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"Just Perceiv'd & Next Door to Nothing:" an Investigation of Minima in the Work of George Berkeley

Nicholas Bryant Nash
University of Wisconsin-Milwaukee

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“JUST PERCEIV’D & NEXT DOOR TO NOTHING:” AN INVESTIGATION OF
MINIMA IN THE WORK OF GEORGE BERKELEY

by

Nick Nash

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ABSTRACT
“JUST PERCEIV’D & NEXT DOOR TO NOTHING:” AN INVESTIGATION OF
MINIMA IN THE WORK OF GEORGE BERKELEY

by

Nick Nash

The University of Wisconsin-Milwaukee, 2013
Under the Supervision of Distinguished Professor Margaret Atherton

For George Berkeley the *minimum visibile* and the *minimum tangibile* are the minimum points that can be perceived by the senses of sight and touch (NTV 54). His account of *minima* is considered by some to be central to his account of perception and his assault on skepticism, while others view the account as simply a digression from his main theme in the *New Theory of Vision*. One issue in particular that commentators disagree on is whether or not Berkeley understands *minima* to be extended or not extended. I argue that *minima* can only be understood as not extended. In order to do this I use an argument very similar to one presented by David Hume. I conclude by considering why Hume uses the argument and Berkeley doesn't.

To
Angela Coventry,
Margaret Atherton,
and a minimum visible,
whatever that is

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Introduction

For George Berkeley the *minimum visibile* and the *minimum tangibile* are the minimum points that can be perceived by the senses of sight and touch (NTV 54).¹ His account of *minima* is considered by some to be central to his account of perception and his assault on skepticism,² while others view the account as simply a digression from his main theme in the *New Theory of Vision*.³ One issue in particular that commentators disagree on is whether or not Berkeley understands *minima* to be extended or not extended. I argue that *minima* can only be understood as not extended. In order to do this I use an argument very similar to one presented by David Hume. I conclude by considering why Hume uses the argument and Berkeley doesn't.

In this paper I first present a number of questions and conflicts that *minima* bring up in Berkeley's account of perception. In this section I show that these problems go away if we think about *minima* correctly and place them in their proper context within the *New Theory of Vision*. In the next section, I argue that *minima* have to be understood as not extended. This argument will bring up the question of how extension can have minimum units that are themselves not extended. In the third part of this paper I will answer this question. It turns out that the argument used in the second part of this paper is very similar to an argument given by David Hume. In the fourth part of this paper I present Hume's arguments for the copy principle, his arguments against infinite

¹ Throughout this paper I use Berkeley, George. 1948 *The Works of George Berkeley Bishop of Cloyne*. Volume 1 & 2. A. A. Luce and T.E. Jessop (ed.). New York: Thomas Nelson and Sons Ltd. The following abbreviations are followed by section or entry number: *Philosophical Commentaries*: PC, *An Essay Towards A New Theory of Vision*: NTV, *The Principles of Human Knowledge*: PHK

² Bracken, Harry M. 1974. *Berkeley*. London: The Macmillan Press LTD. 26-28.

³ Armstrong, David M. 1960. *Berkeley's Theory of Vision: A Critical Examination of Bishop Berkeley's Essay Towards A New Theory of Vision*. Melbourne: Melbourne University Press. 42.

divisibility, and his arguments for the idea of extension. This section ends by asking the question of why Berkeley does not use the argument against extended *minima* that Hume does. In the final part of this paper I try to answer this question.

I.

In his *An Essay Towards A New Theory of Vision* George Berkeley posits the *minimum tangibilia* and the *minimum visibilia*. According to Berkeley, everyone can have the experience of a smallest experience that they can see or touch below which they can no longer experience. To make this idea more concrete, imagine sitting on a couch watching a fruit fly buzz around a large room. When the fruit fly is close there is no problem seeing it. However, because it is so small, if it flies far enough away it disappears. This is because the visual experience of the fruit fly has gotten so small that it can no longer be seen. The experience just before something disappears from sight is a *minimum visibile*. Similarly, the experience of feeling something just before it can no longer be felt is a *minimum tangibile*.

Disappearing fruit flies seem simple enough, however, trying to figure out how *minima* function within Berkeley's system brings up a lot of questions and creates a lot of conflicts. For example: Are *visibilia* points of extended color that make up our visible screen while correspondingly, the *tangibilia* the points of extended sensation that make up our tactile experience?⁴ Or, are *minima* intended to be separate sensible atoms that are stacked together to function as building blocks of the sensible world?⁵ And, if *minima* are intended to work this way, it seems to conflict with experience since visual sensations are

⁴ As suggested by Bracken 1974 pg. 26-28.

⁵ *Minima* as sensible atoms is suggested by Luce, A. A. 1963. *The Dialectic of Immaterialism: An Account of the Making of Berkeley's Principles*. London: Hodder and Stoughton. While *minima* as the building blocks of the sensory world comes from Armstrong 1960 pg. 39-45.

continuous rather than constructed out of a bunch of little points or atoms.⁶ Perhaps, *minima* are simply very small things. If so, can we even make sense of what it means to be the smallest thing that can be seen or touched? For example, while watching a fruit fly buzz around the room I notice that it disappears more quickly when it flies into a shadow than when it stays in the light. Does this mean that light conditions affect a *visibile*? Similarly, the smallest thing I can feel touching the back of my hand is much smaller than the smallest thing I can feel touching my elbow. Does this mean that a *tangibile* is different when it comes in contact with different parts of my body? In order to understand how *minima* function and why they are important for Berkeley's larger argument it is helpful to put them in their proper context within the *New Theory of Vision*.

