Constituents and their Role in Propositions

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Early Draft. Comments Welcome

I. The Problem

According to the hypothesis of structured propositions, propositions have constituents such as objects, properties

and/or concepts, and this helps explain many of their epistemological and representational properties. Some of the

uses that have been given to the notion of propositional constituents in philosophy have been:

- Explain general content differences, for example between the proposition that *Paris is a city* and that *Santa Monica is a city*, or between the proposition that *Ana loves Mary* and that *Mary loves Ana*. According to proponents of the structured-propositions hypothesis, the difference is that, in the first case, the first proposition has Paris (or the sense of "Paris") as a constituent, and the second does not (instead, it has Santa Monica or the meaning of "Santa Monica" as constituent); and in the second case, the difference is that even though the constituents are the same, they are somehow composed in a different way.

- Flesh out the pre-theoretical notion of aboutness. Propositions that are (pre-theoretically) about the same thing must have something in common that explains this. What simpler way to achieve this than by literally having something (some constituent) in common? Consequently, propositions must have 'sharable' constituents. *Miles Davis is a jazz musician* has something in common with the proposition that *John Coltrane is a jazz musician,* and something different in common with the proposition that *Miles Davis released "Kind of Blue"*. According to this hypothesis, propositions are about their constituents, so that propositions about the same thing have a common constituent representing that aspect of reality they have in common.

- Give conditions of epistemic access to propositions. For example, explain why we can not grasp the proposition that Paris is a city if we do not have something like the concept of city or some kind of epistemic access to Paris.

- Explain how thoughts stand in logical and semantic relations to one another because of their form.

- Explain how constituents form truth-evaluable contents. The proposition that *Miles Davis is a jazz musician* does not have the form of a list or a set of objects and properties; it represents Miles Davis as being some way.

Propositional structure is expected to capture the intuition that objects and concepts play different roles in the proposition: concepts are ways of classifying or grouping things as instances of a general kind, objects are the kind of things that get classified or grouped by concepts.

- Explain how concepts are freely recombinable (for example, as expressed by Evans's "Generality Constraint"): Someone who can think a thought of the form *a is F* and who can think a thought of the form *b is G* can also think thoughts of the form *a is G* and *b is F*.

II. Antecedents

Gasiunas (*forthcoming*), Keller (2013) and Tillerman and Fowler (2012) have shown that propositional constitution can not be reduced to relations such as set membership, mereological parthood, hylomorphic parthood, etc. and have proposed their own analyses. Keller proposes to define constitution in terms of metaphysical grounding plus some semantic criteria, while Tillerman and Fowler propose to use non-well-founded mereology; but in the end, both acknowledge that their proposals can not meet all the desiderata of a theory of propositional constituents, i.e., they cannot play the roles listed above. Now, I think I can offer a better analysis that manages to satisfy all the desiderata above.

My proposal is based on structuralist ideas sketched in Shapiro (1997), mixed with Dummett's (1981) theory of logical composition(which he attributes to Frege) and the notion of parametrical mediation advanced by Knobe, Prasada and Newman (2013). Just like Prasada et.al. I think that the constitution relation is not direct, but mediated. Following Shapiro, I think it is mediated by roles, which must be sharply distinguished from the objects or concepts that play them. Finally, from Dummett I borrow the thesis that the relation of composition is not intrinsic, but extrinsic. That is why, in the end, my proposal will seem very close to Frege's.

III. The proposal's main ingredients

My main claim is that propositions are fusions of roles played by objects and concepts. In other words, propositions have roles as parts, and these roles are played by objects and concepts which, in turn, are the constituents of the proposition. To flesh out the proposal, I will introduce each of its elements one by one. First, I will explain what I mean by "roles" and what sort of relation is the relation of *playing* a role. I hope this dispels any doubt that it is very natural and there are clear advantages to accepting roles as part of our ontology. Then, I will apply this general theory

of roles to the case of propositional constituents. The basic idea will be that constituents play a role in propositions, and thus that we must clearly distinguish the components themselves from the roles they play in the proposition. I would argue that the reason traditional accounts of propositional composition have failed has been precisely because they did not recognise this important distinction. Finally, I will show how my account of propositional constitution as mediated by roles satisfies all the desiderata for such a theory.

