

ANTI-METAPHYSICAL ARGUMENTS IN THE ANTICIPATIONS OF PERCEPTION

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Abstract. In the Anticipations, Kant defends the claim that all sensations must register on a purely subjective scale of response to stimuli, in order for sensation to be a possible source of knowledge. In this paper, I argue that Kant defends this claim in response to “scholasticism” or transcendental realism about sensation. The fact that all sensations are measurable on a subjective scale is the a priori content of the principle of the Anticipations, and, according to Kant, is a necessary condition for building any systematic analysis of sensation. The anti-metaphysical arguments in the “Anticipations of Perception” are key building blocks of Kant’s transcendental idealism.

Keywords: Kant; anti-metaphysical arguments; transcendental idealism; anticipations of perception.

1. INTRODUCTION

The Anticipations of Perception is well known to be a perplexing section of the *Critique of Pure Reason*. The Anticipations are mathematical a priori principles that describe variations in intensity of “intensive magnitudes”, which are supposed to be the levels of varying sensations. But how can we know anything a priori about the variation of sensation?

A key element of Kant’s response to Hume was to argue that, when knowledge is restricted to a possible experience, the rules of the necessary connections between our experiences, the principles, can be shown to be necessary. Unlike the categories, which are the basis of secure judgments about particular objects or events, the principles are general rules for the thorough connection of a possible human consciousness.

Now experience rests on the synthetic unity of appearances, i.e., on a synthesis according to concepts of the object of appearances in general, without which it would not even be cognition but rather a rhapsody of perceptions, which would not fit to-

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gether in any context in accordance with rules of a thoroughly connected (possible) consciousness, thus not into the transcendental and necessary unity of apperception. Experience therefore has principles (*Principien*) of its form which ground it a priori, namely general rules of unity in the synthesis of appearances, whose objective reality, as necessary conditions, can always be shown in experience, indeed in its possibility.¹

Kant lays out these principles in the *Analytic*: the mathematical principles of construction of intuitions, the Axioms of Intuition and Anticipations of Perception, and the dynamical principles of possible connections between intuitions, the Analogies of Experience and the Postulates of Empirical Thought.

Kant's general claim that the Principles "ground" the form of experience a priori has been met with profound skepticism. Kitcher², Salmon³, and BonJour⁴, for instance, have reproached Kant in strikingly similar terms, for threatening to impose illegitimate a priori constraints on experience.

The rough idea, of course, is that the mind so shapes or structures experience as to make the synthetic a priori propositions in question invariably come out true *within the experiential realm*. Thus, synthetic a priori knowledge, according to Kant, pertains only to the realm of appearances or phenomena, and not to an *sich* reality.⁵

How could we conceivably establish by pure thought that some logically consistent picture of the real world is false? How could we, without any aid of experience whatever, find out anything about our world in contradistinction to other possible worlds? Given a logically contingent formula – one that admits of true as well as false interpretations – how could we hope to decide on a completely a priori basis which of its interpretations are true and which are false?⁶

Kant proposes that we construct figures in thought, inspect them with the mind's eye, and thus arrive at a priori knowledge of the axioms from which our proofs begin. [...] It is hard to understand how a process of looking at mental cartoons could give us knowledge, unless it were knowledge of a rather unexciting sort, concerned only with the particular figures before us. [...] Kant develops an ingenious response to this dilemma. [...] By constructing figures in pure intuition, we are supposed to become aware of principles which necessarily characterize all our experience.⁷

¹ A156/B195 ff. Citations from the *Critique of Pure Reason* are from the Guyer–Wood translation. All other citations from Kant, except where otherwise noted, are from Kant, Immanuel: *Gesammelte Schriften*. Hrsg.: Bd. 1-22 Preussische Akademie der Wissenschaften, Bd. 23 Deutsche Akademie der Wissenschaften zu Berlin, ab Bd. 24 Akademie der Wissenschaften zu Göttingen. Berlin 1900f.

² Philip Kitcher, *The Nature of Mathematical Knowledge*, Oxford, Oxford University Press, 1983.

³ Wesley Salmon, *Foundations of Scientific Inference*, Pittsburgh, University of Pittsburgh Press, 1967.

⁴ Lawrence BonJour, *In Defense of Pure Reason*, Cambridge, Cambridge University Press, 1998.

⁵ L. BonJour, *ibidem*, p. 23.

⁶ W. Salmon, *Foundations of Scientific Inference*, p. 39.

⁷ P. Kitcher, *The Nature of Mathematical Knowledge*, pp. 49–50.

The latter two objections rest on the view that experience is contingent, that is, that it is illegitimate to restrict the character of possible experience a priori. Experience can present us with an event, or with its opposite. This view is captured quite well by Hume's distinction between relations of ideas and matters of fact in the *Enquiry concerning Human Understanding*. Relations of ideas could not be otherwise, whereas encountering the contradiction of a matter of fact in experience is always possible.

The mathematical principles have met with skepticism even from those most sympathetic to Kant's project. Henry Allison's *Kant's Transcendental Idealism* explicitly does not deal with the Axioms and the Anticipations, moving directly to the Analogies and the Postulates⁸. According to Guyer⁹, the implausibility of Kant's arguments for the Axioms and the Anticipations show that the farther away Kant gets from his central goal of time determination, the more speculative are his arguments¹⁰.

