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Filozofia Nauki 21/2, 31-49

2013

Filozofia Nauki
Rok XXI, 2013, Nr 2(82)

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The Relation of Instantiation

Instantiation is a relation that holds between a property and the particular object that possesses it. It is a multigrade relation, as it can hold not only between an object and its monadic property, but also between several objects and the relations these objects bear to each other.[1] In principle, properties are not limited to be instantiated by objects alone, but rather properties themselves can possess properties, and can have relations, either to other properties or to objects, so that instantiation can also hold between an *n*-tuple of properties. A 'property' is a determination that is numerically different from the object it instantiates.[2,3] Instantiation would therefore hold

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[1] The relation(s) of instantiation can be understood in two ways: either as a unique relation that can be instantiated in itself without different logical types, or as a multitude of different relations of various logical types. For the sake of simplicity, the first conception will be assumed here. Both conceptions face problems and both are affected by some form of Bradley's regress, which is the main issue discussed in this work.

[2] There is, as is well known, a fair amount of polysemy here. Many authors have used the term 'property' to identify the meaning of a predicate, whatever it may be. Others have used 'property' as any entity that satisfies certain fixed theoretical roles, such as solving the problem of one and many, explaining or integrating natural laws, explaining or integrating causal connections, etc. Resemblance classes or nominalist concepts would then, according to this terminology, be 'properties', at least putatively, by dint of fulfilling the role of a property. Here we will assume that 'properties' are 'sparse', in the terminology proposed by Lewis (1986: 59–63, 1999: 10–19). Such entities must be different from those which instantiate them. The existence of a property, therefore, cannot be determined by a priori semantic analysis, and it is the existence of something more than particular objects.

[3] Of course, if there are properties or relations instantiated by themselves — as is the case with a relation of instantiation that instantiates itself — then this characterization applies only to *most* properties. The characterization above is not meant as an analysis of 'property'.

between a universal and the object or objects that exemplify it, but also between a trope and the object or objects that possess it. On the other hand, no form of nominalism accepts instantiation, since the entity proposed by nominalists to fulfill the functions of a 'property' is not numerically different from an individual or from a construction of individuals (as is the case with class nominalism and mereological nominalism). It will be assumed here that properties are universals, that is entities which by their nature can be instantiated in multiple cases.[4]

Assuming that we accept the existence of a relation of instantiation between properties and particulars, what is the nature of such a relation? This paper aims to make advances in the understanding of this connection. It is therefore fundamental to examine the so-called "Bradley's Regress" (Bradley 1897: 18, 27–28, Vallicella 2002), which has been considered a formidable problem for any theory of properties. Let an object *a* instantiate a property P. This would imply that there is a relation **inst** (instantiation) over <*a*, P>, that is:

(1) **inst** (*a*, P).

The state of affairs shown in (1) is the existence of a relation between two entities. If we wish to explain why this relation of instantiation **inst** holds between P and *a*, then it seems that an explanation must be sought similar to that given in order to account for any other relation, that is, in order to explain how a relation is instantiated by an *n*-tuple.[5] Thus:

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[4] Some authors have expressed doubts about the distinction between universals and particulars. There appears a vicious circle if one tries to analyze 'universal' using the concept of 'instantiation' (x is a universal $=_{df}$ x can be instantiated by different objects) and 'instantiation' as a relation that obtains between, for example, universal properties and objects (R is a relation of instantiation $=_{df}$ for any object y and for any property P: (y has R to P) if and only if (y is P)). But no claim is made here concerning how one should *analyze* or correctly define the concepts of 'property', 'instantiation' or 'universal'. Those concepts should be understood intuitively as primitives. Of course, this is compatible with the truth of some ontological theses concerning the relation of instantiation and properties in general. The problems that will be discussed here arise for the relation of instantiation taken in that way and not with respect to any particular analysis of the concept of 'instantiation'.

[5] More formally, a regress seems to follow from these two premises:

(i) $\exists x_1 \exists x_2 \ldots \exists x_n \exists X\, (Xx_1x_2 \ldots x_n)$

(ii) $\forall x_1 \forall x_2 \ldots \forall x_n \forall X\, ((Xx_1x_2 \ldots x_n) \rightarrow \mathbf{inst}\, (x_1, x_2, \ldots, x_n, X))$

Here the variable 'X' has as range universals. As **inst** is itself a universal — at least in principle — it follows that:

(iii) $\forall x_1 \forall x_2 \ldots \forall x_n \forall X\, ((\mathbf{inst}\, (x_1, x_2, \ldots, x_n, X)) \rightarrow \mathbf{inst}\, (\mathbf{inst}\, (x_1, x_2, \ldots, x_n, X)))$

As it will be pointed out later, there does not seem to be any problem with (i)-(ii). Not any regress is vicious. A problem may arise, first, if one tries to *analyze* or define **inst** in a way that requires the same relation of instantiation:

(iv) $\mathbf{inst}\, (x_1, x_2, \ldots, x_n, X) =_{df} \mathbf{inst}\, (\mathbf{inst}\, (x_1, x_2, \ldots, x_n, X))$

Here, if one wants to know what it is for x to instantiate X, then one should know in advance what it is for <x, X> to instantiate the same relation of instantiation. Another different kind of difficulty comes if one is trying to give a certain ontological reductive *explanation*. Here, one tries to explain

(2) **inst** (**inst** (*a*, P)).

The state of affairs shown in (2) is a relation between an instantiation relation and the ordered pair <**inst**, <*a*, P>> which must be explained in the same way:

(3) **inst** (**inst**, (**inst**, (*a*, P))).

And so on. Is this a vicious regress that needs to be resolved? It is, at the very least, a theoretically uncomfortable situation and avoiding it would seem preferable. In the worst possible scenario, it demonstrates the absurdity of the description of properties as 'things' to which an object has some relation. Bradley's Regress is a decisive reason to seek refuge in some form of nominalism or to deny the existence of a 'connection' between properties and particular objects as a straightforward relation that is as robust, from an ontological point of view, as the properties that are being connected.

