_1 \rangle, \dots, \langle q_n, i_n \rangle$ in some spatiotemporal array, the reality-concepts applied in *judgement* will be some ' $\langle q_1^*, i_1^* \rangle, \dots, \langle q_n^*, i_n^* \rangle$ ' which are more or less correlated with, but by no means necessarily identical to $\langle q_1, i_1 \rangle, \dots, \langle q_n, i_n \rangle$ themselves.³⁶

Transcendental necessity undermined?

So judgements made in applications of reality-concepts to intuited objects are not fully constrained by the specific qualities and intensities presented in the intuition. The understanding has interpretative work to do in determining which reality-concept is the most appropriate and 'objective' in any given case, and so the quality and intensity specified in the concept need not match exactly the quality and intensity presented in intuition. This might seem to open the door to a further objection. It might be argued that the ever-present difference between the quality in the intuited appearance and the conceptualization of it undermines the transcendental necessity of the PIM.

Here is how this problem might be thought to arise. If the continuous variability of the intensity of sensation does not necessitate conceptualizing the object's realities as continuous, it would seem always to

be an open possibility that the most objective determination of these qualities will appeal only to discrete, non-continuous reality-values. Perhaps, as the Cartesians or atomists would have it, there is only *one* such value that the density of bodies instantiates. For they could grant that Kant's 'real of sensation' has continuous intensive magnitudes, but then deny that the understanding must interpret these intensities as corresponding to continuous intensities in objects. If this possibility remains open, then it would seem that the PIM loses its necessity.³⁷

Kant himself makes some remarks that might seem to indicate that he was willing to retreat somewhat on the necessity of the PIM. In the Anticipation's critique of atomism (A173/B215ff.), he does not attempt to show that the theory of absolute (i.e. non-continuous) density was impossible or even false, but simply that it is not necessary:

Against [the atomists'] presupposition [of absolute density], for which they can have no ground in experience and which is therefore merely metaphysical, I oppose a transcendental proof, which, to be sure, will not explain the variation in the filling of space, but which will entirely obviate the alleged necessity of the presupposition that the difference in question cannot be explained except by the assumption of empty spaces. (A174/B215)

This 'metaphysical presupposition' is unjustified because the perceived differences in density could equally well be explained by differences in the intensive magnitudes of matter filling space entirely (with no empty spaces). Kant seems to be suggesting that, considered *a priori*, the atomistic explanation and his own dynamic explanation are both metaphysically possible. He goes on to concede that,

My aim here is by no means to assert that this is how it really is concerning the specific gravity of the variety of matters, but only to establish, on the basis of a principle of pure understanding, that the nature of our perceptions makes an explanation of this sort possible. (A174-5/B216)

These passages might be taken as a concession that the PIM does not express a transcendental *necessity* but a mere transcendental *possibility*. But this is not how the passages ought to be taken. Although Kant is claiming here that his dynamic conception of matter is merely contingent (at least with the resources only of the *Critique*), he is *not*

conceding that the PIM itself expresses a mere possibility. For one thing, such a retreat would contradict the rest of the claims of the Anticipations, which assert the principle as an *a priori* and necessary law of all objects generally (A165, B207, A170/B212). More to the point, if we pay attention to what exactly the PIM actually says, we see that it is consistent with both the empirical contingency of the dynamic theory of matter and the possibility that a form of atomism or Cartesian mechanism be true. The PIM states that every reality has a determinate intensive degree. This does *not* entail that every reality is physically capable of varying through a continuum of other such degrees. A reality with a given degree is an intensive magnitude even if this reality happens never to increase nor decrease in intensity for the entire duration of its existence. If *every* piece of matter in the universe turned out (because of some empirical physical law) to possess the exact same degree of density, then the world would effectively be as the atomists describe it, and differences in perceived density would only be explained by appeal to a body's porosity. But this would not change the fact that the uniform density possessed by all matter was still a determinate intensive magnitude.³⁸

The objection under consideration said, in effect, that,

- (i) Even though the qualities of sensations have intensive magnitude, there is no guarantee that the most objective interpretation of the physical world will involve judgements of intensive magnitudes.