Banks¹¹, Longuenesse¹², and Sutherland¹³ have given sympathetic readings of the Anticipations, and Cohen¹⁴ gives a classic, though controversial, reading¹⁵. Cohen hypothesizes that the mathematical Principles are a continuation of Kant's project, in the the Schematism and the Deduction, of giving the conditions for the construction of magnitudes in time according to a rule¹⁶. This reading ascribes the property of continuity to the magnitudes that result from this construction. As Longuenesse correctly observes, even this sympathetic reading ascribes to Kant an implausible view, a view that cannot be defended effectively from the objections raised above¹⁷.

⁸ Henry Allison, *Kant's Transcendental Idealism*, second revised edition, Yale, Yale University Press, 2004, p. 225.

⁹ Paul Guyer, *Kant and the Claims of Knowledge*. Cambridge, Cambridge University Press, 1987.

¹⁰ *Ibidem*, p. 184.

¹¹ Erik Banks, "Kant, Herbart, and Riemann", in *Kant-Studien*, vol. 96, pp. 208–234, 2005.

¹² Béatrice Longuenesse, *Kant and the Capacity to Judge*. Princeton, Princeton University Press, 1998.

¹³ Daniel Sutherland, "Kant's Philosophy of Mathematics and the Greek Mathematical Tradition", in *Philosophical Review*, vol 113 (2), 2004, pp. 157–201.

¹⁴ Hermann Cohen, *Das Prinzip der Infinitesimalmethode und seine Geschichte*, in A. Görland and E. Cassirer (eds.) *Hermann Cohens Schriften zur Philosophie und Zeitgeschichte*, Berlin, Akademie Verlag, 1928 [1883].

¹⁵ For Cohen's reading, and for the neo-Kantian reception of the Anticipations section generally, see the excellent book by Marco Giovanelli (Marco Giovanelli, *Reality and Negation – Kant's Principle of Anticipations of Perception*, Dordrecht, Springer, 2011).

¹⁶ Cohen (§§18–20) argues that intensive magnitudes are the differential, "inextensive" magnitudes evaluated by the Leibnizian infinitesimal calculus. Longuenesse (1998) observes, "Of course, in the principle of the Anticipations of Perception itself Kant does *not* assert that the real that 'corresponds to sensation' is a continuous magnitude. He only asserts that it is an *intensive* magnitude. And it seems sufficient, for something to be an intensive magnitude, that it be represented as something that *can* vary continuously through time. But why then does Kant, in the course of his exposition of the Anticipations, actually extend to sensation and the real that "corresponds" to it the property of continuity that pertains to pure space and pure time?" (Longuenesse 1998, pp. 314–315).

¹⁷ As Longuenesse puts it, "Admitting that we can treat sensation (and the real) as an *intensive magnitude* makes it possible to anticipate experience by determining, at least in some cases, mathematical functions representing the continuous variation of the intensity of a given reality in time. But whether reality is *actually* a continuous magnitude should be confirmed or falsified only empirically" (Longuenesse 1998, p. 314).

More recently, excellent work by Wang¹⁸, Jankowiak¹⁹, and Vance Buroker²⁰, among others, has illuminated the foundations of Kant's concept of continuity and its relationship to the Anticipations of Perception. The work of Wang and Jankowiak has established more secure foundations for the Anticipations and for Kant's reasoning regarding continuity. My aim in this paper is to pursue a complementary goal. I will argue that many of the difficulties associated with the notion of continuity are illuminated by placing the section in its proper historical context: Kant's arguments against Scholastic transcendental metaphysics.

Taking the anti-metaphysical context of Kant's arguments seriously allows for a reading according to which the Anticipations section is not an argument for the principles of construction of quantities in time. Instead, the Anticipations are meant to establish a transcendental possibility, that quantities given in sensation that differ only in degree, and thus cannot be divided or counted, could be the source of possible cognition of empirically real objects. For Kant, though, this possibility can be shown to be actual only a posteriori.

The Anticipations section contains an argument that all perceptions have a degree on a *qualitative* scale of intensity, which is central to Kant's attempt to link the analysis of empirical perception to the conditions of knowledge. The principle of the Anticipations does not support a synthetic connection between objects as they appear to us; rather, it supports the claim that all subjective responses to external stimuli must be evaluable on a scale of degrees of intensity, so that observations can be compared systematically. When Kant speaks of continuity in the Anticipations, then, he does not mean line segment density or continuity of motion. Kant's account of the continuity of intensive magnitudes ascribes to them *qualitative*, not quantitative continuity.

The principle of the Anticipations is that the real in sensation possesses a degree. The argument for the principle is intended to show that all veridical sensations can be compared to each other on a scale, and thus to achieve one of Kant's central aims: to argue for the objective validity of judgments based on the categories and the principles. Following Guyer²¹, I read Kant's objective validity as the assurance, not that any particular object exists that instantiates a given concept, but that the categories and principles will apply to any object of possible knowledge (125ff.). As Kant puts it in discussing the categories, the question at issue is how "*subjective conditions of thinking* should have *objective validity*, i.e., yield conditions of the possibility of all cognitions of objects" (A90/B122). Guyer himself concludes that Kant's Anticipations argument

¹⁸ Weijia Wang, "Kant's Argument for the Principle of Anticipations of Perception", in *Philosophical Forum*, vol. 49 (1), 2018, pp. 61–81.

¹⁹ Tim Jankowiak, "Kant's Argument for the Principle of Intensive Magnitudes", in *Kantian Review*, vol. 18, 2013, pp. 387–412.

²⁰ Jill Vance Buroker, *Kant's Critique of Pure Reason: An Introduction*, Cambridge, Cambridge University Press, 2006.