1. Roles

In order to understand the notion of a *role*, consider some simple examples. For example, Sandy Madera is *Los Diablos Rojos*' 1st base infielder. This means that he plays for *Los Diablos* as 1st base infielder. Being 1st base infielder is his role in *Los Diablos*. Other players play other, similar roles: Carlos Figueroa is the central fielder, Juan Gamboa is the short stop, etc. There is an intuitive sense in which they are all part of the team, but it would be shortsighted to think of the team a just them together as a group of people. As Gabriel Uzquiano (2004) has pointed out, just having them together, even in interaction, does not automatically gives us *Los Diablos Rojos* (imagine they all happen to be attending the same jazz concert. It would be highly misleading to say that *Los Diablos Rojos* attended the concert). Something else is required, and in cases like baseball teams – unlike other sorts of groups, like *The Supreme Court,* where all members play the very same role (Justices) – this requires each one of them to play a different role. These are roles that need to be played in order to have a complete baseball team. We need a pitcher and a short stop, etc. Something else needs to happen for this group of people to constitute *Los Diablos Rojos.* They have to be playing together **as** *Los Diablos Rojos.* They need to form a coherent unity, and this requires each of them to play his role **in** the team.

Language is of little help here, because when we talk we seldom make a difference between the role, and the person playing the role. We say that *Los Diablos Rojos*' 1st base is Dominican, and so we use "*Los Diablos Rojos*' 1st base" to talk about the person playing the role; but we also say things like "*Los Diablos Rojos* need a fast 1st base than can leave the base to catch the ball and then move fast back to his position", where we are not referring to Sandy Madera but to the role itself. Madera's identity is not extinguished by his playing this role, but still it is one of his properties, a relational property he has in relation to the team he plays for.

Appealing to these roles is fundamental to explain the behaviour of the team, as a whole, and of each member within the team. We can explain that Sandy Rojas is expected to catch a fly ball above the first base by simply saying

that he is the team's 1st base infielder. Being expected to catch a fly ball above the first base is part of being the team's 1st base infielder. If he fails to catch a ball and this results in the other team scoring a home-run that results in their victory, it would be unnatural to try to explain the team's defeat without mentioning the contribution of Sandy Rojas as 1st base infielder. This is what I mean when I say, following Knobe, Prasada et.al., that roles **mediate** the relation between team and players or, in general, between complex systems and their constituents. As such, roles play an essential role in our explanations of complex structured entities, like baseball teams, and the contributions of their members.

Consider now, Lisa Vallee-Smith, CEO of *Airfoil Group*. Her being the CEO of the company is her playing a certain role within such company. However, she also plays a different role in the company, since she is also the founder. These roles are different, and thus when talking about her contributions to the company, it is important to keep them apart: what Lisa Vallee-Smith contributes as CEO is different from what she contributed as founder, yet it is the same person making these different contributions. This gives us another reason to draw a distinction between roles and those who play them. Finally, consider bands like *Evil Hippie* and *Los Fancy Free,* they are both Mexican indie bands playing electronic psychedelic rock, with *Evil Hippie* having more of a kraut-rock influence. Interestingly, the same people play in both bands: Martín Thulin, Carlos Icaza, Carlos Navarrete aka *Dr. Bona* and Julio Navarrete. Yet, they play different roles in each band. Martín Thulin sings and leads *Los Fancy Free* while he plays keyboards in *Evil Hippie,* where Carlos sings and leads, for example. Thus, there is a sense in which the band members are the same and another sense in which they are not, and it is this later sense that helps us identify each band. This is another reason why roles are important and another way in which it makes sense to conceive the constitution relation as mediated by roles.

It is for these reasons that I think roles must be taken seriously as parte of our ontological base when dealing with structured entities like teams, corporations, institutions, bands and, of course, propositions. They may not belong to the fundamental furniture of the world, if such a thing exists, but they belong to the furniture of the world nevertheless. In other words, these are good reasons to believe that these entities exist, even if they may turn out to be reducible to other more fundamental entities. Ockham's razor has no job here.

Recognising the importance of roles in explaining complex systems is not a novel idea in philosophy, even if under different nomenclature. The basic idea plays a central role in Shapiro's structuralism (1987), but it is present in

the work of other philosophers too. For example, what I call "playing" a role, Frege called "saturation" and what I call "roles" he called "places", Knobe, Prasada, et.al. called "parameters" and Cummins (1975) called "functions". Shapiro's vocabulary has the advantage that "roles", unlike "slots", "places" or "empty spaces", does not have a negative connotation. Places and slots seem to be negative entities and, therefore, many philosophers prefer to avoid them in their ontology. Roles, fortunately, do not have this connotation. That is why, while many people have trouble thinking of empty spaces or slots as parts of propositions (Oliver 2010), there is not as much trouble accepting that, for example, a baseball team is composed of certain roles - pitcher, first base, short stop, etc. - played by different players.

