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Non-Symmetrical Relations, O-Roles, and Modes

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Abstract I examine and discuss in this paper Orilia's theory of external, non-symmetrical relations, that is based on ontological roles (O-Roles). I explore several attempts to interpret O-Roles from an ontological viewpoint and I reject them because of two problems concerning the status of asymmetrical relations (to be distinguished from non-symmetrical relations simpliciter) and of exemplification as an external, non-symmetrical relation. Finally, following Heil's and Lowe's characterization of modes as particular properties that ontologically depend on their "bearers", I introduce relational modes in order to define a new solution to the problems of the ontological status of both external, non-symmetrical relations and O-Roles. I also deal with five objections raised by Fraser MacBride against relational modes and O-Roles and I elaborate an analysis of the relations of being to the left of and being to the right of.

I shall examine in this paper Francesco Orilia (2011)'s and (2014)'s theory of external, non-symmetrical relations. This theory is based on ontological roles (O-Roles) associated with their *relata*. At first, I shall clarify what we mean by "external, non-symmetrical relations" and explain the major ontological problems connected with external relations: the problem of relational order in external, non-symmetrical relations; the problem of the lack of relational order in external, symmetrical relations; and the problem of converse relations (§1). Secondly, I shall introduce Orilia's theory and some ontological interpretations of it (§2). Afterwards, I shall suggest two different and seemingly plausible views of O-Roles that are nevertheless affected by two problems, concerning the status of asymmetrical relations (to be partly distinguished from non-symmetrical ones) and of exemplification as an external, non-symmetrical relation (§3). I shall defend the idea that, in order to overcome such problems and a more general

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foundational infinite regress problem, one could see both O-Roles and external relations as modes, i.e., as particular properties which ontologically depend on substances (or on other particulars). More precisely, I shall argue that non-symmetrical (and symmetrical) external relations are relational modes whose *relata* are other modes and that such latter modes are particulars' performing certain O-Roles (§4). Finally, I shall argue that this solution overcomes some objections presented by Fraser MacBride against relational tropes and against O-Roles. In particular, I shall elaborate an account of spatial relations such as *being to the left of* and *being to the right of* (§5).

1 External Relations

Relations are the ontological counterparts of relational predicates such as "loves" in

(1)   Romeo loves Juliet.

According to many ontologists, (1) is true in virtue of Romeo's and Juliet's standing in the relation of *loving*.[1] Relations have a certain number of *relata*: at least two—otherwise, they might turn out to be identical with so-called monadic properties, i.e., properties such as *being a man*, which seemingly participates in grounding the truth of

(2)   Romeo is a man.

Relations should be also distinguished from corresponding relational properties, i.e., from monadic properties which are exemplified by the *relata* whenever they stand in those relations. For example, the relation of *loving* should be distinguished from the relational property of *being loved by Romeo*, which is exemplified by Juliet whenever (1) is true. Following B. Russell (1903, 1913) and G. E. Moore (1919), I assume that relational properties are less ontologically fundamental than the corresponding relations: it is only because Romeo and Juliet stand in the relation of *loving* that Juliet exemplifies the relational property of *being loved by Romeo*. Anyway, as we shall see, not all the ontologists accept this thesis.

Internal relations are those relations that either wholly ontologically depend, for their connecting their *relata*, on their *relata*'s existence and/or on their *relata*'s essences and/ or on their *relata*'s intrinsic properties.[2] The relation of *being taller than* in

(3)   Romeo is taller than Juliet,

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[1] I shall use *italic* fonts in order to individuate properties and relations in the text.
[2] Here, I take whole ontological dependence as a relation between entities or sorts of entities, which *can* be reduced to other relations (e.g., supervenience, realization, etc.), even if we could also take it as a primitive, irreducible relation. See more on whole ontological dependence in Section 4. Moreover, I assume that there is a distinction between intrinsic and extrinsic properties, i.e., between the properties that something has regardless of other things and the properties that it has (also or only) in virtue of its being related with other things.

is an internal relation, since it wholly ontologically depends, for its connecting Romeo and Juliet, on Romeo's and Juliet's heights, i.e., on two seemingly intrinsic properties exemplified by Romeo and Juliet.

On the other hand, the relation of *loving* in the truthmaker of (1) is an external relation, since it is not internal: it neither wholly depends, for its connecting Romeo and Juliet, on Romeo's and/or Juliet's existence, nor on Romeo's and/or Juliet's essence, nor on Romeo's and/or Juliet's intrinsic properties. This does not exclude that it *also but not wholly* ontologically depends on some intrinsic properties exemplified by Romeo and/or Juliet: for example, on Romeo's exemplifying the property of *being rational*, to the extent that being rational is a necessary condition for loving someone. Yet, I shall refine this distinction in Section 4.

It is commonly held that external relations can be symmetrical, non-symmetrical, and asymmetrical. Such distinctions might be introduced for internal relations too, even if I shall mostly focus here on external relations. The relation of *being near* involved in the truthmaker of

(4)   Romeo is near Juliet

is a symmetrical relation. Let me restrict my investigation to dyadic relations (relations with two *relata*) for the sake of simplicity. A dyadic relation such as *being near*, connecting *relata* a and b, is symmetrical iff it is metaphysically necessary[3] that a is near b iff b is near a. In other terms, whenever you have that a is near b, you also have that b is near a, either because a's being near b and b's being near a are the same entity or because they coexist by metaphysical necessity. On the other hand, a relation such as *loving* in the truthmaker of (1) is a non-symmetrical relation: unfortunately, it could be the case that Romeo loves Juliet, even if

(5)   Juliet does not love Romeo.

A dyadic relation such as *loving*, connecting *relata* a and b, is non-symmetrical iff it is *not* metaphysically necessary that a loves b iff b loves a. This means that the truth of (1) is compatible both with the truth of (5) and with the truth of

(6)   Juliet loves Romeo,

even if the truth of (5) is obviously incompatible with the truth of (6). If there are non-symmetrical relations such as the relation of *loving*, then it *cannot* be the case that a's loving b is the same entity as b's loving a and it is *not* metaphysically necessary that such entities coexist. Finally, a dyadic relation such as *being under* between *relata* a and b is asymmetrical iff it is metaphysically necessary that, if a is under b, then it is not the case that b is under a, and, if b is under a, then it is not the case that a is under b. This implies that a's being under b and b's being under a cannot coexist.

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[3] Such a metaphysical necessity is grounded on the nature of the relation involved. Anyway, if one aims at claiming that *being symmetrical*, *non-symmetrical*, and *asymmetrical* are contingent, non-necessary features of relations, s/he can use weaker modal operators.

There are three problems connected with external relations. First, what makes it the case that non-symmetrical external relations seemingly have a certain relational order, so that it is *not* metaphysically necessary that the truth of (1) implies the truth of (5)? This is the problem of relational order in non-symmetrical relations (PRO). Secondly, why do symmetrical relations seemingly lack relational order, so that it is metaphysically necessary that the truth of (4) implies that Juliet is near Romeo? This is the problem of the lack of relational order in symmetrical relations (PLRO). Dealing with these problems implies grounding the distinction between non-symmetrical and symmetrical relations.

Finally, there is the problem of converse relations (PCR). The converse relation of *loving* is *being loved*. The converse relation of *being under* is *being on*. It is metaphysically necessary that, whenever Romeo loves Juliet, Juliet is loved by Romeo. Yet, *loving* and *being loved* seemingly are distinct relations. Thus, are Romeo's loving Juliet and Juliet's being loved by Romeo different relational facts or are they the same fact? I shall primarily concentrate here on the (PRO) and the (PLRO), since a good solution to these problems might also ground a good solution to the (PCR).

Accepting O-Roles, I shall give a solution to these problems based on the idea that O-Roles—whenever they are performed by substances in external relations—are modes (i.e., particular properties ontologically depending on other particulars) and that external relations are relational modes between them (i.e., relational modes ontologically depending on those O-Role modes).

