

KANT'S THEORY OF SPACE AND RUSSELL'S SYSTEM OF PERCEPTUAL AND PHYSICAL SPACE: A COMPARATIVE ANALYSIS

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Abstract

In the first *Critique* of 1781, Immanuel Kant develops a theory where he presents his reasons for calling space and time as “subjective forms of intuition of the mind known a priori”. In recent decades, many contemporary philosophers have commented on Kant’s theory expressing a variety of opinion about the basis and validity of his claims. Bertrand Russell’s theory of space which constructs a “public” or physical space from what we are immediately aware of represents one of such responses. It is against this backdrop that this paper attempts to compare Kant’s theory of space with that of Russell’s system. Russell argues that for Kant to say that space is subjective does not distinguish between perceptual space (i.e. the space that it seems to us that objects are in) and physical space (i.e. the space that objects actually are in). Contrary to Kant’s view, Russell claims that it is possible to construct an idea of physical space of objects existing independently of the human mind. Kant’s theory is more like Russell’s theory of physical space except that the independent existence of objects in this space is a point of debate. Again, unlike Kant’s psychological explanation of how we get the concept of physical space, Russell’s point seems to be that we do have the right to infer an actual existing physical space since we can construct some of its properties from the perceptual spaces that we are immediately aware of. On this basis, the paper argues that if we are justified in asserting that there is a physical space more according to the Russellian view than Kant’s theory, then this knowledge is empirically consistent with our ordinary human beliefs.

Introduction: The Problem

The problem of the nature of space and time has been of special interest to scientists and philosophers in the early modern period. Newton and his followers believed that space and time are entities that exist independently of the object located in them. It is conceivable that space and time could exist even if no spatial objects ever existed at all. Opposing this view were many thinkers, among them Leibniz who argue that space and time have no independent metaphysical status. For them, space and time are nothing more than the set of actual and possible relations that physical objects have to one another. Not only is there no such thing as an immaterial space and time containing material objects but that it is not possible to conceive of space and time existing apart from such objects and their relations. Formally, Newtonians regarded space and time as logically primary and perfectly capable of existing in the complete absence of any objects, whereas Leibnizians regarded space and time as logically secondary, dependent entirely on there being various objects spatially and temporally related.

In Kant’s earliest writings, his view on space was relationist. Having been educated under the Leibnizian tradition, he attempted to reconcile this view with other great thinkers like Newton. Kant himself tells us that the entire critical philosophy developed out of his dissatisfaction with the Leibnizian rationalist metaphysics. In his last pre-critical work: *Concerning the Ultimate Foundation of the Differentiation of Regions in Space* (1768), Kant departed from Leibnizian rationalism and moved towards

the direction of Newton that space has an absolute reality of its own – a view he developed two years later in his *Inaugural Dissertation* of 1779. In his response to the nature of the problem in the *Critique of Pure Reason* (1781), Kant sets up the question thus:

What, then are space and time? Are they real existences? Are they only determinations or relations of things, yet such as would belong to things even if they were not intuited? Or are space and time such that they belong only to the forms of intuition and therefore to the subjective constitution of our minds, apart from which they could not be ascribed to anything whatsoever? (68).

In providing answers to the above questions, Kant begins his inquiry by rejecting the possibility that space and time are substances, properties, accidents (determinations) or relations of things in themselves. He argues for the subjective nature of space and time and thinks they are necessary conditions for the existence of our experience of objects. His evidence for this claim rests on the assurance that we cannot think of objects except them being in space and time but we can think of space and time without objects in them. In this way, Kant sees space and time as if they are containers which exist prior to objects if they are to be necessary conditions for the existence of objects. However, if space and time are seen as determinations, properties, relations or accidents of things in themselves and yet necessary conditions of their existence, it would be difficult for space and time to exist when objects do not exist in them. It is this position that Kant rejects because it is logically possible for space and time to exist even if objects do not exist, since we can conceive of them in that manner. But if space and time are regarded as relations between objects, and yet could exist when objects do not exist, then space and time will be, as Kant says “mere non entities” when they do exist without objects existing. If objects depend for their existence on non entities, then the reality of the object is thrown into question. This is perhaps what Kant means when he claims that if space and time were determinations or relations between things in themselves, then they would not be real but must be mere appearances.