This paper will, firstly, discuss whether or not it can be said, as some defenders of immanent universals have done, that instantiation is not a relation (Armstrong 1978: vol. 1, 104–111). This would be a very simple way to dodge the systematic difficulties that seem to come along with Bradley's Regress, but it also forces us to search for an alternative explanation of how, for example, the mereological sum of a particular *a* and a property P, [*a* + P], differs from the state of affairs of *a* possessing P. What is the nature of the existence of a state of affairs with such a structure? What does that structure tell us about the nature of particulars and universals?

If this path were not open to us, we would consider whether the various forms of nominalism, according to which there is no instantiation (since there are no properties understood as entities different from the objects that possess them), are in a better position in the face of this systematic difficulty. If these forms of nominalism show problems analogous to Bradley's Regress, then no argument in favor of nominalism can prevail over positing the existence of properties. This would be a general problem that affects all disputed ontological positions in the same way.

If we cannot avoid Bradley's Regress by denying that instantiation is a relation and if it cannot be avoided by taking refuge in nominalism, then we would be better off learning how to live with it. It is therefore pertinent to consider whether it is indeed a vicious regress and a fatal defect in the ontology of properties. It will be argued that Bradley's Regress is not as serious a problem as has been frequently claimed.

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the difference between the existence of a state of affairs of $x_1, x_2, \ldots, x_n$ being X and the existence of the mereological sum $[x_1 + x_2 + \ldots + x_n + X]$ in terms of a relation **inst** in $<x_1, x_2, \ldots, x_n, X>$. That is, the problem is to explain why there is a state of affairs of $x_1, x_2, \ldots, x_n$ being X, and not only a mere sum $[x_1 + x_2 + \ldots + x_n + X]$. This problem is involved in Bradley's regress. More on this point will be discussed in section 3 below.

1. NON-RELATIONAL CONNECTION BETWEEN PROPERTIES AND OBJECTS

One strategy for tackling Bradley's Regress is to deny that the connection between particulars and universals is an authentic relation. If it is not an authentic relation then it will not be necessary to state that it holds between a property and a particular. This cannot be taken, however, as a *reason* for denying that instantiation is a relation. This would be ad hoc. Some form of justification independent of this theory must be sought.

The strategy to which many have turned is to state that the connection between universals and particulars is in fact a 'tighter' bond than a relation. Positing that what 'really' occurs in the world are states of affairs, and that the properties and particulars that comprise them can be considered individually (or, if you like, 'abstractly'), means there are no such things as 'bare' particulars, that is without properties, nor are there non-instantiated properties. Armstrong says:

> If a property is a way that a thing is, then this brings the property into very intimate connection with the thing, but without destroying the distinction between them. One can see the point of thinking of instantiation as a fundamental connection, a tie or nexus closer than mere relation. Nor will one be much tempted by the idea of an uninstantiated property. A way that things are could hardly exist on its own. (Armstrong 1989: 96–97)

This would give us a reason to neutralize Bradley's Regress (Armstrong, 1978: vol. 1, 104–111; 1989: 108–110; 1997: 30–31, 113–116, 127, Strawson 1959: 167–173, Bergmann 1967: 9 ff.),[6] as it would not be necessary to find some metaphysical 'glue' between objects and properties. At the same time, focusing on states of affairs as fundamental inhabitants of the world reduces the temptation to conceive both objects and properties independently from their appearance in the states of affairs. If this resolution to Bradley's Regress is successful, it would also give us a reason to reject transcendent universals.

The problem with this strategy is that, in order to be able to avoid admitting that instantiation is a relation, it is not enough to say that objects and properties can only exist as parts of a state of affairs. For it fails to explain, for example, why a specific property constitutes a state of affairs if it can be instantiated by other objects. Having recourse to states of affairs as strong particulars seems inappropriate and unsuccessful. A state of affairs must be more than the particulars and properties that comprise it. Consider a possible world w_1 in which there exists a property P instantiated by a particular *a*, but not by *b*, and where *b* instantiates a property Q. Then w_1 is a world in which P and *b* both exist, but there is no state of affairs of *b* possessing P. Now let there be a possible world w_2 where P is instantiated by *b*, but not by *a*, and where *a* instantiates Q. So what is the difference between w_1 and w_2? Intuitively, w_1 contains the states of affairs of *a* instantiating P and *b* instantiating Q, while w_2 contains the

[6] A presentation of different alternatives can be found in Vallicella 2000: 237–259.

states of affairs of *a* instantiating Q and *b* instantiating P. Everything else can be assumed to be the same in both worlds. The properties and objects existing in w_1 and w_2 are the same, but the states of affairs which arise in the possible worlds are different.[7] If the connection, tie or bond between particulars and properties is conceived in a deflationary manner, then it is difficult to explain these differences.

A connection 'tighter' than a relation of instantiation is quite vague. What is the nature of such a connection? It seems that there are two ways in which this connection or non-relational bond could be understood and on neither of them does one achieve the desired objective.

(a) Suppose that states of affairs and facts are the only true inhabitants of the world. Particular objects and properties do not really exist as independent entities, but rather as aspects of states of affairs that are conceived, in accordance with our common-sense view of things, as if they were 'separable' from states of affairs. What we describe as objects or properties are actually aspects in which states of affairs can be seen as resembling each other. When this resemblance reaches a certain standard, as set by the context in question, then it is correct to say, for example, that the same object *b* possesses property P and property Q, but not because there are really such things as objects or properties, but rather because there are forms of resemblance between the states of affairs of *b* instantiating P and *b* instantiating Q with other relevant states of affairs. Clearly, it is not necessary to posit any kind of relation that may connect or link objects and properties that make up a state of affairs, but that is because *there are no* objects and properties in the first place. This is a sophisticated form of resemblance nominalism, this time not of objects, but of states of affairs, which cannot in any way be reconciled with ontology of properties.[8] Therefore, it cannot be seen as a solution to the problem of how objects and properties are connected to form states of affairs without having to posit a relation between them; it is rather a denial of the ontological categories 'object' and 'property'.