Berkeley's first set of arguments in the *New Theory of Vision* show that the visual perception of distance cannot come from sight alone. He begins this argument by claiming that everyone agrees that distance cannot be seen immediately in itself and so, must be seen mediately by means of something else. Knowing that a person is angry because their face is red is an example of knowing something mediately, while the angry person knows their anger immediately. Berkeley's argument continues by noting that although we cannot see distance immediately we do see distance, so it must come mediately from some other experience. The mediate cause of distance perception for Berkeley is the experience of associating certain things that we see with corresponding distances. So, for example, I can watch a fruit fly buzz across the room and know that it is getting farther away from me because of my immediate visual sensation of the fruit fly combined with my mediate experience of knowing that as the fruit fly gets smaller it is

⁶ As suggested by Brook, Richard J. 1973. *Berkeley's Philosophy of Science*. The Hague, Netherlands: Martinus Nijhoff. pg. 67-76.

getting farther away from me. At this point in his argument Berkeley further refines what is available to us immediately through sight by claiming that sight provides us only with light and color.

If sight only provides us with light and color, then touch must be responsible for our sense of outness or space. This distinction between the senses leads Berkeley to argue that our sense of sight and our sense of touch must provide us with access to two distinct objects. This is known as the heterogeneity thesis. As Berkeley puts it, “The true consequence is that the objects of sight and touch are two distinct things. (NTV 49)”

This claim first comes up near the conclusion of Berkeley’s argument against the visual perception of distance at NTV 49. According to Berkeley, “[I]t must be acknowledged that we never see and feel one and the same object. That which is seen is one thing, and that which is felt is another.” So for example, as I type this paper, although I may think that the keyboard that I see and the keyboard that I touch are the same keyboard, according to Berkeley, they are two separate objects.

Berkeley himself recognizes that this is a difficult claim to accept, especially because we are in the habit of referring to objects of sight and objects of touch by the same name. Because of the heterogeneity thesis there are two types of experiences each with their own distinct magnitude or extension. One of these experiences, represented by light and color, is properly visual and so is perceived and measured immediately by sight. Visual perceptions have no fixed size. So for example, the same fruit fly can be tiny if I am looking at it from across the room or, giant if it is sitting on the tip of my nose. The other type of perception is properly tangible and so is perceived and measured immediately by touch. According to Berkeley, the size of objects that we perceive by

touch is fixed. That is to say, the tangible size doesn't vary in different circumstances. That this claim is true is supported by experience. Regardless whether I pluck the fruit fly off my nose or at arms length out of the air—the size I feel does not change. So, for Berkeley, our visual perception of size comes to us mediately by means of associating the variable sizes of objects that we experience immediately with their corresponding fixed tactile experiences.

Understanding that Berkeley holds the heterogeneity thesis is important for making sense of his arguments about *minima*. With the heterogeneity thesis in mind the work that *minima* do within Berkeley's larger argument begin to become clearer. Each of these extensions—one that is the proper object of sight, and one that is the proper object of touch—can be bigger or smaller depending on the context. It is while discussing the size of these two extensions that Berkeley first mentions *minima* when he says, "For, whatever may be said of extension in abstract, it is certain sensible extension is not infinitely divisible. There is a *Minimum Tangibile* and a *Minimum Visibile*, beyond which sense cannot perceive. This every one's experience will inform him." (NTV 54)

For Berkeley, *minima* are intended to represent the lower limit of our sensible experience. So, any experience smaller than a *minimum visibile* cannot be seen, and any experience smaller than a *minimum tangibile* cannot be felt. Following this point, sensible extension, unlike extension in the abstract is not infinitely divisible. We know this because if we start to divide sensible extension smaller and smaller we will eventually arrive at something that is at the lower limit of our experience. Once the thing being divided drops below our minimum experience it can't be divided any longer because we can't experience it. This lower limit is a *minimum*.

Berkeley's claim about infinite divisibility is in response to those who hold that extension is infinitely divisible. The argument for the infinite divisibility of extension is straightforward. No matter how big or how small the piece of extension, it would seem that this piece could always be divided in half. So extension is infinitely divisible. This result has been thought to give rise to any number of paradoxes and problems.⁷

It is important to read Berkeley's claim about infinite divisibility through the heterogeneity thesis. Without the heterogeneity thesis in mind you might imagine cutting up a piece of extension—let's say a grain of wheat—until you can no longer see it. Let's imagine however that you can still feel it under your knife, and so are still able to divide it a few more times. Isn't this an example of dividing a piece of extension that you can no longer sense? No. Because of the heterogeneity thesis, properly speaking, when you are dividing your grain of wheat you are actually experiencing the division of two objects. One is the proper object of sight and the other the proper object of touch. So, what you are feeling under your knife is tangible extension. Since the visual experience of the grain of wheat has dropped below a *minimum visibile* it can no longer be seen. It is also important to remember that Berkeley is not claiming that when an experience drops below our lower limit of sense the thing that had been being experienced stops existing. As a fruit fly buzzes around my living room it doesn't blink out of existence when it is too far away for me to see it. Instead, sometimes it is below the lower limit of my visual perception.

So Berkeley has shown, using the heterogeneity thesis and *minima*, that experience proves that sensible extension is not infinitely divisible. However, as

⁷ For more on this issue see Jesseph, Douglas 1993. *Berkeley's Philosophy of Mathematics*. Chicago, IL: University of Chicago Press pg. 72-85.

mentioned previously, trying to figure out how *minima* are supposed to work within Berkeley's account of perception bring up a number of problems. Figuring out the solution to these problems is particularly important for Berkeley's overall argument. This is because if his account of minima can't be made to mirror our actual experience his argument against the infinite divisibility of substance, which is based in our experience, is undermined.

