

# The bundle theory and the substratum theory: deadly enemies or twin brothers?

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**Abstract** In this paper, I explore several versions of the bundle theory and the substratum theory and compare them, with the surprising result that it seems to be true that they are equivalent (in a sense of ‘equivalent’ to be specified). In order to see whether this is correct or not, I go through several steps: first, I examine different versions of the bundle theory with tropes and compare them to the substratum theory with tropes by going through various standard objections and arguing for a *tu quoque* in all cases. Emphasizing the theoretical role of the substratum and of the relation of compresence, I defend the claim that these views are equivalent for all theoretical purposes. I then examine two different versions of the bundle theory with universals, and show that one of them is, here again, equivalent to the substratum theory with universals, by examining how both views face the famous objection from Identity of Indiscernibles in a completely parallel way. It is only the second, quite extreme and puzzling, version of the bundle theory with universals that is not equivalent to any other view; and the diagnosis of why this is so will show just how unpalatable the view is. Similarly, only a not-so-palatable version of the substratum theory is genuinely different from the other views; and here again it’s precisely what makes it different that makes it less appealing.

**Keywords** Bundles · Substrata · Substratum · Bundle theory · Substratum theory · Metaphysical equivalence · Identity of indiscernibles

## 1 The substratum theory and the bundle theory: deadly enemies

The substratum theory (also called ‘the substance-attribute view’) can be put as a claim about what the relationship between a particular and its properties is: there are

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particulars and there are their properties that are exemplified, instantiated, or had by the particulars who are conceived of as being the bearers of those properties. Such a bearer of properties, which has its identity independently of the properties which it bears, is often called “an underlying subject”, a “substratum”, or a “bare particular”. An object like a table or a person is thus made out of two different kinds of components: properties and a substratum that supports them and glues them together in order to make up an object.

In contrast, the bundle theory denies the existence and the need for a substratum: as fundamental components of reality, there are only properties. Take my neighbour Cyrano: he is of a certain age, he has a big nose, he has such and such a height, and so on. And this is all there is to know, and all there is to *be* Cyrano—his properties. On this view, an object is then taken to be a bundle (a cluster, a bunch, ...) of its properties. There is no need and no room in the bundle theory for two kinds of components to make up objects, rather, they are just bundles of properties which are the ultimate constituents of reality, and which are held together (glued together in order to make up an object) by a special property (an *n*-adic relation, where *n* is the number of properties of the object) often called “compreance” (following Russell, who meant by this label something like “simultaneous presence”; however, when speaking here about the bundle theory and while keeping the term “compreance” it is not only and not specifically Russell’s view that I will have in mind).

## 2 The compreance relation

Depending on how one conceives of the compreance relation (the ‘bundling’ relation) and of the nature of properties, the bundle theory comes in different versions:

		compreance			
		↙	↓	↘	
		one and the same numerically identical relation for all objects	one and the same numerically identical variably polyadic relation for all objects	distinct relations (one per object)	
bundle theory	↗	with properties as universals	3	5	4
	↘	with properties as tropes	1a	1b	2

The numbers in this table simply indicate in what order I will examine these different views; the really interesting ones being 2, 4 and 5. What about the substratum theory? Is there also such a table to be drawn? Not really: of course, the substratum theory comes in different versions depending on whether properties are conceived of as tropes or universals, but there are not different possibilities for the

substratum as there are for the compresence relation—the substratum is, by definition, numerically different in different particular objects.

(1a) and (1b) are not really available options. First, simply because tropes, unlike universals, cannot multiply occur in different objects and so it is not possible here that one and the same compresence relation does its bundling work in different objects. Second, (1a) is unavailable for another obvious reason: not all objects have the same number of properties, and so something like a variably polyadic relation (like “x, y, z, ... are compresent with one another”) is required. (This will also be true for (3).).

### 3 Twin brothers?

The only really interesting position for the bundle theory with tropes with respect to the compresence relation is (2). Let me now compare this view, BTT (Bundle Theory with Tropes) to its alleged opponent STT (Substratum Theory with Tropes).

To make up objects out of properties, BTT uses a bundling relation that goes around under different names like “compresence” (the term that I will be using), “consubstantiation”, “co-instantiation”, “togetherness”, “collocation”, etc. The abundance of labels does *not* reflect an abundance of different analysis of what this relation is; rather, the compresence relation is usually taken as unanalyzable and ontologically primitive. It is thus defined and individuated not by its nature or intrinsic features of which we are not told much by BTT, but rather by its theoretical role: it is a *unifying device*,<sup>1</sup> a device that takes properties to make up objects.

