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Armstrong's Conception of Supervenience

1. Introduction

In this article, I will focus on the notion of *supervenience* introduced and deployed by Armstrong. The aim is to settle the issue of whether it has any fruitful applications. My conclusions are negative. Armstrong gives to his notion of supervenience a major explanatory role of telling why one need not consider certain beings as a genuine ontic expansion, if one already assumes a certain meagre set of more basic entities. On closer inspection, however, Armstrong's notion does not clarify such intuitions any further. The *legitimate uses* of the notion for the above purpose turn out to be redundant: the concepts of *identity* and *partial identity* can be employed instead.

Armstrong, who does not restrict the scope of the definition of supervenience in any manner (e.g., to properties or characteristics of entities), defines supervenience in the following way (Armstrong 1997, 11):

> DEFINITION 1. Entity *A* supervenes on entity *B* if and only if, a) It is possible that *B* exists, b) Necessarily, if *B* exists then *A* exists.

Let "E!" be the predicate of singular existence: "E!e" = e exists. Definition 1 can be expressed in the idiom of modal predicate logic as follows.

> [SUP1]: (e_2 supervenes on e_1) = ($\Diamond E!e_1 \,\&\, \Box\,(E!e_1 \rightarrow E!e_2)$)

If the "subvenient base" consists of two entities, it is possible to write:

> [SUP2]: (e_2 supervenes on e_1 and e_3) = ($\Diamond(E!e_1 \,\&\, E!e_3) \,\&\, \Box\,((E!e_1 \,\&\, E!e_3) \rightarrow E!e_2)$)

Similarly, we can easily generalise Armstrong's notion to apply to cases in which the subvenient base consists of any finite number n of entities.

Armstrong's notion of supervenience, unlike the standard concepts, applies to *entity tokens* instead of *entity types*.[1] In other words, both *supervenient* and *subvenient* items are assumed to be certain definite entities, not entities belonging to some kind. However, they can be entities of any category – they are not restricted, e.g., to *properties of entities*. Just like the other theorists employing some notion of supervenience, Armstrong assumes that, in many cases, the supervenient entities are *less fundamental* than the subvenient ones. This conviction is stated by the *Doctrine of Ontological Free Lunch* as follows:

> It will be used as a premiss in this work that whatever supervenes or, as we can also say, is entailed or necessitated, in this way, is not something ontologically additional to the subvenient, or necessitating, entity or entities. What supervenes is no addition of being (Armstrong 1997, 12).

The *Doctrine of Ontological Free Lunch* must rely on one important assumption. Consider entity e_2 supervening on entity e_1. Let us stipulate that two distinct entities are *wholly distinct* if and only if they are mereologically disjoint, i.e., they do not have common parts (cf. Armstrong 1997, 18). According to the *Doctrine of Ontological Free Lunch*, e_2 is no ontological addition to e_1. Consequently, e_2 cannot be mereologically disjoint from e_1 either. For if e_2 were wholly distinct from e_1, e_2 would be an entity additional to e_1 whose existence is entailed by the existence of e_1. It would be a genuine addition of being. Such genuine ontological additions are, e.g., the property bearing substances or substrata assumed by many theorists in relation to the property tropes functioning as their individual accidents (cf. Martin 1980; Smith 1997; Molnar 2003).

The crucial assumption that must be made by any advocate of the *Doctrine of Ontological Free Lunch* is explicitly stated by Armstrong in his *A Combinatorial Theory of Possibility* (Armstrong 1989b, 116; cf. also Armstrong 1997, 18):

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[1] See Savellos & Yalçin (1995) for a brief presentation of the standard notions of supervenience employed in recent discussion.

> *The Distinct-Existences Principle*: If A and B are wholly distinct existences, then it is possible for A to exist while no part of B does (and vice versa).

