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BUNDLES, INDIVIDUATION AND INDISCERNIBILITY

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ABSTRACT

In a recent paper, Sun Demirli (2010) proposes an allegedly new way of conceiving of individuation in the context of the bundle theory of object constitution. He suggests that allowing for distance relations to individuate objects solves the problems with worlds containing indiscernible objects that would otherwise affect the theory. The aim of the present paper is i) To show that Demirli's proposal falls short of achieving this goal and ii) To carry out a more general critical assessment of the issue by appraising the costs and benefits of Demirli's view as well as of existing alternatives.

Keywords: Bundle theory, universal, instance, individuation, structure, relation, Identity of the Indiscernibles

Introduction

When studying the ontological nature of material objects, it is necessary to distinguish the question of their *internal composition* from the question of their *individuation*. The former question concerns what constitutes a material object as such, and in what way. It aims to identify the categories of entities that partake in the making up of material things. The latter question has instead to do with how each object is individuated as such, self-identical and numerically distinct from everything else and, consequently, counting as one thing of a given kind.

The bundle theory accounts for the internal constitution of objects by postulating that they are entirely composed of collections of repeatable properties (universals) 'glued together' by compresence or some other fundamental relation. Such a theory is *usually* taken to lead to the 'constitutional approach' to individuation and, as a result, to the Leibnizian Principle of the Identity of the Indiscernibles (henceforth, PII). The idea is that if, as the constitutional approach to individuation has it, the constituents of individual objects are the only ground for these objects' identities, since universals are numerically identical across their instances there cannot be

numerically distinct objects with all the same properties. Bundle theorists may avoid this conclusion by introducing 'special' universals with only one instance, acting as 'individuating essences' or 'haecceitates' that uniquely pick out one object each – something like 'being Socrates'.[1] This, though, is normally regarded as unsatisfactory. The reason is that the bundle theorist's fundamental working presupposition is that the world as an assortment of material objects is constituted entirely by instances of *repeatable qualities*, with no constraint other than the mutual compatibility of the latter. The special universals mentioned above, however, would be uniquely connected to specific collections of properties in a way that appears to *presuppose* (or at any rate introduce) non-qualitatively-analysable identities (the labels 'primitive identity' and 'primitive thisness' are often used). Moreover, the supposed individuating essences would be metaphysical posits additional to the 'canonical' properties of things. If, however, the constitutional approach to individuation does in fact make bundle theorists committed to PII, a problem arises: the resulting framework seems unable to make room for Black-type (Black 1952) worlds, inhabited by two or more objects constituted by the same properties and nothing else, but such worlds appear perfectly possible. It follows that bundle theorists need to say something more about individuation and indiscernibility.

The present paper discusses extant attempts to do this, with special focus on an allegedly new view recently proposed by Sun Demirli (Demirli 2010). It will be argued that Demirli's proposal is neither new nor successful as a solution to the problem of indiscernibility. In addition to this, on the basis of a more general comparative assessment, it will be suggested that facts of identity that are fundamental and not derivative – in particular, not derivative on facts concerning the distribution of qualities in the world – should be acknowledged. (This may or may not be deemed sufficient for abandoning the bundle theory – although we will have something to say on this issue, reaching a definitive verdict on this is not amongst the aims of this paper).

The structure of the essay is as follows: Section 1 outlines and discusses a proposal put forward by John O'Leary-Hawthorne, according to which the bundle theorist should 'bite the bullet' and defend a seemingly counterintuitive interpretation of the view s/he endorses in order to make sense of Black-type worlds; Section 2 considers an alternative, presented by Gonzalo Rodriguez-Pereyra, and purported to solve the problem by postulating a distinction between bundles of universals and their instances; Section 3 critically assesses Demirli's (allegedly) new view, based on broadly 'structuralist' considerations; and Section 4 concludes the discussion by summarising its main results, and hinting at some considerations in favour of primitive identities.