We see now that all the objector is really entitled to is

- (ii) Even though the qualities of sensations vary continuously in intensity, there is no guarantee that the most objective interpretation of the physical world will involve judgements of magnitudes which vary continuously in intensity.

(i) is false; (ii) is innocuous. (i) is false because even if the only reality-concept that can be applied is not a magnitude which ever *actually* varies, there will still be a determinate value that can be applied to the density of the object; hence the object will have a determinate, continuous (albeit not continuously varying), intensive magnitude. (ii) is innocuous because it asserts only that Kant's dynamical theory of matter (as opposed to the transcendental theory of possible objects of experience) is not completely *a priori*. But Kant never claimed that *this* theory was

entirely *a priori*, for it rests on the empirical concepts of matter and motion. The only entirely *a priori* theory is the general transcendental theory of experience, of which the PIM is a component.

8. Conclusion

The sensory constitution interpretation provides the best way to rehabilitate the argument for the PIM back into Kant's transcendental theory of experience. This interpretation describes a valid argument, and each of its premises are firmly grounded in central elements of the doctrine of the first *Critique*. Hence, we do not need to conclude (e.g. with Bennett, Wolff, Guyer or Warren³⁹) that the Anticipations have no legitimate place within Kant's transcendental theory of experience.

The most important upshot of this interpretation is that it entails that the realities we judge in objects are metaphysically dependent on the sensations that correspond to them (rather than the other way around). Such a dependency relation would not be available to traditional 'realist' accounts of the relation between representations and objects. But Kant is of course no traditional realist, arguing instead for a transcendental idealism according to which the appearances we cognize as objects depend for their existence on being represented, and are nothing apart from this. Many different writers have understood Kant's transcendental idealism in many different senses, and I have intentionally avoided presupposing any one interpretation of transcendental idealism in my reconstruction of the argument for the PIM. But it is worth pointing out that one of the virtues of my reconstruction of the argument is that it shows how to situate this section of the *Critique* within Kant's transcendental project of reconceptualizing 'being an object' in terms of 'being an object of representation'. Kant's claims about the intensive realities in objects is seen to be another instance of his more general thesis that basic metaphysical facts about the empirical objects we experience in the world depend on the cognitive structures and mechanisms by which we come to represent them.

Notes

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¹ All quotations of Kant's writings from *The Cambridge Editions of the Works of Immanuel Kant*, ed. Paul Guyer and Allen Wood.

² The formulation from the 1781 ed reads, 'In all appearances the sensation, and the real, which corresponds to it in the object (*realitas phaenomenon*), has **intensive magnitude**, i.e., a degree' (A165). The differences between these two formulations will not be significant for my purposes in this article.