One problem that *minima* bring up has to do with whether they are intended to be separate sensible atoms that are stacked together to function as building blocks of the sensible world.⁸ If *minima* are intended to work this way, it seems to conflict with experience since visual sensations are continuous rather than constructed out of a bunch of little points or atoms.⁹ For example, I know the fruit fly just before it disappears is an example of experiencing a *minimum visibile* but my bookshelf doesn't seem to be constructed out of a bunch of little distinct dots all about the same size as the fruit fly before it disappears. If individual minima are stacked together to build sensible extension, as this understanding of minima would seem to suggest, there has to be some explanation for why we don't see the world as a bunch of pixels on a computer screen. This brings up the related question of whether *minima* are simply very small things. These concerns go away however if we think about minima in the right way.

When considering the characteristics of *minima* difficulties arise because of misunderstandings about the role that sensible *minima* are supposed to play for Berkeley. Berkeley is not suggesting that that we experience the world as composed of tiny dots or as the pixels in a computer screen. *Minima* are not to be thought of as units that are used

⁸ Luce 1963 pg. 76 and Armstrong 1960 pg. 39-45.

⁹ Brook 1973 67-76.

to construct the sensory world. Instead they are best thought of as a way of talking about the limits of our visual capacities. When Berkeley makes claims about a *minimum visibile* his claim is that our capacity to experience size has a smallest limit on its lower bound.¹⁰ For Berkeley we can only experience a magnitude that we can perceive. So, since we cannot see something except as having a certain size there will be a lower limit on the smallest thing that we can see.¹¹

Whether or not the things that we experience exist mind-independently, the experience of an individual's perceptions cannot be mind independent. Small objects can have parts smaller than can be seen. A *minimum visibile* should not be confused with a very small object. An object of any size can, depending on our situation, be minimally visible to a perceiver.¹² If I drop a piano on you from high enough, if you happen to be looking up, the piano will enter your vision as a minimally visible point.

For a perceiver to report that something is minimally visible is a report of the same experience regardless of what object is being experienced or who (or what) visual faculty is doing the perceiving. To ask a question about the size of a *minimum visibile* is to ask about a perceiver's visual capacities, not to ask a question about the size of the object that it being perceived.¹³

Another related worry is whether we can we even make sense of what it means to be the smallest experience that can be seen or touched?¹⁴ According to this concern we cannot make sense of the smallest experience that can be seen or touched because our powers of visual discrimination vary. In support of this, it would seem that in different

¹⁰ Atherton, Margaret. 1990. *Berkeley's Revolution in Vision*. Ithaca, New York: Cornell University Press pg. 115-116

¹¹ Atherton 1990 pg. 116-117

¹² Atherton 1990 pg. 134-135

¹³ Atherton 1990 pg. 134-135

¹⁴ Bracken 1974 pg. 26-28

light conditions our smallest visual experience changes. In terms of touch, the smallest experience that can be felt on the back of the hand—which is sensitive—is different from the smallest experience that can be felt on the elbow. However, to argue that we cannot make sense of the smallest experience that can be seen or touched because of the variability of our perceptual experience is only a concern if *minima* have a fixed phenomenal size. As was just mentioned however asking a question about the size of a *minimum* is to ask about a perceiver's capacities, not about the size of the object being perceived. That for Berkeley *minima* are not intended to be fixed is clear if we consider his arguments surrounding *minima*.

At *NTV 80* Berkeley claims that a *minimum* is the same for both a mite and for a person. At first this claim seems crazy. A person is so much bigger than a mite. How could they both have the same *minimum visibile*? However, with the heterogeneity thesis in mind, since vision is only immediately of light and color, and distance and size perception are suggested mediately, through touch, the claim that a *minimum visibile* is the same in both a person and a mite is just to say that both a person and a mite have a minimum limit on their faculty of vision below which they cannot perceive. If we are concerned about the difference in the smallest experience that can be seen in differing light conditions, or the difference between my *minimum visibile* and a mite's, then we would also have to conclude that the *minimum visibile* of a mite would have to be much smaller than my *minimum visibile*. This however is exactly what Berkeley is arguing against in *NTV 80* when he claims that *minima* are the same for all.

Fixed *minima* also conflict with Berkeley's analysis of microscopes. Because the experiences that we feel and the experiences that we see are separate, united by

experience, looking through a microscope severs this connection making the things we see no longer related to the things that we touch in the same way that they were previously. Because of this, having microscope eyes would not at first be helpful. Also, looking through a microscope does not change the fact that we have a lower limit on our visual faculty represented by the *minimum visibile* or change the size of a *minimum*. Even when looking through a microscope there is still a lower limit on the visual faculty. So, a microscope neither make us see more visible points or make the visible points that we do see more clear and distinct. When looking through a microscope, in terms of there being *minima*, nothing changes. All that changes, as Berkeley would put it, is the world that we are in, or what we are looking at. This world and what we see in it still can be reduced to *minima*. However, if *minima* were fixed, our powers of visual discrimination would affect the way that we perceive *minima*. If this was the case, when we looked through a microscope *minima* would become clearer and larger. This however, again, is exactly what Berkeley is arguing against.

II.

Now that *minima* have been placed within Berkeley's larger argument in the *New Theory of Vision*, and the problems that have been raised against his account have been solved, we need to consider the question of whether a *minimum* is extended or not extended. The answer to this question comes from considering the arguments surrounding the divisibility of substance.

Problems over the divisibility of extension come up because any piece of extension no matter how big or small can always be divided. Because of this, extension appears to be infinitely divisible. Berkeley responded to this argument by first showing

that our visual experience and our tactile experience provide access to different objects.¹⁵ He then turned to experience to show that both our visual and our tactile senses have a minimum limit. He called this limit a *minimum* and then used it to show that experience proves that sensible extension is not infinitely divisible.

Both sides in this argument agree that extension is divisible. One side argues that it is divisible infinitely while the other side argues that it is divisible a finite number of times. Following this, exactly how many times extension is divisible depends on an individual's perception. An argument that *minima* are not extended follows from the agreement that extension is divisible:

- (i) Extension is divisible
- (ii) A *minimum*, by definition is not divisible
- (iii) So, a *minimum* is not extended.