(b) Not all predicates refer to a property. For instance, the predicate "to be green if examined before the year 3000 or to be blue if examined after the year 3000" (herein "grue") is not a good candidate for designating an objective entity. The semantic value in a specific case will be fixed by the distribution of the authentic prop-

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[7] Hence, what requires explanation is why there is a state of affairs of, for example, *a* being P, *instead of* just the sum [*a* + P]. The mere existence of *a* and P is not sufficient for the existence of the state of affairs. It has been pointed out that explanations are contrastive. One explains why *p* is the case instead of … The blank should be filled with the aspect in which the contrast is made. So, in this case, the explanation sought is not the answer of why *a* is P, in particular, but why *any* states of affairs is different from the mere existence of its ontological components.

[8] Admittedly, various paths of 'constituting' properties and particulars would remain open to an ontology of states of affairs in the same way they are open to the nominalist: applicability of names and predicates, of mereological concepts, classes and sums. The most reasonable position, however, would be to assume that it is the primitive resemblance between states of affairs that allows them to fulfill the function of a property or an object to be grouped non-arbitrarily.

erties in the world, but there is no single property designated by "grue" in all contexts of the use of this predicate. Armstrong proposes this for all disjunctive or negative predicates (Armstrong 1978: vol. 2, 19–29; 1989: 82–84; 1997: 26–28). The same applies to relational predicates. There are relational predicates that do not designate any authentic relation and whose semantic value is fixed in a certain context by the distribution of the monadic or relational properties that are instantiated there, though without the existence of a single relation that determines their value in all the contexts of use. Armstrong holds that this happens, for example, with the predicate "something being identical to itself" (Armstrong 1978: vol. 2, 91–93) and with all reflexive relations in general. It should therefore be said that something similar occurs with the predicates "X being instantiated by *x*" or "*x* possessing the property X". They are relational predicates but they do not designate a single relation in each context of use. The semantic value of such relational predicates will be set by the distribution of different monadic relations or properties in different contexts.

The fact of a relational predicate not designating a single property, however, does not imply that the predicate has no semantic value. If statements in which such a relational predicate may appear are true, then there must be a certain suitable structuring in the world that makes them true and, in particular, there must be objective properties and relations in the world that constitute this structuring. If, for example, there is no property designated by the predicate "it is P or it is Q", this does not mean that in some context, the statement "*a* is P or it is Q" cannot be true because *a* is P (or because *a* is Q), where both P and Q are authentic properties. In the same way, let us consider the following statement and let us suppose that it is true:

(4) *a* instantiates P.

Why is (4) true? Although the relational predicate "*x* instantiates X" does not designate any authentic relation, there must, however, be some authentic relations or properties whose distribution determines the appropriate ontological structuring. Philosophers like Armstrong have argued that the only elements that are necessary in order that (4) can be true are the particular *a* and the property P, but this is clearly insufficient, as has already been shown. Both the object *a* and the property P can exist despite inexistence of a state of affairs of *a* possessing property P. What explains the difference between the state of affairs and a mere set of entities? It is reasonable to think that it is the relation between object and property: the relation of instantiation.

None of the aforementioned strategies, then, is adequate for independently establishing that instantiation is not an authentic relation. If one truly wishes to posit an ontology with properties that are numerically different from the objects they determine, then there seems to be no way to escape the need to posit a relation between objects and properties, whose function cannot be treated lightly. This, of course, returns us to Bradley's Regress. If an object *a* and a property P can make up a mere set, without constituting a state of affairs, then the object *a*, the property P and the relation [*x* instantiates X] can also constitute a mere set, without managing to give rise to

a state of affair of *a* instantiating P. With a new relation of instantiation the same problem will occur. This forces us to consider the nominalist alternatives which reject positing properties as numerically different from the objects they instantiate, thus avoiding the need to explain the connection between objects and properties.[9]

2. NOMINALIST ALTERNATIVES

If we cannot think of a connection between a particular and a property other than some type of ontologically robust relation, then one might be inclined to seek refuge in some nominalist alternative. Bradley's Regress may show us that it is absurd to posit an ontology of properties, because if properties really exist in the world and are numerically different from the objects by which they are instantiated, then we are in need of some relation that connects particulars with properties, and then of another relation to connect the first relation with the particulars and the properties, and so on. Nominalist theories cut out the regress at the root, as they allow for nothing which could be used to intelligibly establish a relation. Particular objects are all that exists.[10] The nominalist must, at any rate, explain why it appears that the same nature can be instantiated in multiple cases. Of course, for the nominalist, the identity of nature is a mere appearance. The task of explanation is to substitute universal properties or, alternatively, the classes of similar tropes, with adequate constructions from objects that can fulfill the functions of a property. In this way, the nominalist will also be able to explain what is referred to in ordinary contexts when quantifiers are used over a range of properties or when properties are referred to directly. Consider the following statement:

(5) Red is a color.

We do not need the nominalist to propose a paraphrase of (5) that is logically equivalent and eliminates the reference to the property of being red. It is simply enough to substitute the universal or the tropes provided by a defender of properties with your preferred construction: a predicate, a concept or a class, etc. The nominalist will be able to accept that statement (5) is perfectly in order just as it is, and will also be able to admit the correctness of statements like (5) in ordinary contexts. All that will happen is that instead of talking about a property we will be talking, for example, about a class of perfect resemblance between red objects.

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[9] The same applies to a nominalism such as that indicated in (a) above, in which what is posited are facts or states of affairs (instead of objects). The classes of states of affairs, whether having resemblance or not, must fulfill the function of objects and properties.