²¹ P. Guyer, "The Transcendental Deduction of the Categories," pp. 123–160 in *The Cambridge Companion to Kant*, Cambridge, Cambridge University Press, 1992.

does not achieve this, and that Kant's best work in the *Principles* is to ground judgments of causation and conservation. Reading Kant in the context that follows shows that his argument is more effective than has been appreciated.

Kant's argument in the Anticipations section supports the conclusion that any real sensed magnitude must be measured as a degree on a scale of possible subjective responses to stimuli. Sensations, as responses to stimuli, are purely subjective, and can be measured only as degrees on a scale of subjective response. Kant opposes this view to the transcendental realist argument that sensations are coordinated to essential properties of objects. I follow Banks²², Hatfield²³, and Giovanelli²⁴ in concluding that Kant's arguments in the Anticipations, while incomplete in themselves, are influential in the development and foundation of the empirical physiology of perception.

2. READING THE ANTICIPATIONS

The mathematical principles, the Axioms and Anticipations, have been read as the a priori basis for the measurement or, as Kant also puts it, the construction of magnitudes. Kant defines a magnitude as a manifold that contains multiple "homogeneous" elements. "Homogenous" means that the elements of the manifold are comparable to each other, so that they can be measured.²⁵ Kant's words "Quantum" and "Größe" have been translated as "magnitude" to distinguish them from "Quantität", which refers to the category of quantity. This is unfortunate in the present context, because the English word "magnitude" has the connotation of stretching or extending over space or time. Intensive "magnitudes" are instantaneous responses to stimuli and do not have extension in space or time. Nonetheless, they are "Größe" in Kant's sense.

Kant explains the role of the Principles as "general rules of unity in the synthesis of appearances", without which our perceptions "would not fit together in any context in accordance with rules of a thoroughly connected (possible) consciousness, thus not into the transcendental and necessary unity of apperception" (A156/B195 ff.). Kant intends the Axioms and Anticipations to effect the "a priori determination of appearances according to the categories of **magnitude** and **quality**", where the Axioms determine according to magnitude, and the Anticipations according to quality (A161/B201).

The principle of the Axioms of Intuition is that "all intuitions are extensive magnitudes" (B 202). The parts of an extensive magnitude can be compared and counted. The grains in a heap of sand can be compared and counted, so the heap is an extensive magnitude. The carpet in a room can be cut into pieces, which can be compared and

²² E. Banks, "Kant, Herbart, and Riemann".

²³ Gary Hatfield, *The Natural and the Normative: Theories of spatial perception from Kant to Helmholtz*. Cambridge, MA, The MIT Press, 1991.

²⁴ Marco Giovanelli, *Reality and Negation – Kant's Principle of Anticipations of Perception*, Dordrecht, Springer, 2011.

²⁵ B 203, see also Sutherland (2004), 161ff.

counted, and thus the carpet is an extensive magnitude²⁶. To say that all intuitions are extensive magnitudes, then, is to say that our intuitions can be divided into homogeneous parts that can be compared to one another. Our intuition of a geometrical line can be divided into our intuition of half of the line, one fourth of the line, and so on.

The principle of the Anticipations of Perception is that **“In all appearances the real, which is an object of the sensation, has intensive magnitude, i.e., a degree”** (B 207). Although each intuition is discrete, the “real in sensation” is necessarily intensive. Intensive magnitudes are homogenous, because they are magnitudes, but intensive magnitudes cannot be measured by dividing them into discrete, independent parts. Temperature is the paradigm of an intensive magnitude. The temperature of an object is a single magnitude. But it cannot be divided into pieces that can be counted: the temperature of the sun, for instance, cannot be divided into parts. The sun itself can be divided into parts, each of which has its own temperature, but the temperature can be divided only into degrees of temperature.

On Kant’s view, the intensive magnitudes that are the correlate of reality in sensation allow for appearances to be determined according to their quality. The Anticipations of Perception correspond to the categories of quality, which are reality, negation, and limitation. These categories are interrelated. The correlate of reality in experience is the presence of a sensation, so the instantaneous sensation of heat or of weight can be subsumed under the category of reality. The correlate of negation is the absence of that sensation, which may be experienced or inferred – as Kant puts it, the quantity of any sensation can be diminished in imagination until it equals zero. The category of limitation allows for introducing boundaries between reality and negation (the absence of reality). For instance, we cannot perceive a shadow without perceiving the boundary between light and shadow, which is a limitation.

Kant concludes the Anticipations with the claim that “All appearances whatsoever are accordingly continuous magnitudes” (A170/B212). The Axioms have established that all intuitions must be extensive magnitudes. But the Anticipations explicitly are intended to establish that all intuitions of objects are continuous magnitudes, and that this is the case because the real in sensation is an intensive magnitude.

In what follows, I will argue for two related claims. First, Kant’s Anticipations argument is intended to show that sensations should be evaluated for their degree on a subjective scale of sensation, not on an objective scale as true properties of objects in themselves, or even as properties of external objects of knowledge. Second, Kant’s argument that the real in sensation has a degree is intended to prove the objective validity of the principle of the Anticipations, as principle of the connection of possible perceptions, where those perceptions are considered as merely subjective responses to external stimuli. The objective reality of any degree on a scale, i.e. the possibility or actuality of a material object the sensation of which corresponds to that degree, is not at issue in the Anticipations.

²⁶ These examples and exposition follow the very clear introductory discussion of the Anticipations in Guyer (*Kant*, New York and London, Routledge, 2006, 102ff).