1. O'Leary-Hawthorne: Indiscernibles are Numerically Identical

O'Leary-Hawthorne (1995) contends that the bundle theorist should embrace PII *without interpreting it as ruling out the possibility of indiscernibility*. In more detail, he argues that, exactly in the same way in which a single universal can exist at many places, so can a bundle of several universals. It follows from this that Black's alleged

1 This is, for instance, what Loux (1978) does with his 'substance theory of substance'.

counterexample to PII is immediately neutralised: the seemingly distinct indiscernible objects are in fact a multiply-located, numerically unique object. In particular, if – as contended by many realists about universals – universals are *immanent* (that is, they exist in space and time only) and are capable of existence at many places at the same time, then:

> [t]he following possibility is a very genuine one: There is a bundle [...] five feet from itself and nothing else. (O'Leary-Hawthorne 1995, 193)

Vallicella (1997) objects to this that it requires bundles of universals to be like single universals in their multiple instantiability (i.e., their ability to exist at many places, possibly grouped with other universals), but: i) It is by no means obvious that what is true of universals is true of bundles of universals (to take this for granted would be an instance of the 'fallacy of composition': for example, atoms are invisible to the naked eye, but human bodies – although they are composed of atoms – certainly aren't!); ii) Indeed, while universals get instantiated, bundles cannot, for they are particulars and particulars – by definition – do not get instantiated; and iii) Even if it were a potentially repeatable entity, a bundle could not possibly get instantiated because, since every bundle is 'complete' (i.e., it is identical to the sum of all the bundled universals it comprises and only those), no bundle can be bundled together with other universals not in the bundle.

This is substantially correct, but there is an easy reply to Vallicella's objection. It goes as follows: it is indeed only universals, not bundles, that get instantiated at different places; but if, say, a universal A can be instantiated at locations x and y at the same time, so can another universal B; and since it can consequently be the case that both universal A and universal B get instantiated at both x and y, the possibility of two indiscernible *and numerically identical* AB-bundles, i.e., objects, is *ipso facto* obtained without anything like the multiple instantiation of a full-blown bundle. In other words, it may be inaccurate to say that bundles get instantiated but, *pace* Vallicella, O'Leary-Hawthorne's account of individuation does not depend on an assumption to that effect.

But how should one *count* multiply-located objects? In a co-authored paper (O'Leary-Hawthorne and Cover 1998), O'Leary-Hawthorne elaborates on his proposal and contends that ordinary people do not count by *strict* metaphysical identity, which correctly counts qualitatively identical universal-instances and bundles only once; but by what one may call *loose* – or *folk* – identity, which takes location as an individuating factor when, strictly speaking, it is not.[2] Since the bundle theorist's claim that PII is necessarily true is only at odds with the latter (less philosophically relevant) way of counting things, O'Leary-Hawthorne concludes, the possibility of indiscernibles doesn't constitute a problem for the bundle theory.

Rodriguez-Pereyra (2004, 75) protests that this account of individuation cannot make

2 This is, clearly, a confirmation of the fact that O'Leary-Hawthorne is assuming the constitutional approach to individuation.

sense of the difference between an object that exists at two places and objects that exist at three, four or more places (a distinction that seems eminently plausible given that one can conceive of Black-type worlds with any number of indiscernibles). O'Leary-Hawthorne and Cover suggest that such a difference is grounded in the different *n*-adicity of distance relations: distance is dyadic in Black's world, tryadic in a world with (what would look like) three qualitatively identical objects all at the same distance from each other, and so on. Rodriguez-Pereyra, however, considers it self-evident that all distance relations with three or more places are derivative on dyadic ones. Demirli (2010), on the other hand, defends O'Leary-Hawthorne and Cover by arguing that the reducibility of more complex distance relations to simpler dyadic ones only appears obvious under the assumption that objects possess primitive identities, an assumption that O'Leary-Hawthorne and Cover do not make and that, Demirli claims, is in fact problematic. Evidently, the issue is quite tangled. Primitive identities and distance relations will be discussed further later: for the moment, let us grant that Rodriguez-Pereyra's criticism is not lethal to O'Leary-Hawthorne's proposal.