[10] A conception according to which all that exists are states of affairs would also count as a form of nominalism, as indicated earlier. However, such a non-traditional nominalist somehow has to 'build' also *the particular objects* (in addition to the entities that can fulfill the functions of properties).

Several forms of replacing universal properties have already been presented (cf. Armstrong 1978: vol. 1, 11–57). The most traditional forms of nominalism have appealed to predicates or to concepts. Let an object *a* be P; then explanations of this fact such as the following have been proposed:

(6) (*a i*s P) because [attributing the predicate "is P" to *a* is true].[11]

(7) (*a i*s P) because [attributing the concept *being P* to *a* is true].

That is, the fact that *a* is P is constituted by the application of the respective predicate or concept. Similarly, forms of nominalism have been proposed where a universal property is substituted with classes of objects or with mereological fusions of objects. Intuitively, the universal property P is substituted with the class of all objects that are P or with the fusion of all objects that are P. Thus:

(8) (a is P) because [$a \in \{x\text{: P}x\}$].

(9) (a is P) because [$a < (\iota x)\ \forall y\ ((y \leq x) \leftrightarrow \exists z\ (\text{P}z \wedge (y \leq z)))$].

In (9) '<' is the mereological operator 'being an (improper) part of' and '≤' is the mereological operator 'overlapping with'. In the description of the class of P's $\{x\text{: P}x\}$ and in the description of the mereological sum of P's $[(\iota x)\forall y\ ((y \leq x) \leftrightarrow \exists z\ (\text{P}z \wedge (y \leq z)))]$ we have had recourse to the property P that we are trying to eliminate, but this is simply a heuristic resource. In the class or fusion in question, the objects have not been included in the class or fusion because they possess the property of being P, but rather because the classes or fusions are chosen independently and what is later called 'property P' will depend on them.

A nominalist theory that is far more sophisticated is that of resemblance nominalism (Lewis 1986: 50–59; 1999: 10–19, Rodriguez-Pereyra 2002). The universal property of being P is here substituted with a class formed by all and only those objects that bear a degree of perfect resemblance to each other. That is, it is a class of objects such that: (i) each member resembles all the other objects in the class, and (ii) no other object resembles all the objects in the class.[12]

Are these various nominalist constructions free of problems analogous to Bradley's Regress? They seem not. All these forms of nominalism manage to explain the appearance of the same nature instantiated in multiple instances by appealing to a relation between objects (Armstrong 1978: vol. 1, 18–21, 27, 41–42, 53–56; 1989: 53–57), which exposes these constructions to regresses that are at least as damaging as that

[11] These formulations, containing 'because', must be understood as bi-conditionals of the type [(*a i*s P) ↔ (attributing the predicate "is P" to *a* is true)], where the right side ontologically *determines* the left side. A mere bi-conditional might be compatible with a dependency of the right side on the left one, which would go against the aim of the nominalist.

[12] The resemblance required to choose the resemblance class has been refined considerably (cf. Lewis 1999: 14–16, Rodriguez-Pereyra 2002: 142–198), but the details of these refinements are not of interest to this paper.

which affects properties and tropes. In the case of predicate and concept nominalism the entities which one hopes to use to explain 'the one and many' are numerically different from the objects of which we predicate a predicate or to which we apply a concept. What is the exact nature of 'truthfully predicating *x* of *y*' or 'truthfully judging *x* of *y*'? The nominalist cannot say that these are ontologically robust relations, or it would mean a denial of his nominalism. These relations ought to be analyzed in the same way we analyze any other putative property or relation, that is, we should admit that *x* is truthfully predicated of *y* if and only if the predicate "is truthfully predicated" is truthfully predicated of the ordered pair <*x*, *y*>; and analogically for concepts. It is evident that these predications or judgments should then be subjected to the same analysis, and with this it is evident that we are beginning an infinite regress.

In the case of the class nominalism and the mereological fusion nominalism, attribution of a putative property P to an object *a* depends on that object being an element of a class formed from other objects, or on that object being a part of a mereological fusion of which other objects are also parts. The putative property P of *a* consists, therefore, of the relation of *a* to other objects that make up the appropriate class or that are part of the appropriate fusion. What is the relation of belonging or the relation of being part of? The nominalist cannot say that they are ontologically robust relations, as this would be a denial of their nominalism. What remains, therefore, is to say that these relations must be analyzed in the same way as any other putative property or relation, that is, as belonging of the ordered pair to the appropriate class or to the appropriate fusion. It is evident that these new relations must be submitted to the same analysis, and this leads us to a regress.

Some authors have held that in these cases the nominalist could appeal to the *primitive* nature of predication, judgment, belonging or the mereological connection of 'being part of' (cf. Lewis 1999: 20–25). That is, a nominalist could be excused from explaining why something is predicated of something, why something is judged of something, or why something belongs to one class or is part of a whole. If a defender of immanent universals feels justified, for example, in saying that the connection between universal and particular is a non-relational link or bond without any ontological weight, then one cannot see why the nominalist would not be able to claim that the resources he turns to do not require further explanation either.

As has been seen above, however, the defender of immanent universals cannot be excused by saying that instantiation is not an authentic relation, since the ontological function that must be fulfilled cannot be replaced. So what happens with the various forms of nominalism? Well, the fact that *a* is P makes a difference in the world. The object and the predicate or concept may exist while the corresponding state of affairs of *a* being P does not. If the nature of this fact is that something is predicated of *a* or judged of *a* then it would seem that the predication or judgment is ontologically robust. The nominalist, however, would not be able to accept that the predication or judgment is an authentic relation, without denying his own nominalism. Therefore,

analyzing the predication or judgment in the same way as any other attribution of a property or relation cannot be avoided.

In the case of the class nominalism or the mereological nominalism, the classes or fusions in question would not exist if the object *a*, which forms part of them, did not exist. The belonging of the object to *that* precise class or to *that* fusion, however, makes a difference in the world. It is precisely the fact that *a* belongs to that class or to that fusion which makes it P, as there exists the possibility that it is not P. Belonging to or being part of something seem to be relations that are ontologically robust. As in the previous cases, the nominalist cannot accept that these relations are authentic, without denying his nominalism. They should, therefore, be analyzed just like all other putative properties and relations.