If this argument is right it seems to have at least one strange consequence. In order to draw this out let's start with an experience of extension—perhaps the previously mentioned grain of wheat. If I divide it in half, I now experience two extended half-grains of wheat. Now, if I divide it a second time I am experiencing four quarter-grains of wheat. But, let's say that if I divide it a third time it would fall below my visual threshold. So, now the piece of wheat that I am experiencing represent *minimum* of visual perception. In fact, if I have been dividing all of the pieces of wheat equally, then all four of the pieces of wheat that I am experiencing are all *minimum visibilia*.¹⁶ The strange

¹⁵ Although this is an important part of Berkeley's overall argument in the New Theory of Vision it is an important first step in his argument against infinite divisibility because by first showing that our visual experience and our tactile experience provide access to different objects, when he then goes on to argue that sensible extension is not infinitely divisible because we have a minimum experience of it represented by *minima* he blocks the objection considered above involving feeling the grain of wheat being divided with a knife even though it can no longer be seen.

¹⁶ In this example I am using a *minimum visibile* but the same example could be set up for a *minimum tangibile*.

consequence of the above argument is that the first time I divided the piece of wheat both of the pieces I was experiencing were extended. However when I divided it again—this time to a point where if I were to divide it one more time it would fall below my visual threshold—now, all four pieces of wheat that I am experiencing are not extended. This would seem to suggest that once something is a *minimum* it somehow has different characteristics than an extended thing. Somehow just by dividing the half-grains of wheat into quarter grains the characteristics of the wheat changed.

That this is what Berkeley has in mind becomes more reasonable if we consider his presentation of *minimum visibile* and *minimum tangibile* in the *New Theory of Vision*. As has been mentioned previously, Berkeley first introduces *minima* in NTV 54 as a key premise in his argument against the infinite divisibility of substance. He doesn't go more in depth in his explanation at this point because all he needs for his argument is for the reader to have had a minimum experience "beyond which sense cannot perceive." From this he can get to his desired conclusion that "whatever may be said of extension in abstract, it is certain that sensible extension is not infinitely divisible." When Berkeley returns to *minima* however it is clear that he takes *minima* to have different characteristics than extended perceptions because he begins presenting and arguing for these characteristics. In addition, many of these characteristics—such as in NTV 81 when he argues that a *minimum visibile* of a mite and of a person are the same—seem like claims that couldn't be made about extended experiences. So, that Berkeley intended for *minima* to have different characteristics than extended experiences follows from his presentation.

If it is accepted that Berkeley intends that *minima* be not extended, this leaves him in a curious place. If when a visible or tangible sensation is reduced to its lowest sensible limit it is not extended then, how can extension be derived from sensible *minima*?

III.

I have argued that individual *minima* are best understood as not extended.¹⁷ This however brings up a further problem of how extension can be derived from sensible *minima* that are not extended. My claim is that for Berkeley extension is formed by the relationship between more than a single *minimum*. It is this relationship that makes up extension. Extension just is a relationship between minimum experiences of sensation. These points if experienced in isolation are not extended, but when experienced together form extension.

In order to support this position, and to reinforce the claim that *minima* are intended to have different characteristics from extended experiences, I first look at entries from the *Philosophical Commentaries*. The *Philosophical Commentaries* are notebooks that Berkeley kept while working through many of the arguments in his early work. They contain a large number of entries concerning *minima*. I start with entry 321 in the *Philosophical Commentaries*. In this entry Berkeley says:

Qu: why difficult to imagine a minimum. Ans. Because we are not us'd to take notice of 'em singly, they not being able singly to pleasure or hurt us thereby to deserve our regard.

Here, Berkeley is asking the question why it is difficult to imagine a *minimum*. His answer is that they are difficult to imagine because we are not used to noticing them individually. The reason for this, he continues, is that alone they are not able to provide

¹⁷ For two different arguments that minima are not extended see Raynor, David 1980. "Minima Sensibilia in Berkeley and Hume." *Dialogue* 19, 196-200 and Schwartz, Robert 2006. *Visual Versions*. Cambridge, MA: The MIT Press 42-44.

us with pleasure or to hurt us. He isn't however arguing that we are not able to feel pleasure or pain. So, wherever this pleasure or pain comes from, it must come from more than a single *minimum*.

If we consider a *minimum* to be extended, and so in terms of extension there is no difference between a *minimum* and any other extended experience, this claim about pleasure and pain would be problematic. There doesn't seem to be any reason why an extended *minimum* wouldn't provide us with pleasure or hurt us while more than a single *minimum* would. This is unless we were thinking of a *minimum* as simply something that is too small to provide us with pleasure or to hurt us. However, it has been shown above that this is not the way to think about a *minimum*. So, the claim that a *minimum* can't help or hurt us provides additional support for the claim that Berkeley intends for *minimum* have different characteristics from extended sensation because he is clearly making a distinction between *minima* and extension. *Minima*, alone are not able to cause us pleasure or to hurt us, but since we obviously feel pleasure and pain this must come from something that is more than a single *minimum*.

So, if a single *minimum* is not able to cause pleasure or hurt us, but more than a single *minimum* is, there must be an explanation for this. Although this entry does not directly consider the question of what makes extension it does so indirectly by telling us what doesn't make extension. We know that a single *minimum* isn't extended. Also, from this entry we know that a single *minimum* can't cause us pleasure or hurt us. Yet we obviously do feel pleasure and pain so, this pleasure and pain must come from an experience that is more than a *minimum* and so is extended. Because of this, this entry

indirectly shows that there must be some way to get extension from the relation between more than one *minima*, that when experienced alone is not extended.