Thus, the existence of a given entity *e* cannot entail the existence of any entity *f* wholly distinct from *e*. We can suppose, as does Armstrong, that all entities exist contingently. Thus, no entity can be *weakly rigidly dependent* on any wholly distinct entity.[2] Therefore, individual accidents of substances must be rejected.

Hence, the *Doctrine of Ontological Free Lunch* presupposes that any entity *e* can exist without being accompanied by a wholly distinct entity *f*.[3] No definite entity *f* that must exist, if *e* exists, can be wholly distinct from *e*. Consequently, if *f* supervenes on *e*, *f* is not wholly distinct from *e* either. This leads to very clear-cut cases of supervenience taken up in the next section.

2. Identities and partial identities

According to Armstrong, if two entities *e* and *f* share a common part, they are *partially identical to each other*. Intuitively, the more common parts *e* and *f* share, the closer is their identity. In a limiting case, *e* and *f* have all of their parts in common and are identical to each other (Armstrong 1997, 17–18). This talk about "partial identities" presupposes that two mereological assumptions are accepted. First, that any two complex entities sharing their proper parts are identical (*mereological extensionality*).[4] Second, that if entity *e* has entity *f* as its proper part, the existence of *e* entails that *f* is a proper part of *e* (the *necessity of parthood*). *Mereological extensionality* is assumed by the *classical extensional mereologies*, *CEM*, for short (Simons 1987; Varzi 2003). If modality is taken into consideration, the advocates of extensional mereologies usually endorse the *necessity of parthood*.

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[2] Following Simons (1987, 295), weak rigid dependence between entities *e* and *f*, WRD(e, f), can be defined as follows: WRD (e, f) ≡ ¬(□ E!f) & □ ((E!e → E!f) & ¬(e = f)).

[3] Nevertheless, it might be that *e* as an entity of kind K must be accompanied by *some* wholly distinct entity of some definite kind. Then, *e* is *generically dependent* (cf. Simons 1987, 297) on that kind of entity.

[4] Cf. Simons (1987, 112) for the mereological principles leading to mereological extensionality.

Armstrong's conception of mereology is somewhat idiosyncratic. Officially, he claims that the principles of *CEM* apply to all entities in relation to their aggregates. Thus, e.g., any two entities *e* and *f* of whatever category have a mereological sum, which is called "the aggregate of *e* and *f*" by Armstrong (1997, 13). In practice, however, the principles of *CEM* are satisfied only by (first-order) particulars. Thus, any aggregate of *particulars* forms a further *particular* and two *particulars* having the same proper parts are identical (Armstrong 1997, 111–112). By contrast, e.g., the aggregate of two-place relation universal *R* and particulars *a* and *b* can constitute two distinct states of affairs, *Rab* and *Rba*. The existence of parts does not guarantee the existence of the respective states of affairs (Armstrong 1997, sec. 8.2).

According to Armstrong (1997, 122), *states of affairs* have a "non-mereological mode of composition". Nevertheless, in practice, it is weaker mereological principles than those of *CEM* that regulate the composition of these entities from their constituents. It is easy to check that states of affairs satisfy all principles of Simons's (1987, 362) *Minimal Mereology* in relation to their constituents. Moreover, given that certain states of affairs or complex properties (cf. below) exist, they satisfy the *necessity of parthood*.

As a result, in Armstrong's *factualist* metaphysics, we have one clear case of *Armstrongian supervenience*: the proper parts (or constituents) of given entity *e* (of whatever category) supervene on *e*. All constituents are necessary to *e* and they are no ontological addition to *e*. If entity *e* is a *particular*, *e* supervenes on its proper parts. Hence, if we restrict ourselves to particulars, all parts supervene on the wholes constituted by them, and *vice versa*. *Symmetrical supervenience* yields identity (Armstrong 1989b, 112; 1997, 12). By contrast, in the case of primitive states of affairs, parts supervene on wholes, but not *vice versa*. There is no such thing as partial identity having identity as its limiting case.