2. Role Playing

The relation of playing a role is extrinsic. This means, that when an entity plays a role in a system, it does not become part of such system. Role playing is not a kind of fusion, but an extrinsic relation that can be either contingent – like Sandy Madera being *Los Diablos Rojos'* 1st base infielder – or necessary – like Marthín Tulin being *Los Fancy Free* singer. When the relation is contingent, the object could not have played that role, and in turn, the role could have been played by another object, but even when the relation is necessary, there is still an ontological independence between role and player. As aforementioned, there is more to Sandy Madera than playing 1st base infielder for *Los Diablos Rojos*. And this has important **epistemological** consequences: One can be fully aware of *Los Diablos Rojos* and their performance in a game without knowing anything about the players except for what they do on the playfield, that is, except for what they do when they play their respective roles in the team. Since the identity of the role-player is more than just playing such a role, when an entity plays a role, that entity is not fully there in whatever larger whole the relevant role is part of. Thus, one can be fully aware of the team and yet not be able to re-identify any of its constituent players, except when playing their respective role in the team; one may not even be able to re-identify the same player playing a different role or in a different team.

Also, the relation of playing a role is a function. Every role can be played by at most one entity, but the same entity can play more than one role in the same complex system, (as illustrated in the case of Lisa Vallee-Smith) or different roles in different systems (as illustrated in the case of Martín Thulín). This might sound completely counter-intuitive, since we usually speak of different entities playing the same role. For example, we know that six different actors have played the role of James Bond in the long lasting franchise of movies so far, and it is also true that when

Gianluigi Buffon replaced Gianluca Pagliuca in the Italian soccer team for the World Cup play-off first leg in Moscow, he was playing the very role once played by Pagliuca (goalie); all of this is normal talk of roles. However, it is important to notice how loose our talk of role identity is and just be careful not to confuse the role something plays in a system – which is proper to that system and that person – and analogous roles that can be played by other things and/or in analogous systems. Thus, I hope it is straightforward enough to notice that when we say that the drummers in two different bands are playing the same roles in their respective bands what we mean is not that their role is actually the same, but that they are analogous. In my ontology of roles, there is no such thing as the abstract role of *drummer* (even though I do not reject the possibility that further developments of a theory of roles might require the existence of roles of this sort), only the concrete roles actual drummers play in their actual bands. As Shapiro has stressed, the importance of identifying analogous roles in different systems is fundamental for many purposes, like pattern recognition and syntactic processing. However, being able to distinguish different, yet analogous roles is also fundamental.

IV. The proposal

1. Roles as mediators between proposition and constituents

Now that we understand better what I mean by roles and by role playing, I can flesh out the claim that propositions are fusions of roles played by objects and concepts. The basic idea is that the relation between a proposition and its constituents is mediated by roles in the same sense that the relation between a baseball team and its players is also mediated by roles. Propositions have roles as parts and these roles are played by objects and concepts which, in turn, are the constituents of the proposition. In this sense, metaphysically, a proposition is a fusion of roles. The playing relation between constituents and roles, in turn, is neither identity – as Shapiro has stressed – nor part-whole – as Keller, Tillerman, Fowler, Knobe, Prasada, et.al. insist. Instead, it is a necessary, but extrinsic function that allows for the constituents to be metaphysically independent from the proposition (but not the other way around). Also, since playing a role is a function, every role in the proposition can be played by at most one entity, but the same entity can play different roles in different propositions or more than one role in the same proposition, as illustrated in propositions like "John was a terrible performer, but I could never forget him". In other words, an object or concept can occupy more than one place in the same proposition. So it makes sense to say things like "3 + 3 = 6" even if there is only one number 3.

That this relation is external explains why, for example, Paris Hilton can exist independently of whatever we say about her. An object or concept can play a role in a proposition without being a part of such proposition. Role playing is not a kind of fusion, and this has important **epistemological** consequences. This explains why one can fully grasp a proposition without being aware of other properties of their constituents besides the ones they get from playing the role they play in the proposition. We may grasp two propositions that share constituents without realising that they do, and this helps explain why some analytic inferences actually increase knowledge (this also explains why the minimal requirement for understanding an utterance is grasping something like what Korta and Perry (2011) have called its reflexive proposition). Since the identity of the constituent is more than just playing whatever role it plays in the proposition, constituents are not fully **in** the proposition. Thus, grasping a proposition does not entail fully grasping all of its constituents (in the sense of being able to identify them independently of the proposition). One can fully grasp a proposition and yet not be able to re-identify any of its constituent, except when playing their respective role in the proposition; one may not even be able to re-identify the same constituent playing a different role in the same proposition or in a different one.

