

Cultural Prejudice and the Plenitude Principle

ABSTRACT: The *Plenitude Principle* is that for every filled spacetime region, there is an object that is exactly located at that region. Hawthorne motivates it on the grounds that it's the only way to avoid cultural prejudice with regards to what material objects exist (the *argument from cultural prejudice*). There is a similar argument for a perdurantist-universalist theory, and the content of this paper applies *mutatis mutandis* to that argument as well.

I argue that given the premises of the argument from cultural prejudice, and the possibility of superposition, a stronger principle follows: that every filled spacetime region is exactly occupied by *any* cardinality of objects you care to mention. That principle is far less plausible than the Plenitude Principle, and should be avoided by resisting the argument from cultural prejudice. I end with a discussion of how best to reject the argument.

1. Introduction

1.1 Terminology: Exact location, pervasion and filling

Take as primitive the relation 'object x is exactly located at spacetime region r '. The region an object exactly occupies is its 'shadow in substantival space' [Parsons 2007: 203] e.g. a cube that exists for but an instant is exactly located at a single three-dimensional cube shaped region of spacetime. Next, define:

x pervades spacetime region $r =_{df}$ r is a sub-region of a spacetime region exactly occupied by x .

E.g. the cube would pervade numerous regions, of all variety of shapes and dimensions, as long as they were contained within that cube-shaped region.

Next take as primitive the predicate ' r is filled'. It holds of a region of spacetime whenever that region is filled with matter e.g. the region the cube exactly occupies would be filled. As I shall use the primitive, if a region is filled then every sub-region of it is likewise filled e.g. every region the cube pervades is filled, whereas if the cube appeared in an otherwise empty universe then the superregions of the region the cube exactly occupies are not filled (although they would have filled parts).

1.2 The Plenitude Principle

Define:

The Plenitude Principle (PP): For any filled spacetime region, there is a material object that is exactly located at that region.

Were PP to be true then there would exist various bizarre gerrymandered objects. For example, the union of those regions exactly occupied by myself, the furthest galaxy that we know of and the left hands of the entire cast of *Dallas* is filled, and thus given PP is exactly occupied by a bizarre gerrymandered Nikk-Galaxy-hand object.

The only person who explicitly defends PP is Hawthorne, and he does so on the grounds of his argument from cultural prejudice (see §2). However a similar argument is popular for theories that combine perdurantism with mereological universalism [Hudson 2006: 636; Jubien 1993: 2; Sider 2008: 257-61].¹ This is unsurprising given that PP and universalist-perdurantism are so similar.² Whilst this paper specifically deals with PP, the thesis of this paper can be easily adapted to apply to this closely-related theory instead.

¹ It is also discussed, but not endorsed, by Merricks [2001: 74-5].

² Indeed, given the spatiotemporal version of the Doctrine of Arbitrary Undetached Parts (see §6) universalism entails PP (we don't also need perdurantism, as the spatiotemporal version of the Doctrine entails perdurantism). *Proof:* Given universalism there is a fusion of every object: call it Big. Big exactly occupies a region R , which is filled. No filled region fails to be a sub-region of R for a filled region must be pervaded by an object, or a plurality of objects, all of which are part of Big *a fortiori* Big pervades every filled region. Given the spatiotemporal version of the Doctrine, every sub-region of R is exactly occupied by an object. As every filled region is a sub-region of R , every filled region is exactly occupied by an object and PP is true. QED.

2. The Argument from Cultural Prejudice

2.1 Hawthorne's Argument from Cultural Prejudice

Hawthorne's argument for PP is:

Consider all the regions of space-time that are filled with matter. Which of them correspond to the boundaries of an object? The plenitude lover says that all of them do. This view strikes me as correct: as others have rightly noted, other views risk anthropocentrism. This is not to deny that we might *initially* be sceptical of the existence of objects like the outcars and incars entertained by Eli Hirsch, objects that grow and shrink as a car leaves its garage. But we don't think it ridiculous that there are objects that grow and shrink as large rocks move underwater, where the size of the object corresponds to the portion of the rock above the surface of the water: we call such objects 'islands'. It seems clear that none but the most insular metaphysician should countenance islands whilst repudiating incars; none but the most radical should renounce both. Instead, we should supplement the ontology of common sense with a range of additional objects whose existence we recognize on grounds of parity [i.e. accept PP]. This expansion brings with it the added benefit of explaining how it is possible for members of our community to refer successfully so much of the time without having to be lucky. [Hawthorne 2006: vii]^{3,4}

The rest of §2 lays out more clearly my (hopefully charitable) interpretation of this argument. I believe that it has three main steps.

2.1 Step One: Establish Occupational Profiles

Every culture has a set of cultural beliefs.⁵ These might be moral beliefs (modern western cultures believe sacrifice is wrong, the Aztecs thought it was obligatory), historical beliefs (modern western cultures believe the creation of the universe took place 14.2 billion years ago, the 12th century clergy thought it took place ~6,000 years ago), political beliefs (modern western cultures think democracy is a good political system, the galaxy spanning anarchist colonies of 150,000 AD may think differently) and – more importantly for our purposes – beliefs about what material objects exist.