Several other solutions have been given to the ontological problems of external relations. For example, Bertrand Russell (1903) distinguishes directions or senses in external relations: the direction in the truthmaker of (1) goes from Romeo to Juliet (direction-1), while the direction in the truthmaker of (6) goes from Juliet to Romeo (direction-2). Since the relation of *loving* can be characterized by both direction-1 and direction-2, but having direction-1 does not imply having direction-2 (and vice versa), the truth of (1) does not imply the truth of (6) (and vice versa). A consequence of Russell's solution consists in accepting that the relation of *loving* in the truthmaker of (1), i.e., *loving-1*, is different from the relation of *loving* in the truthmaker of (6), i.e., *loving-2*., since *loving-1* and *loving-2* have different directions that are somehow essential to them.

Fraser MacBride (2007, 2014) defends a primitivist solution to the (PRO): roughly, it is a primitive fact of the universe that (1) does not imply the truth of (6), and vice versa, or it is a primitive feature of *loving* that Romeo's loving Juliet does not imply Juliet's loving Romeo, and vice versa. Nothing has to be explained. On the other hand, Kit Fine (2000) suggests a solution based on the notion of *co-mannered completion* by relations. I shall not explore these solutions, because I do not aim at analyzing and criticizing them here.

An interesting solution to the (PRO) is advocated by positionalists (e.g., Russell (1913) and Hochberg (1987)). According to positionalism, non-symmetrical relations have different positions associated with the "places" that can be occupied by the *relata*. For example, *loving* has two different positions: let me call them position-1 and position-2. If (1) is true, Romeo occupies position-1 and Juliet occupies position-2. On the other hand, if (6) is true, Juliet occupies position-1 and Romeo occupies position-2. Since different ways of occupying positions are involved, Romeo's loving Juliet is different from Juliet's loving Romeo. Many problems surround positionalism. The first problem concerns the distinction between positions: how are positions distinguished from one another? Is the distinction between positions arbitrary? If there is a distinction between positions, what grounds that distinction? Of course, you could

accept positionalism and claim that the distinction between positions is a primitive one. However, in this case, the advantages of being a primitivist about positions over being a primitivist about non-symmetrical relations would not be clear.

Secondly, do we have the same positions in different non-symmetrical relations or not? Thirdly, are there different positions in symmetrical relations too? If symmetrical relations do not have different positions, the (PRO) is still not solved—and the (PLRO) either. In fact, one could reformulate both problems as follows: why do non-symmetrical relations have different positions? And why do not symmetrical relations have different positions? On the other hand, if symmetrical relations have different positions, then it is still not clear why Romeo's being in position-1 with respect to *loving* and Juliet's being in position-2 with respect to *loving* do *not* imply Juliet's being in position-1 with respect to *loving* and Romeo's being in position-2 with respect to *loving* (and vice versa), whereas Romeo's being in position-1 with respect to *being near* (a symmetrical relation) and Juliet's being in position-2 with respect to *being near* imply Juliet's being in position-1 with respect to *being near* and Romeo's being in position-2 with respect to *being near* (and vice versa). This amounts again to the (PRO)'s and the (PLRO)'s remaining unsolved. Moreover, in the latter case, either position-1 or position-2 turns out to be identical, so that they are not distinct positions, or they can be occupied by different *relata* at one and the same time.

Finally: what are positions? Are they further relations between *relata* and the relation itself? Are they properties of the relation or of the *relata* whenever they stand in the relation?

2 O-Roles and Their Ontology

O-Roles (or Onto-Thematic Roles) represent an improvement of positionalism. According to Orilia (2011), O-Roles are different roles that a *relatum* could perform within a relation. O-Roles are the ontological counterparts of the thematic roles with which noun phrases occur in sentences—as they are postulated by linguists. For example, in the truthmaker of (1), Romeo performs the O-Role *agent* within the *loving* relation with Juliet, while Juliet performs the O-Role *patient* within that relation with Romeo.[4] O-Roles can be individuated by studying different sorts of relations in the universe. Moreover, they are repeatable: several relations are characterized by the same O-Role(s) (e.g., *agent* could characterize both the *loving* and the *kicking* relations), and one and the same relation could be characterized by different places with the same O-Role(s). Symmetrical relations are seemingly characterized by the same O-Roles occurring more than once: in *being near*, Romeo and Juliet seemingly occupy the same O-Role (*theme*, at least following Orilia (2014)), so that there is no difference between Romeo's being near Juliet and Juliet's being near Romeo.

Many problems connected with positionalism are solved by O-Roles. In fact, the distinction between different places occupied by the *relata* of a non-symmetrical relation is not arbitrary, but it is grounded on the distinction between different O-Roles—or O-Roles are identical with those places themselves. Secondly, we have the same O-Roles in different, non-symmetrical relations. Thirdly, O-Roles characterize symmetrical relations too. Yet, a non-symmetrical relation has different O-Roles associated with it, while a symmetrical relation has different places but the same O-

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[4] I adopt the convention of isolating the names of O-Roles within two "*".

Role for each place. Thus, the relation of *being near* has two places, which are nevertheless characterized by one and the same O-Role (e.g., the O-role *theme*). This seemingly answers the (PRO) and the (PLRO): the number of O-Roles grounds the distinction between non-symmetrical and symmetrical relations.

Two questions remain open. The first question is: how many O-Roles are we allowed to find in the universe? The second question is: what are O-Roles? Trying to answer the first question, Orilia (2014) identifies several different O-Roles: for example, *agent*, *patient*, *beneficiary*, *instrument*, *theme*, *location*, etc. I am not concerned here with this issue. What I wish to investigate is the ontological status of O-Roles, i.e., the answer to the second question.

At first sight, one could think of O-Roles as features of places within the relation. Yet, what are features and places? This solution relies on there being such entities in the universe. Thus, (1) is made true by the fact that the *loving* relation has two places, that such places respectively have the O-Role *agent* and *patient* as their properties and that Romeo occupies the place which exemplifies the O-Role *agent*, while Juliet occupies the place which exemplifies the O-Role *patient*. However, is the link between each place and the *loving* relation a further relation? Is it characterized by further O-Roles? And what about the link between Romeo and his place and Juliet and her place and the exemplification link which seemingly connects each O-Role and each place? Are they relations too? Such complications cannot be easily overcome.

A second option is available if we take O-Roles as relations linking unordered complexes, such as the one constituted by Romeo, Juliet and the *loving* relation,[5] and each *relatum*.[6] Thus, following (1), Romeo stands in the *agent*-relation to the unordered complex constituted by Romeo, Juliet, and the *loving* relation. Yet, unordered complexes are mysterious entities. Moreover, if the *agent*-relation is an external, non-symmetrical relation, as it seems to be, then one should accept that (i) in principle, there exist unordered complexes in the universe which stand in no O-Role relation and (ii) O-Role relations have O-Roles too. This introduces an interesting infinite regress: the O-Roles of O-Role relations are further external, non-symmetrical relations, so that they need further O-Role relations too, and so on, *ad infinitum*. This infinite regress is foundational, at least if we maintain that facts or truths about *relata*'s standing in external, non-symmetrical relations are grounded—also or wholly—on facts or truths about *relata*'s performing certain O-Roles in those relations. On the other hand, if we reversed the foundational order, the advantages of accepting O-Roles in order to answer the (PRO) would disappear, since external, non-symmetrical relations would now be invoked in order to ground facts or truths about O-Roles and O-Roles could not be invoked in order to explain such relations' connecting certain *relata*.

O-Roles could be taken as ways in which relations are exemplified by their *relata*—as Orilia (2011) himself is inclined to think. In this case, exemplification is considered a polyadic relation, i.e., a relation that might have different numbers of *relata* in different circumstances. With respect to the exemplification of *loving* between Romeo and Juliet according to (1), there are three places characterized

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[5] In this framework, an unordered complex is constituted by a relation R and its *relata*, taken regardless of the way in which R connects them.

