CAN BUNDLE THEORY EXPLAIN INDIVIDUATION?

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Bundle theory reduces particulars to bundles of properties. Bundle theorists have been working to explain individuation within an ontology of repeatable properties, but the outcomes are not satisfactory. Even the trope approach toward properties is not capable of establishing individuation. This article argues that bundle theorists are wrong in searching for individuators within the bundles of properties. Rather, individuation should be established within ontologically more fundamental level of events. Events, with their spatial and temporal character, enable us to individuate the bundles of properties involved and this is one of the reasons for the superiority of bundle theory to other competitive theories of substance.

Both bundle theory (BT) and substratum theory (ST) agree that particulars are ontologically complex entities. BT reduces particulars to bundles of properties. In addition to properties, ST also recognizes their bearers, substrata.[1] BT is an ontologically single category theory, whereas ST is dualistic. This gives priority to BT. Moreover, bundle theorists consider substrata rather speculative and mysterious entities. On the other hand, substratum theorists suspect the way BT treats individuation. As BT recognizes only repeatable properties, how can you form an individual entity out of repeatable components? Substrata are genuine individuators because they are unique, necessary, sustaining and unrepeatable components of every individual. Bundle theorists come with several approaches to address the issue of individuation. Location in space and time has been deployed ([2], 70) or the framework of possible worlds has been used to record different modal behaviour of bundles ([9], 306 – 308). What is even more surprising, the very same question has been addressed to ST: What distinguishes one substratum from the

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[1] The history of ST is long and rich with Aristotle as its source. J. Locke is one of the forefathers of BT.

other ([5], 48 – 52), ([4], 113 – 17)?[2] Since substrata are property bearers they are necessarily property – less. Or, as they are often called, *bare particulars*. What individuates one property – less entity from another? The answer is not easy, as it necessarily introduces some kind of property, something which must be avoided in this case. It is also true of the property of "being identical with itself" which questions the very existence of bare particulars. It seems that individuation is a serious problem for every ontology that recognizes repeatable entities, universals, including ST. The aim of this article is twofold: (1) To prove that BT is not capable of ensuring individuation at the level of individuals. However, (2) individuals seem to be only derived, ontologically secondary entities. As will be argued later, events are more fundamental and, which is more important, BT is able to individuate bundles of properties within the framework of events. This might be considered a case for the favouring of BT over its rivals.

1. Traditional and alternative bundle theories

Traditional BT reduces particulars to bundles of properties. This approach leads to the false conclusion that every property of a given particular is its necessary component. If particular *I* is just a mere bundle of its properties then the loss or gain of a single property will result in a different object from *I*. Thus *I* cannot change, which is unacceptable. BT solved this difficulty by introducing several forms of empirical essentialism involving both necessary and contingent properties, e.g. Simons with his *nuclear theory* ([7], 376). Necessary properties are essential and compose an individual's identity, whereas contingent properties may change without any impact on identity. Some recent theories make the difference between contingent and necessary properties relative. Every property in a given bundle shares, in certain degrees, both a necessary and a contingent character. However, there are certain properties that significantly contribute to its identity and also

[2] The position of M. J. Loux is rather different. He is a proponent of ST but in the Aristotelian style ([4], 117 – 125). He is a critic of both bare particulars and BT. When the article refers to ST it refers to the concept of bare particulars but we must bear in mind that there are several approaches within ST. However, the bare particular approach has become dominant in recent literature.

properties that are less significant contributors in this regard.[3] Destruction of a given bundle would probably require the destruction of several essential properties, and not just one as in the previous case.

We are using the expression *bundle of properties*. But what is the nature of the bundling relation and what is the nature of the properties involved? Firstly, bundles are not sets but complexes having their own inner structures. The relation between a bundle and its components is not that of a set and its members, but it is a part-whole relation. Traditional BT identifies properties with universals, whereas recent literature prefers tropes. Tropes are particular instances of universals: this particular colour, this particular shape. If the attributes in a given bundle are universals, then bundling can be characterized as the compresence of universals. Bundling is a higher order relation and its relata are lower order properties. Bundling can also be conceived as a structural universal of higher order, and its instance is a compresed bundle of universals of lower order. Thus, a molecule of water can be reduced to the properties of "being H_2" and "being O", and a higher order relation that bundles these properties to what we recognize as a molecule of water. This is just an oversimplified picture, as there are far more universals and bundling relations involved in a molecule of water. If you treat properties as tropes, "being this H_2 atom" and "being this O atom", the situation may be different.[4] A bundling relation can also be universal whose relata are given tropes or it is a trope itself. Again, if we borrow the language of the theory of types, it is a trope of higher order that bundles tropes of lower order. A trope theorist would prefer the second alternative, as it minimizes our ontological commitments to a single category of tropes. However, this exposition of the bundling relation is rather short and fragmentary, leaving many questions unanswered. Precise analyses would lead us to a different topic, as the relevant literature is numerous and heterogeneous.