Cultures can disagree over whether or not an object exactly occupies a given region. One source of such disagreement is caused by disagreement over which regions are filled e.g. cultures may disagree over whether the spacetime region occupied by the solar system contains two gas giants or three because one culture has sub-standard astronomy. We could reconcile *those* disagreements

³ Jake Chandler has pointed out to me that there is a different reading of this quote: that Hawthorne intends not to be arguing *for* PP but merely trying to defray the alleged costs of believing it i.e. the cost of an ontological commitment to gerrymandered objects. This commitment is seen by some as being so costly that they see this as motivation alone to give up on PP [Markosian 2008: 343-5]. Given Chandler's reading, it is prejudiced to think that this counter intuition against gerrymandered objects is a deep metaphysical insight rather than a mere cultural more, such that we should ignore the alleged cost of accepting gerrymandered objects. This is an interesting argument, and one that should be pursued, but it is not the argument I discuss in this paper. Nor is it the argument Hawthorne intends, for he makes clear later [2006: 109] that this is intended to be an argument for PP not as a response to objections to PP.

⁴ Hawthorne actually intends a principle *stronger* than PP: that for every region r there is an object for every function f from worlds to that region [2006: viii, 53]. This detail need not concern us, for this stronger principle entails PP which is enough for my purposes.

⁵ You might think this is false, perhaps because (strictly speaking) there are no cultures, or that they don't (strictly speaking) have beliefs. These are good points, but we shall ignore them for now and charitably assume that, in some sense as yet to be defined, cultures exist and have beliefs. This is charitable, as if it turns out that there is no satisfactory resolution, this would stop the argument from cultural prejudice before it has even begun.

easily enough e.g. by equipping all cultures with better telescopes. But disagreements will remain even when cultures agree about which spacetime regions are filled. As an example Hawthorne uses incars/outcars, but here are some examples of actual cultures disagreeing:

Case one: Take a region which we think is exactly occupied by a single yam. Whilst we think there is but one object, the people of the Trobriand Islands believe there are *two* objects. The first is a taytu, which corresponds to an unripened yam. The second is a yowanna, distinct from the taytu, which corresponds to the ripened yam. [Lee 1950: 91]

Case two: The English and the French recognise different cuts of beef – the French don't think the English cut the meat at the correct joints. It's a small leap from that to claiming that the two cultures recognise different *parts* of the beef, and thus differ over what objects exist – that the French don't think the English cut *nature* at the correct joints.⁶

Case three: Cultures disagree over what countries exist (for instance, in the case of Israel, northern Cyprus and Transnistria), so, if we treat countries as material objects, there is disagreement over what objects exist.⁷

It is disagreement over *these* cases (where there is agreement over what regions are filled, but disagreement remains over what objects exist) that is metaphysically interesting.

Some terminology is in order. First, imagine that every culture knew which regions were actually filled or not. Given this information, they would have certain beliefs about what objects exist, and which regions they were exactly located at.⁸ Define:

x is an *occupational profile* of culture $c =_{df}$ x is the set of ordered pairs pairing the objects that c would believe exist under those circumstances with the region(s) c would believe each object was exactly located at.⁹

Next, take the domain of cultures to include not only actual cultures but also the merely possible cultures. For any filled region there is presumably some *possible* culture that believes it to be filled. For instance, the union of the regions exactly occupied by myself, the galaxy Abell 1835 and the left hands of the cast of *Dallas* is filled. It's possible that there be a culture that believes it to be exactly occupied by an object (perhaps they believe that object plays a religious role). Repeat the exercise for all other regions, and combination of regions. So, for any set of regions, there is some (probably merely possible) culture that pairs an object with each of those regions i.e. there is an occupational profile pairing objects with any combination of regions.

Finally, define:

x is *fulfilled* $=_{df}$ x is an occupational profile and for every ordered pair that is a member of x , the object from that pair is exactly located at the region it is paired with
 x is *unfulfilled* $=_{df}$ x is an occupational profile that is not fulfilled.

⁶ With thanks to Shane Glackin for both the example and the tagline.

⁷ One might think that, especially in the latter two cases, there is no disagreement over what *exists*, but merely over what *predicates* the existing things fall under (e.g. everyone agrees that a given plot of land over in the Middle East *exists*, they just disagree over whether it is a *legitimate state* or not). But this is not an *objection* to the argument, for to claim that in such disagreements the purported objects exist, and disagreement is merely about what predicates those existing things fall under, is just to endorse the argument from cultural prejudice for PP.

⁸ This formulation suffers from problems concerning vagueness. For instance, a culture that knew which regions were filled might be sure that some region was occupied by a yam, but not be sure precisely which region that was. Gloss over this problem, for it would only overcomplicate matters to recast the argument in a form that could account for it.

⁹ I leave open the possibility of multiple regions being paired with one object as this is how some think endurantism should be cashed out – a single object exactly located at multiple spacetime regions. This added complication makes little difference to my argument, and so I ignore it for the course of this paper, instead assuming (for ease of discussion) that all objects are exactly located at but one spacetime region.