More direct evidence that Berkeley intends for extension to come from the relation between *minima* comes from *Philosophical commentaries* entry 78. In this entry Berkeley gives an account of Locke's view of extension contrasting body and space.¹⁸ He follows this with his own view, in entry 78a, with "Why may not I say visible extension is a continuity of visible points tangible extension is a Continuity of tangible points." Here, rather than body and space, Berkeley is contrasting visible and tangible extension. Both are made up of a continuous amount of points. If we believe that *minima* are extended this entry amounts to little more than the claim that a continuous amount of extended visible and tangible points make up visible and tangible extension. There doesn't seem to be any particular reason to make this claim however. If *minima visibilia* and *minima tangibilia* were extended then, of course visible extension would be made from a continuous amount of visible points and tangible extension would be a continuous amount of tangible points.

However, if *minima* are understood as not extended this entry must be read differently. It is clear from this entry that what Berkeley is trying to do is to give an account of visual and tangible extension. If we begin trying to understand this account knowing that *minima* are not extended what comes out is that for Berkeley visible extension is formed by a continuity of visible points while tangible extension is formed by a continuity of tangible points. Because we know that individual *minima* are not extended but the account that Berkeley is giving is of extension, extension must come

¹⁸ The suggestion that Berkeley is contrasting his view with Locke's comes from the editor's notes to PC. Pg. 111

from somewhere. It is also clear from this account that the place that Berkeley intends for the extension to come from is from the relationship between the points that we know alone are not extended.

The claim that extension is formed relationally becomes more plausible if we consider the relation that must be formed between visible and tangible extension. Although Berkeley argues with the heterogeneity thesis that experiences of sight and experiences of touch are separate experiences he isn't arguing that these separate objects have no relation to each other. In fact the relationship between visible and tangible extension is central to Berkeley's project. For example, we are able to see distance and tangible size because of the relationship between the objects that we touch and the objects that we see. If the relationship between experiences of sight and touch is important enough in Berkeley's account to lead to the ability to see distance and size it is a small step to believe that a relationship between *minima visibilia* forms visible extension while a relationship between *minima tangibilia* forms tangible extension.

An example of Berkeley using a relation between visible and tangible extension is in NTV 62 when Berkeley is arguing that there is no necessary connection formed between the ideas of sight and touch.

Because our eyes might have been framed in such a manner as to be able to see nothing but what were less than the *minimum tangible*. In which case it is not impossible we might have perceived all the immediate objects of sight, the very same that we do now : But unto those visible appearances there would not be connected those different tangible magnitudes that are now. (NTV 62)

In this passage Berkeley sets up a situation in which the tangible magnitudes that we currently associate with corresponding visual magnitudes are changed. From this example it is clear that the particular phenomenal experience of visible size that we now associate with a *minimum visible* could have instead been associated with a different

phenomenal size of a *minimum tangible*. This means that it is not our particular experiences of phenomenal *minima* that make up our visual experience of size. Instead, it is their relationship between *minima tangibilia* and *minima visibilia*.

That the relationship between visible and tangible extension is central to Berkeley's overall argument also finds support in the New Theory of Vision. In the following passage Berkeley is giving an explanation of why we think visible objects and tangible objects are the same object in spite of the heterogeneity thesis that shows that they are separate.

These signs are constant and universal, their connexion with tangible ideas has been learnt at our first entrance into the world ; and ever since, almost every moment of our lives, it has been occurring to our thoughts, and fastening and striking deeper on our minds. When we observe that signs are variable, and of human institution ; when we remember that there was a time they were not connected in our minds with those things they now so readily suggest ; but that their signification was learned by the slow steps of experience : This preserves us from confounding them. (NTV 144)

The signs that Berkeley is talking about are our visual experiences that we associate with particular tangible experiences. He is arguing that as long as we have been able to see, we have been associating particular visual experiences with other tangible experiences.

Because of this constant association the connection between the two is very deep.

However, we are able to observe that visible experience and tangible experience are not always universally connected. From this we can realize that this association is learned.

Because this connection is learned, we can know that visible experiences of objects and tangible experiences of objects are experiences of separate objects.

Another way to frame this passage is to say that Berkeley is arguing that what is mistakenly understood to be one extension is in fact two separate extensions, one visible and the other tangible. This mistake is made because the regular experience of the relationship between the two extensions makes them seem like one extension. Although

in this situation the relationship between the two extensions is misleading it is clear that it is an important part of our daily lives.

For Berkeley the experience that we mistake to be a single extension is formed by the relationship between two separate extensions one visible and the other tangible. The relationship between these two extensions is so important that it leads to our experience distance and size. If it is a relationship between experiences of visible extension and experiences of tangible extension that lead to our experience of distance and size, it is a small step to believe that it is a relationship between *minima visibilia* that form visible extension and between *minima tangibilia* that form tangible extension.

As it turns out, the argument that I used in section two to show that a *minimum* cannot be extended is very similar to an argument that David Hume uses in *A Treatise of Human Nature* to show that a simple indivisible idea cannot be an idea of extension. In the next part of this paper I present Hume's copy principle and his arguments against infinite divisibility and conclude with his argument for why a simple indivisible idea cannot be an idea of extension. This will bring up the question of why Hume explicitly argues this way while Berkeley does not. In the final section I try to answer this question.

IV.

In order to best make sense of Hume's argument for why a simple indivisible idea cannot be an idea of extension it is necessary to first consider his copy principle and his arguments against the infinite divisibility of substance.

The copy principle

The copy principle is Hume's claim that all simple ideas are formed from copies of simple impressions.¹⁹ In order to arrive at this claim, Hume divides perceptions into two types—impressions and ideas. For Hume, that this distinction will be clear is obvious. Impressions have more force and liveliness than ideas and are perceptions that include hearing, seeing, feeling, loving, hating, and willing as well as all our sensations passions and emotions. (EHU 2.3) Ideas, by comparison, occur in thinking and reasoning and are less lively than perceptions. We are conscious of ideas when we reflect on anything from the above list.