[6] Unordered complexes have been introduced by Hochberg (1987). Orilia (2011) considers this solution too.

by three different O-Roles: the relation *loving* itself (in the first place) has the O-Role *attribution*; Romeo (in the second place) has the O-Role *agent*; and Juliet (in the third place) has the O-Role *patient*. In this case, the exemplification relation connects three facts: *loving*'s having the O-Role *attribution*; Romeo's having the O-Role *agent*; and Juliet's having the O-Role *patient*. Yet, if (i) a *relatum*'s having a certain O-Role is nothing more than that *relatum*'s standing in an exemplification relation to the O-Role, (ii) such a latter exemplification relation is external and non-symmetrical, and (iii) facts or truths about external, non-symmetrical relations (such as the *loving* relation given (1)) are grounded—partly or wholly—on facts or truths about O-Roles, then the regress problem is not avoided: it reappears with respect to the exemplification relation. Moreover, the complex exemplification relation itself in the truthmaker of (1) must be linked by further exemplification relations with its *relata*—in this case, three facts, i.e., the *relata*'s exemplifying their O-Roles.[7]

The Leibnitian solution defended in Orilia (2000, 2008) is based on two elements. First, in the truthmaker of (1), we should distinguish between two different exemplifications of monadic properties: Romeo's exemplifying the monadic property of *loving* qua *agent* and Juliet's exemplifying the monadic property of *loving* qua *patient*. Secondly, there is a special sort of relation (an *insofar as* relation) between these two exemplifications, and the obtaining of such a relation is what makes (1) true: Romeo exemplifies the monadic property of *loving* qua *agent* *insofar as* Juliet exemplifies the monadic property of *loving* qua *patient*. The *insofar as* relation is symmetrical. Now, if symmetrical relations have O-Roles too—though not different sorts of O-Roles—there is a problem of foundational infinite regress in this case too. Moreover, the exemplification relation linking the monadic properties and the *relata* seemingly involves a foundational, infinite regress, at least if it is taken as an external, non-symmetrical relation.[8] Finally, it can be argued against the Leibnitian solution that Romeo's exemplifying the monadic property of *loving* qua *agent* seemingly is less fundamental than some other fact, such as Romeo's standing in the *agent* relation to the relation of *loving* or Romeo's exemplifying the monadic property of *being *agent** with respect to the relation of *loving*. The "qua" in such monadic properties seemingly has some ontological counterpart which participates in grounding their exemplification.

3 Two Further Solutions—and Why They Fail

As we have seen, there is a foundational infinite regress problem in many ontological characterizations of O-Roles, at least if we take O-Roles and/or exemplification as

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[7] This might not be a problem for Orilia, since he accepts fact infinitism, i.e., the idea that there are infinite chains of foundational dependence between facts (see Orilia 2006, 2007, and 2009). However, if you want to reach a fundamental level of the universe which is not grounded on anything else, then you can accept neither fact infinitism nor this view of the ontological status of O-Roles. Of course, the infinite foundational regress problem with respect to exemplification is nothing but a version of Bradley's famous regress (see, for example, Maurin 2012).

[8] Orilia (2008: 185) deals with this objection by claiming that there is no problem of foundational infinite regress for exemplification, since exemplification is a necessarily asymmetrical relation and necessarily asymmetrical relations do not have relational order. Yet, see the discussion on asymmetrical relations in the next section.

external, non-symmetrical relations. Perhaps, this problem can be circumscribed to some category of external, non-symmetrical relations or it can be circumscribed to the exemplification relation, with the goal of arguing at a later stage that there actually is no problem with those relations or with exemplification. This "divide and conquer" strategy is used in the following solutions.

The first solution is based on the acceptance of O-Roles as external relations and on a refinement of the aforementioned Leibnitian solution. There are two relational facts: Romeo's standing in the *agent* relation to the relation of *loving* and Juliet's standing in the *patient* relation to the relation of *loving*. Of course, such a relation of *loving* turns out to be something different from the relation which seemingly connects Romeo and Juliet according to (1), since it does not have Romeo and Juliet as its *relata*. Moreover, it is not a relation at all, since it does not have more than one place to fill: it is only related to Romeo by an *agent* relation. Thus, it would be better to name such an entity (i.e., the entity which is related to Romeo by an *agent* relation) *loving-a*, instead of *loving*. Moreover, Romeo's standing in the *agent* relation to *loving-a* is linked by a special sort of relation (i.e., a *co-occurrence* relation) with Juliet's standing in the *patient* relation to *loving-a*. This complex fact of co-occurrence is what makes (1) true. On the other hand, there is another complex fact that makes (6) true, i.e., the *co-occurrence* of Romeo's standing in the *patient* relation to *loving-a* and of Juliet's standing in the *agent* relation to *loving-a*.

The *co-occurrence* relation is symmetrical. If we concede that symmetrical relations have O-Roles too, then there is a foundational infinite regress in the connections between *co-occurrence* and its *relata*. In reply, one could argue that symmetrical relations do not have O-Roles or that there is no foundational infinite regress, since *relata*'s having certain O-Roles in symmetrical relations is less fundamental than their standing in such relations. However, the worst problem for this solution affects the *agent* and *patient* relations themselves. *Agent*, *patient*, and other O-Role relations are asymmetrical relations: they have two places, one of which can be occupied only by entities such as Romeo and Juliet and the other by entities such as *loving-a*. While it can be the case that Romeo stands in the *agent* relation to *loving-a*, it cannot be the case that *loving-a* stands in the *agent* relation to Romeo.[9] Yet, since asymmetrical relations are a special sort of non-symmetrical relations and since we have conceded that all non-symmetrical relations have O-Roles, asymmetrical relations have O-Roles too. This means that Romeo must have some O-Role in the *agent* relation with *loving-a* and *loving-a* must have some different O-Role in the *agent* relation and that these further relational facts (provided that O-Roles are relations) co-occur. A foundational infinite regress begins.

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[9] Such an asymmetrical relation is even stronger than the *being under* relation that I have briefly discussed in Section 1. In fact, it is not simply the case that, as a matter of metaphysical necessity, if one of the *relata* stands in the asymmetrical relation to the other *relatum*, then the latter does not stand in that relation to the former. O-Roles relations are such that one category of *relata*, i.e., entities such as *loving-a*, *cannot* occupy one of the places of the relation (the place occupied by Romeo). This introduces a sub-category of asymmetrical relations, i.e., strongly asymmetrical relations. A dyadic relation such as *agent* between *relata* a and b (so that a is *agent* to b) is a strongly asymmetrical relation iff it cannot be the case that b is *agent* to a. Afterwards, if exemplification is a relation, then it is a strongly asymmetrical relation, at least with respect to objects and their properties.

In reply, one could adopt two different strategies. First, it is possible to circumscribe our solution to non-symmetrical relations that are not asymmetrical. Secondly, it is possible to argue that the infinite regress is not foundational, so that it is not vicious.

The latter strategy is based on the idea that Romeo's standing in the *agent* relation to *loving-a* is more fundamental than—and it somehow grounds—the *co-occurrence* of the following facts: Romeo's occupying some O-Role with respect to *agent* and *loving-a*'s occupying some different O-Role with respect to *agent*. Anyway, if there is this latter *co-occurrence* fact, then there actually is no relational fact such as Romeo's (directly) standing in the *agent* relation to *loving-a.*[10] Moreover, there is no clear intuition here about the foundational direction, i.e., it is difficult to decide whether the adoption of this strategy is well motivated or not.

The former strategy is based on a restriction of O-Roles to non-symmetrical yet non-asymmetrical relations. O-Roles can be introduced only with respect to such relations. However, in order for this restriction not to be arbitrary, it should be grounded on something. For example, it can be claimed that there is no (PRO) with asymmetrical relations such as the *agent* relation and that O-Roles should be introduced only in order to solve the (PRO). However, it seems acceptable to formulate the (PRO) with respect to the *agent* relation too: what makes it the case that it can be true that Romeo is *agent* to *loving-a* and that it cannot be true that *loving-a* is *agent* to Romeo? True: non-symmetrical yet non-asymmetrical relations are such that a's being R-related to b can coexist with b's being R-related to a—even if it is *not* necessary that they coexist. On the other hand, asymmetrical relations are such that a's being R-related to b and b's being R-related to a cannot coexist. Yet, an explanation for asymmetrical relations' being non-symmetrical—and a solution for the (PRO) and the (PCR) they have—should still be given. In turn, one could reply that such an explanation does not have to include O-Roles: O-Roles explain the non-symmetricity of non-symmetrical yet non-asymmetrical relations, while something else explains the non-symmetricity of asymmetrical relations. However, this reply is suspiciously *ad hoc*. In conclusion, if we aim at maintaining O-Roles and at avoiding foundational infinite regresses, we should look for another ontological view of O-Roles.