Compare this to STT (and see how easy it is for me to write an almost exact paraphrase of the preceding paragraph here). To make up objects, STT uses properties and a bearer of properties that goes around under different names like “substratum” (the term that I will be using), “naked particular”, “bare particular”, “thin particular”, “substance” (but be careful about this one), etc. The abundance of labels does *not* reflect an abundance of different analysis of what this bearer is; rather, the substratum is usually taken as unanalyzable and ontologically primitive. It is thus defined and individuated not by its nature or intrinsic features of which we are not told much by STT, but rather by its theoretical role: it is a *unifying device*, a device that takes properties to make objects.

Both BTT and STT thus have a unifying device, a primitive and under-defined one, an entity whose purpose is to tie or glue together properties of a single object. Paraphrasing Locke, in *both* cases this unifying device is a “we-know-not-what” ... but it is a “we-know-what-it-does”, that is, we know its theoretical role.<sup>2</sup>

<sup>1</sup> One could also say ‘tying device’ or ‘object-making device’.

<sup>2</sup> Compare to what Peter Simons puts as an objection to BTT (my italics): “One possibility is that compresence is neither a binary (gluing two tropes) nor a ternary (gluing two tropes and a place) relation but one with many more terms, as many as there are tropes in the bundle. We may not know what arity this relation has—it might even be infinite—and there might be different arities for different types of concrete independent particular, but there will be such a relation nevertheless. A big drawback this has is that it is hard to see what explanatory force this has. *All we are saying is that a bundle of tropes is held together by whatever relation holds it together.* This is really giving up.” (Simons 1994, p. 371)

One often asks, as an objection to STT: “In virtue of what is a substratum distinct from another substratum? No attributes or properties can distinguish between them!”. But the very same question can be asked about compresence: “*Tu quoque*: In virtue of what is one compresence relation (involved in the bundling of an object A) distinct from another (involved in the bundling of another object B)? No attributes or properties can distinguish between them.” Both views answer these questions by a primitivist claim.

It is by reflecting on the preceding that it struck me for the first time that I actually don’t really see the difference between BTT and STT. But of course much more needs to be done in order to even start to justify any kind of equivalence claim between the two views. I shall do this by first examining a possible difference in the status of the unifying device in BTT and STT (and see that there isn’t any), and then by examining some objections to STT and BTT where the unifying device plays a crucial role, and argue for a *tu quoque* in all cases.

#### 4 The status of the unifying device

A possible difference between BTT and STT could be that compresence is just one among other elements of the bundle (just one among the properties of an object), while a substratum has to be considered apart from the properties it bears. So compresence and the substratum don’t have the same status, they do *not* play the same theoretical role in the composition of an object.

But this is not true, as Ehring (2001) shows: The properties included in a bundle are compresent. The compresence relation, however, is not a member of the bundle like the other properties and relations because if we included compresence in the bundle, then it would itself have to be compresent with the other properties: compresence compresent with F, G, H, ... But that either makes no sense or leads to an infinite regress. And what it shows is that compresence, exactly as the substratum, has to be considered apart from the other properties of the object; its status as a unifying device is thus different from the other properties and is the same in BTT and STT.

#### 5 The objection from change

Let us now consider a first of two classic objections to BTT, and examine how STT allegedly avoids them by appealing to a substratum.

This first objection can be found, for instance, in Van Cleve (1985, p. 122): “If a thing were a set of properties, it would be incapable of change. For a thing could change its properties only if the set identical with it could change its members, but that is impossible; no set can change its members.” Taking an example of an individual that is supposed to change one of its properties over time, he adds: “[...] what we have is replacement of one individual by another, not change in the properties of one and the same individual.” (Van Cleve 1985, p. 124).

The idea here is simple, and quite compelling: if an individual is identified with a bundle of properties, then if one of the properties changes, the bundle is not the same, and so, the individual who is the bundle is not the same—it simply ceased to

exist, while another individual has taken its place. So, according to BTT, nothing can undergo change in properties.

How does STT avoid this objection? It doesn't! There is no more genuine change in STT than in BTT: the substratum (the thin particular) does obviously *not* change (since it is propertyless, it cannot undergo qualitative change), and the thick particular (the substratum + the properties it bears) does *not* change either *for exactly the same reason* as in the case of BTT. There is no change, but there is replacement of one thick particular by another: take a thick particular at  $t_1$  and at a later time  $t_2$  when it went through some qualitative change, it simply is something different.