Note that multiple occupational profiles can be fulfilled, for a profile is fulfilled just as long as every object it pairs with a region is exactly located there. So it is still fulfilled even if it ‘misses out’ other objects being exactly located at regions.

2.2 Step Two: Disqualify Unfilled Regions

Next, we try and determine which profiles are unfulfilled. Certainly *some* of the profiles will not be fulfilled, for some (perhaps merely possible) cultures would, even in light of which regions were filled or not, still believe that objects were exactly located at some of the unfilled regions. Such profiles are obviously unfulfilled, because the following is true:

Filling and Objects (FO): If object x is exactly located at r then r is filled.

(FO) is incontrovertible: if a *material* object occupies a region then surely the region is *filled with matter* (the matter of the material object!). Intuitively (and for the proponent of the argument from cultural prejudice, we shall accept on the grounds of charity) (FO) is a culturally independent thesis i.e. you do not display cultural prejudice by believing it. (That it is culturally independent is important, as will become clear below).

Even once we have disqualified those profiles that breach (FO) there will remain numerous profiles. Of the remaining profiles we have three choices as to which are fulfilled: (i) none of them; (ii) some but not all of them and (iii) all of them.

If none of the profiles are fulfilled then no filled region is occupied by an object, for if some filled regions were occupied there would be at least one (possible) culture that believed this was the case (as for every combination of objects and regions there is an occupational profile). *Pace* option (i) that would mean that at least one profile would be fulfilled. So if no profiles are fulfilled, there are no objects. But that is implausible, both because at least some objects exist (whether they be simples, or objects such as you and I) and because at least some regions are filled (and if there are no objects, what would they be filled *by*?).

2.3 Step Three: The Determination Thesis

We arrive at the meat of the argument when we consider option (ii): that some profiles are fulfilled and some are not. This option (allegedly) won’t work because the proponent of the argument from cultural prejudice endorses:

The Determination Thesis: There is no way to determine that an occupational profile (that doesn’t breach (FO)) is unfulfilled.¹⁰

Presumably, the motivation for the Determination Thesis is that it is difficult to see what method would be used to determine which profiles were unfulfilled. It would seem that science won’t help for, look as hard as he might, the physicist will not see some magical ‘yam particle’ that attaches itself to an object whilst it persists, and then vanishes when it ceases to be. Biology might not help either, for whilst mainstream biology recognizes yams and not taytu/yowanna, this is presumably a contingent fact. If the Trobriander had been more scientifically inclined, and had promulgated their own views and taxonomies, then the biological sciences might well talk of taytu and yowanna in place of yams. Moreover, biology can’t help with other objects, such as incars, countries etc. So I think that part of the thinking behind the Determination Thesis is (rightly or wrongly) that there is no empirical method that can determine whether a profile is unfulfilled. The other part of the thinking is that, without science as a guide, there is no guide other than our intuitions. But our intuitions are as justified as those of the Trobriander, and to accept ours over theirs is sheer prejudice (hence the name of the argument).¹¹

¹⁰ Note that it is which profiles are unfulfilled, not fulfilled. Clearly the proponents of the argument from cultural prejudice believe that we can determine that a profile is fulfilled for they believe lots of profiles are fulfilled i.e. *any* profile that only pairs objects with filled regions.

¹¹ My use of ‘our’ and ‘they’ assumes that all my readers are of Western origin, so I am being somewhat prejudiced myself. My apologies if you are a Trobriander metaphysicist.

We then say that for any profile, if we cannot, even in principle, determine that it is unfulfilled we should believe that it is fulfilled (I return to criticise this final step in §6, arguing that we can instead remain agnostic). Given all of this, the only profiles that we can, cultural prejudice aside, determine to be unfulfilled are those that breach (FO), and so we should not endorse option (ii).

2.4 Conclusion

This leaves us with option (iii) – that *every* remaining profile is fulfilled. As there is such a profile for every combination of filled regions and objects, every filled region is occupied by an object i.e PP is true.

3. Superposition and Occupational Profiles

Doubtless, you have objections to some step of the argument. The Determination Thesis might be false because you believe that what exists is determined by a scientific theory that can be discovered independent of culture (e.g. that scientists could demonstrate that Trobriander botany is false and Western botany is correct). Or perhaps you believe God designed man with the natural faculties to track which profiles are correct, and thus we have good reason for disqualifying the vast majority of the ‘merely possible’ cultures and their strange profiles. As I do not advocate the argument from cultural prejudice, I may well have sympathies with such objections. But set that aside in favour of *my* counterargument: that the first step does not go far enough in the profiles that there are (§3), and that this means we must commit to a principle stronger than PP (which comes with insuperable problems) (§4).

There are more profiles than first imagined because we have not yet mentioned profiles that pair *multiple* objects with the same region. Define:

$x_1, x_2 \dots$ are superposed =_{df} for every one of $x_1, x_2 \dots$ there is a region that they all exactly occupy.