Resemblance nominalism does, however, deserve separate consideration. Of course, its defenders claim that resemblance is a primitive relation that cannot be further analyzed. This is aimed at avoiding any regress. Russell (1912: 68–69) stated long ago that two objects resemble each other in certain *respects* and not in others. These respects seem to be universals by another name. If they are not universals, then they should be analyzed in the same way as other putative relations and the regress will then reappear. As with the previous cases, on the one hand, it is not easy to sustain a deflationary theory, as the resemblance of one object to another makes a difference in the world. There is, however, an alternative strategy for defending resemblance nominalism. Resemblance seems to be an internal relation that supervenes upon the intrinsic nature of its *relata*.[13] Given the objects in question, there is no requirement for anything other than their intrinsic properties in order that some resemblance or, as the case may be, non-resemblance can exist between them. An internal relation seems to be a clear example of a relation that makes no difference to the facts of the world. Its existence is supervenient upon the facts based on the nature of each of the objects that resemble each other, and thus it would seem that it is not necessary that it is considered ontologically robust. This would seem sufficient to avoid a regress.

There is, however, a significant problem with this strategy. Resemblance nominalism cannot hold that the relation of resemblance is an internal relation. In fact, the nominalist aims to hold that it is the resemblance of an object to other appropriate

[13] A relation is said to be 'internal' if it arises between two objects due to the intrinsic nature of those objects. A relation that is not internal is called 'external' (Lewis holds in addition that a relation is external if and only if it supervenes on the *n*-tuple of *relata* taken jointly; thus, a relation may be neither internal nor external; Lewis 1986: 62–63; this distinction is not considered here). The intrinsic nature of an object arises from all the intrinsic properties it possesses. A property is intrinsic if and only if it is possessed by an object irrespective of whether the object is alone or accompanied. A property is extrinsic if and only if it is not intrinsic. An object *x* is alone in a possible world *w* if and only if there does not exist any other object different from *x* in *w*. An object is accompanied if and only if it is not alone (cf. Lewis, Langton 1999; there are refined versions of this notion that are not of interest here).

entities that *determines* whether, for example, the object is P. If the relation of resemblance is an internal relation, this would invert the dependency. Objects will possess their intrinsic nature and it is this intrinsic nature that subsequently determines which other objects it does or does not resemble. If it is intrinsic nature that determines resemblance, then it cannot be said that it is the resemblance of an object to another objects that ontologically determines the properties it possesses. If resemblance cannot be taken as an internal relation, the initial problem reappears for the nominalist: how can we explain the difference that resemblance makes in the world?

As we have seen, none of the nominalist alternatives is free of problems analogous to Bradley's Regress. The various forms of nominalism attempt to explain why an object seems to have properties and relations to other objects by appealing to some relation of the object (or objects) to other entities. The relations to which the nominalist turns cannot simply be ignored as irrelevant from an ontological viewpoint. The existence of these relations determines in turn what states of affairs or facts are true. The method used by a nominalist to avoid positing properties or ontologically robust relations rests on postulating various constructions of classes, fusions, resemblances, predicates or concepts. Therefore, the nominalist must analyze these relations like any other property or relation and this opens the door for regresses of the same type as Bradley's Regress.

Of course, nominalists can also seek refuge in anti-realism. They could simply accept that states of affairs in the world are not objective entities, independent of what we create, judge or speak of. Thus it would not be necessary to offer explanations of the relations of predication, judgment, belonging or being part of something. What we call reality would be an artifact of our own discursive and judgmental practices, for any existing states of affairs will then depend on what predications or judgments are made and these have no deep motivation. Similarly, resemblances between objects can also be regarded as fixed by the context of evaluation of a subject or of a culture. In the case of belonging to or being part of, the nominalist could simply assume the existence of all classes and all mereological sums that exist according to the set theory or the standard extensional mereology. All these set-theoretical or mereological constructs would be called 'properties' without privileges or discriminations. Among all these, some will stand out, for purely pragmatic reasons, but this will not reflect a deep ontological fact. I believe that in all the cases nominalists can be excused from giving an explanation of why such relations constitute true states of affairs, but this requires a form of anti-realism, which I consider neither reasonable nor very attractive even for nominalists themselves.

3. IS BRADLEY'S REGRESS REALLY SO DAMAGING?

If we must learn to live with Bradley's Regress or with some variant of it, whether or not we are defenders of an ontology of universals, then it will be of use to

understand the structure of the regress and to examine what damage it actually causes. Firstly, we must clarify that not all infinite regresses are of themselves a reason to reject whatever may be causing them. Not all infinite regresses are vicious. For example, the following postulates lead to positing infinity of entities:

(10) 1 is a number.

(11) $\forall x\,[(x \text{ is a number}) \rightarrow \exists y\,((y = (x + 1)) \wedge (y \text{ is a number}))]$.

No one would think, however, that there is anything theoretically wrong in a structure of infinite numbers that satisfy (10) and (11). This is the supposition that has been used to practice arithmetic from time immemorial and no one has seen any reason to reject the notion of a number as incoherent or as theoretically undesirable. Similarly, let us suppose that:

(12) p is true.

By the principle of equivalence $[(q \text{ is true}) \leftrightarrow q]$ it follows that:

(13) (p is true) is true.

Thus, applying the same principle as in (13), it follows that:

(14) ((p is true) is true) is true.