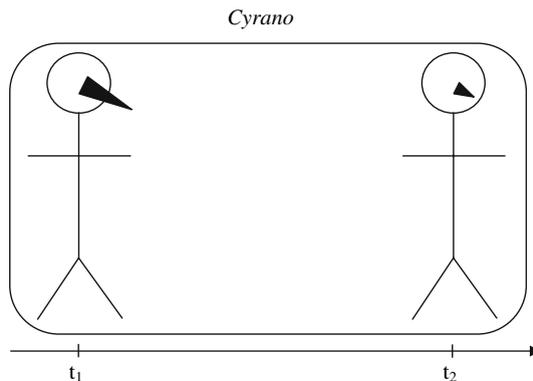
Of course, the STT theorist will object: "I have something that you, BTT, don't have: a substratum that remains the same over different times, and this guarantees me that the individual, while changing its properties, is the same individual."

But if this were an acceptable reply here, then BTT has at hand exactly the same: "I have a compresence relation that remains the same over different times, and this guarantees me that the individual, while changing its properties, is the same individual. You have your primitive unifying device that does the job, I have mine."

So it seems that both views can handle the objection in the same way by appealing to the unifying device, and that calling the device different names ("compresence" or "substratum") does not change anything since both unifying devices just play the same role in the same way. To be more precise about this, let us examine the two main strategies there are to face the problem of persistence through time, namely a version of perdurantism and a version of endurantism, and see whether there is any difference between the use of a substratum or the compresence relation. (There isn't.)

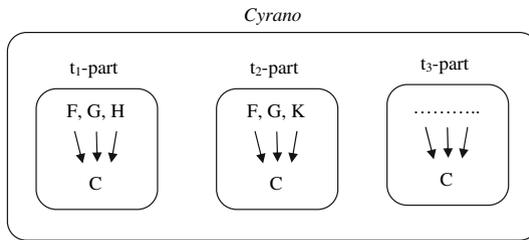
## 6 The perdurantist version

A traditional version of perdurantism (the 4D worm view) for BTT is a *bundle-bundle* theory. Think again of my neighbour Cyrano, as a case of an object changing in intrinsic properties over time: Cyrano has, at  $t_1$ , a big nose but undergoes plastic surgery, and has at a later time  $t_2$  a small nose.

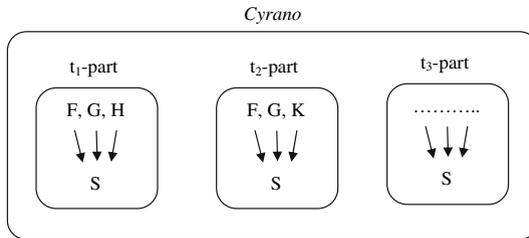


According to perdurantism, Cyrano is an aggregate of his temporal parts, that are numerically and qualitatively distinct objects. The perdurantist account of change

thus claims that Cyrano changes over time by having different temporal parts at different times. In terms of BTT, this picture looks as follows (where “C” stands for “comprensence”):



Cyrano is here simply a bundle of momentary bundles of properties (a bundle of bundles). Now, what about a perdurantist version of STT? It does not look any different from BTT-like perdurantism, except that I had to change “C” into “S” (for “substratum”):



So I would like to suggest that it seems that the only difference we have here is terminological: in both cases, there is a unifying device included in the momentary temporal parts of Cyrano, and saying that in one case it’s comprehensence and that in the other case it’s a substratum does not make any difference in the way this unifying device achieves to play its theoretical role. Let us now have a look at the endurantist alternative.

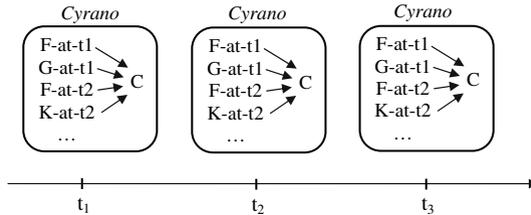
## 7 The endurantist version

Endurantism is the view that Cyrano persists through time and through intrinsic change by existing wholly at different times, rather than by having temporal parts. For the endurantist, one and the same (numerically identical) person exists wholly at  $t_1$  and  $t_2$  and has the two incompatible properties of having a big nose and having a small nose. In order to avoid the threat of having to deal with a contradiction, endurantists will typically embrace some kind of temporal indexation strategy and it is the standard version with time-indexed properties that I will be using here.<sup>3</sup> According to this view (*indexicalism*), Cyrano does not have incompatible properties, for instead of having properties like “having a big nose” he has time-indexed properties like “having-a-big-nose-at- $t_1$ ” and “having-a-small-nose-at- $t_2$ ”, and these are perfectly well compatible and non-contradictory. Thus, since the

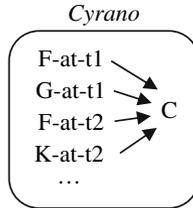
<sup>3</sup> I’ll talk about adverbialism in Sect. 11.

indexicalist will claim that all properties are always indexed, no contradiction can ever arise from intrinsic change of an object that is numerically one and the same at different times, as the endurantist claims.