Moving on to a different point, it must be noticed that, although O'Leary-Hawthorne's account of individuation within the bundle theory is internally consistent, it creates a non-negligible 'gap' between metaphysics and common sense. This is not to suggest that a theory (philosophical or otherwise) should always seek agreement with common sense: if anything, philosophy and science taught us that we should be ready to give up even the most entrenched commonsense beliefs about things. The point is, rather, that, *ceteris paribus*, a theory that creates a systematic distinction between the commonsense description of the observed phenomena and its proper, correct description should not be preferred to one that does not establish such a distinction. More in general, O'Leary-Hawthorne's proposal rules out in principle worlds (with *numerically distinct* indiscernibles) that would appear perfectly possible. True, such account provides an explanation as to *why* this is the case, i.e., an argument to the effect that certain stipulations only give the impression of making ontological sense. However, it also appears to set a restriction on the domain of the metaphysically possible that one may wish to avoid by endorsing an alternative, equally explanatory, account of individuation (whether such an alternative account exists is, of course, still an open question).[3] And matters are likely to become worse when it comes to properties: does the doubly located sphere inhabiting Black's world really only have, say, unit mass? If so, don't our best available empirical descriptions of the world (most notably, those provided by science) run the risk of being classified as 'folk'? Or should we accept that bundles (can) include contradictory properties, such as 'weighing 1 kg.' and 'weighing 2 kg.'?[4]

In view of the above, it seems fair to say that O'Leary-Hawthorne's strategy for solving

3 Demirli goes as far as to assert that O'Leary-Hawthorne's theory "fails to address the very problem of individuation that has been presented as a challenge to the bundle theory" (Demirli 2010, 4). Of course, though, unless one *assumes* that numerically distinct but indiscernible objects are metaphysically possible, this is too strong. Adams (1979) and, following him, Rodriguez-Pereyra (2004) argue in favour of the metaphysical possibility of Black-like worlds on the basis of the possibility (seemingly accepted by everybody) of worlds containing *quasi*-indiscernibles, i.e., things that are almost indiscernible and only differ in a tiny non-essential respect. But O'Leary-Hawthorne can deny the key premise that this argument rests upon: namely, that there is a continuum with no 'cut-point' from quasi-indiscernibility to full indiscernibility.

4 See Hawley (2009) for more discussion of this point.

the problem of indiscernibility in the context of the bundle theory is not exempt from difficulties.

2. Rodriguez-Pereyra: Objects are Numerically Unique Bundle-Instances

Rodriguez-Pereyra (2004) proposes another account of individuation which, he contends, makes the bundle theory compatible with the existence of numerically distinct but indiscernible objects. Rodriguez-Pereyra's basic idea is the following:

> When a bundle is in a place, there is also another entity there, namely an instance of the bundle. The instance is entirely constituted by the universals of the bundle. But the instance and the bundle are two distinct entities. (Rodriguez-Pereyra 2004, 78)

In more detail, Rodriguez-Pereyra points out that the bundle theory does *not* include a commitment to the principle that identity of constituents entails numerical identity; and that, if such a principle is explicitly rejected, every object turns out to be numerically unique (and uniquely located) independently of which properties are instantiated in the world and how. In particular, two exactly similar objects are constituted by the same instantiated universals, and yet count as two distinct entities. In view of this, says Rodriguez-Pereyra, the bundle theory turns out to be compatible with the possibility of numerically distinct indiscernibles.[5]

Now, Rodriguez-Pereyra's view certainly solves the problem that the bundle theory has with the individuation of indiscernibles. However, it has (at least) two drawbacks.

First, it explicitly assumes that whenever an object exists, there is *both* (see quotation above) a bundle and an instance of that bundle at the relevant space-time location; hence, it leads to an unwelcome duplication of entities.