In the discussions of the ‘Transcendental Aesthetic’, Kant begins with an analysis of his theory of space and time which he called the metaphysical and transcendental expositions of these concepts. In this, he has one section for the arguments on space and another section for the same corresponding arguments about time. In this essay, the focus of our analysis will be centered only on the consideration of his theory of space. Let us begin first with the metaphysical exposition.

Metaphysical Exposition

By ‘exposition’, Kant means “the clear though not necessarily exhaustive representation of that which belongs to a concept (68). Kant argues that “the exposition is metaphysical when it contains that which exhibits the concept as given a priori” (68). Kant uses four basic arguments to show the metaphysical exposition of the nature of space. Argument one states that space cannot be an empirical concept derived from sense experiences. Kant claims that since the representation of space is involved in the very act of representing a world of physical objects, it cannot be based on experience of these objects. He tells us that my sensation cannot “be referred to something outside me” (68) unless I presupposed the representation of space. Nor can my sensations be represented “as outside and alongside one another” (68) without the representation of space. This means that space is also presupposed for determining the numerical distinctness of physical objects from one another.

Argument two shows that “space is a necessary a priori representation which underlie all outer intuitions” (68). This argument says that although we can imagine space empty of objects (which is precisely what geometry does), we cannot imagine that there is no space. Space, according to Kant “must therefore be regarded as the condition for the possibility of appearances and not as a determination dependent upon them” (68). Having set up to his satisfaction the position that space is known a priori, argument three goes on to give reasons for considering space not as a priori concept but a priori or pure intuition. Kant’s argument is that “we can represent to ourselves only one space; and if we speak of diverse

spaces, we mean thereby only parts of one and the same unique space” (69). Furthermore, these parts cannot be the constituents out of which space is composed, for the parts can only be thought as in the whole space. Thus, the concept of spaces is derived from our apprehension of limiting the whole and getting a section of it. Since Kant thought that concepts were general notions indicating a kind of thing, of which there must be several instances, space as an individual cannot be apprehended by a concept of space; but only by its parts. The only way we can apprehend an individual is to have an intuition of it. From these considerations, Kant thinks he has shown that one cannot compose the all embracing space by adding up the individual parts, as it were, since we cannot think of the individual spaces without thinking of them as a whole. Thus, the notion of space as a whole is presupposed by an understanding of the notion of spaces. In this way, space must be known by an a priori and not empirical intuition. It is however not clear what the reason for this consideration is. Perhaps, Kant feels that the concept of space is a priori and therefore must be founded on an a priori intuition of space.

The fourth argument, according to Kant is that “space is represented as an infinite given magnitude” (69) which can be explained by the possibility of it being “an a priori intuition (and) not a concept” (70). Unlike a concept, Kant says that the representation of space contains “an infinite number of representation within itself” (70). Here Kant does not mean that we perceive space as an infinite whole but that space is given to us unbounded in the sense that we cannot see the “end” or “edge” of space because behind any given space lies more space that is further infinitely divisible. This point is made more explicitly by Kant in the *Dissertation* when he says;

The concept of space is a singular representation comprehending all things within itself; not an abstract common notion containing them under itself. For what you speak of as several places are only parts of the same boundless space, related to one another by a fixed position, nor can you conceive to yourself a cubic foot unless it be bounded in all directions by the space that surrounds it (68).

Thus, it is because space is seen as infinite in the senses described above that we can speak of it as having an infinite number of parts. From the metaphysical arguments of the nature of space, Kant goes on to discuss his transcendental arguments.