Now, the BTT figure one is tempted to draw here is the following (as before, “C” is the compresence relation that ties together the different properties of the bundle):

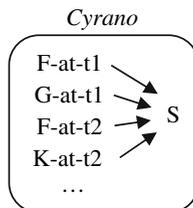


But this is a *bad* picture. It is *not* the picture the endurantist should be drawing. First, why draw three times the same thing? These three bundles of properties are not three bundles located at three different temporal locations, rather they are one and the same. Drawing the same thing three times is here totally redundant and unhelpful. Second, the time-axis is also redundant—we do not need it in order to know what is happening to Cyrano at different times, since all temporal specifications are already included in the properties of which Cyrano is a bundle. So, after removing all of the redundant and confusing elements, here is the correct endurantist picture:



Cyrano is simply a bundle of time-indexed properties. If you find this strange and surprising ... you really shouldn't. If you find it strange and surprising, it's perhaps just that you are accustomed to thinking in terms of perdurantism-inspired pictures. But I hope that you don't find this strange, and surprising—after all, this is exactly the endurantist picture Peter Van Inwagen draws (see Van Inwagen 1985, p. 195), except that he does not do it in terms of the bundle theory.

And again, with no surprise, the STT endurantist picture looks just like the preceding one:



The upshot of all the above considerations is, again, simply the following: the substratum and the compresence relation play the same theoretical role. Thus,

because both BTT and STT use their unifying device in the same way, they have exactly the same means to face the objection in a parallel way and it seems that the difference between them is merely terminological—one has a unifying device called “C” and the other has a device called “S” but since both devices are theoretical entities (they are there to do some theoretical work) and are thus individuated by their theoretical role, and since they play their theoretical role in the same way, they just seem to be one and the same thing under different disguises. And if that’s the case, there just does not seem to be any real difference between BTT and STT.

## 8 The modal objection

I shall now more quickly go through the second of the two classic objections to BTT, which is the modal analogue of the first, and is structurally similar to it. Take Cyrano, who is a bundle of bundles of properties (or a bundle of time-indexed properties, if you prefer the endurantist approach). Now, the objector remarks, as before, that the identity of bundles depends on their constituents—a bundle must have the constituents it has, otherwise it would not be the same bundle. So, it seems that the components of a bundle are essential to it. But then, the bundle theorist faces the unwelcome consequence of his theory that any property of any individual turns out to be a necessary property of it. Take, again, Cyrano who has a big nose. In the bundle theorist’s vocabulary, what we have is a bundle of bundles of properties, among which is the property of having a big nose. But, since Cyrano is this bundle, and since bundles have their components essentially, it is impossible for Cyrano to have had any other properties than he actually has—even the most insignificant and contingent ones, like the size of his nose, or the amount of hair he had this morning at 7 A.M. If this is true, bundle theory certainly does not look very appealing.

How does STT avoid this objection? It doesn’t! The bare substratum cannot have different properties than the ones it actually has, since in itself it doesn’t have any, and the thick particular (the substratum + the properties it bears) cannot have different properties either, *for exactly the same reason* that the BTT theorist’s bundle cannot have different properties. If what individuates the particular Cyrano is *only* the substratum (which would be a strange view anyway) then it has all of its properties essentially, since it doesn’t have any, and if what individuates Cyrano is the substratum *and* its properties, then if you take one property away you don’t have the same particular anymore, exactly as in the case of BTT.

Of course, the STT theorist, as before, will object: “I have something that you, BTT, don’t have: a substratum that allows me to have a particular with different properties because it will still make it the same particular even if some properties change”.

But if this were an acceptable reply here, then BTT has at hand exactly the same: “I have a compresence relation that remains the same even if it were to bundle different properties, and this guarantees me that the particular, while having different properties, is the same particular. You have your primitive unifying device that does the job, I have mine.”

As before, it seems that both views can handle the objection in the same way by appealing to the unifying device, and that calling the device different names (“compresence” or “substratum”) does not change anything since both unifying devices just play the same role in the same way. To be more precise, exactly as in the temporal case in the preceding section, both views have in the modal case the possibility to pick their favourite view on persistence across possible worlds (trans-world identity, counterpart theory, modal perdurants, ...) and use it to answer the objection. And as before, my point here is not to defend BTT against objections, but to show that whatever means STT has to avoid them can be also equally well used by BTT, simply because both views have a unifying device which just seems to be one and the same thing.