An example makes this distinction clearer. When I am sitting by a campfire I feel an impression of the heat caused by the fire (among other impressions that may include the color of the fire and the smell of the smoke). This impression has much force and liveliness. However, when I am lying in my tent reflecting on the fire I can form an idea of the heat from the fire. This idea of the heat from the fire comes from the impression of the heat of the fire. However, an idea of fire does not have as much force or liveliness as the impression of the fire. What Hume has in mind is fairly straightforward. The idea that I form while reflecting on the heat from a fire will never have the same force as the actual experience of heat from a fire. This difference can be easily summarized as the distinction between feeling something and thinking about it. (THN 1.1.1.1)

In order to arrive at the copy principle Hume further divides impressions and ideas into simple and complex. A simple impression is an impression that cannot be broken down. In the above example, the heat from the fire is a simple impression because

¹⁹ This discussion of the copy principle was helped along by Coventry, Angela 2007. *Hume: A Guide for the Perplexed*. London: Continuum Publishing.

the feeling of heat cannot be broken down further into more simple impressions.

Similarly, if I am looking at an apple, the red of the apple is a simple impression because the impression of the color red cannot be broken down into further simple impressions.

Complex impressions and ideas, on the other hand, are impressions and ideas that can be further broken down. So, using the above example, my complex impressions of the experience of the campfire, including the colors, and sounds, smells and heat form a complex idea of a campfire. These impressions and ideas are complex because they can be further broken down into simpler impressions and ideas.

It is at the level of simple impressions that the copy principle arises. As mentioned above, the copy principle is Hume's claim that all simple ideas are formed from copies of simple impressions. Complex ideas on the other hand do not have to come from exact copies of complex impressions. So for example, I can have a complex idea of a city that I have never been to, for example Des Moines Iowa, where the complex idea of the city is formed from combinations of simple ideas but these complex ideas are not an exact copy of the city of Des Moines (they may in fact be a very poor approximation of what Des Moines is actually like). At the same time I can have a complex idea of a city that I have lived in, for example Portland, Oregon, and yet not have a perfect copy of all of the streets and buildings in my head. My idea of Portland is much closer to the actual Portland than my idea of Des Moines is to the actual Des Moines, however in neither case is my complex idea an exact copy.

One of the things that the copy principle allows Hume to do is to answer the question of if a term we are using has any definitive meaning. If there is a possibility that a word has been used without a clear meaning all we have to do is ask what impression

the idea arises from and apply the copy principle to find out if we can find the impression. If we are unable to find a simple impression then we can confirm that the word does not have a clear meaning. (EHU 2.9) Hume applies the copy principle to a number of different questions including to substance, personal identity, the necessary connection between cause and effect as well as space and time.

Arguments against infinite divisibility

In book one part two of the *Treatise* Hume considers arguments against the infinite divisibility of space and time. He begins his analysis of infinite divisibility by considering the ideas of space and time.

According to Hume “ ‘Tis universally allow’d, that the capacity of the mind is limited, and can never attain a full and adequate conception of infinity.” His argument against the infinite divisibility continues, that whatever is capable of being divided infinitely must consist of an infinite number of parts. Because for Hume it is impossible to set a bound on the number of parts without also setting a bound to their division, he concludes that the idea that we form of any finite quality is not infinitely divisible.

(T1.2.1.2)

Hume’s next argument against infinite divisibility builds on his previous conclusion that the idea that we form of any finite quality is not infinitely divisible. Because the imagination reaches a *minimum* which cannot get any smaller, Hume claims that if you tell him about a thousandth or ten thousandth part of a grain of sand, he can have a distinct idea of these numbers and of their different proportions but the images which he forms in his mind to represent these different parts are not different from each other. Also, these images in his mind are no different from the image which he uses to

represent the grain of sand itself which is suppose to be one thousand or ten thousand time larger. Following this observation Hume claims that what consists of parts is distinguishable into them, and what is distinguishable is separable. However, whatever we may imagine of a grain of sand the idea of a grain of sand is not distinguishable or separable into even twenty different parts let alone an infinite amount. (T1.2.1.3)

After this Hume extends his argument from ideas in the imagination to the senses. In order to do this he provides an experiment. First, put a spot of ink on a piece of paper and back up until it disappears. According to Hume, the moment before the spot disappears, the impression formed by the dot is perfectly indivisible. Following from this Hume gives his account of how a microscope or telescope affects this when he claims that when one of these devices makes something visible that previously wasn't, it doesn't produce new rays of light [perhaps best understood as new instances of light and color], but instead spreads out instances of light and color that were already there. Because of this these devices are able to give parts to impressions that to the naked eye appear simple and uncompounded, while at the same time increasing to *minimum* instances of light and color that were previously imperceptible. (T1.2.1.4)

Hume next goes on to show the error in the common opinion that it is impossible for the mind to form an adequate idea of what goes beyond a certain degree of minuteness as well as of greatness. We form ideas of some very small objects in our imagination. Also, the minimum ideas that appear to our senses are the smallest things that we can sense. However, our senses provide us with disproportionate images of things that represent as indivisible things that are really composed of a great number of parts. Because we take our impressions of objects from the senses to be equal to the object, and

through reason find that there are other objects much smaller, we quickly come to the conclusion that these ideas of our imagination are inferior to any idea of our imagination or impression of our senses. It is however certain that we can form ideas of very small things. So, instead we should conclude that the difficulty lies in enlarging our conception so much that we can form a notion of a very small mite or even a notion of something much smaller than a mite. In order to form this notion we have to have distinct ideas representing every part of the thing that we are forming the notion of. However according to the argument in favor of infinite divisibility we cannot form a notion of every part of these things because there are an infinite amount of parts. (T1.2.1.5)

The idea of extension

Next, Hume begins considering the qualities of space and time by applying the copy principle. He claims that we acquire the idea of extension by opening our eyes and looking at the objects that surround us and then by closing our eyes and considering the distance between them. Because for Hume, according to the copy principle, every idea comes from an impression that is exactly similar to it, the impressions similar to the idea of extension, Hume shortly concludes, must come from sight. (T1.2.3.2)