Transcendental Exposition

Kant defines transcendental exposition of space as “the explanation of a concept as a principle from which the possibility of other a priori synthetic knowledge can be understood” (70). He demonstrates this argument on “the assumption of a given mode of explaining the concept” (70) in mathematical knowledge. In this, he argues that “geometry is a science which determines the properties of space synthetically and yet a priori” (70) in the form of an intuition. For example, the statement that “space has three dimensions cannot be shown if we examine merely the concepts. For the concept of the subject does not contain the concept of the predicate as an analytic statement does. However, the statement is necessary because it is not possible for space not to have three dimensions. Thus for Kant, space must be a priori since necessary statement cannot be empirical. The only option is to see our knowledge of space grounded in an a priori intuition. Kant shows that this intuition can only be in the subject because it precedes the object of experience. In this way, intuition is seen “merely (as) the form of outer sense in general” (71), since it shapes the appearances of these objects.

What then does Kant conclude about the metaphysical and transcendental status of space? He calls space empirically real that is it is real “in respect of whatever Kant represented to us outwardly as object” (B44). It is also transcendently ideal that is “in respect of things when they are considered in themselves”, space is not real (A28). Without a subject or a mind space is nothing, since it is the form which orders the mind’s experiences. As Kant says, “once we abstract from the subjective conditions of perception, it (space) is nothing at all and cannot be attributed to the things in themselves” (A61, B44). This conclusion summarizes his view that space is the “subjective form of intuition of the mind known a priori”. This means

that space is merely the subjective way that our minds have in organizing phenomena of external objects – a position which raises a number of fundamental questions. For example, if space is a form of the mind for ordering our experiences of external objects and if these forms are not the ones we immediately experienced; then what are they? Again, what is the nature of the mind that organizes our experiences? Is it the mind that each individual has? or it is the empirical self as phenomenon? Or the mind as a phenomenon object while the soul is the noumenon or the thing in itself – the transcendent reality behind the mind as phenomenon? Or is the mind the noumenon subject aware of itself as phenomenon object but unaware of itself as it is in itself? No doubt, it is these inherent difficulties seen to discredit Kant calling space a subjective form of intuition of the mind that prompted Bertrand Russell to work out his system of perceptual and physical space that offers a possible alternative to the Kantian model.

Bertrand Russell's Theory of Perceptual and Physical Space

Russell makes the basic distinction between a “private” space, or “a perspective” and the “system of perspectives” (namely, public space) or the system of all the “points of view” exemplified by all the private spaces (*Our Knowledge of the External World* 70). If the perceiver moves or something that he is perceiving moves, then the perceived spatial relations in the private space change, and it becomes (by definition) a new private space. Here, there are two co-ordinates which determine the constitution of the private space. These are (i) the aspects of the things viewed, of which only one (for each thing) appears at a given perspective; and (ii) the perspective or private space of which the aspects of the things viewed are members, that is, the point from which the things are viewed. The first is then the point at which the thing appears to be, and the second is the point from which the perceiver is viewing the thing (80).

The private space of a perceiver is, Russell feels, a correlation of the perceived spaces of several senses, for example the sight, touch, hearing and kinesthetic spaces. Russell argues that our knowledge of the constitution of private space is contingent or empirical, since we must learn as children to correlate these many spaces of the senses. Because we can correlate them without difficulty, however, we imagine a common cause of the sense data of our different senses, that is a physical object existing independently of us. Russell does not argue that we directly perceive physical objects, but that we infer them as the simplest hypotheses to explain the correlation of the sense data of our various senses (75). Also, he claims that we are justified in accepting as known the existence of other minds by an argument from analogy. On the basis of similar actions on the part of what look to be bodies similar to mine, I infer feelings similar to mine being aroused in relation to the physical bodies which I posit as the causes of sense data of bodies.

If I posit that other perceivers exist, therefore, I can accept as accurate, testimony concerning the appearances of things in their private spaces. On the basis of their experience of different private spaces than mine, and my experience of different private spaces when I move, I posit a continuous series of “points of view” at which, if there were a perceiver, he would be aware of a private space with certain characteristics. I also posit that any normal observer would have the same private space from the same point of view. In the same way that I inferred, from accepting the principle of causality and the explanatory hypothesis of a physical object as a common cause of the correlations of my various sense spaces, an actual physical object; I can infer the existence of a physical space of the physical objects from the correlations of different private spaces.