The bundle theorist may wish to circumvent this difficulty by opting for so-called *moderate realism*. Moderate realism was initially – in the Middle Ages – the thesis that universals exist only in the mind of God, as patterns by which s/he creates particular things. Thomas Aquinas and John of Salisbury were proponents of such a view. According to modern-day moderate realists (see Mertz 1996), instead, every universal-instance possesses two ontological *aspects* – one repeatable and one non-repeatable – at the same time, but these aspects *do not correspond to two genuinely distinct (categories of) entities*. Indeed, if this is the case both individuality – determined by the non-repeatable aspect – and similarity – grounded in the repeatable aspect – are accounted for without the need to postulate a problematic numerical difference between bundles and their instances. However, such postulation of distinct aspects within every property-instance may legitimately be regarded as implausible and *ad hoc*.

Be this as it may, there is a second problem: Rodriguez-Pereyra's account could be said

5 Rodriguez-Pereyra explains that the bundle theory – construed as he presents it – in fact entails the *falsity* of PII.

to betray the very spirit of realism about universals, which essentially consists in the *rejection* of primitive identities for objects. Recall the discussion of individual essences and haecceitates in the introduction. Now, even though Rodriguez-Pereyra doesn't postulate mysterious individuating factors additional to the properties of things, he does attribute unique identities to the latter while, at the same time, leaving such identities unexplained. However, if that instances of bundles are numerically distinct is simply *assumed*, it seems to be tantamount to attributing primitive identities to instances of bundles. And to the extent that Rodriguez-Pereyra is understood as suggesting that the numerical uniqueness of instances of bundles follows from differences in location[6], his account immediately runs into further problems. On the one hand, in the case of Black's universe as well as in any other analogous putative counterexample to PII unambiguous individuation on the basis of spatial location is impossible. On the other hand, even if it were in fact possible, the proposed framework would in any case remain unable to allow for the possibility of co-located but non-materially-coincident objects – a possibility which will be discussed in detail later and that, as we will see, must be taken seriously in the light of contemporary physics.[7]

Given the foregoing, it seems fair to say that, although there are no conclusive arguments against either of them, both O'Leary-Hawthorne's proposal and Rodriguez-Pereyra's have shortcomings, and provide accounts of individuation in the bundle-theoretic setting that cannot be considered entirely satisfactory. The former establishes a distinction between 'strict' and 'folk' counting that may legitimately be deemed unappealing, and seems to have non-negligible problems with the treatment of properties. The latter introduces identities for instances of bundles in a way that is either left unexplained or, at any rate, unable to account for certain scenarios (to be looked at more closely in a moment) where location cannot be used to establish numerical difference.

3. Demirli's (Allegedly) New Proposal Based on Spatial Structure

Demirli (2010) proposes an alternative way of accounting for Black-like worlds from a bundle-theoretic perspective, which he deems superior to both O'Leary-Hawthorne's and Rodriguez-Pereyra's. He claims that the bundle theorist who takes Black-like scenarios seriously *can (and should) give up the constitutional approach to individuation altogether*.[8] In particular, Demirli suggests that the bundle theorist can overcome all problems with Black-like scenarios by *postulating irreducibly polyadic distance relations*

6 For instance, when he says that "*this* instance *here* of the bundle in question is not the same as *that* instance *there* of the same bundle" (Ib.).

7 In connection to this, Demirli (2010) argues that, exactly because it endows instances of bundles with primitive identity, Rodriguez-Pereyra's proposal entails the empty possibility of many identical objects piled up in the same place at the same time, so failing to constitute a credible account of individuation. We will discuss this objection further in the next section, where it will become clear that it does not contradict the claim just made in the main text, and also that it is not compelling. Another objection formulated by Demirli that is worth mentioning is that Rodriguez-Pereyra's version of the bundle theory is entirely equivalent to trope theory. This is not correct: while it is a fundamental tenet of trope theory that property-instances do not derive on anything more fundamental, as there simply are no repeatable entities, Rodriguez-Pereyra never denies that property-instances are instances of universals but 'just' that, if they are, they cannot be numerically unique.