3. KANT'S ANTI-METAPHYSICAL PROJECT

Kant's argument that we have access to the real in sensation only by degrees is meant to counter transcendental realism, in the form of the metaphysical views held by the philosophers Kant refers to as "the scholastics". Kant argues that the reality that corresponds to our subjective sensations has a degree because he rejects scholastic arguments that the bodies that appear to our senses possess all the perfections proper to them. A perfection, for Kant and for Kant's "scholastics", is not "perfect" in the colloquial sense of "ideal" or "faultless". Instead, a perfection is a predicate that an object possesses in order to be what it is. In the *Inaugural Dissertation*, Kant observes that the notion of a maximum of perfection occurs in Plato's *Republic*²⁷. Schönfeld²⁸ sees a more proximate source of Kant's account of perfection, and its relation to the analysis of reality, in Augustine's *De natura boni*, in which Augustine argues that goodness is real, and thus that the analysis of being is the analysis of the good²⁹. Alexander Baumgarten, who wrote the *Metaphysica* on which Kant bases his metaphysics lectures in 1794 and 1795, the *Metaphysik Vigilantius* or *Arnoldt*, "reiterated the Augustinian equivalence of being and the good and tied both terms to the notion of perfection"³⁰.

In the *Inaugural Dissertation*, Kant appeals to the related notion of the "maximum" or "ideal" of perfection, which is God, as the principle of the intelligible world. In the *Dissertation*, Kant seems still to conceive of God as an actual *ens realissimum*, that is, the source of all perfections. In the *Critique of Pure Reason*, Kant no longer conceives of God as the actually existing source of determinations of reality³¹. However, Kant still appeals to the *ens realissimum* in the form of "the maximum of perfection, called an idea by Plato". He argues that no reality *as perceived* can reach the standard of being the "maximum of perfection", that is, the source of all reality.

Instead, external reality affects our sensibility, and is the ground of the subject's perceptions. Kant's shift to the Critical analysis of how we have access, through sensibility, to knowledge of objects is a key step in the development of transcendental idealism. The transcendental realist position is that perception of external being is correlated with the essential properties of objects, so that objects that appear to us are objects as they are in themselves. The Anticipations section has the consequence that the real to which we have access in sensation is the ground of the possibility of unifying all sensations on the same scale of intensity. That possibility is a necessary condition of knowledge of reality.

Kant argues for the objective validity, and not the objective reality, of the principle of the Anticipations. In saying that sensed reality grounds the possibility of knowledge, Kant does not intend to say that we already know that real external objects cause the sub-

²⁷ MSI, AA 02:396.10–17.

²⁸ Martin Schönfeld, *The Philosophy of the Young Kant*, Oxford, Oxford University Press, 2000.

²⁹ *Ibidem*, p. 108.

³⁰ *Ibidem*, p. 109.

³¹ As he makes clear in the Ideal of Pure Reason, for instance, cf. A576/B604.

ject's raw, instantaneous sensations. While, at times, Kant speaks of the real ground or "Realgrund", i.e., of something being the ground of the being of something else, elsewhere he speaks of the notion that all *knowledge* must have a ground. As Kant puts it in the Nachlaß, "That everything in the world has a ground, means the same as: it can be cognized a priori and stands under a rule of order", and "The first synthetic a priori principle: Everything has a ground of cognition" (N 5193). The principle of the Anticipations is that even raw sensation must register on a scale of the intensity of the subject's possible response to stimuli to be a possible source of knowledge.

The Anticipations section thus contains an argument against transcendental realism. Objects of perception are not given to us as unities – their properties must be constructed by unifying representations, according to the categories as rules for synthesis. The Anticipations adds the claim that the unity of sensation, of the mere affection of the subject, is a qualitative, not a quantitative unity. The sequences of our impressions are objectively real only once they have been synthesized according to the categories of quantity. But the qualitative scale of the intensity of sensation is objectively valid, in that it shows how our sensations can be compared to each other.

A related argument for the qualitative, rather than quantitative, unity of sensed real magnitudes is found in Kant's arguments against the "scholastics" in the Transcendental Deduction. In §12, an addition to the Deduction for the B Edition, Kant argues against transcendental realism in metaphysics. According to the "transcendental philosophy of the ancients", as interpreted by the "scholastics", the a priori concept of an object contains the predicates *Quodlibet ens est unum, verum, bonum*: Every being is one, true, and good (B113). In §12, Kant argues that these categories of oneness, truth, and goodness are found in his Table, but that they are requirements for cognition of things, and do not give material predicates of the things themselves. Later, in a passage from his lectures based on Baumgarten's *Metaphysica* that strikingly recalls the content of §12, Kant expounds on his reading of these categories:

The Aristotelian school considers formal unity as transcendental, and in a metaphysical sense assumes [...] the principle: any being is transcendently *one, true, good* <*quodlibet ens est transcendentaliter unum, verum, bonum*>, and [is] predicated of the object

(a) *one* <*unum*>, i.e., that one thing is not many things – unity

(b) *truth* <*verum*>, i.e., to each thing is actually applied what is proper to it, or—certain predicates, which belonged to the concept of the thing, actually apply to the thing, therefore the predicates of the thing could be attributed to it according to actuality, not possibility, e.g., every triangle has angles. This is the proposition: every thing *has truth in itself* or in each thing is truth (each thing has nothing in itself that does not agree with itself).

(c) *Good* <*bonum*>, i.e., each thing has everything in itself in order to be what it is, or—everything is transcendently <*transcendentaliter*> perfect.³²

³² Kant (1997 [1794-1795]), 458; V-MP / Arnoldt, AA 29:989-29:990.