The second view of O-Roles I wish to discuss here is somehow simpler. It is based on the idea that there are two non-relational facts: Romeo's instantiating the property of *being *agent** and Juliet's instantiating the property of *being *patient**. A symmetrical *loving-b* relation connects such facts. The *loving-b* relation is different from both the *loving* relation which was invoked to connect Romeo and Juliet and the *loving-a* entity. O-Roles are monadic properties. This avoids the foundational infinite regress problem with O-Role relations. Yet, it does not avoid the same problem with symmetrical relations such as *loving-b*, at least if they have O-Roles. Moreover, what about exemplification? If exemplification is an asymmetrical relation, then Romeo's standing in the *exemplification* relation to *being *agent** is affected by a foundational infinite regress problem.

Exemplification seemingly has all the features of external, asymmetrical relations. Its *relata*—the *exemplificans* (what exemplifies) and the *exemplificatum* (what is *exemplified*)—can exist apart from one another, at least in the case of non-essential properties, so that exemplification resembles in this respect external relations. It can be

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[10] Incidentally, it can be argued that even symmetrical relations, if they have O-Roles, do not directly connect their *relata*. Thus, there remains an infinite foundational regress problem for the co-occurrence relation too.

replied that *a*'s exemplifying an intrinsic property P wholly ontologically depends on *a*'s having one of its intrinsic properties (P itself), so that exemplification is an internal relation. Yet, *a*'s having P is the same as *a*'s exemplifying P, so that one cannot properly claim that there are two facts here and that one of them ontologically depends on the other. Furthermore, exemplification seemingly is asymmetrical, at least with respect to objects such as Romeo and their properties: it is metaphysically necessary that, if Romeo exemplifies the property of *being an *agent**, then the property of *being an *agent** does not exemplify Romeo.[11] If exemplification is an external, asymmetrical relation, then it is non-symmetrical too. O-Roles should be introduced, and exemplification turns out to be affected by the foundational infinite regress problem.

In conclusion, this latter solution does not have a foundational infinite regress problem with O-Role relations. Yet, it has that problem with exemplification and with symmetrical relations such as *loving-b*. Thus, it is more viable than the other solutions, as long as one claims that symmetrical relations do not have O-Roles and that exemplification is not a non-symmetrical relation characterized by O-Roles. The first assumption could be defended by remarking that there is no (PRO) with symmetrical relations and that O-Roles should only be invoked in order to deal with the (PRO). This amends what we have said about symmetrical relations and O-Roles in Section 2. At the same time, the lack of O-Roles implies the lack of relational order in symmetrical relations, so that one seemingly has an answer to the (PLRO). The second assumption could be defended by assigning to exemplification a non-relational ontological status or no ontological status at all.

4 Relational Modes

Is there a way to avoid such versions of the foundational infinite regress problem, while maintaining that symmetrical relations have O-Roles and without dealing with the problematic issue of exemplification's being a relation? Yes, at least if you are inclined to believe in modes.

Modes are particular properties that ontologically depend, among other things, on their "bearers." [12] Thus, *Romeo's being a man*, i.e., Romeo's manhood, is a mode, i.e., a particular property, which ontologically depends on Romeo, i.e., its bearer. It is worth noticing that there are no exemplification links between Romeo and *Romeo's being a man*, so that Romeo is *not* properly the bearer of *Romeo's being a man*. In fact, what makes

(7)   Romeo is a man

true is not Romeo's exemplifying the property of *being a man*, but the existence of the mode *Romeo's being a man*: as a matter of metaphysical necessity, (2) is true iff *Romeo's being a man* exists.[13]

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[11] This also demonstrates that exemplification is a strongly asymmetrical relation, at least with respect to objects and their properties. Perhaps there are cases of non-strongly asymmetrical exemplifications or of non-asymmetrical exemplifications between properties. Yet, I cannot provide here examples.

[12] See Heil (2003: 137–150, 2012: 106–109) and Lowe (2002: 78–83, 2006: 87–100).

[13] Moreover, modes differ from tropes, as long as some trope theorists take tropes as particular properties which do not ontologically depend on their bearers.

In my perspective, the theory of modes should be refined in order to introduce external relational modes. An external relational mode simply is a mode which ontologically depends on more than one bearer and which does *not* wholly ontologically depend on the existence of its bearers and/or on their essences and/or on their intrinsic modes—even if I shall refine this definition in a few lines. Thus, *Romeo's being near Juliet* is an external relational mode, which ontologically depends on both Romeo and Juliet and which does *not* wholly ontologically depend on the existence of Romeo and/or Juliet and/or on their essences and/or on their intrinsic modes.

Moreover, in order to introduce external, non-symmetrical, relational modes, it is perhaps necessary to allow that modes can ontologically depend, among other things, not only on particular entities such as Romeo and Juliet (which can be considered substances for the sake of clarity) but also on other modes, i.e., on another sort of particular entities—as we shall see.

However, this modification is not required in the first mode-based solution I shall explore—and O-Roles are not required. One could simply claim that the (PRO) is solved by considering *Romeo's loving Juliet* and *Juliet's loving Romeo* two different modes. More generally, external, non-symmetrical, relational modes (e.g., the modes of loving) are such that *Romeo's loving Juliet* and *Juliet's loving Romeo* neither are the same mode, nor do they necessarily coexist. On the other hand, external, symmetrical, relational modes (e.g., the modes of being near) are such that "Romeo's being near Juliet" and "Juliet's being near Romeo" either refer to the same mode or refer to two different modes which necessarily coexist.

Yet, the (PRO) and the (PLRO) can be reiterated: what makes it the case that *Romeo's loving Juliet* and *Juliet's loving Romeo* neither are the same mode nor do they necessarily coexist, while "Romeo's being near Juliet" and "Juliet's being near Romeo" either refer to the same mode or refer to two different modes which necessarily coexist? Either you stop here and claim that the first solution should be accepted as a primitive fact about different sorts of relational modes, or you look for another solution.

Following a different path, O-Roles come again into play. In the end, this is the solution I am inclined to accept. Yet, before introducing it, I would like to refine my definition of relational modes and my distinction between internal and external relational modes. For reasons related to my studies on ontological emergence,[14] I wish to concede that relational modes that wholly ontologically depend on the essence(s) and/or the existence of their *relata* could still be external, if the *relata* are other external relational modes or they ontologically depend on other external relational modes.

As a matter of metaphysical necessity, a mode is relational iff it ontologically depends on more than one particular (i.e., on more than one substance or, as we shall see, on more than one mode). Let me now clarify whole ontological dependence. The entities on which an entity e_1 wholly ontologically depends are all the entities that are jointly necessary and sufficient to explain why e_1 exists and why e_1 is what it is (its essential nature).[15] I shall name the entities on which an entity e_1

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[14] See Paolini Paoletti (2015).

[15] Of course, e_1 could wholly ontologically depend on only one entity. Yet, I have used the plural "entities" in this characterization of whole ontological dependence for the sake of clarity.

wholly ontologically depends its $basis_1$. The entities in $basis_1$ might wholly ontologically depend on other entities. $Basis_2$ includes all and only the entities on which all and only the entities in $basis_1$ wholly ontologically depend. In turn, there might be another basis ($basis_3$) for all and only the entities in $basis_2$, and so on, *ad infinitum* or until we reach only entities that do not wholly ontologically depend on other entities. The chain of whole ontological dependence of an entity e_1 includes its $basis_1$ and its $basis_2$, and so on, *ad infinitum* or until we reach only entities that do not wholly ontologically depend on other entities.

As a matter of metaphysical necessity, a relational mode is internal iff (i) it wholly ontologically depends on the existence and/or the essence(s) and/or the intrinsic modes of its *relata and* (ii) it is *not* the case that its chain of whole ontological dependence includes one or more than one relational mode that does *not* wholly ontologically depend on the existence and/or the essence(s) and/or the intrinsic modes of its *relata*. On the other hand, as a matter of metaphysical necessity, a relational mode is external iff it is not internal. Thus, a relational mode might be external either because it violates (i) or because it violates (ii)—or because it violates both. These definitions allow for external relational modes that wholly ontologically depend on other external relational modes—and something else, in case.