8 It is perhaps worth reminding the reader at this point that the constitutional approach to individuation is not an indispensable element of the bundle theory, which is exclusively concerned with the internal composition of objects; and that, consequently, dispensing with the constitutional approach to individuation, as Demirli does, doesn't entail the abandonment of the bundle theory.

capable of individuating their relata. This means endorsing a *structural* approach to individuation, according to which the distance relations individual objects bear to other objects (i.e., to other 'positions' in the spatial structures they belong to) suffice for individuating them – even in the case in which the objects in question have all the same constituent universals.

In more detail, Demirli accepts that *compresence*, the relation that ties various universals together into bundles (and which he takes to be irreducibly plural and multigrade), may give rise to qualitatively identical bundles. But, he argues, these bundles can be numerically distinct nonetheless, provided that they satisfy the sufficiency criterion for numerical diversity that he calls the 'amended structural diversity thesis'. According to the amended structural diversity thesis:

> If bundles $x_1 \ldots x_n$ are mutually distant under the distance relation R^n, then $x_1 \ldots x_n$ are all mutually diverse (where n is a finite number). (Demirli 2010, 10)

This allegedly enables the structural account of individuation to explain the possibility of indiscernible and numerically distinct individual objects, consequently making sense of Black's thought-experimental scenario without postulating multiply-located objects (*contra* the O'Leary-Hawthorne strategy), but also avoiding primitive (or, at any rate, non-explicitly-accounted-for) identities (*contra* the Rodriguez-Pereyra strategy). Alas, Demirli's proposal is not itself exempt from problems.

3.1. Can Distance Relations Individuate in All Cases?

A first important difficulty is that distance relations may not suffice for numerical distinctness. Demirli correctly argues that the Russellian idea that distance relations presuppose numerical diversity is question-begging. No objection to this. However, Demirli also states (agreeing again with Russell) that nothing can be separated by distance from itself. But, as shown by Hacking's (1975) 're-description' argument against Black-like counterexamples to PII, that distance is an irreflexive relation depends on the topological structure of space. In a non-Euclidean space, Black's world could be interpreted as one with a single object at some distance from itself (O'Leary-Hawthorne again!). The obvious rejoinder is that it is part of Black's thought-experiment that space is Euclidean, that is, that one has zero distance only between an object and itself. This is true, but the important point is another. Namely, that Demirli provides a compelling account of Black's world but not of Hacking's, which represents a well-defined, independent metaphysical possibility. And since a metaphysical account of individuation must (or, at least, had better) be generally valid – that is, its proponents must (or, at least, had better) show that it works for all possible worlds – the foregoing entails that Demirli's theory of individuation is unsatisfactory.[9]

9 One may add a further consideration (suggested by an anonymous referee). Suppose two simple but extended objects exist that are indiscernible and touch each other: since they touch, there is no distance relation that individuates them, and so nothing that tells them apart. Demirli might reply that the centres of mass of the extended simples are at a non-zero distance from each other, but such a reference to the objects' centres would be questionable given the assumed simplicity.

Demirli may respond that there are independent reasons for ruling out those worlds in which the structural diversity thesis doesn't apply; or for preferring the structural view of individuation in spite of the fact that it is only valid for some possible worlds. However, he doesn't offer any argument in support of either of these claims.[10]

3.2. Demirli's Structural Diversity Thesis and Weak Discernibility in Quantum Mechanics

Related to this there is another, more general point. Namely, that Demirli's proposal is not as new as he seems to believe, and even if one modifies it on the basis of possibilities already explored by other authors, it still turns out to be unsuccessful.