In sum, it is possible to find three incontestable cases of supervenience in Armstrong's ontology. First, proper parts supervene on the entities constituted by them. Second, also the particulars formed by any particulars supervene on their proper parts. Third, any entity supervenes on itself by being self-identical.

3. Further "free lunches"

In addition to the superveniences mentioned in the previous section, Armstrong claims that there are further ontological free lunches. I am confined to mentioning only some of the most important:

Grounded internal relations. Assume that particular *a* instantiates property P_1 and that particular *b* instantiates property P_2. Moreover, the existence of these states of affairs entails that grounded internal relation *R* connects *a* and *b*. According to Armstrong, state of affairs *Rab* supervenes on P_1a and P_2b. Thus, Armstrong claims that grounded internal relations and the respective states of affairs are no ontological addition to their bases.[5]

Strict internal relations. Necessarily, if two entities *e* and *f* exist, they are connected by strict (or ungrounded) internal relation *R*. According to Armstrong, the instantiation of *R* by *e* and *f* supervenes on entities *e* and *f*. Moreover, Armstrong claims that internal relation *R* is no ontological addition to *e* and *f*.[6]

Conjunctive states of affairs. Given that any two primitive states of affairs *A* and *B* exist, conjunctive state of affairs *A* & *B* exists. According to Armstrong, *A* & *B* supervenes on *A* and *B*. Armstrong claims that conjunctive states of affairs are no ontological addition to the primitive ones (Armstrong 1989b, 111–112; 1997, 122–123).

Conjunctive and structural properties. According to Armstrong, conjunctive and structural properties are obtained as abstractions from conjunctive states of affairs. For instance, state of affairs *Pa* & *Rb* contains structural property *Px* & *Ry* instantiated by particular *a* + *b*. According to Armstrong, conjunctive and structural properties supervene on the (more) primitive properties and/or relations

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[5] Armstrong (1989b, 105; 1997, 89). According to Armstrong (1989b, 105), "objects having certain properties are *internally* related by relation R if and only if, in each possible world which contains these objects, and where they have these properties, the objects are related by the relation R." Armstrong's cited characterisation of "internal relations" and his similar definitions in (Armstrong 1989a, 43) and in (Armstrong 1997, 87) are designed to cover both grounded and ungrounded internal relations. For the sake of clarity, I distinguish between these two cases.

[6] Armstrong (1989b, 105–109; 1997, 12, 89–90). However, Armstrong (1997, 90) wonders whether the strict internal relations introduced by some ontologists are "ontologically costless superveniences".

> instantiated by particulars. Armstrong claims that conjunctive and structural properties are no ontological addition to the latter entities (Armstrong 1989b, 113).

Armstrong maintains that all these items or "free lunches" are *entities* that supervene on more basic entities. According to Armstrong, they are no addition of being relative to the more basic entities. However, it is problematic whether these alleged entities can be introduced without violating *The Distinct-Existences Principle*.

Let us start with conjunctive states of affairs, which will turn out to be *the least problematic* from this perspective. Armstrong maintains that primitive states of affairs form conjunctive states of affairs in accordance with the principles of *CEM*. According to Armstrong, conjunctive states of affairs supervene on their conjuncts and *vice versa*. The *symmetrical supervenience* between conjunctive states of affairs and their conjuncts yields identity (Armstrong 1997, 122–123).

However, the exact ontological status of "*conjunctive states of affairs*" is not transparent. Are they bare aggregates of primitive states of affairs? Or are they something else? There are two basic alternatives. According to the first alternative advocated by Gustav Bergmann (1967, 36), conjunction is a genuine ontological tie that binds primitive states of affairs (facts) to conjunctive states of affairs (facts). According to the second alternative, conjunctive states of affairs can be considered as mere aggregates of their conjuncts. We need not postulate any such further entity as the tie of conjunction. It *seems* that Armstrong opts for the second alternative, he seems to identify "conjunctive states of affairs" to the aggregates of the more basic states of affairs (cf. Armstrong 1997, 122). If we choose the second alternative, it is clarifying to speak about *aggregates of primitive states of affairs* that form complex states of affairs instead of "conjunctive states of affairs". As a logical constant the *conjunction symbol* does not refer to any ontological tie that connects distinct entities.