The private spaces and possible private spaces can be ordered by their similarities to define “the place (in perspective, or physical, space) where a thing, (e.g. a penny) is” (75). For instance, all the “points of view” in which a penny looks circular in a private space of a perceiver would form a straight line in perspective or physical space. If we also consider all the “points of view” in which a penny looks circular in a private space of a perceiver would form a straight line in perspective or physical space. If we also consider all the “points of view” in which the penny appears end-on as a line of a certain thickness in any private space of a perceiver, these “points of view” will form a straight line in perspective space. Where the lines (constructed from the “points of view” in which the penny looks circular, and the “points of view” in

which the penny looks like a line) meet in perspective space is defined as the place where the penny is. Since we have now defined the place where the penny is, we can understand what it means to say that the perspectives (private spaces) in which the penny looks larger are nearer to the thing than those in which it looks small. These perspectives are nearer to the perspective which is the place where the thing is (98). Thus, we can define three dimensions in perspective space by correlating the private spaces of three observers as containing aspects of the same thing in the same place, by the above construction of lines. If we take the point at which the perceiver is as a point in perspective space, we can discover by construction of a line from similar aspects of the thing (e.g. circular) in private spaces, which “points of view” of the observer are nearer to the thing and which farther away by seeing which aspects are larger, for example which circular aspects are larger circles.

So far we have been able to base our notions of places in perspective space by inference from private spaces. However, there are many possible points of view at which a perceiver is standing. Thus, if we continue the dimensions of perspective space by extending our lines constructed from actual private spaces farther than there are actual private spaces, then we are extrapolating “ideal” private spaces – spaces that we think possible if a perceiver were there, but are not actual. We construct these “ideal” points of view by considering them analogous to the sensible continuous movements of an observer. We build up the notion of a continuous space from our past experience of continuous points of view and continuous private spaces whenever we move. In this way, our physical or perspective space is not known to be actually continuous, only ideally so (100). Russell suggests that we do have reasons to believe that it is actually continuous. For instance, sound retardation with distance from the perceiver is one indication that space is continuous. In this case we posit a continuous space filled with air and other materials that provide the medium for the sound, but which in so doing require some time for sound waves to pass through.

The same reason that we have to believe in the existence of physical objects as causes of our sense data, can be given for our belief in a continuous space in which these physical objects are located (101). This is, Russell implies, the fact that positing physical objects and physical space is (i) the simplest hypothesis which (ii) explains the changes and correlations in my sense data. For instance, if I leave home to go to work in my car, leaving my dog napping by the fire; travel around about road and look up to see him running to meet me across the fields, taking a shortcut; the simplest explanation is that there is a physical object which causes my sense data of a dog, which has just traversed a continuous physical space from the place I saw him last to where he is now.

Similarities and Differences Between Kant’s and Russell’s Theory of Space

From our analysis of Kant’s theory of space and Russell’s system of perceptual and physical space, we can infer that both philosophers agreed to the reality of space but disagreed as to the independence existence of object in this space. Yet, Kant unlike Russell never had the notion of a perceptual space in the sense of an immediately experienced space of sensation. Of course, Kant’s space is lacking in the one element we feel fundamental to Russell’s physical space namely that it be a space containing objects independent of us. Kant’s main reason for denying a physical space of this sort was that the axioms of geometry could not be known, a priori, to apply to this space. If he had posited a physical space, the concepts of geometry would have been applicable to things in themselves, which Kant must deny since he felt the application of geometry is known a priori. Whereas on Russell’s view (of an inferred physical space), the application would only be synthetically or empirically known. As we have seen, there is no conclusive argument holding that geometry must be synthetic a priori; for we can hold either that it is a priori but analytic if taken as a “pure” science, or we can hold that the axioms of geometry are hypotheses, from which if true the rest of the system is deductible, but whose axioms are only synthetic postulates, of whose truth we must have empirical evidence to show that they do apply to the world of physics. Kant’s theory is defective in that we now admit other possibilities for the constitution of physical space than the Euclidean

properties we assumed it held a priori. Einstein's view of space hold it to be finite and curved, as opposed to the Euclidean infinite space of straight planes.