To begin with, Demirli's structural account is nothing but (a specific form of) the view that allows for so-called 'weak discernibility' as a source of individuality. According to the latter, two things may have all the same monadic properties and yet be numerically distinct because they partake in an *irreflexive symmetric relation* (basically because, by its very nature, such a relation requires its relata not to be the same object, i.e., cannot hold between an object and itself). This idea, first made explicit by Quine (1976), has been discussed in recent times in the philosophy of mathematics (Ladyman 2005) and of physics (Saunders 2006, Muller and Saunders 2008 and Muller and Seevinck 2009). Not surprisingly, it has found supporters among those sympathetic to an approach to ontology according to which the identities of things are (or, at least, can be) entirely determined by facts that are *extrinsic* to those things. Indeed, if it is not assumed that relations depend on their relata, irreflexive relations may provide an entirely qualitative basis for the identities of the things they relate, even if more 'customary' monadic and relational properties do not and, consequently, individuation becomes completely independent of the intrinsic nature of the things in question. In this context, it is clear that the spatial relations emphasised by Demirli are *just one* specific type among all the relations that could play the role of individuators.

Saunders (2006), for instance, applies the notion of weak discernibility with a view to neutralising Black's counterexample to PII, and does this exactly on the basis of the '...is at a distance from...' relations also employed by Demirli. However, Saunders immediately goes on to explain that *distance relations are insufficient for guaranteeing numerical difference in all cases*; and not just because of fancy thought-experimental scenarios. In particular, unlike in Black-like settings, distance relations cannot do the job in the case of *actual* physical systems such as those constituted by many qualitatively identical quantum particles: for, what would seem to be numerically distinct indiscernible objects in those systems are attributed the same location by the theory.[11] This means that even if one assumes that space has a Euclidean structure (so

10 Notice that the argument just presented does not hinge on whether or not Hacking is actually successful in presenting a physically equivalent re-description of Black's universe (something that is convincingly put into doubt by French 1995), as it only concerns the metaphysical status of distance relations. In personal communication Demirli was happy to assume irreflexivity as a requirement for individuating relations.

11 This is because position is an observable like all the others in (standard) quantum mechanics, and it is possible for it to take the same value (although in probabilistic terms – but probabilities are everything the theory gives us, and

circumventing the difficulties with the dependence of distance relations on the overall spatial architecture of the universe mentioned earlier), Demirli's structural account still fails to be as general as needed – this time, it would seem, because of counterexamples coming from the *actual* world and not just from a philosopher's ingenuity.

An immediate objection might be that in fact the mentioned examples have nothing to do with the actual world. This could be argued for on the basis of a general antirealist stance towards science that we don't need to discuss here, as it conflicts with the metaphysical realism that underlies the entire discussion[12] and, at any rate, makes the considerations in this section simply irrelevant. But it may also follow from a more specific and certainly less negligible worry. The worry is that the philosophical discussion of identity and individuality in quantum mechanics has by and large focused on a theory that may well be 'standard', but doesn't in any way offer a satisfactory account of physical reality – first and foremost because it is unable to solve the infamous 'measurement problem'[13] – and should consequently not be regarded as a true description of the latter. While a detailed discussion of this is outside the scope of the present paper, three brief comments are in order. First, it is true that certain theories/interpretations alternative to the mainstream one (for instance, Bohmian mechanics) may solve the measurement problem – incidentally, these may also remain exempt from problems with indiscernibility (in Bohmian mechanics, for example, particles have unique space-time trajectories); but those theories meet with difficulties of their own, so much so that they are regarded with scepticism by vast sections (the majority?) of the physics community. In view of this, it seems advisable in this case for philosophers to ground their considerations, at least on a first instance, in what scientists themselves regard as the 'standard' theory of the relevant domain (indeed, this appears to be a good way of proceeding in general, but we don't need to argue for this thesis here). Secondly, as it has been made clear in recent work (see, in particular, Muller and Seevinck 2009), the relevant results about discernibility in the quantum realm can also be proved for a 'minimal theory' that is independent of the projection postulate and, consequently, of the measurement problem. Third, the present critique of the structural account of individuation within the bundle theory doesn't *crucially* rest on the relevant examples being actual ones: for, clearly, systems with co-located indiscernibles should in any case be taken into account by any metaphysical theory at least as possibilities (if only to show that they aren't really possibilities after all).