[3] Throughout the paper, the distinction between essential and contingent properties, later tropes, will be in this relativistic framework.

[4] Defenders of BT with a trope approach to properties might be accused of "cheating" ([9], 306). Bundle theory was supposed to explain an individual's composition by properties, whereas tropes are genuine particulars.

2. Individuals and individuation

In what follows, we will search for an entity that enables us to differentiate one bundle of properties from another. Let us call this entity *an individuator*. An individuator is what makes two different bundles different. Suppose that our particular *I* is a bundle that includes both contingent and necessary properties treated as universals. Further suppose that the bundling relation is also universal. Then it is logically possible that there exists some particular *J* that is a bundle of the same components as the particular *I*. The universalistic nature of *I*'s components cannot prevent such a situation. *I* and *J* are qualitatively identical but numerically different. This leaves individuation unexplained, merely saying that they are different because they are different. However, the problem is why they are different. There are several proposals to answer this question.

One of them is to deploy an old idea of individual essences, *haecceities*. *I* is to have its unique and non – repeatable property of "being identical with *I*". However, this property fails to be a genuine individuator. There are several reasons for this. Individual essences of this sort are trivial and formal. They treat individuality as an ontologically primitive, non-analyzable category and this is not what we want. We want to explain individuation and not to leave it as it is. Spatial and temporal location is another candidate for individuator.[5] Though *I* and *J* are absolutely alike, they cannot occupy the same region of spacetime and this is what makes them different. There are at least two reasons for being sceptical about this mode of individuation. (1) Spatial and temporal location is considered to be an individual's impure property. Impure properties require, indeed depend on, the existence of some other entity and so cannot be considered as an individual's intrinsic properties. An example might be a spatial relation between our individual *I* and, let us say, an individual *K*, which is different from the spatial relation of *J* to *K*. But again, "being in this or that position from *K*" is an impure property for both *I* and *J* and so its role in individuation must be considered with some reservations. An impure property might also be established between space-time points and a given individual. But this solution (2) broadens our ontological commitments to space-time regions that be-

[5] It may sound odd to say that universals have their occurrences in space and time. However, if I am not mistaken, this possibility lies behind an old Aristotelian concept of *universalia in rebus*.

come part of the individual's composition. It makes space-time regions substantial.

As mentioned earlier, another solution of individuation may lie in the modal framework. Though individuals *I* and *J* are complexes of the same universals, there exists the possibility that they might be different. There also remains the possibility of having different histories. *I* and *J* might be different in different possible worlds, and this is what individuates them: their "modal behaviour". However, besides the problem of transworld identity, there still remains the logical possibility that *I* and *J* have the same modal behaviour and so, once again, individuation is left unexplained. Furthermore, bundles consisting of universals seem to have difficulties of another sort too. They are related to causation. ST explains the causal potential of a given individual by the fact that its individuator, the substratum, instantiates certain universals and so manifests certain causal powers. But it should be remembered that, in BT, there is nothing to be instantianed. There are only properties, and if the properties are universals then the situation becomes even worse. It leads us to another problem: how do universals causally interact? The question is not an easy one, but it is beyond our current interest here. In his recent article [6], Rodriguez-Pereyra argues that bundles of the same universals are distinct in regard to their instances. Our bundles *I* and *J* are distinct, as they are two instances of the same universals. However, Pereyra treats the concept of instance as primitive, and this prevents us from a proper explanation of individuation.