According to Dirac, sub-atomic particles can be in the same place [Dirac 1987: 210; cf Pruss 2001: 173-4] and thus be superposed.¹² Call any profile that pairs multiple objects with the same region an *extraneous occupational profile* (in that such profiles exceed the requirement given by PP that a filled region has *at least* one object there). Clearly, there will be extraneous profiles pairing *finitely* many objects with some region (for instance, a culture swayed by Dirac would have such a profile). But there is no reason to deny that a (merely possible) culture might think there were infinitely many superposed objects (cases of *infinite superposition*). Indeed, for *any cardinality* there are (merely possible) cultures that believe that that cardinality of material objects are all superposed at some region. For example, there is some possible culture that thinks a filled region is exactly occupied by beth-zero objects, another that thinks it is exactly occupied by beth-ten, another thinks beth- 7×10^{56} and so on. To each of these cultures there is an extraneous profile.

Given the Determination Thesis, only profiles that fail to meet (FO) go unfulfilled. But there will be many extraneous profiles that *don't* breach (FO), and so there will be fulfilled profiles that pair any cardinality of objects you care for with any given filled region. So the argument from cultural prejudice is committed not just to PP but to:

PP⁺: For every filled spacetime region, r , it is the case that for *any* cardinality n there are at least n objects exactly located at r .

In §4 I argue that PP⁺ is wildly implausible. In §5 I discuss possible ways to revise the argument to get PP without PP⁺ (such as by revising the Determination Thesis) and conclude that this

¹² You might worry that Dirac only allows them to be superposed at a time. But if two particles can be superposed *at a time* (i.e. both be exactly located at the same *spatial* region at a certain time), it seems to be metaphysically possible for two *instantaneously* existing particles to be superposed throughout the entire of their (very brief) lives. Once you allow that case of superposition, it seems odd to deny that objects can be superposed at one and the same spacetime region even when they last for longer than an instant.

cannot be done. So, in order to avoid PP⁺, the argument from cultural prejudice is unsound. In §6 I discuss where I think it goes wrong.

4. The Problem of Extraneous Occupational Profiles

There are four problems facing PP⁺, given here in order of reverse importance:

4.1 Problem one: No Independent Support

Given the original thesis of PP scads of objects must exist in order for no culture to be marginalised with regards to what objects they think exist. But this is not the *only* reason for thinking these objects exist. Considerations of simplicity, vagueness, dealing with set theory etc. have also been advanced as reasons to accept PP.¹³ So the argument from cultural prejudice has synergistic qualities, adding another perk to the growing list of benefits that PP offers, even though on its own it may not be a compelling reason.

But PP⁺ is not likewise in good company. For example, PP⁺ entails that there are (more than) beth-58 objects where I am sat. The only reason we have for positing them is so that we aren't prejudiced against a culture far removed from actuality. So there is a *vast* increase in the number of objects that exist *solely* to satisfy those exotic non-actual cultures. Unlike with PP there are no other arguments to garnish PP⁺ and make us think it is a price worth paying.

4.2 Problem two: There is no set of all objects

Imagine there is a set of all objects. Let the cardinality of that set be m (so there are m objects). Take some cardinality n , where $n > m$. PP⁺ entails that there are (at least) n objects. Thus the cardinality of the set of all objects isn't m after all. Obviously this works for any cardinality, hence there is no set of all material objects.

It is not unprecedented to think there is no such set. Both Lewis (with his Genuine Modal Realism) [Forrest and Armstrong 1984; Lewis 1986: 101-4] and Williamson (with his theory of necessary existents) [Sider Forthcoming] look to be committed to such a thing (although Lewis does try and avoid it, I am convinced by Pruss [2001] that he cannot do this given the possibility of superposed particles). There are two problems with losing such a set. First, if there is no such set then we cannot identify properties with sets (for there would be nothing to correspond to the property of being a material object). Second, it appears that without such a set we cannot have an iterative theory of sets (which demands that there is a set of all material objects [Sider Forthcoming]). One might deal with these problems (using sparse universals to solve the first problem [Nolan 1996], or coming up with a non-iterative set theory to solve the second) but they are (non-negligible) costs nonetheless.

4.3 Problem three: Revised Problem of the Many

PP⁺ accentuates the Problem of the Many. In the case of PP the problem is that if a person exactly occupies region R then there is an object that exactly occupies R^* , where R is the union of R^* and a single point-sized region. It is difficult to see how that second object, in differing with regards to but a single point-sized part, can fail to be a person just like the first object. Thus both are people. Repeat this procedure for all of the regions that differ from R with regards to a single point-sized sub-region. We end up with an infinite number of people where normally we think there is but one.¹⁴

There are various responses to the problem of the many, of which only some are open to those who endorse PP. Here are two such answers.

¹³ More specifically, they are advanced in favour of universalism (often in combination with perdurantism), but given the consanguineous relationship between PP and universalism (see §1.2) I think it is fair to gloss over this difference and see them as motivations for PP also.

¹⁴ This exposition of the problem is defective in various ways, none of which are relevant to the discussion here. For the sake of presentation and clarity I stick to this somewhat mutilated version. For a fuller account see Hudson 2001 and Weatherson 2003.