Importantly, this last point allows one to see that it is not an option for Demirli to accept all of the above and restrict his account to middle-sized ordinary objects. For, besides conflicting with the sensible demand that metaphysics be made as continuous with science as possible, such a move would in any case be ineffective against the presented counterexamples, taken as representing possible systems of objects in general and not just systems (be they actual or just possible) of micro-objects. That is to say that the proposed restriction would again affect the generality of Demirli's account.

should *not* be understood merely in terms of ignorance) for more than one system.

12 It is assumed here that metaphysical realism subsumes scientific realism.

13 This is the problem of explaining why we always observe/measure well-defined values for magnitudes that the theory describes as typically 'superposed' – that is, lacking precise values.

For similar reasons, things would not get any better if Demirli allowed for relations other than distance to individuate in the cases in which spatial separation won't do. Because, while some relations might do the job in specific cases (perhaps even in all actual cases[14]), the *possibility* again remains open that *no relation whatsoever* holds that discerns two or more numerically distinct objects. That is, whatever happens to be the case, say, for quantum particles, Demirli's theory of individuation, motivated primarily by the need to account for a possibility exemplified by Black's universe, appears unable to account for another possibility – call it 'Black universe with spatially coincident objects'.

3.3. Co-Located Objects

The foregoing naturally leads us to consider an issue that was only mentioned earlier (see footnote 7 above). Following Demirli, one may take it to be problematic for Rodriguez-Pereyra that his account makes room for the seemingly empty possibility of many exactly similar objects piled up in exactly the same place at the same time (the 'piling scenario'). But it seems to be exactly this seemingly empty possibility that we are now pointing at as a potential counterexample to Demirli's own proposal. Doesn't this mean that there is no problem at all for Demirli here? The answer is 'No' as, upon scrutiny, a rather relevant ambiguity can be found in Demirli's argument that entitles one to say that, while he focuses on a mere pseudo-problem, Demirli himself is in fact unable to account for truly problematic possibilities.

Let us see this in more detail. In formulating his claim that the Rodriguez-Pereyra strategy is unable to deal with the piling scenario, Demirli does not specify that in the original formulation of this objection to primitive identity (Della Rocca 2005) it is explicitly added that the objects piled up *share all the same constituent parts*. But Della Rocca's point is exactly that our intuition tells us that it makes no sense to think that where we see one thing there are in fact *n* indiscernible things all *completely materially coinciding*. The possibility of non-materially-coincident but co-located (indiscernible) things is a rather different one, and in fact one that – as we have seen – makes perfect sense not only conceptually but in view of contemporary physics. No wonder, then, that Della Rocca doesn't centre his argument on the latter possibility, taking instead complete overlap to be a fundamental assumption in his argument!

Indeed, given the distinction just drawn, Demirli's worry with respect to the Rodriguez-Pereyra strategy, turns out to be misplaced: even if instances of bundles possess primitive identities, it doesn't in any obvious way follow that they can have any number of such identities, as it would be demanded by a piling scenario with colocated and materially coincident indiscernibles. On the other hand, the possibility of co-located, non-materialy-coincident indiscernibles is instead a problem for Demirli: for,

14 This is what Saunders, Muller and Seevinck claim: they show that irreducible spin and position/momentum correlations always discern weakly in the quantum domain (they do not say that these correlations individuate, as they prefer to distinguish between absolutely discernible individuals and weakly discernible 'relationals', but this is little more than a terminological choice which is not relevant for our present purposes). For a dissenting voice, see Dieks and Veerstegh (2008).

no individuating relation (of distance or otherwise) being available in the envisaged scenarios, he seems forced to rule out the possibility altogether.

In light of the above, it is legitimate to claim that Demirli's proposal concerning individuation within the bundle theory is not (entirely) new and, at any rate, fails to achieve the level of generality required for any such metaphysical proposal.