- ³ This is in contrast to the 'dynamical' principles of the Analogies and the Postulates, which have to do with the relation of objects 'to each other or to understanding' (B110; see also: A162/B201 and A178/B221).
- ⁴ The *Physical Monadology* of 1756 presents an earlier version of the dynamical theory of matter (see I: 485ff.).
- ⁵ Unfortunately, with the exception of one discussion at the end of section 7, it will not be possible in this article to go into any detail regarding the complex relationship between the transcendental theory of experience articulated in the *Critique* and the physical theory described in *MFNS*. I mention the connection here, however, simply to indicate the importance of the PIM for Kant's broader, systematic project.
- ⁶ I say this is only 'close' to a definition because of the reference to sensation and time, which indicates that this is a definition of the schematized category, and not a definition of the pure concept on its own. This definition will suit our purposes because we will be concerned only with the use of this concept in experience.
- ⁷ Which concepts are to count as 'positive determinations' as opposed to mere privations will often turn out to be an empirical question. For instance, physical theories have been in agreement since antiquity that heat is a real property of a thing. But whether cold should be understood as an equally real and opposed property was in dispute during Kant's time. Kant himself (incorrectly, it turns out) favoured treating cold as a real and positive determination of objects in his *Negative Magnitudes* of 1763 (2: 185ff.).
- ⁸ Kant's logic lectures provide useful context on the relation between affirmative judgements and the concept of reality through the emphasis on 'affirmative marks': 'Through affirmative marks, however, I think of what is in fact present in the thing' (*Blomberg Logic*, 24: 110); 'Affirmative or negative marks. Through the former we cognize what the thing is, through the latter what it is not' (*Jäsche Logic*, 9: 59); see also: 24: 836 and 726.
- ⁹ The concept of reality is not to be confused with the concepts of actuality (*Wirklichkeit*), existence (*Dasein* or *Existenz*) or being (*Sein*). Kant claims that, 'Being is obviously not a real predicate, i.e., a concept of something that could add to the concept of a thing' and that 'the actual contains nothing more than the merely possible' (A598–9/B626–7). This is because 'not the least bit gets added to the thing when I posit in addition that this thing is' (*ibid.*). To say that something is actual or exists does not increase what we think in the object. Reality, by contrast, is a 'real predicate' according to Kant, because representing something as possessing a certain kind of reality makes a difference in the concept of that thing: it says more than simply *that* it is, but *in virtue of what* it is, or *how* it has being.
- ¹⁰ In the First Analogy, Kant will elaborate on the distinction between sensible qualities and physical matter as types of realities in terms of the distinction between accident and substance (see A181/B225 and A186/B229).
- ¹¹ Following Kant, I will be using the phrases 'real of appearance' and 'matter of appearance' interchangeably.
- ¹² Kant suggests that, even though it is possible that 'all finite thinking beings must necessarily agree with human beings' with respect to space and time as the forms of intuition, 'we cannot decide this' (B72). And at B155, he writes, 'I can represent other kinds of intuition as at least possible.'
- ¹³ For a discussion of the 'contingent necessity' of space and time as forms of intuition, see Van Cleve (1999).
- ¹⁴ In the Schematism, Kant asserts that 'every sensation has a degree or magnitude' and infers from this to the possibility of descending 'in time from the sensation that has a certain degree to its disappearance' (A143/B182–3).

- ¹⁵ Cf. *Metaphysik Volckmann*, 28: 424–5, quoted in Guyer (1987: 199–200).
- ¹⁶ Elsewhere in the *Critique*, Kant states (in a discussion of the causes of sensation no less) that arguments from effects to causes are never certain: ‘the inference from a given effect to its determinate cause is always uncertain, since the effect can have arisen from more than one cause’ (A368). Thus any attempt to establish an *a priori* principle on the basis of an inference from effect to cause would fail to meet Kant’s own standards.
- ¹⁷ Note that Kant does not even say that *appearances* (i.e. spatiotemporal physical objects) are the source of sensory affection here, leaving open the possibility that the real ground of sensory affection lies outside the phenomenal realm altogether.
- ¹⁸ Cf. A373: ‘sensation is that which designates (*bezeichnet*) a reality in space and time’.
- ¹⁹ Cf. A42/B59–60: regarding appearances, Kant writes, ‘space and time are its pure forms; sensation in general its matter’.
- ²⁰ It should not come as a surprise that Kant’s theory of empirical intuition would turn out to be relevant here. Reality is one of the ‘mathematical’ categories, and these are ‘concerned with objects of intuition’ (B110).
- ²¹ Kant refers to sensation as ‘matter’ in several different contexts. In addition to describing sensations as the matter of intuition, sensation is also sometimes the matter of perception (A168/B209–10) or of experience in general (A223/B270). On the identification of sensation with the matter of intuition, see A267/B323, *Metaphysik Mrongovius*, 29: 795, and the *Fortschritte*, 20: 266. For discussions of sensations as the matter of intuition, see Aquila (1983: chs 2–3) and Pippin (1982: ch. 2).
- ²² Kant defines perceptions (*Wahrnehmungen*) as ‘representations accompanied with sensation’ (B147). Empirical intuitions then are at the very least a *species* of perception. In referring, in the Anticipations, to those perceptions which refer to appearances, Kant must be referring to perceptions which are also empirical intuitions.
- ²³ See my discussion of ‘the real of sensation’ in §2 above.
- ²⁴ Readers familiar with recent literature on the representational content of intuitions will recognize the claim that intuitions are non-conceptual as controversial. It will not be possible to present a defence of this claim here. However, I can at least indicate some passages that I take to be unambiguous assertions of the non-conceptuality of intuitions: A68/B93, A89–91/B122–3, A320/B377, *Jäsche Logic*, 9: 91. On this controversy, see Sellars (1967: ch. 1), Allais (2009), Longuenesse (1998: 199ff.), Ginsborg (2008) and Hanna (2008).
- ²⁵ Sellars makes a similar point in his account of the imagination’s role in the construction of ‘image-models’ (i.e. intuitions) in experience: ‘to say that [something] is present in the experience by virtue of being imagined is not to say that it is *presented as* imagined ... [S]ensations do not present themselves *as* sensations, nor images *as* images’ (Sellars 2007: 457–8).
- ²⁶ Importantly though, qua non-conceptual representation, intuitions do not represent these qualities *as* the qualities they are, for a mere intuition cannot represent its object *as* anything. This is what Kant means when he says the intuition’s object is ‘undetermined’ (A20/B34). The intuition is simply a brute sensory awareness of certain qualities at certain locations.
- ²⁷ I am grateful to an anonymous reviewer for pointing out the need for the following clarification.
- ²⁸ The major point of disagreement between Berkeley and Kant (aside from Kant leaving open the possibility of non-mental things in themselves) would be that Berkeley thinks we represent these objects as internal, mental ideas while Kant thinks we represent them as external, physical things.