## 9 The equivalence claim

The argument for this latter claim, that I already introduced at the end of the preceding section, was the following:

- A. BTT and STT are equivalent  
because
- B. the unifying device called “substratum” in STT and the unifying device called “compresence” in BTT are identical (metaphysical equivalence)  
because
- C. they play the same theoretical role in the same way  
and
- D. they are theoretical entities (that is, they are individuated by their theoretical role).

But perhaps some will not be comfortable with (D) because they will feel that the substratum and the compresence relation, even though they do the same theoretical work, are not ‘just’ theoretical entities but really *are* metaphysically *different* things (I ask those (not rhetorically, but with genuine interest) to show why and how they believe this to be the case). Or perhaps some will not be happy with (C) and (D) being enough to justify (B), and consequently to justify (A), because they believe that playing the same theoretical role is not enough to justify that there is a *metaphysical* equivalence. Depending on how one takes these worries, one might be tempted to accept one or the other of the following conclusions:

- *Strong Conclusion:*  
Thesis: BTT and STT are *metaphysically equivalent*.  
Argument: C and S are theoretical entities, which means that they are individuated by their theoretical role. Since the theoretical role they play is the same, they are the same theoretical entity.
- *Weak Conclusion:*  
Thesis: it is *epistemically under-determined* which one of BTT or STT we should choose.

Argument: C and S are metaphysically different entities, but they play the same theoretical role in the same way, and STT and BTT have the same explanatory power (as far as we metaphysicians are concerned, they both do the job we want them to do).

I myself am strongly tempted to endorse the Strong Conclusion, following the (A)–(D) argument above, but since I am not sure how to rule out the Weak Conclusion, I prudentially prefer to limit myself to this weaker claim.

## 10 Versions with universals

It is time now to examine the top line of my table from Sect. 2 and compare the Bundle Theory with Universals (BTU) and the Substratum Theory with Universals (STU). As already mentioned, in this table, (3) is ruled out for exactly the same reason (1a) was: not all objects have the same number of properties, and so if one wants to have one and the same relation to be the bundling relation for all objects (which is here plausible since we are friends of universals) something like a variably polyadic relation (like “ $x, y, z, \dots$  are compresent with one another”) is required.

But before, let’s have a closer look at (4) where *different* universals play the role of the bundling relation for different objects; one universal per object. With respect to the two objections we have seen in the case of BTT and STT, the situation is here the same, and the same equivalence conclusion can be drawn. But there is another traditional objection to the bundle theory with universals that will perhaps make a difference between BTU and STU: the objection from the principle of Identity of Indiscernibles. Let us see how the objection goes.

BTU suffers from a traditionally weighty objection: it is committed to the principle of Identity of Indiscernibles. But this principle is false.<sup>4</sup> So, BTU is false.

$$[\text{Id.Ind.}] (\forall x) (\forall y) ((\forall F) (Fx \leftrightarrow Fy) \rightarrow (x = y))$$

Under BTU, material objects are said to be bundles of properties. Now, take two objects that have the same properties, for instance, as in Max Black’s world, two perfect spheres of the same size, same mass, same composition, same colour, and so on. Both spheres are bundles of the same properties (universals<sup>5</sup>)—and so are the same bundles. But then, the bundle theorist must accept that the two spheres are numerically identical—that is, there is only one sphere. And this is exactly what the principle of Identity of Indiscernibles claims.

But this principle is false, for it is quite possible there to be two numerically distinct objects that have exactly the same properties (that are qualitative duplicates). The example of *two* spheres exactly alike in all of their properties is possible.

How can BTU get out of this trouble? Distinguishing between the two bundles by the use of spatio-temporal location properties (“being on the left of Cyrano”) or by the use of haecceistic properties (“being identical to sphere A”) has not proven to be

<sup>4</sup> Or only *contingently* true.

<sup>5</sup> Of course, BTT does not suffer from this objection.

a very appealing strategy in the abundant literature on this subject. But, for my present purposes, it is not the time now to examine these possible answers to the objection, rather what I wish to ask myself now is: how does STU face it? Or rather: why does this objection not even arise against STU? The answer is obvious and readily at hand: the two spheres are distinguished not by their properties (they *are* qualitative duplicates), but by what bears them, that is, the substrata that ‘unify’ them and put them together in order to make up an object. The substrata being numerically distinct, the two spheres are numerically distinct as well.