Kant singles out this third predicate for criticism, implicitly in the Anticipations, and explicitly in the Lectures and in the Deduction. According to the scholastic view, as presented here by Kant, all beings possess all the predicates proper to them (truth), and beings possess all the predicates to ground their existence, i.e., they possess all the predicates proper to them as perfections. In the Lectures and in §12, Kant links the scholastic view he describes in the quotation above explicitly to the analysis of reality and to the “possibility of things itself”:

These supposedly transcendental predicates of **things** are nothing other than logical requisites and criteria of all **cognition of things** in general, and ground it in the categories of quantity, namely, the categories of **unity**, **plurality**, and **totality**; yet these categories must really have been taken [by the scholastics] as material, as belonging to the possibility of things itself, when in fact they should have been used in a merely formal sense, as belonging to the logical requirements for every cognition; thus these criteria of thinking were carelessly made into properties of things in themselves.³³

Kant echoes this conclusion in the Lectures on Metaphysics:

here each thing was considered only in relation to its own essence, and to this extent these criteria of the thing are correct, since each thing just is what it is: but in the metaphysical sense, i.e., in the relation of the thing [to what is] outside it, therefore considered against all other possible things, no thing, excluding the most real being «*ens realissimo*», can be attributed a perfection, rather each has a lack of reality, therefore negative perfection, or is imperfect.³⁴

Kant does not argue only against the scholastic position. He argues for a rival metaphysical position: “in the metaphysical sense [...] no thing [...] can be attributed a perfection, rather each has a lack of reality, therefore negative perfection”. Metaphysically speaking, then, for Kant no thing except the *ens realissimum* “has everything in itself in order to be what it is”, Kant’s definition of a being that possesses all perfections. Instead, each being, “considered against all other possible things”, “has a lack of reality”.

In §12 and in the metaphysics lectures, Kant argues that the predicates of oneness, truth, and goodness are best applied qualitatively, as applying to our cognition of objects, and not quantitatively, as material predicates of beings in themselves.

In every cognition of an object there is, namely, **unity** of the concept, which one can call **qualitative unity** insofar as by that only the unity of the comprehension of the manifold of cognition is thought, as, say the unity of the theme in a play, a speech, or a fable. Second, **truth** in respect of the consequences. The more true consequences from a given concept, the more indication of its objective reality. One could call this the **qualitative plurality** of the marks that belong to a concept

³³ B113–114.

³⁴ Kant (1997 [1794-1795]), 459; V-MP / Arnoldt, AA 29:990. *Ens realissimum* is in the genitive; *realissimo* the nominative case.

as a common ground (not thought of in it as a magnitude). Third, finally, **perfection**, which consists in this plurality conversely being traced back to the unity of the concept, and agreeing completely with this one and no other one, which one can call **qualitative completeness** (totality).³⁵

In a metaphysical sense *<in sensu metaphysico>* these criteria are therefore unusable, but as logical prescriptions for the consideration of an object it is important that one must see from its determination whether it has unity, truth, or perfection, e.g., formal unity of a book.³⁶

Note that the first *Critique*'s definition of goodness appeals to the notion of "perfection", just as the scholastic one does. But Kant defines perfection differently, as the plurality of the characteristics or *Merkmale* that belong to a concept agreeing with that concept and with no other concept, or what Kant calls "qualitative completeness (totality)". What the scholastics saw as metaphysical characteristics of being, according to Kant, Kant sees as logical characteristics of true cognition.

Immediately following the passage cited above, Kant draws the following conclusion for his view of reality.

It follows now from this, that the real, since it has its ground in sensation, therefore in the object of the senses, could not have its abode in the merely intellectual, therefore the degree of the real can thus be thought neither as greatest *<maximum>* nor as smallest *<minimum>*. On the other hand it is certain that the modification of the degree of the intensive magnitude of the real quality must be infinite, even if it can also be unnoticeable. Therefore between the determinate degree A until 0 = zero there must be found an infinite multitude of qualities of the real, even if in an unnoticeable degree, e.g., knowledge, representations, yes even the consciousness of human beings have many degrees, without one being able to determine the smallest.³⁷

Kant distinguishes in the lectures between the real taken substantively and adjectivally, i.e., between objective, independent reality and the real of subjective sensation.³⁸ The Anticipations discussion concerns the "real of sensation", which is "merely subjective":

[Appearances] therefore also contain in addition to the intuition the materials for some object in general (through which something existing in space and time is represented), i.e., the real of the sensation, as merely subjective representation, by

³⁵ B114.

³⁶ Kant (1997 [1794-1795]), 459; V-MP / Arnoldt, AA 29:990.

³⁷ Kant (1997 [1794-1795]), 468; V-MP / Arnoldt, AA 29:1000.

³⁸ Cf. Kant (1997 [1794-1795]), 468; V-MP / Arnoldt, AA 29: 1000, no. (5): "One uses the word *reality* in a double sense (1) adjectivally, and then it means only the form of the object, is therefore applied formally *«formaliter»*, and indeed then it can be used only in the singular *«in singulari»*. E.g., representations, concepts have objective reality. Magnitude is here reality and applies to the form of the concept insofar as it has an object; (2) or substantively, and then reality refers to the material of the object and is usable only in the plural *«in plurali»*, because the reality of the thing in itself is considered".

which one can only be conscious that the subject is affected, and which one relates to an object in general.³⁹

The “merely subjective representation” of heat, of gravity, of the largeness of an angle, has its ground in sensation. Because our access to the real is through sensation and not the intellect, the degree of the real cannot be a minimum or a maximum, because these can be determined only through concepts. Instead, then, our subjective sensation of the real shares with other sensations the property of having “many degrees, without one being able to determine the smallest”. This context illuminates Kant’s conclusion in the Anticipations:

All appearances whatsoever are accordingly continuous magnitudes, either in their intuition, as extensive magnitudes, or *in their mere perception* (sensation and thus reality), as intensive ones.⁴⁰

The argument of the Anticipations is that any given *appearance*, as merely subjective representation or “mere perception”, “has an **intensive magnitude**, i.e., a degree”. We do not perceive empirically real objects as aggregates of perfections. Instead, we perceive a set of single, indivisible, intensive magnitudes, which are the ground of a synthesis, according to rules, that determines a set of unified objects of cognition. Intensive magnitudes like weight are perceived as unities, and are not constructed in time, as extensive magnitudes are. But intensive magnitudes, like weight, are necessary conditions for knowledge of empirically real phenomena, like gravity. The instantaneous “moment” of the weight of an object, in terminology Kant borrows from Newton and Galileo, grounds determination of the gravitational force exerted on that object. The gravitational force is an extensive quantity, but the instantaneous moment of weight cannot be divided into discrete parts – it is an intensive magnitude.

Kant’s argument that the real that corresponds to our sensations has a degree should be understood as a negative, anti-metaphysical position: the real that corresponds to our sensations has a degree, *and is therefore not an essence or a perfection accessible to the intellect*. Reflection on sensation does not allow access to the essential properties of things as they are in themselves. Mere subjective sensation reveals one thing: the magnitude, or degree, of the subject’s response to a stimulus. Subjective sensation cannot be proven to be correlated with the real properties of independently existing beings without further argument.

In this context, Kant’s argument that sensation, as intensive magnitude, is continuous in quality is more cogent. Kant’s argument that the real that corresponds to our sensations has a degree is a *negative* argument: an argument that the real phenomenon that corresponds to our subjective sensation of heat, for instance, is not an aggregate of essences or perfections. Kant rejects the notion that any being *as sensed* possesses all perfections proper to it, as predicates accessible to sensation in perception or to the intellect through reflection. When we sense that the boiling drop of water is hot, we do not sense “heat” in

³⁹ A165 / B207–208.

⁴⁰ A170 / B212, emphasis added.

it, as a perfection in the scholastic, transcendental sense. That sense is: “each thing has everything in itself in order to be what it is, or—everything is transcendently *«transcendentaliter»* perfect” (Kant (1997 [1794-1795]), 459; V-MP / Arnoldt, AA 29:990). The ground of our perception is the sensation itself, the “moment” of heat or of gravity.

Thus, Kant concludes, we do not perceive the ground of reality directly; rather, we perceive limitations of the real. Kant’s argument is against the German rationalists and the “scholastics,” and, to an extent, against his own pre-Critical position. The Anticipations of Perception section supports three significant conclusions:

- 1) Our sensations are qualitative unities. Sensation does not reach to the ultimate ground or source of reality, but only to its presence to us (how we are affected).
- 2) Our sensations are not of objects as aggregates of perfections, because we do not perceive the ground of reality or of the being of things, but rather the basis of our knowledge of things.
- 3) All sensations are evaluable as degrees on a scale that is determined subjectively and qualitatively. Thus, all our sensations can be connected as sensations.

4. OBJECTIVE VALIDITY AND THE ANALYSIS OF SENSATION

Kant presents the Principles in general as objectively real, saying that

Experience [...] has principles (*Principien*) of its form which ground it a priori, namely general rules of unity in the synthesis of appearances, whose objective reality, as necessary conditions, can always be shown in experience, indeed in its possibility.⁴¹

Principles have objective reality insofar as they are necessary conditions for connecting observations in such a way that they constitute cognition of an object.

However, Kant’s principles also must be objectively *valid*, that is, they should apply to any object of possible knowledge. I have emphasized the “merely subjective” character of Kant’s analysis of sensation, a key element of Kant’s argument that all possible sensations are connected to each other as degrees on a scale of intensity. This argument is one answer to Kant’s question of how “*subjective conditions of thinking* should have *objective validity*, i.e., yield conditions of the possibility of all cognitions of objects” (A90 / B122). Kant distinguishes the question of objective validity from objective reality, which, in this context, could be the question of whether the presence of a sensation is correlated with the presence of a real object, or the question of whether sensations reflect the real properties of objects. Kant says explicitly that he will not address these questions in the Anticipations.⁴²

⁴¹ A156/B195-6.

⁴² “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 [*Materien*], 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, and that it is false to assume that the

Instead, in the Anticipations Kant distinguishes the real in appearance, as a degree of sensation perceived instantaneously, from temporal observations (intuitions), as extensive magnitudes constructed in time.

Apprehension, merely by means of sensation, fills only an instant (if I do not take into consideration the succession of many sensations). As something in the appearance, the apprehension of which is not a successive synthesis, proceeding from the parts to the whole representation, it therefore has no extensive magnitude; the absence of sensation in the same moment would represent this as empty, thus = 0. Now that in the empirical intuition which corresponds to the sensation is reality (*realitas phaenomenon*); that which corresponds to its absence is negation = 0. [...] Now I call that magnitude which can only be apprehended as a unity, and in which multiplicity can only be represented through approximation to negation = 0, **intensive magnitude**. Thus every reality in the appearance has intensive magnitude, i.e., a degree.⁴³

In the Anticipations, Kant argues that “every reality in the appearance has intensive magnitude”, and that intensive magnitudes “can only be apprehended as a unity,” which can be restated as “every reality in the appearance, *as intensive magnitude*, can only be apprehended as a unity”. The *variation* of intensive magnitudes takes place over time, and, in particular, such magnitudes are capable of successive diminution down to zero. But the initial apprehension of an intensive magnitude, for Kant, takes place “augenblicklich”, and the magnitude as apprehended is a unity.