It is important to recognise that the conjunctive states of affairs considered in accordance with the first alternative are a *genuine ontological addition* to primitive states of affairs. Their existence is entailed by the existence of their constituent states of affairs. Nevertheless, they contain a constituent (i.e., the ontological tie of conjunction) that is wholly distinct from the primitive states of affairs bound together. The postulation of such a further tie violates *The Distinct-Existences Principle*:

the tie is *a further constituent of reality* whose existence is entailed by the existence of the primitive states of affairs. Since the conjunctive states of affairs of the first kind contain the tie of conjunction as their further constituent, they constitute a genuine ontic addition to primitive states of affairs.[7]

If *conjunctive and structural properties* are abstractions from the conjunctive states of affairs considered in accordance with the second alternative, they are no addition of being in relation to the primitive states of affairs. As a consequence, they are mere aggregates of their constituent properties and/or relations. Each aggregate of instantiated properties and relations is identified to a complex (a conjunctive or a structural) property.

By contrast, *strict* and *grounded internal relations* are very problematic from the present perspective. Let us assume, as does Armstrong (1997, 12, 87–90), that internal relations are *supervenient entities*. Thus, as *entities* they are genuine constituents of the world. They cannot be identified to their subvenient bases. For instance, *grounded internal relations* do not contain the properties grounding them as their proper or improper parts. *Grounded internal relations* are not proper parts of the properties that ground them either. Thus, *grounded internal relations* are wholly distinct from the properties at issue. Similar claims apply to *strict internal relations* and to the entities connected by *strict internal relations*. As a consequence, *both strict* and *grounded internal relations* are entities wholly distinct from their subvenient bases.

Hence, Armstrong's contention that internal relations are *supervenient entities* contradicts both the *Distinct-Existences Principle* and the *Doctrine of Ontological Free Lunch*. The existence of two entities *a* and *b* entails that a strict internal relation *R* connecting *a* and *b* exists. *R* is an entity wholly distinct from *a* and *b*, which contradicts the *Distinct-Existences Principle*. At the same time, *R* is a genuine ontological addition to *a* and *b*, *because R* is wholly distinct from *a* and *b*. Similar claims are true of grounded internal relations. It is inconsistent to maintain that internal relations considered as supervenient entities are no ontological addition to their bases:

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[7] According to Bergmann (1967, 9), "[a] collection of entities is as such not itself an entity." Thus, a collection of primitive facts is not a complex fact. In order to obtain a complex fact, we need to assume an ontological tie that binds the primitive facts to a complex fact.

> His [Armstrong's, *my addition*] doctrine of supervenience is bound up with the following incoherent claim about supervenient entities: "ontologically, they are no addition to the universe" (Armstrong 1989b, 114). Since supervenient entities exist and are not identical to the entities upon which they supervene, they *must* be an ontological addition (Oliver 1996, 31, fn. 30).

Oliver exaggerates: the supervenient proper parts of entity *e* are no ontological addition to *e*. The complex entities identified to the aggregates of their parts are identical to their parts and no ontological addition either. However, Oliver's claim is correct, if we restrict the claim as follows: it is inconsistent to consider supervenient entities *wholly distinct* from their subvenient bases as "ontological free lunch". The supervenient entities that have entities *wholly distinct* from their subvenient bases as their (necessary) parts cannot be "ontological free lunches" either.