But what grounds the claim that the two substrata are numerically distinct? It cannot be a qualitative difference between them, so what is it? As we have already seen, there is not much of a choice, and so substratum theorists simply claim that the numerical difference between two substrata is a primitive fact. (Very well, any theory has its primitives.) But, as before, BTU can use exactly the same strategy—remember that here we have different compresence relations, one per object, and so two objects, even qualitatively identical, will always be numerically distinct since the bundling relation that ties together their properties will be a different universal—exactly as in the case of STU it will be a numerically different substratum. But then, as a *tu quoque*, one can ask: In virtue of what is a given compresence relation numerically distinct from another compresence relation? And there is no better answer to this question than to the same question about distinct substrata, the only option is primitive distinctness.<sup>6</sup>

But then, again, it seems that the thing that plays the role of a unifying device in STU (the substratum) and the thing that plays the role of a unifying device in BTU (the compresence relation) are both equally well suited to do the job: once we are ready to accept as a suitable way to avoid the objection from Id.Ind. that there is primitive numerical difference between substrata, why not *as happily* answer the objection by saying that there is primitive numerical difference between two compresence relations? After all, bundle theorists often speak about the compresence relation as of a primitive that is as under-defined and under-explained as a substratum is, so why not let it do the job for which it seems so naturally suited? So, as in the case of BTT and STT, the two theories here do have the same means to avoid any worries with Id.Ind., both contain a ‘unifying device’ that allows them to do so in the same way, and calling this device different names (substratum versus compresence relation) does not make a difference other than merely terminological. Stick to a neutral vocabulary (like “unifying device”) and reformulate the two views, with respect to the Id.Ind. objection: both will be able to say that sphere A and sphere B can be distinguished by there being a primitively distinguished unifying device for A and for B. So, as before, a Strong Conclusion and a Weak Conclusion can be alternatively drawn in the case of BTU and STU.

Note: In the same manner, BTU can avoid other objections that ultimately rest on the principle of Identity of Indiscernibles, like “the problem of angels” (Hawthorne and Cover 1998, p. 216) or “the problem with circular time and circular space”

<sup>6</sup> The perhaps tempting idea to distinguish non-primitively between the compresence relations precisely by the number of properties they relate is unappealing because *some* distinct objects *do* have the same number of properties. (For instance two objects that are qualitative duplicates except for their colour.)

(Hawthorne and Cover 1998, p. 218)—indeed, these objections actually are ‘just’ different cases that exhibit the problem with identical indiscernibles in different ways. But of course, Hawthorne and Cover use a different version of BTU—the one that I shall examine in the following section.

## 11 Enemies after all?

In the remaining section of the paper, I will now consider places where the bundle theory and the substratum theory are *not* equivalent, and show that the reason why these versions are not equivalent is also the reason why they are much less appealing.<sup>7</sup>

A first such place is the last case (5) in my table from Sect. 2 above: BTU where the compresence relation is one and the same numerically identical variably polyadic universal that plays the role of the bundling relation for all objects (let’s call it “BTU<sub>2</sub>”). This feature makes BTU<sub>2</sub> more vulnerable to the objection from Id.Ind. and makes it a different, non-equivalent, view than STU (and than the version of BTU examined in the preceding section (let’s call this one BTU<sub>1</sub>)). It is easy to see how and why: since BTU<sub>2</sub>’s unifying device is *one and the same* for all objects (rather than one per object as in STU or BTU<sub>1</sub>), it is no wonder that we have troubles here with the identity of indiscernible objects, since the (allegedly) two indiscernible objects not only share all of their qualitative properties (universals) but they even share what makes them to be an object, they even share one and the very same unifying device! From this point of view, it is really not hard to see why worries arise about the claim that they are *two*, rather than *one*, in the first place! So, I dare say, what makes BTU<sub>2</sub> a different view from the others is also its main weakness.

Hawthorne defends BTU<sub>2</sub> against this worry in his Hawthorne (1995), and his defence is as ingenious as it is simple: since, according to BTU<sub>2</sub>, objects are bundles of universals, they can behave like universals; relevantly, a bundle of universals (for instance the bundle that is a sphere in Black’s world) can be, exactly as a single universal can be, bi-instantiated, and bi-located. Black’s world can be thus re-described in terms of BTU<sub>2</sub> as a world where there is one sphere bi-located at a distance from itself. (And this is strange, Hawthorne claims, only to the extent that the idea of a bi-located universal is perhaps strange.)