A more perspicuous statement of this view is found in Kant’s lectures on metaphysics, the so-called *Metaphysik Vigilantius* or *Arnoldt*, from the winter semester of 1794–1795.⁴⁴

One calls this *degree* of sensation *intensive magnitude*, in order to distinguish it from the extensive magnitude with quantity, and says: everything sensible has intensive magnitude, or = a degree of sensation; that is: it can be represented from zero = null = which has no sensation at all, the sensation can climb, or again decrease from a certain measure until = 0. But it is understood as a magnitude whereby the parts are not cognized previously in order to determine the magnitude, rather they must be cognized as unity, and the parts drawn out from the unity. Thus, e.g., a line, which must be composed, differs from an extinguishing light: with the latter there is only a unity of sensation, but in each following state a different degree of this.⁴⁵

Intensive magnitudes are “cognized as unity, and the parts drawn out from the unity”. Unlike a line, “which must be composed” as extensive magnitude, intensive magni-

real in appearance is always equal in degree and differs only in aggregation and its extensive magnitude, especially when this is allegedly asserted on the basis of a principle of understanding a priori” (A174–175 / B216).

⁴³ A167–0168 / B209–210.

⁴⁴ About the *Lectures on Metaphysics*, see Ameriks (Karl Ameriks, *Interpreting Kant’s Critiques*, Oxford, Oxford University Press, 2003): “the striking amount of overlap over the years demonstrates, I believe, that these student notes are in general a very good indication of what Kant taught. But they must be used with caution, especially because there are problems with their presentation even in the *Akademie* edition” (119n); and “With the recent availability of new data from these lectures, Kant’s detailed treatment of Baumgarten can no longer be ignored as a major indication of his metaphysical views.” (pp. 119–120).

⁴⁵ Kant (1997 [1794–1795]), 467; V-MP / Arnoldt, AA 29:999.

tudes are perceived first as a single, unified sensation, and then the temporal variations in degree are composed, “drawn out”, from that unity.

These passages suggest that raw sensations are not informative; only the variation of sensation can be the basis of objective cognition. The process of “drawing out” these variations is set forth, not in the Anticipations, but in the Schematism. The discussion of reality in the Schematism makes precise the difference between reality and negation, on the one hand, and the schema of a reality representable as a quantum, on the other:

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). Negation is that the concept of which represents a non-being (in time). The opposition of the two thus takes place in the distinction of *one and the same time* as either a filled or an empty time. [...] Now every sensation has a degree or magnitude, through which it can more or less fill *the same time*, i.e., the inner sense in regard to *the same representation* of an object, until it ceases in nothingness (= 0 = *negatio*). Hence there is a relation and connection between, or rather a transition from reality to negation, that makes every reality representable as a quantum, and the schema of a reality, as the quantity of something insofar as it fills time, is just this continuous and uniform *generation of that quantity in time*, as one descends *in time* from the sensation that has a certain degree to its disappearance or gradually ascends from negation to its magnitude.⁴⁶

The Anticipations have to do with reality as it is apprehended instantaneously, at the *same* time, in the *same* sensation—“augenblicklich”. The *schema* of reality, on the other hand, involves the continuous generation of a quantity as it varies over time.

Kant’s schema of reality is based on what Newton refers to as the fluxion of natural quantities: the continuous increase or decrease of some quantity in time. As Newton remarks in his treatise on the fluxion method,

in what follows, I consider Quantities as if they were generated by continual Increase, after the manner of a Space, which a Body or Thing in Motion describes. [...] Now those Quantities which I consider as gradually and indefinitely increasing, I shall hereafter call *Fluents*, or *Flowing Quantities*.⁴⁷

The arguments of the Schematism and of the Anticipations must be kept carefully apart. Kant explicitly holds back from arguing in the Anticipations that we can construct real differences in intensive magnitude a priori, by determining the variation of the real in sensation over time. Instead, he argues that we can anticipate the apprehension of the real in sensation that takes place *instantaneously*. Then, to construct a schema of that reality as extensive magnitude, the parts of that unity have to be drawn out from the unity as apprehended. We construct such extensive magnitudes through fluxion, according to the schema of reality, but that construction does not fall under the rubric of the Anticipations.

⁴⁶ A143 / B182-183, emphasis added.

⁴⁷ Newton (1736), 20.

The above context allows for a more extensive account of what Kant means by the qualitative continuity of reality. Kant argues in the Anticipations that intensive magnitudes “can only be apprehended as a unity”. Unlike extensive magnitudes, in which the complete magnitude is generated by successive synthesis from the parts to the whole, for intensive magnitudes the magnitude is apprehended as a unity and then the parts are drawn from the whole. Nonetheless, as Kant observes in the metaphysics lectures, the parts are still homogeneous, and thus by definition intensive magnitudes are still magnitudes, even though they must be perceived instantaneously.