Since, for Hume, we are able to get our idea of extension from looking at things Hume concludes that the impression that this idea comes from must be available to sight. Because from sight we receive impressions of only colored points disposed in a certain manner Hume concludes that the idea of extension has to come from the impression copied from these colored points. (T1.2.3.4)

Hume next claims that we form an abstract idea of extension based merely on the disposition of these points rather than on their particular color. It is important to

remember that for Hume abstract ideas are just particular ideas used in a general way to represent a wide variety of objects. So, from all of our experiences of particular colored points arranged in various ways we are able to form an abstract idea of extension. We are even able to carry this abstract idea of extension beyond simply the sense of sight when we discover that objects of touch are similar to objects of sight. This allows the abstract idea of extension to represent both objects of sight and touch. (T1.2.3.5)

After spending some time considering the characteristics of time and how it is related to space, Hume mentions that there is a very decisive argument that establishes his present doctrine concerning our ideas of space and time. This argument comes from the claim that our ideas of space and time are formed by the composition of parts that are indivisible. (T1.2.3.12)

He begins by considering one simple indivisible idea the compound of which forms extension. Although Hume does not use the word in this context, clearly what he has in mind is that this simple indivisible idea is a perceptual *minimum*. He continues by claiming that this cannot be the idea of extension because the idea of extension consists of parts. This idea however is perfectly simple and indivisible. So, whatever else may be said of this perceptual *minimum*, it cannot form the idea of extension because extension is divisible. Hume then continues to investigate the characteristics of these perceptual *minima* that are not extended. He first rules out that they might be nothing. Nothing is a characteristic he equates with being real. According to Hume these indivisible perceptual minima can't be nothing because the compound idea of extension is real and so the compound idea of extension can't be composed of pieces that are not real or are nothing. Since the two types of things that we can perceive that might make up the idea of

extension must be either colored or tangible Hume settles on the claim that these minimum points are necessarily colored or tangible because we have to be able to perceive them. Although these perceptual *minima* are colored or tangible they are not by themselves extended because they are not divisible. (T1.2.3.14-17)

One similarity that should be noticed however is that the argument that Hume uses to claim that the idea of extension can not come from the impressions of perceptual *minima* that are indivisible is very similar to the argument that I used above to show that for Berkeley *minima* can't be extended. The argument from above is:

- (iv) Extension is divisible.
- (v) A *minimum*, by definition is not divisible.
- (vi) So, a *minimum* is not extended.

Hume's argument is:

- (i) A simple indivisible idea does not have any parts.
- (ii) The idea of extension consists of parts.
- (iii) So, a simple indivisible idea cannot be an idea of extension.

Setting aside the differences in the arguments caused by Hume's use of the distinction between impressions and ideas, a question that we might ask is why Hume explicitly uses this argument while Berkeley does not? Why is it important for Hume to argue this way while Berkeley leaves it for us to discover by ourselves? In the final section of this paper I will try to answer these questions.

V.

One reason that Berkeley may not use the argument that I have provided for *minima* not being extended is that he does not have access to the copy principle. When

first considering the copy principle it may seem like the important distinction that it allows is between impressions and ideas. This distinction is important, and in fact one of the differences between my argument and Hume's is that Hume's argument is presented using ideas while mine is presented simply using extension. However, I think that what the copy principle allows in this situation is the ability to isolate simple impressions and ideas in a way that Berkeley does not have available. It is this isolation that Hume's argument turns on, and since Berkeley does not have this same ability to isolate simple impressions and ideas that is provided by the copy principle he does not provide the argument that I have given for non-extended *minima*.

In order to better explain my point I will consider the first premise of Hume's argument:

- (i) A simple indivisible idea does not have any parts.

and compare it to the corresponding premise of my argument (which in this case is the second premise):

- (ii) A *minimum*, by definition, is not divisible.

A simple indivisible idea is available for Hume to use as a premise because of the copy principle. Since the copy principle takes a simple impression, and from it forms a simple idea, the claim that a simple indivisible idea does not have any parts is a premise he is able to arrive at. What the copy principle does in this situation is isolate simple impressions and ideas so that they can be talked about apart from other impressions and ideas. In the corresponding premise of my argument, on the other hand, the indivisibility comes only from the definition of a *minimum*.

For Berkeley, although a *minimum* is necessarily a singular thing he doesn't have need to talk about *minima* in isolation. Instead, for Berkeley, we only experience *minima* against and among other experiences. When I am sitting on my couch and the fruit fly that is flying around my living room is reduced to a perceptual *minimum* just before it disappears even though at that moment I am perceiving a *minimum visibilia*, I am experiencing it against the backdrop of other visual perceptions, in this case all the rest of the stuff that I also see in my living room. For Berkeley our visual field is always the same size regardless of what we are looking at. His system has no way of isolating a single *minimum* and no need. This is why Berkeley does not use the argument that I have presented for non-extended *minima*.

I have just claimed that Berkeley's system has no way and no need to isolate a single *minimum*. Yet, if my above analysis is correct, it is the ability to isolate a single *minimum* that would allow Berkeley to argue the way that I argue on his behalf. One way of showing that Berkeley's system has the ability to isolate a single minimum, and so could use my argument, that seems promising involves showing that Berkeley could hold the copy principle. In order to try to show that Berkeley could hold the copy principle I will begin by considering some important differences between Berkeley and Hume's accounts.

One immediate difference between Berkeley's account and Hume's is Hume's lack of the heterogeneity thesis. For Berkeley the heterogeneity thesis holds that experiences of sight and experiences of touch are actually experiences of separate objects. The heterogeneity thesis is important for Berkeley because he uses it as a part of his argument against infinite divisibility. Although Hume does not argue for the

heterogeneity thesis it may seem possible to arrive at the heterogeneity thesis through the copy principle.