Another divergence of Kant's view from Russell's is that Kant gives no satisfactory reasons for thinking that space is known a priori. In the same way, there is no clear reason for denying a perceptual space of sensations as advocated by Russell. If he does hold that intuitions are a form of knowledge and all other "givens" are mere sensations, it is difficult to see how one can explain mistakes while not positing a perceptual space. On the contrary, Russell's theory explains the mistakes by positing a physical space which is not identical to any of the perceptual spaces of the sense or of individual viewers. Russell's view allows all of us to refer to the same object without the necessity of positing that we are all manifestations of one mind, which Kant's theory seems to demand. This indication is completely rejected by Russell.

Another aspect in which Kant's theory differs from Russell's is the difficulty of seeing, as Russell asks "why ... I always see people's eyes above their mouths and not below them" (Russell, *A History of Western Philosophy* 714-715). Although the general geometrical properties of space are determined by the mind a priori, the specific spatial relations, extensions, etc. that phenomena have is something that must be determined empirically, and is part of the sensuous intuitions of the object. Thus, the sensuous intuitions of phenomena are often invariant, especially for example in regard to people's noses being above their mouths rather than below. It is difficult to see why this is so. We have seen that Kant thought of the phenomena object as in some way caused or a product of the relation of the thing in itself and the mind. Presumably certain properties of the thing in itself produce certain properties in the phenomena object, although we cannot know what the properties of the thing in itself are. However, Kant does not believe that the things in themselves are in space and time, or have spatial or temporal properties. It seems utterly inconceivable, then, what possible property the thing in itself might have to produce the sensuous experience of for example a "box" having the spatial extension of 4ft. by 5ft. by 3ft. How could something with no spatial properties be the "ground" which determined the specific spatial properties of a particular phenomenon? Consequently, Russell's doubts as to the adequacy of Kant's subjective theory of space become even stronger.

Furthermore, Russell's construction of physical space as an inference from the properties of private space has an advantage over Kant's system, in that it makes possible the existence of external objects in a space which is not dependent on our minds nor on any noumenon "mind". Although it professes to do so, Kant's system does not satisfactorily explain how we can correctly posit that phenomena are "matter" ("matter" entails by its definition the capability of existing independently of being perceived), and phenomena depend for their existence on some sort of mind (either phenomena or noumena). Russell's system, on the other hand, allows us to posit physical objects which are independent of minds and which have certain properties (by inference from what we are immediately aware). We can posit that physical objects are "matter", on Russell's system.

General Comments

It is true that there are difficulties in an epistemology like Russell's which allows inference from immediately perceived sense data to the nature of the cause of the sense data, that is a physical object. We can disagree that if positing physical objects as causes is justified because it explains the correlation of sense data, then there are other possible explanations of this same correlation (for example God). Russell claims that it is the simplest explanation, but one can question what relevance the criterion has in epistemology. In any case, whatever problems we encounter in Russell, they are not as severe as those found in a Kantian system. Although, Kant insists he is a realist, he claim is not denying the existence of external objects but only knowledge of them. This assertion is inconsistent with his epistemology as a whole. Since space is a priori and depends on intuition to become determinate, we can only say that phenomena or objects of experience exist. Again, since things in themselves are not objects of experience,

we cannot intuit them as they are in themselves. It was indeed Kant's contention that we cannot even know if they exist or not since our a priori knowledge of space can only apply to possible objects of intuition.