Let me now turn to my solution based on O-Roles and external relational modes. I assume that O-Roles are (intrinsic) modes of substances. *Romeo's being an agent* is a mode M_1 and *Juliet's being a patient* is a different mode M_2. The external, non-symmetrical, relational mode of loving whose existence makes (1) true is a mode that ontologically depends on both M_1 and M_2. More precisely, it is a relational mode M_3, namely the relational mode *loving-c between M_1 and M_2*.[16] The existence of M_3 makes (1) true. Moreover, M_3 is different from another relational mode M_6, i.e., *loving-c between M_4 and M_5*, where "M_4" refers to *Juliet's being an agent* and "M_5" to *Romeo's being a patient*. M_6's existence makes (6) true. Yet, since M_3 is different from M_6, they could either coexist, so that both (1) and (6) are true, or they could exist apart from each other, so that only (1) (or only (6)) is true. For this reason, it is neither metaphysically necessary that (1) implies (6) nor that (6) implies (1). The (PRO) now has a solution.

On the other hand, we could claim that (4) is made true by the existence of an external, symmetrical, relational mode M_9. M_9 is such that it ontologically depends on modes M_7 (i.e., *Romeo's being theme*, if we assume that *being theme* legitimately stands for some O-Role[17]) and M_8 (i.e., *Juliet's being theme*), so that M_9 is *being near-a between M_7 and M_8*.[18] In this case, we do not have different O-Roles involved in M_9: there is no different relational mode of being near-a with different and inverted O-Roles for Romeo and Juliet. External, symmetrical relational modes are such that they ontologically depend on modes with the same O-Roles. It is metaphysically necessary that Romeo's being near Juliet implies Juliet's being near Romeo since the truthmaker of both truths is one and the same external, symmetrical relational mode. I offer this solution to the (PLRO).

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[16] I use "*loving-c*" here in order to distinguish this sort of relational mode from the relations of *loving, loving-a* and *loving-b*.

[17] Orilia (2014: 298f) introduces the O-Roles *theme* for participants in a location or undergoing a change of location.

[18] I use *being near-a* here in order to distinguish this sort of relational mode from the relation of *being near*, which should seemingly connect Romeo and Juliet—at least if you admit that there is such a relation.

Finally, what about the (PCR)? I suggest that the converse relational modes of external relational modes are identical with those latter modes, as long as they ontologically depend on the same O-Role modes. Thus, Romeo's *loving* Juliet and Juliet's *being loved* by Romeo are the same relational mode, since "Romeo loves Juliet" and "Juliet is loved by Romeo" only express in different ways the same truth—made true by one and the same relational mode M_3, i.e., *loving-c between Romeo's being agent (M_1) and Juliet's being patient (M_2)*. Something analogous happens with *being on* and *being under*: one and the same relational mode (named in different ways) holds between a substance's performing a certain O-Role and another substance's performing a different O-Role—even if I shall not define here that relational mode. Moreover, my solution does not have to deal with the problematic status of exemplification as a relation and with Bradley's regress—since there are no external relations of exemplification between a substance and its modes[19] (see also the next section)—and it does not have to deny that symmetrical relations have O-Roles too.[20]

My view can also allow for variable polyadicity. If it is true, with respect to different situations, that

(8)   Romeo eats the soup

by directly putting the soup into his mouth, and that

(9)   Romeo eats the soup with a spoon,

then it seems that two different relations are invoked: the two-place relation of *eating*, involving the O-Role *agent* (for Romeo) and *patient* (for the soup), and the three-place relation of *eating with*, involving the O-Role *agent* (for Romeo),

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[19] In contrast, if relations and/or O-Roles are universals, one must deal with the problematic status of exemplification and with further problems depending on the sort of solution she prefers. I have examined some possible solutions based on the tacit assumption that relations and O-Roles are universals in Sections 2 and 3.

[20] This solution resembles, at least in part, Anna-Sofia Maurin (2010)'s solution to Bradley's regress within trope theory. According to Maurin, the *compresence* relation between certain tropes asymmetrically depends on those tropes, whereas those tropes do not depend on it. This means that there is a possible world in which those tropes exist and are not compresent, whereas there is no possible world in which compresence relation exists without relating those tropes. However, what I wish to claim here is that there is no exemplification problem for modes, since modes ontologically depend on their "bearers" and such a dependence is asymmetrical. Contrariwise, in many theories of tropes, tropes are more fundamental than substances and they cannot ontologically depend on them. Thus, there is no possibility of having Bradley's regress within mode theory (i.e., the view according to which there are both substances and modes and modes ontologically depend on substances). Yet, you have that possibility within those trope theories that introduce compresence relations (or other sorts of relations) in order to allow for the dependence of substances on tropes. As I shall explain in the next section, in mode theory, the ontological dependence between *Romeo's being a man* and Romeo himself is not an external, asymmetrical relation, but an internal, asymmetrical relation, since its "instantiation" by *Romeo's being a man* and Romeo himself wholly depends on the essence (and on the existence) of the mode *Romeo's being a man*. Moreover, if you claim that modes ontologically depend on particular entities different from them, you can justify the thesis that (at least some) relations between modes (i.e., some relational modes) ontologically depend on the related modes. I shall discuss in the next section Simons (2010)'s solution, according to which relational tropes are necessarily bound to their *relata*: it is not possible for a trope to exist and not to relate the *relata* it actually relates.

patient (for the soup), and *instrument* (for the spoon).[21] If one maintained that relations essentially have a certain number of "places to fill," then these two relations would be different *eating* relations. Yet, it also seems that Romeo is in the same relation with the same sort of object (the soup); the only difference between (7) and (8) is that, according to (8), Romeo uses an instrument.

My solution asserts that there might be different relational modes of *eating* (or, better, of *eating-a*, to be distinguished from the relation of *eating*) which ontologically depend on different numbers—and different sorts—of O-Role modes. With respect to the truth of (7), there is a relational mode of *eating-a between Romeo's being an agent and the soup's being a patient*. With respect to the truth of (8), there is a different relational mode of *eating-a* (which is nevertheless a mode *of eating-a*, of the same sort [22] of relational modes) *between Romeo's being an agent, the soup's being a patient and the spoon's being an instrument*.[23]

Moreover, if we accept that O-Roles are modes and that relational modes ontologically depend on them, we should also accept that O-Role modes are more ontologically fundamental than relational modes. Thus, *Romeo's being an agent* is more ontologically fundamental than M_3, i.e., the mode which makes it true that Romeo loves Juliet. I see no problem with this further assumption of my theory: entities' performing certain O-Roles seemingly is independent of their performing those O-Roles in specific relational modes—even if one could add that their performing certain O-Roles necessitates the existence of at least one relational mode in which they perform those O-Roles. For example, the existence of *Romeo's being an agent* is independent of the existence of M_3. Yet, the existence of *Romeo's being an agent* necessitates the existence of at least one relational mode in which Romeo is an agent.[24]

5 MacBride and the Problematic Status of Relational Modes

Peter Simons (2010: 202–203) has argued for the idea that relational tropes, as long as they individually depend on the things they connect, could avoid Bradley's regress of exemplification. Since I agree with this point and I have developed a theory of relational modes to a larger extent, I should deal with Fraser MacBride (2010)'s criticisms of Simons' proposal. According to MacBride, relational tropes do not avoid Bradley's regress, since they do not justify why and how a certain relation relates its own terms. I shall only quote those criticisms that are directed towards the assumptions of my own theory:

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[21] The O-Role *instrument* is mentioned in Orilia (2014). Moreover, it is worth noticing that, in my example, statements such as (8) do not simply describe the same situation described by (7) by specifying something more (the instrument). In fact, in the truhmaker of (7), there is no instrument that is used by Romeo.

[22] Lowe (2006)'s four-category ontology could help here: Lowe admits that, besides substances and modes, there are also kinds and (universal) properties. Modes are modes of (universal) properties. Yet, substances and modes do *not* literally exemplify (universal) properties: substances are characterized by modes that are modes of certain (universal) properties.

[23] A similar result can be perhaps achieved by claiming that different relations of *eating* with different numbers of "places to fill" have the same second-order property (a property of properties of substances), i.e., the property of *being eating relations*.