A consequence of this is that material objects, like a sphere or Cyrano or yourself, behave like universals. So such a view really seems to collapse the distinction between objects and properties—indeed, it seems that objects are simply eliminated from ontology. This is, in short, a worry put forward by Vallicella (1997). But it is hard to evaluate the dialectic force of this worry, since the BTU<sub>2</sub> theorist could very well simply bite the bullet, without perhaps too much harm. But

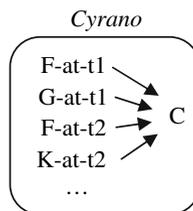
<sup>7</sup> Another such place, I believe (but without arguing for it in this paper), is a bundle-theoretic-like view called the “nuclear theory”, defended by Simons (1994) and based on Husserl’s view. This view does not fit in my table from Sect. 2, indeed, it has a different structure than ‘standard’ bundle and substratum theories since, as Simons himself says, “it combines aspects of both bundle theory and substratum theory”. I believe that precisely because of its unusual structure the view is unappealing, but I do not offer any arguments to support that belief here.

Vallicella offers a second objection that seems to me more damaging, while being simpler: to be multiply located, a bundle of universals would have to be instantiated, but this makes no sense for  $BTU_2$ . Here is an almost exact quote from Vallicella (1997, p. 94) that I have only slightly modified in order to stick to my terminology in this paper:

A universal  $U$  is (multiply) located if and only if it is (multiply) instantiated. So if a bundle  $B$  of universals is itself a universal then it is (multiply) located if and only if it is (multiply) instantiated. But what could account for  $B$ 's (multiple) instantiation? On  $BTU_2$ , universals are instantiated by being bundled together with other universals. But it makes no sense to suppose that  $B$  is bundled together with other universals; for  $B$  is a complete bundle of universals. [...] But if  $B$  is not bundled together with other universals, then it is not instantiated. For on  $BTU_2$ , a universal is instantiated just in case it enters into a bundle. And if  $B$  is not instantiated, then it cannot be multiply instantiated. But if  $B$  cannot be multiply instantiated, it cannot be multiply located. So Black's world cannot be given Hawthorne's reading: it cannot be construed as a single sphere at a non-zero distance from itself. For the sphere cannot be doubly located without being doubly instantiated, and it cannot be instantiated at all, for the simple reason that a bundle of universals is not a universal but a particular, and no particular can be instantiated.

It is not my purpose here to try to refute  $BTU_2$ , even though I share Vallicella's worries. My point, as already mentioned, is simply to see that the reason why  $BTU_2$  is a non-equivalent view, different from  $BTU_1$  and  $STU$ , is also the reason why it is in trouble, where its competitors are on safe waters.

To make my case stronger, let me note another point of dissatisfaction with  $BTU_2$  and the way it can handle persistence through time. Let us first suppose that our  $BTU_2$  theorist is an endurantist. Remember the objection to endurantism from temporary intrinsics, and take again my neighbour Cyrano and say that at time  $t_1$  he has a big nose, but he then decides to undergo plastic surgery (for expository reasons a bit later than before, say at  $t_5$ ) and consequently has a small nose at a later time  $t_6$ . For the endurantist, this means that one and the same (numerically identical) person exists wholly at  $t_1$  and  $t_6$  and has the two incompatible properties of having a big nose and having a small nose. As we have seen, to avoid a contradiction, the endurantist appeals here to an indexicalist strategy and so this is how the view looked like:



Now, my worry is the following. At  $t_1$ , Cyrano has a big nose. At  $t_2$ , he has a big nose. At  $t_3$ , he still has a big nose. And so on, until the surgery. The intuitive thing to

say here is clearly that Cyrano keeps having a certain property for a certain time—but the indexicalist endurantist just cannot allow for that. According to indexicalism, at any time during the interval  $t_1$ – $t_4$ , Cyrano has to lose all of his properties and gain new ones: he first has the property “having-a-big-nose-at- $t_1$ ”, then the property “having-a-big-nose-at- $t_2$ ”, then the property “having-a-big-nose-at- $t_3$ ”, and so on. According to this view, because Cyrano cannot simply (*simpliciter*) have the property of having a big nose, he has to change his properties all the time, and he cannot keep any—he just cannot stay the same. And since the property “having a big nose” is not available to her, the endurantist does not have the theoretical means to say that all these time-indexed properties have ‘something in common’—they just are different properties.

But rather than objecting to endurantism, my point here is that time-indexed properties *are tropes*. In the indexicalist’s world there is no room for a single property to be multiply instantiated, since any property is time-bound and cannot be instantiated at different times, and so there simply is no room for universals (multiply instantiable properties).

And of course, not only properties have to be time-bound but space-time-bound. The need for this is most salient in the case of a time-travel scenario. Suppose that at  $t_6$  Cyrano travels back to the past in order to tell his former self that the surgery will be all right and that he does not have to worry. According to endurantism, Cyrano then has the properties “having-a-big-nose-at- $t_1$ ” and “having-a-small-nose-at- $t_1$ ”: a seeming contradiction, easily solved by claiming that all properties are always space-time-bound, since of course “having-a-big-nose-at- $I_1$ - $t_1$ ” and “having-a-big-nose-at- $I_2$ - $t_1$ ” are not contradictory (where “ $I$ ” stands of course for “spatial location”).<sup>8</sup>

So: the endurantist has to do something in order to avoid the Lewisian worry about temporary intrinsics, and if what she does there is to embrace indexicalism, her properties just have to be space-time bound and non-multiply instantiated—tropes. So it seems that this is not an option the  $BTU_2$  theorist can choose.