If Kant is completely consistent, his theory of space forces him to a complete idealism in regard to objects existing independently of us. They may exist but we can never know if they do or not. It seems that if Kant had realized the consequence of his epistemology, he could not even have justified his theory of space as a form of intuition of a mind, if the "mind" is taken to be the noumena mind. But since we cannot know whether the noumena mind exists, what reason is there for saying that space we know exist is a form of intuition of a mind whose existence is problematic? If we are to be consistent realists, we must find some justification in our analysis for believing that external objects exist. If we have a justification for believing in their existence, then we must have a justification for claiming to know some of their properties. Whatever inference leads to concluding that physical objects exist will most probably give grounds for inference about some of their properties, including their spatial properties. Since Kant never felt the need to justify his belief in the existence in things in themselves independent of perceivers, he concludes that we could know nothing of their properties.

It seems that Kant's system unlike Russell's does not allow any inference from immediate objects of experience to in principle unobservable entities to which would explain the actions of the former. Since he believes that knowledge must involve a combination of concepts and directly intuited given objects, we cannot have knowledge of objects which are not objects of possible experience, or intuition. However, Kant himself seems to be inconsistent on this point. He says that the understanding can only have knowledge when it is used in its empirical employment; that is, to apply to objects of possible experience. The illegitimate use of the understanding to apply to things in themselves he called the transcendental employment.

Kant, in discussing the distinction between the world of things in themselves, about which we can think, but have no knowledge; and the world of phenomena, or of experience, affirms that Newton's concept of gravity can be known from the world of experience. Some have thought, Kant says, that the distinction between the world of experience and the world of thought could be made such that "observational astronomy, which teaches merely the observation of the starry heavens, would give an account of the former; theoretical astronomy, on the other hand, as taught according to the Copernican system, or according to Newton's laws of gravitation, would give an account of the second, namely, of an intelligible world" (Kant *Critique* 273). Kant denies that this is the distinction that he has in mind, since reason and understanding are employed in dealing with phenomena. He says that his question is "whether, in addition to the empirical employment of the understanding – to its employment even in the Newtonian account of the structure of the universe – there is likewise possible a transcendental employment, which has to do with the noumenon of the object. This question we have answered in the negative" (274).

Kant thinks that positing gravity as the cause and explanation of the movement of the stars is the justified use of the understanding – the empirical employment. But gravity is a force which is in principle unobservable. We can observe the effects of gravity, but never gravity itself. If, then, we are justified in accepting Newton's laws of gravity, we are justified in positing something which is not an object of possible experience (viz. gravity) which explains the actions of objects of possible experience. This being a good example of the inferences that scientists make that is the positing of unobservable entity or cause to explain the action of observed entities. If what we have said about the inference to gravity is justified, why are not Russell's inferences to the existence of physical objects and physical space as explanations of the correlation of sensations? This being the case we are justified in believing Russell's theory that argues for the existence of objects in physical space independent of us.

Conclusion

In this paper, our intent has been to compare Kant's theory of space with Russell's system of perceptual and physical space. In doing this, we saw how the logical outcome of the debate between

Newton's absolutist and Leibniz's relationalist theory coupled with his earliest writings occasioned by Newton's influence provided the initial background for the formulation of the Kantian theory that space is a "subjective form of intuition of the mind known a priori". Because of the internal difficulties of the Kantian theory, we offered to compare it with Russell's who constructed a concept of public and physical space of correlations of private perceptual spaces as possible alternative to the Kantian model.

From what we have seen of the arguments in the 'Transcendental Aesthetic' and what we have said above about Russell, we can see that his notion of physical space differed from Kant's theory of the space of phenomena in the sense that Kant did not consider the dichotomy between perceptual space or the spatial properties that we are immediately aware of in our experience and physical space or the space and spatial properties which object actually have. While Russell denied that we directly perceived physical space, Kant thinks that the space of phenomena is directly perceived; since it is the form of sensuous intuition which is directly perceived. Here, Kant meant by "form of intuition", a condition which is psychologically necessary for humans to have any experience of object and which is uniform for all people so that they would ultimately agree on both a general property of space and the specific spatial properties or relations between particular object. While Russell posited private spaces or the space of the sensations of which we are immediately aware, Kant on the other hand denied that sensations have any perceivable spatial properties. It was indeed Kant's view that the general properties of the space of phenomena are known a priori, although particular properties of phenomena are known empirically.

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