What about tropes? At first sight, individuation is no problem for tropes. By definition, this patch of red is numerically different from that patch of red. This is also true even in the case when both patches are absolutely similar. However, this leads to a numerical difference only, which we have been trying to avoid. Suppose that our particulars *I* and *J* are absolutely similar red spheres.[6] What makes them two rather than one? If we forget about numerical difference, the answer in nothing. Even if we stay with it, we face epistemological problems. There is nothing that tells us which of the two spheres is *J* and which is *I*. Again, we can mention location in spacetime, individual essences or modal be-

[6] This example is borrowed from Max Black's article *Identity of Indiscernibles*, published in *Mind* 61, 1952, pp. 152 – 64. However, Black's spheres were bundles of universals.

haviour but then we are in the same position as we were in the case of bundled universals.[7]

We might partly summarize that both bundles of universals and bundles of tropes are able to ensure particularity but not individuation. Every individual is particular but not every particular is individual. Individuals are only those particulars that are qualitatively distinct from every other particular. Our bundles *I* and *J* are not qualitatively distinct and so fail to be individuals. They lack any non-trivial property that distinguishes one from the other. As mentioned in the beginning, individuation is also a serious problem for ST. It seems that only nominalists have no problem with individuation, but they face problems of their own. As mentioned earlier, BT should look somewhere else for individuators. Hopefully, the right place is events. However, there is no direct link between individuals and events. The link is mediated by states of affairs, and it is our next task to clarify their structure. That will also reveal several important facts about individuals too. Only after that may we look at events and their potential for resolving the problem of individuation.

3. States of affairs

Suppose that our particular *I* is a bundle of the following tropes: E_1, E_2 (they tend to be essential) and C_1, C_2 (they tend to be contingent). Using Armstrong's terminology ([1], 206), *I* is conceived as a thin particular when reduced to E_1 and E_2. It becomes thick if it also includes tropes C_1 and C_2.[8] Thin particulars play the same role as substrata in ST as they are, metaphorically, bearers of contingent properties. When a bundle of essential tropes (a thin particular) acquires contingent tropes (becomes a thick particular) we have a state of affairs ([1], 206). However, we need a closer look at the structure of states of affairs. We need to answer the following questions: (1) What is the relationship between essential tropes and contingent ones within a bundle? (2) What determines the

[7] There are also other possibilities available. Bundling universals with tropes, for instance. Suppose that essential properties are universals and contingent ones are tropes. This sounds a promising strategy but, as far as I know, there has been no systematic study of it.

[8] Of course, the difference is that Armstrong is one of the most prominent defenders of universals, not of tropes.

existence of particular tropes in a bundle (either essential or contingent)? It is plain that questions (1) and (2) touch on another serious objection to BT, and that is the problem of "ontological glue" holding properties in bundles instead of being chaotically distributed throughout spacetime. However, we will address this problem only to the extent required by our current purpose. We will start with the first question.

The relation between essential and contingent tropes is not that of supervenience. At least, not supervenience in the normal sense. Properties C_1 and C_2 are not reducible to properties E_1 and E_2 nor it is necessary that whenever we have E_1 and E_2, we automatically have C_1 and C_2. A thin particular can acquire different contingent properties then it actually has. A thick particular is also subject to change. If we want to use the expression *supervenience*, we might add that it is *possibilistic* or *modal supervenience*. Essential tropes certainly determine the possible range of contingent tropes within the bundle. They significantly contribute to the bundle's identity, and so naturally determine contingent tropes. What else determines contingent tropes in a bundle? The whole job cannot be done by essential tropes. The process of change (losing and gaining contingent tropes) is conditioned by external factors too. The world is not a pile of isolated particulars. It is rather a vibrant network of bundles of tropes and their mutual interactions. Thus a holistic strategy will help us to answer questions (1) and (2). The network is formed by causal interactions among bundles. Contingent tropes within a given bundle are formally determined by the bundle's essential properties and materially by interactions with other bundles.[9] Essential tropes provide a space of possible contingent tropes and external causation realizes some of them.[10] Any relevant change of external causal links causes changes to contingent tropes of a given bundle. However, every change is within the space of possible contingent tropes determined by an individual's identity based on its essential tropes. We

[9] The whole idea of formal and material causation is borrowed from Wittgenstein's treatment of objects in his *Tractatus* [8]. Especially his treatment of internal and external properties and their contribution to the composition of objects (paragraphs 2.0123 – 2.013). The *Tractatus* contains several ideas worth considering in relation to BT.