According to the copy principle, simple ideas are copied from identical simple impressions. Because of the discussion of the source of the idea of extension in Hume, we know that the idea of extension comes from an abstract idea formed from the combination of simple minimum impression of touch and simple minimum impressions of sight. Although these simple impressions are used together to form the abstract idea of extension, when considered by themselves, as just simple impressions, these simple impressions must be separate and distinct from each other in a way similar to what the heterogeneity thesis requires.

Although something like the heterogeneity thesis may hold for Hume when considering simple impressions, the heterogeneity thesis stops holding when we begin to consider complex impressions. Remember that for Berkeley, because of the heterogeneity thesis, as I am typing this paper, although the keyboard that I experience with touch, and the keyboard that I experience with sight appear to be the same keyboard, because of the heterogeneity thesis, they are in fact separate keyboards. One keyboard is the proper object of sight while the other is the proper object of touch. However, for Hume, although the impressions that are used to form the idea of extension are simple, the idea of extension itself is complex and involves an abstraction between ideas of sight and ideas of touch. Because of this, the heterogeneity thesis would not hold for Hume for the idea of an extended object.

But, just because we might not be able to get the heterogeneity thesis out of the copy principle, this does not mean that we can't get the copy principle out of the

heterogeneity thesis. Although Berkeley does not consider *minima* in isolation, if he were going to, a *minimum tangibile* and a *minimum visibile* would have to be examples of simple impressions. Because, according to the heterogeneity thesis, experiences of sight and experiences of touch are experiences of separate objects these minimum perceptions of sight and touch would necessarily have to be simple. If Berkeley held the copy principle, the simple impressions formed by *minimum visibile* and the *minimum tangibile* would have to form simple impressions. This is not to say that Hume's theory of ideas is compatible with Berkeley's. I am only trying to show that, should he want to, Berkeley has the resources to isolate simple impressions and their corresponding ideas in the same way that Hume does.

Berkeley doesn't have a reason to isolate single *minimum tangibile* and *minimum visibile* however. Considering why this is will make a point about the difference in the way that *minima* work in Berkeley and Hume's systems.

The closest thing that Berkeley has to the copy principle is what is known as the likeness principle. Berkeley presents this principle in *The Principles of Human Knowledge* while trying to undermine the representationalist response to his argument:

But say you, though the ideas themselves do not exist without the mind, yet there may be things like them wherof they are copies or resemblances, which things exist without the mind, in an unthinking substance. I answer, an idea can be like nothing but an idea ; a colour or figure can be like nothing but another colour or figure. (PHK 8)

The copy principle requires simple impressions in order to form simple ideas, while the likeness principle requires likeness between two things. So, as Berkeley says, an idea can only be like another idea, while a color or a figure has to be like another color or figure. Notice also that the copy principle requires simples while the likeness principle has no such restrictions. This point about simples brings out a good reason why Berkeley does

not argue as I have above. It also marks an important difference between Berkeley and Hume's account of *minima*.

For Hume, because of the copy principle, impressions must enter the mind as ideas from exact copies of simple impressions. In order for this to work, extension must be made up of parts that can be broken down into perceptual *minima*. Because of this, Hume presents an account of extended objects being built up out of minimum perceptions. Another way to put this is that for Hume, *minima* are blocks that extension is somehow built out of. For Berkeley however all that is required by the likeness principle is that ideas resemble other ideas. Because of this there is no need for extension to be built up out of perceptual *minima*. In fact, it is not built up out of perceptual minima. Instead, for Berkeley, rather than a building block, a *minimum* represents a lower limit on our ability to perceive.

This line of argument has the curious effect of pointing out an error in section three. Although I tried to argue that for Berkeley extension is formed by the relationship between individual *minima* it now appears that for Berkeley extension is just formed by perceiving extended things. The upshot however is that it becomes clear that Berkeley and Hume have very different understanding of what a minima is suppose to do and how extension is formed.

All of this still leaves open the questions of if Berkeley could use the argument that I presented for non-extended *minima*. I claim that he can. My first reason for this is that it is a good argument. Berkeley's use of minima appears as part of his argument against infinite divisibility. With this in mind, the first premise of my argument, that extension is divisible, is something that both sides of the argument surrounding the

divisibility of substance agree on. Because both sides agree I take this to be a good premise. The second premise just follows from the definition of a *minimum*. A *minimum* by definition is not divisible. The conclusion, that a *minimum* is not extended, clearly follows from the premises provided.

Someone might object that given what I have shown, for Berkeley, a *minimum* must be extended. This is because Berkeley never gives us a way to perceive a *minimum* in isolation. So, even if we are perceiving a *minimum* it is only as a part of a larger perception which is itself extended. Because there is no way to perceive a *minimum* apart from this larger perception that is extended, a *minimum* must be extended.

In response to this I would argue that this argument only works if it is impossible in Berkeley's system to perceive a single *minimum* in isolation. We know that this is not the case however because of *Philosophical Commentaries* entry 321. In this entry Berkeley claims that we are not used to noticing a single *minimum* not that it is impossible to do so. This supports the claim that although Berkeley does not argue as I do in part two, it does not mean that he can't. It only means that he has no need to because he has no need to isolate a single *minimum*.

Conclusion

Commentators disagree on whether or not Berkeley understands *minima* to be extended or not extended. I have argued that *minima* can only be understood as not extended. This brought up the question of how extension could be formed from *minima* that are not extended which I tried to answer. In order to argue that *minima* are not extended I used an argument very similar to one used by David Hume. This brought up

the question of why Hume used this argument while Berkeley did not. While trying to answer this question I showed that Berkeley and Hume use *minima* differently.²⁰

²⁰ Thank you to Margaret Atherton, Bob Schwartz, and Miren Boehm for their assistance while working on this project.

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