And so on. Neither is this considered a vicious regress,[14] nor a reason to reject the notion of truth as incoherent or inconvenient. If infinite regresses are undesirable, this is not simply due to the fact that they are infinite regresses. There must be something which differentiates vicious regresses from the harmless ones. Nolan (2001) has discussed in detail the reasons why a regress may be considered vicious:[15]

(a) An infinite regress can be vicious if it indicates an inconsistency. Nolan (2001: 524–530) gives several examples. One of them is the famous example of the 'third man' in one of its interpretations: (i) if objects a_1, a_2… a_n are F, then there must be one single form, F-ness, by which we understand the objects a_1, a_2… a_n as F; (ii) all forms are predicated of themselves, thus, F-ness is F; (iii) if something has a characteristic, it cannot be identical to the thing by which it is understood as having said characteristic. From these premises it follows that there must be a single form by which the objects a_1, a_2… a_n and F-ness, are all F. From (ii) it follows that the form

[14] The referee for this journal has suggested that these sequences of numbers or propositions should not be called 'regresses' but simply 'infinite series' or 'infinite progresses'. That could be a useful terminological distinction that will not be followed here. Gratton (2009) argues that an infinite regress argument has two parts: (i) an infinite regress — what the referee prefers to call simply an 'infinite series'— and (ii) an independent reason for which the regress indicated in (i) is false, or unfeasible, or undesirable. Several reasons for thinking that a regress is vicious are presented below.

[15] We leave aside the difficulties involved in saying that a truly infinite number of entities is incoherent. This claim is normally associated with Aristotle (cf. *Physics* III, chap. 4–8). Here we assume that there is nothing objectionable *per se* in an infinite collection.

in question which comes of this will also be F and thus the regress begins. However, it turns out that premises (i)-(iii) are incoherent, as (ii) establishes that any form F is predicated of itself, but (iii) establishes that a form F cannot be predicated of itself. The regress is a symptom of the underlying incoherence.

(b) An infinite regress can be vicious if it indicates the failure of a reductive theory that attempts to analyze or explain a certain phenomenon by appealing to an *analysans/explanans* that contains the concept of *analysandum/explanandum*. An example of a vicious regress of this type comes from the homunculus theory of vision. One may ask why an organism *x* possesses vision. The answer is: because there is a homunculus in organism *x* that has *vision* and communicates the information it obtains to *x*. The vision of the homunculus is no clearer than the vision of organism *x*, the *analysandum*. The explanation of the vision of the homunculus would have, in principle, to turn to the same procedure, which generates the regress.

(c) An infinite regress can be vicious if an infinite set of entities is posited from a domain that is known to be finite. If a theory implies, for example, that a subject must possess infinite number of beliefs or a theory of action implies that there are infinitely many intentions, this would go against our intuition that finite rational subjects, such as ourselves, can only have a finite number of beliefs and intentions.

(d) An infinite regress can be vicious, that is, can be a reason to reject a theory or to consider the theory less justified, if it posits *too many* entities. This would be a lack of ontological or explicative parsimony which must then be avoided.

If Bradley's Regress is vicious, for which of these reasons will it be so? The usual formulations show that the problem in question is that we should be able to explain why, for example, a state of affairs of an object *a* possessing a property P is indeed a state of affairs and not a mere mereological fusion [*a* + P] or a class {*a*, P}. If in order to explain the difference between a state of affairs and mere sums or classes we introduce a third element **inst** which connects *a* with P, we can again ask ourselves about the difference between **inst** actually connecting *a* with P and the sum [*a* + P + **inst**]. If we subsequently introduce an additional element that explains this difference, the question again arises, and so on. Each step is insufficient to explain the difference between a state of affairs and a sum/fusion.

It would now be of use to consider exactly why Bradley's Regress would be objectionable. It seems, firstly, that there is no inconsistency in the premises, so it seems that reason (a) does not apply.[16] If the regress is vicious, it would have to be

[16] Naturally, an inconsistency seems to arise if the relation of instantiation can be instantiated by itself — as is supposed in this work — and one admits negative properties. In this case there will be a property [$\lambda x \neg$**inst** (x, x)]. If this property is instantiated by itself, then it is not instantiated by itself, and if it is not instantiated by itself, then it is instantiated by itself. A distinction of different relations of instantiation of different logical types could block this difficulty — but not others in the vicinity (consider, for example, two properties P_1, P_2 such that P_1 is the property that anything has if and only if it has P_2, and such that P_2 is the property that anything has if and only if it does not have P_1). The inconsistency disappears, also, if one rejects negative properties, as is usual between de-

for one of the other reasons, that is, it should be due to being an insufficient reductive explanation, or due to the positing of infinite entities in a knowingly finite domain, or, lastly, due to simply not being economical. It is therefore necessary to examine each of these possible causes.

3.1. Failed explanation?

The fault described in (b) arises whenever: (i) the aim is to reduce an entity, and (ii) the proposed reduction reintroduces the entity that is supposed to be reduced in the explanation or analysis. During the attempt to eliminate the offending entity from the explanation or analysis it reappears in the new explanation or analysis. This would seem to be the common fault when introducing Bradley's Regress. What exactly, however, is a reductive explanation or a reductive analysis in this case? A reductive analysis of the existence of an entity is a necessary biconditional whose justification must be given a priori, by purely conceptual reflection, and the notion of the *analysandum* must not appear in the *analysans*. A reductive analysis is normally understood as an analysis in which a finite set of necessary and sufficient conditions can be used to generate the *analysandum*. For it might well be that there are necessary and sufficient conditions for generating the *analysandum*, but they are infinite and their precise formulation exceeds our capacities for thought or expression. In this case, the *analysandum* may still be supervenient upon the *analysans*, but may not be reducible to it. Thus, the reductive analysis might be formulated in the following way, assuming that the *analysandum* consists in the existence of A's (i.e. obtaining of facts of type A):

(15) $\quad \Box\forall x\,[Ax \leftrightarrow (C_1x \wedge C_2x \wedge \ldots \wedge C_nx)].$

It must be supposed that the conditions C_1, C_2, …, C_n are finite and that (15) will be justified by mere a priori conceptual reflection.