Answer one: Accept that composition is identity, and that overlap is partial identity. The infinite people mereologically overlap so greatly that they are *almost* numerically identical. Thus we should, for practical purposes, count them as one person [Lewis 1993].

Answer two: Accept epistemicism. Whilst each of the many people is ever so slightly different, the conditions as to what qualifies you as a person are so fragile that the difference of a single point-sized part *can* make the difference. So there is but one person.

Whether these answers work or not, they certainly won't help us once we accept PP⁺. Given PP⁺ we have an infinite number of people exactly occupying the same region. Now the above answers fail to alleviate the problem of the many. The respective failures are:

Failure one: All of the people are exactly located at one and the same region. It would be arbitrary to think that the people partly overlapped but didn't wholly overlap. So either they wholly overlap (have all parts in common), or are wholly disjoint (have no parts in common). If the infinite people wholly overlap one another then, given composition as identity, they are identical to one another. But given PP⁺ there is definitely more than one object, so they cannot be identical. If they are wholly disjoint then, in not even partially overlapping, they are not partially identical and we no longer have a solution to the problem of the many.

Failure two: Epistemicism says that the conditions for being a person are fragile, and that even the slightest difference in what regions you occupy can affect whether something is a person or not. But in this case the infinite people exactly occupy the same region. Hence the conditions can be as fragile as you want, and they will still all meet exactly the same conditions *a fortiori* all still count as people.

Perhaps there is some alternative response that will solve the problem whether you accept PP or PP⁺, but there is no extant candidate. So as it stands, PP⁺ appears to be far more problematic when we come to the Problem of the Many.

4.4 Problem four: An Incredulous Stare

PP⁺ suffers from unbelievably rampant overpopulation. It is one thing to say that every filled region is exactly occupied by a material object, thus allowing in taytu and incars, but it's a different ball game to say there are now (more than) 7×10^{56} taytu and incars all superposed in one place. The former I find difficult to accept, the latter I find almost impossible. There might be more things in heaven and earth than dreamt of in Horatio's ontology – but surely not as much as PP⁺ demands! Whilst incredulous stares are not the bread and butter of philosophical arguments, I think one is deserved in the case of PP⁺, and I am sure others will follow suit.

Given these four problems for PP⁺ I think we have good reasons for avoiding it, and taking the argument from cultural prejudice to be unsound.

5. Responses

We might try reformulating the argument slightly, to capture PP whilst avoiding PP⁺. §3 has already argued that the first step must be revised as to include the extraneous profiles, so it can't be that which stands in need of revision. Nor does giving up on the second step help – if we didn't disqualify profiles that paired objects with unfilled regions we don't end up with *less* objects but *more*. So we must deny the third step. In this section I discuss various ways to alter that last step in order to save a commitment to PP, whilst avoiding a commitment to PP⁺. All, I argue, are to be found wanting.

5.1 Endorsing Cultural Prejudice

We could avoid commitment to PP⁺ by thinking that cultural prejudice wasn't so bad after all, and instead rely upon our own intuitions to determine what exists. As, intuitively, those weird extraneous profiles aren't fulfilled, this would stop the move to PP⁺. However, it simultaneously scuppers the argument for PP for we can rely on our prejudiced intuitions to exclude profiles such as the Trobriander's.

5.2 Revising the Determination Thesis

The Determination Thesis already rules out certain occupational profiles, namely those that fail to meet (FO). This is because we have a *non-prejudiced* and *culturally independent* reason to exclude such profiles. Perhaps there are similar reasons to rule out enough profiles such that we are committed to PP and yet avoid a commitment to PP⁺ i.e. we revise the Determination Thesis to rule out more profiles than just those that fail to meet (FO). The rest of §5 demonstrates that there is no such plausible revision.

5.3 Revision One: No Outlandish Profiles

The first revision could be to disqualify particularly weird profiles. A profile that paired beth-58 objects with a given filled region would be pretty outlandish, so perhaps we should ignore not only those profiles that fail to meet criterion (FO), but also these exotic ones as well. Two problems. Firstly, what is outlandish to one may not be outlandish to another. Determining what is (and isn't) an outlandish profile is a process open to cultural prejudice (for instance, the culture that pairs beth-58 objects with a filled region won't think their own profile so outlandish!). So the revision won't help as we need a culturally *independent* method to rule out such profiles. Secondly, we would undermine the argument for PP in any case. A profile that paired an object with the union of the regions occupied by myself, the galaxy Abell 1835 and the left hands of the cast of *Dallas* is pretty outlandish. So that profile (and similar profiles) would remain unfulfilled on the grounds of their outlandishness, and the revised thesis wouldn't guarantee PP.