- ²⁹ Full disclosure: I am partial to the strongly phenomenalist ('Berkeleyan') reading of SC2, but this is not the place to fight that battle.
- ³⁰ Johannes Haag arrives at a similar understanding of this part of Kant's argument for the PIM. Responding to the worry that the distinction between the intensive magnitudes of sensations and the real that corresponds to it is unprincipled (and therefore '*unkritische*'), Haag replies that, strictly speaking, there is no such distinction at all. This is because the intensive magnitude of the sensation is the same intensive magnitude which is 'projected' (*projizierte*) onto the represented object. 'Sensation has a degree both as *matter in the appearance* and as *matter in an object*, i.e., as a quality (*Eigenschaft*) projected onto an object in general; it is however not a problematic duplication of entities with intensive magnitudes, for it is *one and the same* sensation that has this magnitude – considered once as matter in the appearance and once more as quality of a represented object' (Haag 2007: 140–1, my translation).
- ³¹ Note that, unlike with SC2, with SC3 there is not a question about whether the identification should be understood as a type identity or a token identity. For it is one and the same numerically self-identical object which is represented both by the intuition that presents the appearance and by the judgement that determines the intensive magnitude of the appearance.
- ³² This problem is a version of the famous problem of 'double affection'. For a discussion of this version of the problem, see Stang (2013).
- ³³ In the only other reference in the Anticipations to sensations as effects Kant does not refer to what the cause of sensation might be at all. He simply says that, through sensation, 'one can only be conscious that the subject is affected' (B207).
- ³⁴ This of course leaves open the question of what the true cause of sensation is, if not the real in appearance. Unsurprisingly, my answer is: things in themselves, which are distinct from the objects of cognition. It is beyond the scope of this article to discuss the metaphysics of so-called 'noumenal affection'. The claim that things in themselves are the true causes of sensations, while perhaps not universal in the literature, is far from heterodox. For recent arguments in favor of the 'noumenal affection' doctrine, see Haag (2007: 139), Longuenesse (2001: 302) and Hogan (2009: 501–32).
- ³⁵ I use quotation marks to denote conceptual articulations of representational contents. Thus $\langle q_{\beta}, i_{\beta} \rangle$ refers to the quality and intensity themselves, while ' $\langle q_{\beta}, i_{\beta} \rangle$ ' refers to the concept thereof.
- ³⁶ For instance, I might apply only a single concept of a particular hue of green, ' $\langle q_{\beta}, i_{\beta} \rangle$ ', to the surface of a perceived ball, even though the sensations of the ball display a wide range of dark to light greens.
- ³⁷ A similar objection was made against the causal interpretation in section 5.
- ³⁸ In this scenario, the atomist would be committed to the claim that there is some primitive universal constant, d , which specifies the one intensive magnitude of density that every piece of matter happens to possess. d would simply be that value which is equal to the ratio of mass over volume for every piece of matter.
- ³⁹ See section 1 above.

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