However, when we are dealing with a reductive explanation, it is not a biconditional that we are proposing, but simply a conditional in which the *explanans* is the antecedent and the *explanandum* is the consequent. For the purposes of this examination, it will be assumed that the conditional in question is a strict conditional.[17]

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fenders of theories of sparse properties. In any case, this inconsistency is irrelevant to the problem discussed, because a theory with different relations of instantiation of different logical types will face the same kind of systematic problem posed by Bradley's regress. The mere existence of any of the infinitely many different relations of instantiation is not sufficient to necessitate the existence of an authentic state of affairs.

[17] As is well known, the notion of 'explanation' has been the object of arduous and complex discussion for a large part of the last century and it is likely it will continue with the same ferocity in this century. We do not wish to prejudge this issue, but simply offer a plausible characterization of what an explanation is in ontology (where it is usually not possible, for example, to expect that the *explanandum* should be deduced from the *explanans*, and where neither can it be expected that the

There is no reason why this conditional should be justified a priori by mere conceptual reflection, nor will it be necessarily found through comprehension of the 'meaning' of the *explanandum*. A justification of an ontological explanation can include data taken from the empirical sciences, as well as considerations of simplicity, economy, likelihood, internal coherence or external coherence of the proposed theory with other theories that are thought to be well justified, etc. A reductive explanation will be an explanation in which the *explanandum* does not appear in the *explanans* and where the *explanandum* can be expressed or understood in a finite number of clauses. If this is not the case, it may still occur that the *explanans* is supervenient on the *explanandum*. Assuming that the *explanandum* is the existence of A's (that is, the facts of type A), the general form of a reductive ontological explanation could, therefore, be:

(16) $\quad \Box\forall x\,[(C_1x \wedge C_2x \wedge \ldots \wedge C_nx) \rightarrow Ax]$.

Here we must assume that the conditions of the *explanans* C_1, C_2, … C_n are finite. (16) need not be justified by an a priori analysis and it only specifies sufficient conditions for the fact A to arise. One particular form of ontological explanation is the search for *truthmakers*, that is, through identification of the entities that are required to guarantee the truth of a proposition.

When the relation of instantiation is introduced to serve as the connection between a property and a particular object, it seems more reasonable to think of an ontological explanation than of an analysis. It is not reasonable to think that positing the relation of instantiation arises from an 'analysis' of the state of affairs. The meaning or the concept of a 'state of affairs' does not seem to imply neither that it must comprise a relation of instantiation, nor that it must not.[18] It is, therefore, preferable in an ontological explanation to think that the *explanandum* consists in the existence of a state of affairs that comprises a particular object and a property. The sought-after explanation must have the following form (assuming that what is explained is simply a state of affairs of an object possessing a property):

(17) $\quad \Box\forall x\forall X\,[E \rightarrow (x \text{ is } X)]$.

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explanans includes 'natural laws', nor can it ordinarily be expected that there exists some type of causal connection between *explanans* and *explanandum*, etc.).

[18] The referee has noted that although a relation of instantiation is not part of the meaning — in natural language — of "state of affairs" it may be regarded as part of a 'theoretical' definition. Many times, indeed, ontological explanations have been presented as 'analyses' of different concepts, while what one is really trying to do is to propose a good ontological explanation of the nature of the entities in question. For example, the problem of universals has been frequently presented as a problem of how to 'analyze' predication and resemblance. But whether there are universals is neither a matter of analysis, nor something that can be 'stipulated away' by some theoretical definition. Likewise, whether there is an authentic sparse relation of instantiation is not a matter of an analysis, nor something that can be 'stipulated away' by some theoretical definition.

Where 'E' is the condition required for the existence of the state of affairs of x possessing property X. The *explanans* that arises is:

(18) $\Box\forall x\forall X\,[\mathbf{inst}\,(x, X) \rightarrow (x \text{ is } X)]$.

The point is that if the antecedent in quantified conditional (18) is taken as the state of affairs that, in turn, must be explained, this leads to:

(19) $\Box\forall x\forall X\,[\mathbf{inst}\,(\mathbf{inst}\,(x, X)) \rightarrow \mathbf{inst}\,(x, X)]$.

(19) cannot have a reductive ontological explanation for the *explanans* is in the *explanandum*. From (18) and (19) it follows that:

(20) $\Box\forall x\forall X\,[\mathbf{inst}\,(\mathbf{inst}, (x, X)) \rightarrow (x \text{ is } X)]$.

Then, the antecedent of (20) can be taken as the state of affairs to be explained and another occurrence of **inst** will then be added to this explanation. If this process is performed n number of times, it follows that:

(21) $\Box\forall x\forall X\,[\mathbf{inst}\,(\mathbf{inst}\,\ldots\,(\mathbf{inst}, (x, X))\,\ldots) \rightarrow (x \text{ is } X)]$.

In (21) it must be supposed that the relation of instantiation **inst** in the antecedent occurs n times, for an arbitrary n. Is this a reductive explanation? It may be thought so. Firstly, clearly the *explanandum* does not appear in the *explanans*. Secondly, even when the *explanans* may be infinite due to the — possible — infinitely iterated occurrence of **inst**, these infinite occurrences also clearly obey a principle. It is an infinity that can be subdued by a recursive clause. Of course, the explanation of the state of affairs of **inst** (x, X) will not be reductive for the above reasons, but this is another question. If we wish, we can find ourselves in the curious theoretical situation of an infinite set of ontological explanations, none of which is reductive by itself, but which allow us to infer an ontological explanation that in fact is.

There is an important problem, however, in taking (21) as an adequate reductive explanation. What should be explained *reductively* is the existence of the state of affairs [x is X] in the consequent of (21), but the successive introductions of **inst** in the antecedent will only establish **inst** *actually relating* <x, X>, that is, it will be the *state of affairs* of **inst** (x, X), whereas what we want to explain is the very nature of a state of affairs. None of the successive introductions of **inst** will manage to resolve this question and (21) cannot be considered a satisfactory reductive explanation.