5.4 Revision Two: No Extraneous Profiles

Another revision is to say that there is a non-prejudiced and culturally independent reason for thinking that superposition is metaphysically impossible *a fortiori* that *no* extraneous profile can be fulfilled. However, I doubt that there is any reason to endorse such an impossibility. I can easily conceive of Dirac's scenario, and whilst conceivability does not entail impossibility there is no reason here to think my conceiving has been misled. So I share the view of other philosophers that a brute intuition that superposition is impossible is not to be trusted [Williams 2006: 504-5]. Trying to find reasons for its impossibility beyond this brute intuition is difficult. The only extant reason I know of is if one endorses supersubstantivalism (that objects are identical to regions of spacetime).¹⁵ I concede that, given supersubstantivalism, we need not accept PP⁺. However, I suspect most people will find building such a commitment into the argument from cultural prejudice to be a weighty cost.¹⁶

Moreover, to think superposition is impossible is to throw oneself to the fortunes of science (for if Dirac were right then it would be possible). Further, fearing that mere armchair philosophy shouldn't deliver profound results affecting physics, we might well endorse the principle that if P has been a part of a plausible scientific theory then *ceteris paribus* P is metaphysically possible [Hawley 2004: 397; Sider 1993: 287]. So, even if it turns out that Dirac's theory is actually false the theory nevertheless demonstrates the metaphysical possibility of superposition.

So we have good reasons to think that (supersubstantivalism aside) no ban on superposition is going to be forthcoming.

5.5 Revision Three: We can determine the facts about sub-atomic particles

We might avoid PP⁺ by revising the Determination Thesis such that what sub-atomic particles exist can be determined by culturally independent means. If we are quite charitable, we can see how this solves the problem:

¹⁵ I find it far more reasonable that there could be a culturally independent reason for thinking that *mereological coincidence* is impossible. So I can be moved to endorse the impossibility of a statue being superposed with a lump of clay, not because they are superposed but because they mereologically coincide. As Dirac's example demonstrates, alleged cases of coincidence aren't the only cases of superposition, so you shouldn't conflate the impossibility of the former with the impossibility of the latter.

¹⁶ With thanks to Alan Weir for pointing out the supersubstantivalist angle.

Proof: Charitably assume a ban on mereological coincidence, and that (in our world at least) everything is composed of particles (maybe this won't work for other worlds, but it's probably good enough for PP⁺ to be false at this world). If there are no superposed particles then superposed objects must be composed of the same particles, which breaches the ban on mereological coincidence. Hence, there can't be superposed objects and no extraneous profile would be fulfilled. If there are superposed particles then, *ex hypothesi*, we would be able to tell how *many* particles there were in any given place. This fixes the maximum number of superposed objects. If there were at most two particles superposed at any region, then there can be at most three superposed objects (one with one particle as a part, another with the other, and one with both). If there were at most three superposed particles then there will be at most seven superposed composites (three with just the particles as parts, three more with two of the particles as parts, and one with all of the particles as parts). And so on, whereby if there are at most n superposed particles there can be at most 2^{n-1} superposed composites. So any extraneous profile that pairs more than that number of objects with any given region can be known, independent of culture, to be unfulfilled, and PP⁺ no longer follows.

So, given a few assumptions, there's reason to think that if you can (independent of culture) determine what particles there are, we can revise the argument to ensure a commitment to PP whilst avoiding PP⁺.

I'm willing to be so charitable because this revision rests on there being some culturally independent method with which we can determine what sub-atomic particles there are. But it is *ad hoc* to treat microscopic particles differently from macroscopic objects, and think we can determine the existence of the former but not the later. Macroscopic objects (such as yams) are not ontologically different from sub-atomic particles: the former are just smaller and harder to observe than the later [Maxwell 1962: 14-15]. Indeed, in being smaller and harder to detect we should be suspicious of claims that we can determine facts about such things but not the bigger objects with which we are more directly acquainted.

I expect the response to be that sub-atomic particles, in being the posits of physics, are somehow immune to the ravages of cultural inclination in a way that yams are not. So there can be cultural disagreement about yams, but no similar disagreements about sub-atomic particles. But there *are* disagreements that are similar:

Example one: No electron is identical to a positron. But before the 1930's positrons were often thought of as positively-charged electrons. So the thinking of pre-1930's physics is that electrons are contingently negatively charged, whereas the thinking post-1930 is that a change in charge will illicit a substantial change [Simons 2001: 139-40]. Given the former, an electron that undergoes a reaction that causes it to change its charge to become a positron is *one* object that stays numerically (but not qualitatively) identical throughout. Whereas post-1930's physics says that there are two objects in that region, an electron and then a distinct positron.

Example two: Similarly Feynman believes positrons are electrons, but electrons that travel back in time [Feynmann 1987]. Of course, not everyone thinks this. So an electron and a positron that undergo mutual annihilation will be said by most to be a case of two objects meeting and vanishing whereas according to Feynmann they are a case of a single object that travels forward in time until a certain point when it starts travelling back.