The author calls the *degree of sensation* = the magnitude of the quality; it does express this determination that a something in the thing is thought as posited, but one determines the *degree* better this way: *magnitude of the unity*, i.e., the representation of an object, insofar as I think its magnitude (quantity <*quantitatem*>) as unity, provides the degree of the magnitude. Thus the magnitude is given here not as plurality, but as unity and distinguishes itself precisely from extensive magnitude.⁴⁸ Therefore, e.g., a drop of boiling water is indeed *less than* a full kettle, but both are equally hot. The unity, which is perceived here with the sensation of the object, thus shows that it rests on the equality of the ground, and the unity of the ground makes wholly dispensable the multiple homogeneity in consideration of the reality. Thus an angle is equally large, however far the lines or sides may extend: it determines the equality of the inclination, and *only* its difference determines a difference of intensive magnitude, since this reduces merely to the existence of motion in large and small angles. A lively thought that gradually loses its impression has unity however different it is in every step of its waning.⁴⁹

The homogeneity of an extensive magnitude is a result of the fact that the magnitude was generated successively from similar parts, whereas the homogeneity of an intensive magnitude results from the “unity of the *ground*”. The ground, in the case of intensive magnitudes, is the response of the subject to stimuli.

Kant rejects the notion that any object or phenomenon, as a real unity, is given to the understanding rather than to sensation. As a result, judgments about reality are based on sensation, and sensation is the ground of an infinite synthesis of degrees of reality. According to Kant’s arguments in the Anticipations,

Now I call that magnitude which can only be apprehended as a unity, and in which multiplicity can only be represented through approximation to negation = 0, **intensive magnitude**. Thus *every reality in the appearance* has intensive magnitude, i.e., a degree (A167-168 / B209-210, italics added).

This final claim is what allows Kant to argue for the objective validity of the principle of the Anticipations. Every real phenomenon, as it is revealed in sensation, registers on a scale of subjective response, determined by the degree of presence or absence of the sensation to the subject. Real phenomena can thus be connected to each other on a mathematical scale, can be compared, and can be objects of cognition.

⁴⁸ Marginalia omitted here.

⁴⁹ Kant (1997 [1794–1795]), 467–468; V-MP / Arnoldt, AA 29:999–1000.

Especially in the context of Kant's arguments against "the scholastics", the Anticipations section constitutes an argument that our access to reality – the basis of our judgments about reality – is empirical. The determination of degrees of sensation on a scale depends entirely on the merely subjective response to external stimuli in experience.

However, the objective validity of the principle of the Anticipations depends on a single a priori claim: that all sensations must register on a scale of possible subjective response. This claim has no objectively real content: the scale is merely subjective. But the bare claim that all sensations must have a degree is an assumption necessary to building a system of knowledge, based on sensibility as one source of knowledge.

Kant's argument that raw subjective response, the registering of responses to stimuli, must be evaluable on a scale was very influential on the development of empirical psychology. Erik Banks traces the influence of Kant's Anticipations section on Johann Friedrich Herbart's pioneering work in the empirical physiology of sensation. Kant's argument that sensation should be evaluated using degrees on a scale has a broad influence, through Herbart, on the establishment and philosophical foundations of empirical physiology and psychology (Giovannelli 2011, Hatfield 1990).

For Kant, the goal of the evaluation of sensation is not to establish a science of the physiology of perception, as it is for Herbart. However, Kant and Herbart share an interest in investigating what can be inferred legitimately from the merely subjective, instantaneous registering of sensation by a human subject. The minimum requirement Kant places on the evaluation of sensation is that all sensations must have a place on a scale of human subjective response. This scale is determined by the values 1, the full presence of a sensation, and 0, the complete absence of the sensation.

Are the presence and absence of a sensation correlated with the presence and absence of a real object? This is a distinct question for Kant, the question of objective reality. Kant does address this question, especially in the Schematism. But the key to understanding the specific significance and influence of Kant's argument in the Anticipations is to recognize that Kant's interest was in proving the objective validity of the principle of the Anticipations, not the objective reality of any particular intensive magnitude.

A full evaluation of the Anticipations section ought to be linked to the analysis of Kant's particular notion of systematicity. How is it possible for sensation to be evaluated systematically? How can any property of contingent sensation fit into the necessary a priori conditions of the possibility of knowledge? The latter question is at the root of the objections from Salmon, Bonjour, and Kitcher cited at the outset. Kant's insight was to realize that he did not need to appeal to any objective property in the analysis of sensation. Sensation need not be correlated to essential properties of external objects, as the "scholastics" argue. Instead, sensation can be analyzed as a "merely subjective" response. Kant realizes that this response must register as a degree of the subject's *possible* response to a stimulus.

Kant did not develop this idea in a satisfying way. His analysis assigns the magnitude "1" to the "full presence" of a sensation, and "0" to the "absence" of a sensation. But Kant does not explain anywhere how these magnitudes are determined, or how the

scale of subjective response is to be evaluated. Clearly, Kant's methods require comparing any given partial presence of a sensation to the subject's possible response to the full presence of the sensation. But Kant does not explain how this comparison is to be done, or how the standard of the subject's possible (not actual) response is to be determined. Kant gives examples, but does not specify a methodology.

While Kant's own account is scientifically unsatisfying, it was the basis for significant progress in the systematic study of sensation. Kant's focus on the raw, instantaneous registering of sensation on a scale influenced Herbart's analysis of sensation in founding empirical psychology. Further, Kant's argument that this scale should be considered as the merely subjective response to a stimulus, and not (or not necessarily) as containing information about the presence of an external object, was influential in 19th century debates about the foundations of empirical psychology and physiology⁵⁰.

⁵⁰ For an example of one such foundational debate, see Heidelberger (Michael Heidelberger, *Nature from Within: Gustav Theodor Fechner and his psychophysical worldview*, translated Cynthia Klohr, Pittsburgh, University of Pittsburgh Press, 2004, 175ff), which has a fascinating discussion of Fechner's thesis of psychophysical parallelism, which Hans Vaihinger attributes to Kant.