The question is whether or not this is important. Not all explanations can be reductive. For instance, we probably have no reductive explanations of causal facts or of modal facts and this is no reason to reject their existence. If there were no reductive explanations of states of affairs and if, in particular, appealing to the relation of instantiation did not constitute a successful reductive explanation, it would not make us hold that there is no connection between properties and particular objects. Quite possibly this is what Bradley's Regress really shows us. It would seem impossible reductively to explain the existence of states of affairs comprising objects and prop-

erties. Bradley's Regress indicates precisely this impossibility. It is, however, not necessary to embark on a project of finding this reductive explanation.[19]

3.2. A knowingly finite domain?

Another reason why Bradley's Regress may be taken as vicious is that it is seen as positing infinite entities in a knowingly finite domain. There should be an infinite number of instantiations of the **inst** relation in a single state of affairs. This constitutes a fault if we have reasonable evidence that the domain of entities in question is finite in nature, that is, if it were in some way true that the very structure of a state of affairs must have a finite number of constituent elements and a finite number of connections between these elements. Does such evidence exist? It seems not. According to everything we know, for example, it may occur (in the epistemic sense) that all properties are complex, whether of a conjunctive or structural nature (Armstrong 1978: vol. 2, 80–84). To the best of our knowledge, it may also occur that there are no mereological atoms and that, therefore, all material objects are composed of their own parts which, in turn, are composed of their own parts and so on into infinity (gunk). The state of affairs of a table being in a room could be infinitely complex.

This does not mean that one cannot have a reasonable comprehension of the existence of this state of affairs, depending on whether the concepts and judgments that are involved in this comprehension are finite. A simple concept or a semantically simple predicate, however, need not correspond to a simple property. In this situation, if there were an infinite multitude of instantiations of **inst** in each state of affairs, this would not clash head on with our intuitions about the fundamental constitution of the world and neither would it clash with our finite cognitive capacity to understand the existence of such states of affairs. It must also be remembered that the infinity of instantiations of **inst** is recursive, which is the opposite of what happens with, for example, an infinitely descending complexity of structural properties. Anyone who understands that [**inst** (*a*, P)] implies [**inst** (**inst** (*a*, P))] understands that there follow infinitely many applications of **inst**, in the same way that anyone who understands (10) and (11) understands that there are infinitely many natural numbers. This does not, therefore, seem a reason to regard Bradley's Regress as vicious.

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[19] A solution along these lines can be adopted also by a nominalist. The connection between an object and a predicate, or the connection between an object and other objects with which the object in question forms a class, should be taken as a predicate, or a class, as the case might be. The fact that a predicate is truly said of a particular object, though, has to be considered a primitive, not explainable in a reductive manner.

3.3. Lack of parsimony?

Lastly, we must ask whether Bradley's Regress implies a lack of economy to the extent that it is sufficient to declare the regress vicious. The fact of a theory being not economical is a question that must be decided by considering the theoretical alternatives and their respective costs. Economy, or its absence, cannot be decided absolutely. There is parsimony in terms of number of entities, but also in terms of the categories of the posited entities. Here, positing infinite recursive instantiations of **inst** seems a lack of economy. This appearance, however, fades away if we consider that a relation between properties and particulars is indispensable, if we are going to posit an ontology in which these entities are really different, and if the nominalist alternatives suffer from analogous regresses when one renounces positing properties. Therefore, Bradley's Regress cannot be eliminated by theories that posit properties. Thus, the lack of parsimony is not a reason to consider the regress as vicious.

4. CONCLUSIONS

We have considered some fundamental characteristics of the relation of instantiation, that is, the relation that connects particular objects and properties. The so-called Bradley's Regress is a reason often employed: (i) to reject the existence of this connection, or simply (ii) to deny that properties exist as entities different from the particular objects that possess them.

As for (i), we have argued that it does not seem reasonable to deny that instantiation is an ontologically robust relation. There is a theoretical function which instantiation fulfills and which cannot be substituted by anything else. We must then explain the difference between a state of affairs of an object possessing a property and a mere fusion of particular objects and properties. If we really hold that there are properties and objects that possess them, as numerically different entities, then some relation between them must be posited.

As for (ii), we have argued that none of the nominalist alternatives is free of problems analogous to Bradley's Regress. Neither predicate nominalism, concept nominalism, nor class nominalism, mereological nominalism or resemblance nominalism can be presumed to be free of the systematic difficulties of various regresses that must be treated in the same way, *mutatis mutandis*, as Bradley's Regress. Thus, the regress cannot be used to discriminate between theories in the metaphysics of properties, as all positions in the dispute must face the same issue.

In one way or another, therefore, we must face Bradley's Regress. So does it generate a vicious infinite regress? Four reasons have been shown which can be applied to show that a regress can be taken as vicious: (a) being indicative of an inconsistency, (b) being indicative of an faulty reduction, (c) implying the positing of infinite entities for a knowingly finite domain, or (d) being simply not economical.

A regress will be vicious if, in the sense of (b) above, we are aiming to give a reductive explanation of a state of affairs as a complexity of objects and particulars. But we do not have to give reductive explanations for everything. It probably does not even make sense to demand a reductive explanation for everything. If the nature of a state of affairs does not allow for reductive explanation, this is no disaster for our ontologies. We do not have decent reductive explanations for modality, causality or existence. If this is our predicament in general, then Bradley's Regress is a far less formidable problem than has been thought.[20]

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[20] This paper has been written as part of Fondecyt research project 1090002 (Conicyt; Chile). A preliminary version was presented at the III Workshop on Language, Context, and Cognition, held between August 4 and 6 2010 at the Hotel Cirilo Armstrong, in Valparaiso. I wish to thank the participants of the Workshop for the comments and suggestions. I would also like to express my appreciation for the detailed comments by Javier Cumpa, Sebastián Briceño and by the anonymous referee for this journal.