In both examples, just as all cultures are not a chorus concerning whether a given region contains a single yam or a taytu/yowanna, scientists have not been not univocal over what sub-atomic particles exactly occupy which regions. Nor can such matters be resolved by culturally independent means. Consider the first example. I follow Simons in thinking that we are *legislating* the persistence conditions of electrons as opposed to *discovering* them [Simons 2001: 140], in just the same way that we legislate the persistence conditions of perennial herbaceous vines such as yams. So there is no *empirical* way to reconcile whether pre- or post-1930s physics is correct. Consider the second example. One might think we could empirically determine

whether objects are travelling back in time. But there is currently (and perhaps even in principle) no *empirical* test that could distinguish whether or not they are particles going back in time or not. So if we decided between the two cases we would do so without using empirical means *a fortiori* have no reason to believe the Determination Thesis (or suitable revisions thereof). Just look back at the defence of the Thesis (§2.3). The support for it was that there was no conceivable empirical experiment that would determine the facts in the yam/taytu/yowanna cases. So whilst the revised Determination Thesis would get PP without PP⁺, there would no longer be any reason to think it was true.

So sub-atomic particles are as susceptible to cultural vagaries as every other object, and there is no reason to think we are better placed to establish what ones there are than we are with yams, countries etc.

5.6 Revision Four: No Good Reason

Finally, you might think that those cultures that think extraneous profiles with ridiculous numbers of objects are fulfilled should be ignored on the grounds that there's just no good reason to believe them, whereas (if Dirac were right) there would be some good reason (a scientific reason) for thinking there were two superposed particles. But this won't work either, for whatever reason we use to determine the truth in the matter of superposed objects we can bring to bear on all other objects. If you should think an extraneous profile is fulfilled only if (Western) science gives you good reason to think so, then you should say the same of all profiles. But now we haven't revised the Determination Thesis, but just ditched it in favour of letting Western science dictate what objects there are. Maybe that's a good plan, but it certainly doesn't rescue the argument for PP.

6. Profile Agnosticism

In lieu of any further revision, I conclude that we cannot have PP without PP⁺. Holding firm a denial of PP⁺, the argument from cultural prejudice is unsound and I am obliged to say where I think the argument goes wrong.

Clearly, I must say that some, but not all, profiles are fulfilled. Hawthorne thought that this meant we would display prejudice by preferring some given profile. Instead, I say we should decline to say of most profiles that they are fulfilled. Holding in mind the Determination Thesis, we should not say that they go *unfulfilled* either, instead remaining agnostic about the vast majority of profiles. It is this agnosticism, and not PP, that is the lesson to be drawn from the argument from cultural prejudice. Not that I think we should be agnostic about *all* profiles:

- We can be sure that profiles that breach (FO) are unfulfilled.
- As I exist, I know that any profile that doesn't pair me with the appropriate region is unfulfilled.¹⁷
- Similarly, I know that the profile that consists of nothing but the ordered pair of myself and the region I occupy is fulfilled. Fearing solipsism, I might also take ot be fulfilled those profiles that consist of nothing more than pairs of objects similar to me (such as other humans) and the appropriate regions.

For all other profiles, in lieu of any method of determining whether they are fulfilled or not, I should remain agnostic. This includes the profile of my own culture, so I decline to say that certain countries exist, that yams exist, that islands exist etc. Hawthorne said that repudiating the existence of these things is quite radical. But I do not think *my* position is that radical for I *don't* repudiate the existence of such things, instead remaining thoroughly agnostic about their existence.

¹⁷ That is, of course, only if we can – by culturally independent means – determine that nihilism is false, and that I exist. But it is not outrageous to think a *cogito* style argument akin to the one van Inwagen uses [1990: ch. 12] works to demonstrate that independent of cultural beliefs.

Nor should we think this ends up being a radical thesis with regards to everyday practice. The agnostic should continue acting *as if* there were such things, doing so as a matter of pragmatic expediency. It's often a bad idea to act as if a theory were true when you're not sure whether it is (e.g. forming a theory about how to disarm a bomb can prove quite unfortuitous if it turns out to be false) but in this case, the agnostic need have no fear as it doesn't matter whether the profile I pragmatically utilise is fulfilled or not. For example, it doesn't matter whether I'm eating a yam or a taytu for whichever exists as a matter of fact will fill my belly just as well. Short of odd looks when living amongst the Trobriander people, pretending as if the profile of Western culture is fulfilled will cause me no bad effects. This lack of causal difference with regard to what profile is fulfilled was the *motivation for the Determination Thesis in the first place*. If there were some difference, we would, on the back of it, be able to determine which profile was fulfilled or not. So you can't hold the Determination Thesis whilst thinking that agnostics who take a pragmatic approach as to what to believe about fulfilled profiles will somehow come unstuck. So taking your culture's profile to be an attractive fiction is one way to make the position less radical, and placate Hawthorne's distaste for those who decline to believe in islands etc.

Another way to de-radicalise the position is that agnosticism is not a theory we are forever bound to. There might, *contra* the Determination Thesis, turn out to be ways of determining which profiles are fulfilled or not. There is good reason to think that advances in metaphysics might lead us to such things. For example, considerations about vagueness might lead us to universalism [Sider 2001: 120-39; 2008: 257-61], whilst consideration about the nature of spatial and temporary intrinsics might lead us to endorsing the spatiotemporal version of the Doctrine of Arbitrary Undetached Parts (whereby every spacetime region pervaded by an object is itself exactly occupied by an object).¹⁸ DAUP and universalism entail PP (proof given in *n2* above) so under these circumstances we would know PP was true. Considerations about intrinsic properties and vagueness seem to be culturally independent, so we would have a culturally independent way to determine which profiles were fulfilled (in this case PP would be true anyhow, but I am only concerned as to whether the argument from cultural prejudice is sound, not whether PP itself is true or not).¹⁹ This isn't to say I endorse such an argument, but only that it demonstrates that there's hope yet for metaphysics to quell the agnosticism we, in our current position, should maintain.