The "second-class properties" mentioned by Armstrong (1997, sec. 3.9) form a further difficult case of supervenience:

> *Second-class Properties*. According to Armstrong, there are properties of particulars that are not universals. Particulars have them contingently. Armstrong calls them "second-class properties". If particular *a* instantiates second-class property *P*, second-class state of affairs *Pa* supervenes on some first-class states of affairs, i.e., the instantiations of genuine property universals. Thus, according to Armstrong, the second-class properties and states of affairs are no ontological addition to the first- class properties and states affairs.

Armstrong does not convey to us any clear idea of second-class properties. He assumes that both conjunctive and structural properties are genuine property universals. Therefore, they cannot be second-class properties. What Armstrong seems to have in mind are the manifest properties of macro-objects not reducible to genuine property universals. Some of these manifest properties can turn out to be "disjunctive or negative properties" formed by the more basic properties (Armstrong 1997, sec. 3.9).

However, the second-class properties characterised in this way are either *entities* wholly distinct from the genuine property universals *or* they contain some constituents that are wholly distinct from their subvenient bases. First, we must assume the *ontological tie of disjunction* to

obtain disjunctive properties from property universals. Assume that "conjunctive properties" are aggregates of their constituent properties, constituents of the complex states of affairs obtained as aggregates of primitive states of affairs. Because "disjunctive states of affairs" are entities distinct from these conjunctive states of affairs, we must introduce the "tie of disjunction" (or a similar entity) to form disjunctive states of affairs in which disjunctive properties occur. Thus, we must assume the tie of disjunction to construct disjunctive properties. Second, there might be second-class properties not reducible to any kind of complexes of first-class properties and something else. Such second-class properties are entities wholly distinct from their subvenient bases. *Pace* Armstrong, all second-class properties and states of affairs are a genuine ontic addition to the first-class beings. The (alleged) fact that the second-class properties are second-class beings does not deprive them from their ontological status as constituents of the world. Since second-class beings are entities, they have some character as *further existents*.[8]

Similarly, Armstrong (1997, sec. 3.9) claims that strict and grounded internal relations (thought as entities) have an ontological status of a secondary existent: the first are third-class and the second are second-class relations.[9] Still, they are separate constituents of reality. They are no "*ontological free lunches* or *pseudo-additions*", since they are *genuine additions* to their subvenient bases.[10] Hence, Armstrong's attempts at applying the *Doctrine of Ontological Free Lunch* to internal relations or second-class properties are doomed to fail.

4. Conclusion

We have identified the precise reason why all complex particulars and all constituents of entities are legitimate cases of supervenience in Armstrong's ontology: their introduction does not contradict the *Distinct-Existences Principle*. If complex properties and states of affairs can be introduced without violating that principle, they qualify as further "ontological free lunches".

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[8] See also Tim De Mey's contribution in this volume.
[9] Williams (1963) also uses the term "second-class entity" for internal relations.
[10] Cf. also Simons's (2005, sec. 6) criticism of Campbell (1990, 37).

By contrast, Armstrong's conception of internal relations and second-class properties as supervenient entities contradicts the *Distinct-Existences Principle*. Thus, we must either reject the principle or the claim that "internal relations" or "second-class properties" are entities of any kind. Assume the *necessity of parthood*. If we introduce supervenient beings that contain entities wholly distinct from the subvenient entities as their proper or improper parts, we also introduce *rigid dependencies between wholly distinct entities*. Such dependencies violate the *Distinct-Existences Principle*. If the *Distinct-Existences Principle* does not obtain, the *Doctrine of Ontological Free Lunch* must be rejected.

Armstrongian superveniences do not lead to any increase of being, if both the *Distinct-Existences Principle* and the *necessity of parthood* hold. All "supervenient entities" turn out to be proper parts of the first-class beings or identical to the aggregates of the first-class entities. All talk about "superveniences" can be replaced with the talk about identities between entities or part-whole relations (Armstrong's partial identities) between distinct entities. As a consequence, the legitimate uses of the notion are redundant.[11]

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