[24] Yet, modes are not complex entities, such as facts and states of affairs. They are simple entities that ontologically depend on other entities.

"Now, do relational tropes evade this regress? It doesn't seem so. Bradley's reasoning appears to apply just as smoothly to the case of relational tropes as universals. For even a relational trope r must be something to a and b, otherwise R can hardly hold between them. Hence it must be related to them. But this means there must be a further relational trope r^* to so relate r, a and b, and then things just keep falling apart after that concession. So it appears that relational tropes succumb to the regress if universals do. (…) One might argue that there is no need to posit a further relation in order to explain how a bears the relational trope r to b because there is nothing further about the possibility of relations relating that stands in need of explanation. It is the very *nature* of r to be borne (if it exists) by a to b. So the mere existence of r necessitates its holding between a and b without need of further relations. However, it is difficult to avoid the suspicion that to endorse this line of reasoning would be to license a form of cheating. For how can positing the existence of a relational trope like r explain anything about its capacity to relate when it has been stipulated to be the very essence of R that it relates a to b? It is as though the capacity of relational tropes to relate is explained by mentioning the fact that they have a "virtus relativa." But this no more explains r's capacity to relate than the doctor in Molière's *Le Malade imaginaire* assigning to opium a virtus dormitiva explains its capacity to put people to sleep" (MacBride 2010: 173–174).

Bradley's regress could affect my solution in two different points: it could concern both O-Role modes, such as *Romeo's being an agent*, and relational modes that have O-Role modes as their *relata*. The O-Role mode *Romeo's being an agent* ontologically depends on Romeo, so that the relation between that mode and Romeo is an internal (asymmetrical) relation of ontological dependence, which is based on the essence of the mode itself. In turn, relational modes that have O-Role modes as their *relata* ontologically depend on those modes, and such a relation of ontological dependence is internal (and asymmetrical) too, since it is based on the essence of those relational modes themselves.[25] Internal relations are less fundamental then their *relata*, so that there is no foundational infinite regress here.[26]

In order to reply to MacBride's criticisms, it is necessary to distinguish between different questions:

(I)   What makes it the case that, for example, the relational mode M_3 holds between M_1 and M_2, *rather than between other modes*?

(II) What makes it the case that the relational mode M_3 holds between modes, i.e., that it somehow relates modes, *rather than other sorts of entities*?

(III) What makes it the case that the relational mode M_3 relates, i.e., that it is *relational*?

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[25] It is worth adding that, even if the relations of ontological dependence between the relational modes in question and their *relata* are internal, the relational modes do not turn out to be internal relational modes for this reason: they also but not wholly ontologically depend on their *relata*.

[26] This implies that, being internal and asymmetrical (and non-symmetrical) relations, relations of ontological dependence are such that you could also apply O-Roles within them (at least if you think that internal relations have O-Roles), without having infinite foundational regresses. Yet, as I shall clarify in a few pages, I do not think that internal relations have O-Roles.

I think that question (I) could be answered by simply claiming that the relational mode M_3 ontologically depends on M_1 and M_2 in virtue of its own essence, so that it cannot but relate those modes. Of course, one could add further details: for example, that it is also in virtue of the intrinsic modes of the substances in M_1 and M_2 that M_3 can hold between them (e.g., Romeo can be a lover also in virtue of *Romeo's being a rational being*). Moreover, in order to justify the existence of M_3, it could be added that something has caused its existence according to some law(s) of nature. Anyway, giving an answer to (I) *cannot* imply that the existence and the nature of M_3 are explained away—at least if you believe that relational modes such as M_3 are fundamental constituents of the universe.

Giving an answer to (II) and (III) is more complicate. It is part of the essence of relational modes that they relate modes, rather than other sorts of entities, and it is also part of their essences that they are relational. Why? I think that, if there were exhaustive answers in this respect, relational modes would turn out to be non-fundamental constituents of the universe, because their relating modes and their being relational (i.e., two features of their essences) would be explained away by referring to something else. Relational modes would be wholly ontologically dependent on something else, since they would depend on something else for their own essences: they would not be fundamental. A similar analysis might be offered for O-Role modes, at least with respect to their being modes.

In sum, the "capacity to relate" of M_3 could be partly explained, at least with respect to questions such as (I). Anyway, one cannot "explain away" the essence of M_3, including its being relational (i.e., its having a capacity to relate)—at least if she thinks that M_3 is a fundamental constituent of the universe. Positing the existence of relational modes such as M_3 (and of O-Role modes) might be justified by appealing to the fact that they solve some ontological problems connected with external relations. However, you cannot ask for an explanation of the essences of relational modes (including their being relational) when your opponent believes that they are fundamental constituents of the universe, i.e., that they cannot be explained away—at least if you want to demonstrate that your opponent's assumptions lead to some problem. Otherwise, you would misrepresent her assumptions. In sum, if relational modes are fundamental, their capacity to relate (i.e., their being relational) is fundamental too: that capacity has no "why-explanation." On the other hand, it seems to me that there is a "virtus relativa" of relational modes only for those who believe that they should be explained away—even if they do not know how.[27]

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[27] I assume here that MacBride's argument roughly works as follows: if relations (or relational entities) exist, then you have Bradley's regress and you cannot avoid that regress by claiming that it is part of the nature of relations (or of relational entities) to have a primitive and unexplained capacity to relate—since that capacity is somehow left unexplained. Thus, it is an argument *against* a viable response to Bradley's regress. A different and more general concern would be the following: why do we have to accept that there are relations (or essentially relational entities)—or that such entities are ontologically fundamental? This article is not concerned with giving an answer to this worry. I do *not* wish to claim that we have to accept primitively and essentially relational entities *only because* they are the best solution to Bradley's regress. On the contrary, one should have independent reasons for believing that there are relations or essentially relational entities (or that they are fundamental). In sum, my response to MacBride's argument is not a proof of the existence of relational entities, but it is only a defense of a viable way to reply to one proof of their (alleged) non-existence (i.e., Bradley's regress).

MacBride (2014: 12) raises four different objections against Orilia's account. First, he argues that relations such as the one of *being less than* in

(10)   5 is less than 7

seemingly present no O-Roles. Secondly, something analogous happens with *being to the left of* in

(11)   Anthony is to the left of Fulvia.

Thirdly, he claims that, "if the descriptions of the roles things perform really are logically detached in this manner from our descriptions of how they are related," as Orilia (2011: 5) asserts, "then even though there may be a fact of the matter about which roles things perform, nothing we ever say about them will provide a reason for supposing that they perform one role rather than another" (MacBride 2014: 12).

Finally, he notices that the *assignment* relation between an O-Role and the *relatum* performing it could give rise to a vicious foundational regress. Since I have argued to a large extent against the possibility of such a regress within mode theory, I shall turn to the other objections.

With respect to the third objection, I think that the descriptions of the roles things perform actually represent ways to access their O-Roles. However, this does not imply that there should be a strict correspondence between the descriptions of O-Roles and their existence—and essences. I think that a good criterion to distinguish "good" O-Roles from "bad" ones (i.e., O-Roles that actually exist from descriptions that *merely aim at* referring to O-Roles) is given by the fact that good O-Roles recur in different relations. For example, *agent* seemingly is a good O-Role, since it recurs in different relations (*loving*, *eating*, *writing*, and so on). Another good criterion is given by the fact that good O-Roles are such that their being performed by certain *relata* in certain relations is preserved through transformations of those relations into their converse relations. Romeo still performs the O-Role *agent* and Juliet still performs the O-Role *patient* whenever Juliet *is loved* by Romeo.