4. Concluding Remarks

The result of our discussion seems to be that the bundle theory is simply unable to account for individuation in such a way that all problems with indiscernibility and Black-like scenarios are defused. In particular, Demirli's structural account of individuation for objects conceived of as bundles of universals is unable to solve the problems that it was purported to solve. Insisting on distance relations only, it falls short of providing an explanation of cases in which indiscernible bundles exist at the same place (leaving aside the need for an explanation of why non-zero distance relations *must* be – or, at least, as a contingent matter of fact invariably turn out to be - irreflexive). Allowing for relations of any kind to individuate *might* be a strategy as long as individuation in specific actual domains is concerned; but this option (beside the fact that it has been already considered by other authors, and is currently an object of dispute within the philosophy of science and of physics) is not sufficient at the general level of metaphysical possibility at which Demirli sets (as he should) his own discussion. For, it is at least possible that co-located, numerically distinct (but not materially coincident!) indiscernibles fail to be in any relation whatsoever that is sufficient for their individuation. All things considered, then, it looks as though as far as individuation is concerned the real choice for the bundle theorist is between the O'Leary-Hawthorne strategy and the Rodriguez-Pereyra strategy. The former having quite counterintuitive consequences, it seems that those who want to make sense of Black-type universes without allowing for multiply-located objects must eventually make room for primitive identities along the lines suggested by Rodriguez-Pereyra, perhaps modified (in moderate realist fashion) so as to avoid positing *both* a bundle of universals and a bundle-instance for each object.

As we have seen, the basic source of scepticism towards this sort of suggestion is that it rests on the introduction of the primitive identity that many bundle theorists (certainly including Demirli) are eager to get rid of. But is such an assumption truly a problem? It is not clear why. Most bundle theorists (as well as other philosophers) do not like primitive identity because it looks mysterious to them and, they claim, everything (individuation, similarity facts etc.) can be accounted for on the basis of qualities only, and so there is no need for such a puzzling factor. More specifically, bundle theorists deny that objects have their identities primitively, and analyse instead those identities in terms of the objects' qualitative features. But, notice, bundle theorists must admit primitive, non-further-analysable identities at least for these qualitative features, i.e., for universals! Hence, they cannot get rid of primitive identities completely. The sensible question consequently arises whether such identities couldn't (or, perhaps, shouldn't) be allowed for property-instances too, at least as long as this brings with itself a clear

explanatory gain without compromising the overall consistency and plausibility of the view. Indeed, as we have seen, individuation does represent a problem for the bundle theorist, especially if s/he is not willing to just ban Black-type universes from the realm of the possible and/or is not ready to radically depart from common sense. And such a problem is certainly solved (without departing from common sense, duplicating entities and/or making individuation an entirely extrinsic matter – all choices that many would regard as unwelcome) once one acknowledges primitive identities for property-instances.

On the other hand, as for the overall consistency and plausibility of the view, the question remains whether endowing property-instances with primitive identities truly is in the spirit of the bundle theory. Indeed, we believe that it is not, and that there are good reasons for switching to nominalism. These reasons have to do with economy and simplicity, but also with the fact that universals as peculiar repeatable entities are expressly introduced with a view to solving certain problems that, all things considered, are left at least partly unsolved.[15] However, any personal preference is immaterial for the arguments put forward in this paper, which only aimed to provide an objective critical assessment of what bundle theorists can (and did) say about the question of individuation and indiscernibility.[16], [17]

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15 In particular, the common claim that the bundle theory should be preferred to the alternative accounts because it does away with bare particulars while also naturally and straightforwardly accounting for similarity facts is at least questionable given the difficulties that the theory encounters in explaining partial similarities (see, for instance, Gibb (2007), Eddon (2007) and Morganti (forthcoming)).

16 An option that remains open to the bundle theorist is to construe the view in such a way that states of affairs, not objects, are constituted by compresent universals. This would allow them to account for Black-like universes by simply taking them as wholes that can be completely characterised in qualitative terms, without the need to account for the individuality of specific parts of that whole. This strategy, pursued by Dasgupta (2009), requires a shift of ontological focus away from objects that is certainly non-trivial and calls for careful discussion. At any rate, the critical assessment of this proposal constitutes material for another paper.

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