But perhaps she has other options—she can either choose (to try) to be a perdurantist or (to try) to remain an endurantist but abandon indexicalism in favour of adverbialism. Let us examine these two options in turn.

Perdurantism just does not seem to be available to the  $BTU_2$  theorist either. At the very least, it would be very strange for her to take that route since her central claim is that objects behave like universals and can be multiply located, while the perdurantist’s central claim is that all objects are space-time bound and that nothing (no object) can be multiply located. So even if perdurantism does not force one to embrace tropes (unlike indexicalist endurantism), it does not seem to be a viable option for the friend of  $BTU_2$ .

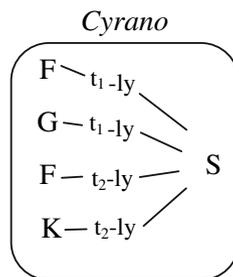
The last option is endurantist *adverbialism*. Or is it? Indeed, we will now easily see that adverbialism is available only to the *substratum* theorist, and not to the bundle theorist and so this strategy cannot be of any help to  $BTU_2$  either.

The adverbialist solution to the problem of temporary intrinsic properties proposes not to temporally modify the property but the having of it. Thus the

<sup>8</sup> I am not saying that this solves all problems the endurantist might have with time travel.

adverbialist will say that “Cyrano has a big nose at  $t_1$ ” is to be analyzed as “Cyrano has-at- $t_1$  a big nose” or, more elegantly, “Cyrano has  $t_1$ -ly a big nose” (see Johnston 1987, p. 129). So, according to adverbialism, there is not just the having of a property, there is always  $t$ -ly having (or having-at- $t$ ) of a property. This will provide a solution to the problem of temporary intrinsics, because Cyrano has a big nose at  $t_1$  and has a small nose at  $t_2$ , and so he has both the incompatible properties, but it has the former  $t_1$ -ly and the latter  $t_2$ -ly and this is how the threat of a contradiction is avoided.

Now, in order to be able to be an adverbialist, the *substratum* theorist could want to say that there is a *third* component in her view—a relation of exemplification between the substratum and its properties—and that this relation is time-indexed (rather than the properties being time-indexed, as the endurantist indexicalist would have it). The endurantist-adverbialist-substratist picture then looks like this (where “S” stands for “substratum”):



The bundle theorist, obviously, cannot (and does not want to) provide anything like this, since she does not introduce a substratum that needs to be related by a special relation to its properties; her view does not require any such intermediaries—and so, she cannot be an adverbialist since there is no suitable place where to put the adverbialist index,<sup>9</sup> and so BTU<sub>2</sub> simply cannot appeal to this strategy. To sum up:

First, BTU<sub>2</sub> is not compatible with endurantist indexicalism because this view requires tropes rather than universals; it does not, at least *prima facie*, look like it could be made to work under perdurantism; and endurantist adverbialism simply is not an available option. Add to this Vallicella’s worries, and it really seems that BTU<sub>2</sub> is a non-equivalent view to the others only because of features that make it ultimately very hard to sound appealing.

Second, there is another place where the bundle theory and the substratum theory are not equivalent: only the substratum theory is compatible with adverbialist endurantism. But: this is true only for a certain version of the substratum theory, namely a version that insists on there really being a *third* component in the theory, a (time-indexed) *relation* between the substratum and its properties. And even substratum theorists themselves often agree that this is a bad version of their view (among other reasons, because of Bradley-like regresses and related issues). Most recently, Sider (2006) in his defence of substrata insists that the relation of

<sup>9</sup> Indexing the relation of compresence would make it a *perdurantist* view.

exemplification should not be put too much weight on, and it is often claimed that exemplification is not a relation, that it is a “non-relational tie”, that we shouldn’t reify exemplification (Lewis 1983, p. 351–355). I guess that the idea here is to build already into the substratum the theoretical function to be able to simply stick to its properties in addition to its function of being a unifier (exactly as compresence!), rather than only taking it as a unifier that requires a further theoretical device in order to account for the nature of objects. And only if one takes the latter (much less palatable) option, one will get a different view than the bundle theory (and here again, the reason why it is different is also the reason why it is unpalatable).

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