With respect to (9), I am inclined to think that it expresses an internal relation between 5 and 7: it is part of the very nature of 5 (of what 5 essentially is) and/or of 7 (of what 7 essentially is) that 5 is less than 7. Since O-Roles are invoked only in order to deal with three ontological problems connected with *external* relations, I do not see the need of having O-Roles in internal relations too.[28]

The matter is much more complicate with (10). For what I understand, Orilia (2014: 301) claims that this statement is made true by the fact that both Anthony and Fulvia's left part perform the *boundary* O-Role in some spatial relation, such as *being beside*. The *boundary* O-Role is performed by bodies in certain directionless spatial relations (bodies that are "besides" one another). Fulvia's left part is the part where she has, or normal human beings have, the heart. I do not "buy" this solution for two reasons. First, not all the bodies that stand in relations of *being to*

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[28] Orilia (2014: 300–301) could seemingly agree with my solution: according to him, there are no comparison facts between magnitudes.
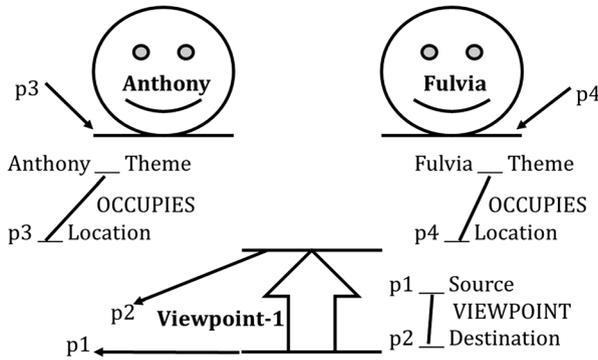
Fig. 1 Anthony occupies the space point (or the spatial region) p_3 and Fulvia occupies the space point (or the spatial region) p_4. The viewpoint is in front of both Anthony and Fulvia (*viewpoint-1*) and it goes from p_1 to p_2

the left of have (or could have) the heart, so that it turns out to be difficult to define their left parts. Secondly, relations such as *being to the left of* not only depend on the spatial locations of their *relata* but also on something else, i.e., the viewpoint from which the relation is somehow "observed."

In Fig. 1, Anthony occupies the space point (or the spatial region) p_3 and Fulvia occupies the space point (or the spatial region) p_4. The viewpoint is in front of both Anthony and Fulvia (viewpoint-1). In Fig. 2, it is behind them (viewpoint-2), while they occupy the same places. Viewpoint-1 is different from viewpoint-2. Moreover, it seems that viewpoint-1 "goes from" a certain point p_1—the point from which someone could "observe" the whole situation—to another point in front of it p_2—the point that the same person could assume as the point in front of her. And the same happens with viewpoint-2 and two different points p_5 and p_6: viewpoint-2 goes from p_5 to p_6.

The following data characterize Anthony, Fulvia, viewpoint-1, and viewpoint-2:

(d1)   Anthony is to the left of Fulvia with respect to viewpoint-1;
(d2)   Anthony is to the right of Fulvia with respect to viewpoint-2;
(d3)   As a matter of metaphysical necessity, Anthony is to the left of Fulvia with respect to viewpoint-1 iff Fulvia is to the right of Anthony with respect to viewpoint-1;
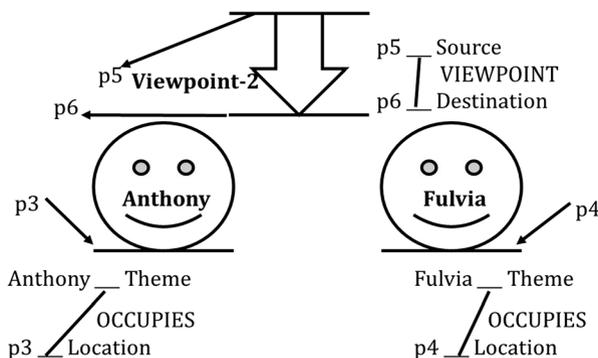

Fig. 2 The viewpoint is behind Anthony and Fulvia (*viewpoint-2*) and it goes from p_5 to p_6, while they occupy the same places
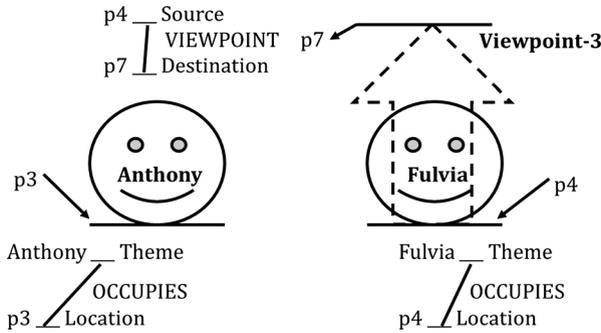
Fig. 3 Scenario that both MacBride (2013) and Orilia (2014) presumably have in mind when they talk of Anthony's being to the left of Fulvia. *Viewpoint-3* goes from p_4 to p_7

(d4)   As a matter of metaphysical necessity, Anthony is to the right of Fulvia with respect to viewpoint-2 iff Fulvia is to the left of Anthony with respect to viewpoint-2;

(d5)   As a matter of metaphysical necessity, Anthony is to the left of Fulvia with respect to viewpoint-1 iff Anthony is to the right of Fulvia with respect to viewpoint-2;

(d6)   As a matter of metaphysical necessity, Fulvia is to the right of Anthony with respect to viewpoint-1 iff Fulvia is to the left of Anthony with respect to viewpoint-2.

How should we account for these data? What are viewpoints? And how are relations such as *being to the left of* constructed with respect to them? I shall illustrate my solution gradually.

I assume here a substantivalist view of space points and spatial regions: the existence and the identity of space points and spatial regions do not depend on things that occupy those points and those regions.[29] Moreover, I assume that there would be facts such as Anthony's being to the left of Fulvia with respect to a certain viewpoint even without the existence of observers occupying that viewpoint. This seemingly implies that the existence and the identity of viewpoints neither depend on the existence of observers occupying them nor on what they do.

I take viewpoints as relational modes in which a certain point performs the *source* O-Role and another point performs the *destination* O-Roles. For example, viewpoint-1 is nothing but the relational mode *viewpoint-a between p_1's being source and p_2's being destination*: *viewpoint-a* is a relation analogous to the relation of *going from (a certain place) to (another place)*. Viewpoint-2 is the relational mode *viewpoint-a between p_5's being source and p_6's being destination*. Viewpoints seemingly are external and relational modes: nothing in the nature of space points and of spatial regions implies that they occupy certain O-Roles within *viewpoint-a*'s relational modes, rather than other

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[29] However, my solution would also work in a non-substantivalist framework. In this case, space points and spatial entities would be derivative entities wholly dependent on other entities, and they would take part in the relations depicted below.
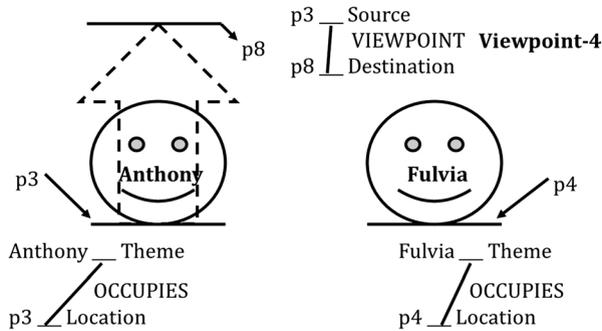
Fig. 4 Anthony occupies the space point p_3 and Fulvia occupies the space point p_4. *Viewpoint-4* goes from p_3 to p_8

O-Roles or no O-Role at all (if those relational modes did not exist). Moreover, they are non-symmetrical, since they involve different O-Roles.

On the other hand, in both figures, there are two *occupying-a* relational modes O_1 and O_2 (to be distinguished from *occupying* relations between substances): O_1 is *occupying-a between Anthony's being theme and p_3's being location*, whereas O_2 is *occupying-a between Fulvia's being theme and p_4's being location*. O_1 and O_2 are external relational modes: neither the existence, nor the essence(s), nor the intrinsic features of Anthony, Fulvia, p_3, and p_4 necessitate the existence of O_1 and O_2. Such relational modes are non-symmetrical, since they involve different O-Roles.