[10] Traditional trope theorists would not be happy with this distinction. Tropes were traditionally treated as empirical, phenomenal entities. However, our individuals are phenomenally manifested by contingent tropes, not by essential ones. This idea is also borrowed from Wittgenstein's *Tractatus*

might also locate tropes which actually link several bundles and so compose more complex structures and networks. They must be somewhere on the edge of the bundles involved with the lowest degree of essentiality and with the highest degree of contingency.

I think that this holistic approach can partly reveal what is going on inside the bundles of tropes, too. Tropes are excellent elements of causal sequences. It is this particular electric charge and that particular electric charge that causes this particular process. Not some abstract electric "chargeness". It seems that, in the case of tropes, the bundling relation is a product of causal relations between tropes that compose a given particular and tropes of those particulars that causally interact with a given particular. Something that can be reduced to internal and external causation from the perspective of a given particular, a given bundle of tropes. Thus "ontological glue", "bundling relation" and "internal/external causation" are three different names for the very same thing. What is more important, they presuppose states of affairs and not isolated particulars.

However, states of affairs (substrata of essential properties acquiring contingent properties) are also tropes. They are abstract particulars: abstract because several states of affairs can occupy the same region of spacetime, but particular because one state of affairs cannot appear in more space locations in the same time period. States of affairs should be separated from events. Events are the last and the most important issue of this article in connection with its central topic: the possibility of individuation within bundle theory.

4. Events and individuation

We frequently use the expressions *causal relations*, *causal powers*, *causal potential*, etc. When you ask questions concerning the reasons why this entity has this or that property and why it is in this or that relation, you are talking about events. Events are processes when bundles lose and gain tropes. The actual composition of a bundle is a state of affairs.[11] The network that links bundles of tropes can be characterized as

[11] A close connection of events with the categories of tropes, causation, states of affairs and change is to be found in Lombard's exposition ([3], 280 – 290). He also makes the same distinction implicit in our account: states of affairs being considered rather as static entities while events are considered temporal and dynamic ([3], 289).

a network of events. Now we are ready to answer the principal question of this essay: How can bundle theory handle the individuation of particulars? It fails when focusing on isolated bundles. If you see bundles as entities involved in events, then there is potential to involve spatial and temporal individuation once again. Such individuation has been rejected in the case of isolated bundles for the reasons that spatial and temporal locations are an individual's impure properties. Moreover, it also requires the existence of spatio-temporal tropes and thus makes spacetime substantial. However, this is not fully true of the space-time identification of events. Spatial and temporal characteristics of events are their pure properties. Events are not necessarily distinguished by the entities involved but also by the place and time where they occur. A change of tropes happens at a certain place and in a certain time period. Then it is easy to distinguish one bundle from the other. Only one bundle can lose or gain specified tropes in a specified spacetime region, and this is its genuine individuator. A holistic approach is necessary, as events connect several trope bundles through the change of their contingent tropes.

However, a minor problem remains with the requirements of absolute spacetime which might be, under certain conditions, questionable. On the other hand, we do not have any problem with a substantial approach to spacetime, as we do not need spacetime tropes anymore (see objection (2) in paragraph 2). Similarly to the states of affairs, events are to be conceived as abstract particulars: more than one event can happen at one place in a given period of time, but one event cannot happen in more then one place in the same time period. Any similar event taking place in different space at the same time is necessarily different, and this enables us to individuate the involved bundles.

Conclusion

We have reached monistic ontology of tropes. Primal are trope events, from which we derive individuals conceived as bundles of trope properties. The world is the totality of trope events. And events, with the help of their spatio-temporal character, enable us also to individuate entities which are involved in them: that is, bundles of tropes. A holistic approach toward bundles is capable of handling individuation. Moreover, it is also fruitful in the case of another serious objection to BT: What holds bundled tropes bundled? Why don't we have just the world

of chaotic tropes without any individuals? As mentioned in the last two paragraphs of this paper, the answer lies in the distinction between internal and external causation of the bundles. However, a detailed answer would require an account of its own.

Can bundle theory explain individuation?

The answer is yes if the bundles are bundles of tropes and if they are conceived as parts of some more complex structures – events.

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