With those reasons in mind, I do not think agnosticism is radical or unbelievable, hopefully appeasing Hawthorne's misgivings. Nor am I alone in such agnosticism. For instance, according to Merricks [2005: 625] most people who believe in restricted composition are agnostic about the details. So they, at least, believe that sometimes filled regions are not exactly occupied by an object, but remain agnostic about which regions these are i.e. agnostic about certain profiles being fulfilled whilst maintaining that some (beyond those that breach (FO)) are definitely not.

So the argument from cultural prejudice fails to guarantee PP, but nevertheless it is instructive: we should currently remain agnostic about most occupational profiles being fulfilled, but remain hopeful that metaphysics may be able to resolve the matter in the future.²⁰

¹⁸ Considerations about temporary intrinsics of objects might lead us to perdurantism [Lewis 1986: 202-4] whilst analogous arguments about spatial intrinsics might lead us to endorsing the spatial version of DAUP (that if x exactly occupies spatial region r at t then every spatial sub-region of r is exactly occupied by some object at t) [Hudson 2005: 108ff]. When combined with universalism, they entail the spatiotemporal version of DAUP.

¹⁹ Although neither DAUP nor universalism rule out extraneous profiles being fulfilled, so even then we must remain agnostic about extraneous profiles until some further arguments were advanced to rule out (or rule in) such profiles.

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7. Bibliography

- Dirac, P. 1987. *The Principles of Quantum Mechanics 4th Edition* Oxford: Clarendon Press.
- Feynman, R. 1987. The Reason For Antiparticles, in Feynman, R. and Weinberg, S. (eds.) *Elementary Particles and the Laws of Physics*: 1-59.
- Forrest, P. and Armstrong, D. 1984. An Argument Against David Lewis' Theory of Possible Worlds, *Australasian Journal of Philosophy* 62: 164-8.
- Hawley, K. 2004. Borderline Simple or Extremely Simple?, *Monist* 87: 385-404.
- Hawthorne, J. 2006. *Metaphysical Essays*, Oxford: OUP.
- Hudson, H. 2001. *A Materialist Metaphysics of the Human Person*, New York: Cornell University Press.
- Hudson, H. 2005. *The Metaphysics of Hyperspace*, Oxford: OUP.
- Hudson, H. 2006. Confining Composition, *Journal of Philosophy* 103: 631-51.
- Jubien, M. 1993. *Ontology, Modality and the Fallacy of Reference*, Cambridge: Cambridge University Press.
- Lee, D. 1950. Lineal and non-lineal codification of reality, *Psychosomatic Medicine* 12: 89-97.
- Lewis, D. 1986. *On the Plurality of Worlds*, Oxford: Blackwell.
- Lewis, D. 1993. Many, But Almost One, reprinted in Lewis (ed.) *Papers in Metaphysics and Epistemology*: 164-82.
- Markosian, N. 2008. Restricted Composition, from Sider, Hawthorne and Zimmerman (eds.) *Contemporary Debates in Metaphysics*: 341-63.
- Maxwell, G. 1962. The ontological status of theoretical entities, in Feigl, H. and Maxwell, G. (eds.) *Minnesota Studies in the Philosophy of Science*.
- Merricks, T. 2001. *Objects and Persons*, Oxford: OUP.
- Merricks, T. 2005. Composition and Vagueness, *Mind* 114: 615-37.
- Nolan, D. 1996. Recombination Unbound, *Philosophical Studies* 84: 239-62.
- Pruss, A. 2001. The Cardinality Objection to David Lewis's Modal Realism, *Philosophical Studies* 104: 169-78.
- Sider, T. 1993. Van Inwagen and the Possibility of Gunk, *Analysis* 53: 285-9.
- Sider, T. 2001. *Four-Dimensionalism*, Oxford: Clarendon Press.
- Sider, T. 2007. Parthood, *Philosophical Review* 116: 51-91.
- Sider, T. 2008. Temporal parts, from Sider, T., Hawthorne, J. and Zimmerman, D. (eds.) *Contemporary Debates in Metaphysics*: 241-62.
- Sider, T. Forthcoming. Williamson's Many Necessary Existents, *Analysis*.
- Simons, P. 2001. Are all essential parts analytically essential?, in D. Miéville (ed.) *Méréologie et modalités*: 129-149.
- van Inwagen, P. 1990. *Material Beings*, New York: Cornell University Press.
- Weatherston, B. 2003. The Problem of the Many, *The Stanford Encyclopedia of Philosophy*.
- Williams, R. 2006. Illusions of Gunk, *Philosophical Perspectives* 20: 494-513.

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