In Fig. 1, we can now distinguish between two further external relational modes, roughly making it the case that p_3 is to the left with respect to viewpoint-1 and that p_4 is to the right with respect to viewpoint-1. The first mode will be L_1, i.e., the mode *left-a between p_3's being theme and viewpoint-1's being theme*—to be distinguished from substances' *being to the left of* other substances. I assume that *left-a* modes are external and symmetrical relational modes. They are external, since they wholly ontologically depend on the essences of p_3 (in my example) and of viewpoint-1, i.e., of an external relational mode, so that they violate our constraint (ii) on the definition of internal relational modes and turn out to be external. It seems to me legitimate to assume that they are symmetrical, since viewpoint-1 is not an entity that can be to the left or to the right of other entities—while only substances, by occupying certain spaces, and spaces themselves (space points, spatial regions), could have such features.[30] Thus, there is no relational order in *left-a* relational modes going from p_3 to viewpoint-1 or from viewpoint-1 to p_3.[31] Being a spatial relational mode with no direction, the appropriate O-Roles in L_1 are *theme*'s O-Roles.[32] R_1 is the external and symmetrical relational mode *right-a between p_4's being theme and viewpoint-1's being theme*. Finally, in

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[30] Yet, p_1, i.e., viewpoint-1's source, is to the right of p_3 with respect to viewpoint-1.

[31] Moreover, *left-a* relational modes are not asymmetrical comparisons between certain entities—such as p_3—and certain standards of comparison—such as viewpoint-1. I think that the only legitimate comparisons are the ones that wholly ontologically depend on the intrinsic qualities of the entities to be compared, such as *being taller than* in (3). There are no spatial qualities of modes to be compared here: modes occupy no space. In my substantivalist view of space, if modes occupied a space, they would stand in some relation with some space point (or with some spatial region), and that relation—being a mode—would stand in some other relation with some space point (or with some spatial region), and so on, ad infinitum, thus having a proliferation of modes.

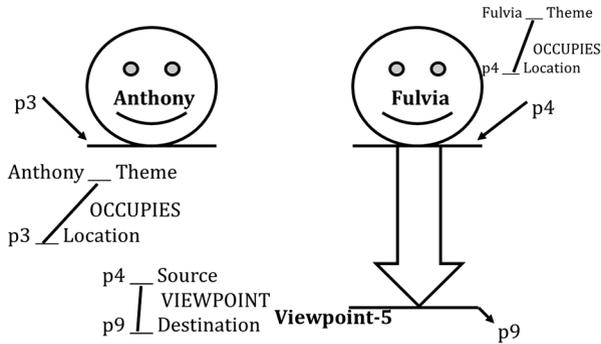[32] This implies that, in my view, *theme* is not necessarily correlated with *location*.

Fig. 5 Anthony occupies the space point p_3 and Fulvia occupies the space point p_4. *Viewpoint-5* goes from p_4 to p_9

Fig. 2, we have two external and symmetrical relational modes: L_2, i.e., *left-a between p_4's being theme and viewpoint-2's being theme*, and R_2, i.e., *right-a between p_5's being theme and viewpoint-2's being theme*.

Let me now take stock before accounting for the data. We have: viewpoint-1 and viewpoint-2; O_1 and O_2 (i.e., the relational modes involving Anthony and Fulvia and the places they occupy); and L_1, L_2, R_1, and R_2 (i.e., the relational *left-a* and *right-a* modes involving viewpoint-1 and viewpoint-2 and the space points occupied by Romeo and Juliet).

The datum (d1), i.e., Anthony's being to the left of Fulvia with respect to viewpoint-1, is accounted in terms of the existence of a relational co-occurrence mode C_1, i.e., the *co-occurrence between O_1's being theme, O_2's being theme, L_1's being theme and R_1's being theme*. To put it in few words, Anthony's and Fulvia's positions and the relations between those positions and viewpoint-1 *together* make it the case that Anthony is to the left of Fulvia. The co-occurrence mode C_1 is a spatial, external, symmetrical, relational mode. It is external, since the chains of ontological dependence of its *relata* include external relational modes (such as O_1, O_2, L_1, and R_1—O_1's being theme of course ontologically depends on O_1 itself). It is symmetrical, since it seemingly implies no relational order. Finally, it is spatial
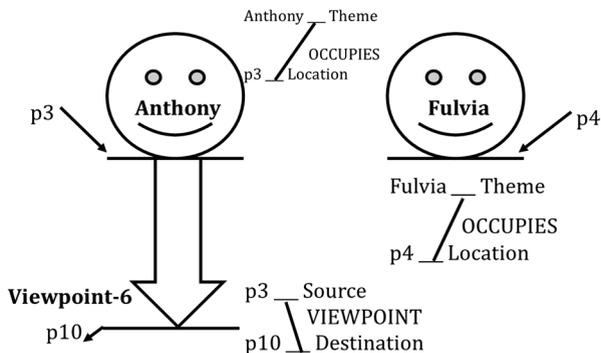

Fig. 6 Anthony occupies the space point p_3 and Fulvia occupies the space point p_4. *Viewpoint-6* goes from p_3 to p_{10}

since it has to do with entities and their positions in a directionless way, so that it involves the *theme* O-Role.

The datum (d2), i.e., Anthony's being to the right of Fulvia with respect to viewpoint-2, is accounted in terms of the existence of another relational co-occurrence mode C_2, i.e., the *co-occurrence between O_1's being theme, O_2's being theme, L_2's being theme and R_2's being theme*.

The datum (d3), i.e., that, as a matter of metaphysical necessity, Anthony is to the left of Fulvia with respect to viewpoint-1 iff Fulvia is to the right of Anthony with respect to viewpoint-1, is accounted by the fact that one and same relational co-occurrence mode C_1 both makes it true that Anthony is to the left of Fulvia with respect to viewpoint-1 and that Fulvia is to the right of Anthony with respect to viewpoint-1. C_1 includes everything one needs in order to account for this situation: "Anthony is to the left of Fulvia with respect to viewpoint-1" and "Fulvia is to the right of Anthony with respect to viewpoint-1" are two descriptions of it.[33]

The datum (d4), i.e., that, as a matter of metaphysical necessity, Anthony is to the right of Fulvia with respect to viewpoint-2 iff Fulvia is to the left of Anthony with respect to viewpoint-2, is accounted in a similar vein by the existence of the co-occurrence mode C_2.

What about (d5) and (d6)? I think that one should first determine a certain relation between viewpoint-1 and viewpoint-2, so that viewpoint-1's left is viewpoint-2's right, viewpoint-1's right is viewpoint-2's left, and so on. With respect to viewpoint-1 and viewpoint-2, such a relation is a relation of *oppositeness*.[34] This relation is an external, symmetrical relational mode S_1—oppositeness involving two modes with the O-Role *agent*, i.e., *the oppositeness between viewpoint-1's being agent and viewpoint-2's being agent*.[35] S_1 is external, since it ontologically depends on two external relational modes, i.e., viewpoint-1 and viewpoint-2.

The datum (d5), i.e., that, as a matter of metaphysical necessity, Anthony is to the left of Fulvia with respect to viewpoint-1 iff Anthony is to the right of Fulvia with respect to viewpoint-2, is accounted by the existence of a co-occurrence, external and symmetrical relational mode C_3, i.e., the *co-occurrence between C_1's being theme, C_2's being theme, and S_1's being theme*. The existence of C_3 also accounts for (d6), i.e., for the fact that, as a matter of metaphysical necessity, Fulvia is to the right of Anthony with respect to viewpoint-1 iff Fulvia is to the left of Anthony with respect to viewpoint-2.

Figures 3, 4, 5, and 6 show other plausible scenarios with different viewpoints. Figure 3 shows the scenario that both MacBride (2014) and Orilia (2014) presumably have in mind when they talk of Anthony's being to the left of Fulvia. I do not have enough space here to deal with these latter scenarios. Yet, the sort of account I have in mind for them should now be clear.

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[33] Of course, if we had two substances both at the left with respect to a certain viewpoint, in order to determine which substance is to the left of the other, we should choose a new viewpoint between their positions.

[34] Yet, you might also have relations between viewpoints different from oppositeness, i.e., if the right with respect to a certain viewpoint is 45 degrees to the right with respect to another viewpoint.

[35] One could use the *agent* O-Role even when the action is not explicit. I think that, in this case, the implicit action consists in *establishing an equivalence* or, more presumably, that there are two possible actions of *rotating with respect to one another* involving viewpoint-1 and viewpoint-2. Alternatively, since the oppositeness in question still is a spatial relation, one could invoke the O-Role *theme* for them.

I am sorry for having introduced such complicate distinctions in order to deal with (10). However, I think that they are somehow justified by the difficulty of explaining the nature of viewpoints and of the relations depending on them.

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