2. Propositions as fusions of roles

Propositions are fusions of roles, but not any fusion of roles has the structure of a proposition. The fusion must respect certain logical and grammatical criteria, i.e., it must be well formed. A simple way to understand in what sense a fusion of roles is well formed is by adopting a type theory similar to the one used in formal semantics.[1] The fundamental idea, for those not familiar with type theory is that every role is of a logical type. Types, in turn, can be divided into three groups depending on whether they can be played by objects (let's call them roles of type *object*), propositions (let's call them roles of type *proposition*) or concepts. Roles that can be played by concepts are of different types depending on the types of their arguments and values, so for example, a role of type *<object, proposition>* is one that can be played by a concept that, when applied to and object, gives rise to a proposition. Thus, the role of the *baldness* concept in the proposition *John is bald* is of type *<object proposition>*, while the role John plays in that proposition is of type *object*; similarly, adverbial concepts such as *red* occupy roles of type *<<object, proposition>, <object, proposition>>* because, when applied to first-order concepts such as *shirt*, result in another first-order concept, such as *red shirt*; logical operators like conjunction or disjunction can play roles of type

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[1]. For an easy and simple introduction, I recommend chapters 4 and 5 of (Gamut 1991)

<proposition, <proposition, proposition>>, since their application to two propositions results in a new proposition (the conjunction or disjunction of the original ones), etc.

Note that the being of a certain type does not exhaust the identity of the role. That a role is of a certain type only tells us what kind of object can play such a role, nothing else. As such, it gives us all the information necessary to determine when a fusion of roles is appropriate to be a proposition. But there is more to roles than types. This means that two roles of the same type are not only numerically different, they can be substantially different as well. This is as should be if we think of more familiar roles, like the ones used as examples earlier in this text. The role of short stop in a baseball team, for example, is not just being a person. Otherwise, short stop and 1st base infielder would be only numerically different, since they are of the same type: whoever can play one role could also, even if only in principle, also play the other. However, they are not only numerically different, they are genuine and substantially different. Similarly for the roles that make up propositions. In *John loves Mary*, for example, the roles that John and Mary play are not only numerically different, but substantially different: John plays the role of being who loves Mary according to the proposition, while Mary plays the role of being who is loved by John according to the proposition. That they are of the same logical type does not actually say much about each role: only that they can be played by entities of the same ontological kind.

This does not mean that different roles in the same proposition cannot be just numerically different.[2] In trivial identity propositions, like *4=4*, the two roles that *4* plays are not only of the same type, but they are also just numerically different, i.e., identical except for being different. Again, this is not idiosincratic of propositions. Consider Uzquiano's example of the *United States Supreme Court:* most of its members (except for the Chief Justice) play the same role of *Justices*, i.e., they play roles that are nothing but numerically distinct. Similarly with some roles within propositions like those involved in statements of numerical identity.

Once roles are classified by their types, we can recursively calculate the type of fusions of roles from the type of its parts:

1. Roles of type *object* are well formed

2. Given two well formed roles or fusions of roles, one of type *X* and another type *<X, Y>*, their fusion is also well formed and of type *Y*

3. No other fusion of roles is well formed.

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2. Thanks to Jeremy Goodman for bringing this point up to me.

Once we have well-formed fusions, some of them will be of the *proposition* type. When objects and concepts of the appropriate kind play the roles in a well formed fusion of roles of type *proposition,* what we get is an actual proposition. This means that fusions of roles do not constitute a proposition until those roles are played by concepts and objects of the proper kind. It is only in this sense that the proposition is grounded in its constituents, even if they are not part of it.

3. It works!

This proposal has none of the problems of the proposals discussed or proposed by Gasiunas (*forthcoming*), Keller (2013), Gilmore (2014) or Tillman and co-authors (2012):

- It explains general content differences, for example between the proposition that *Paris is a city* and that *Santa Monica is a city*, or between the proposition that *Ana loves Mary* and that *Mary loves Ana*. The difference between the propositions that *Paris is a city* and that *Santa Monica is a city* is explained by saying that Paris plays a role in the first proposition and no role in the other and vice versa; The difference between the propositions that *Ana loves Mary* and that *Mary loves Ana* is explained by saying that, even though their constituents are the same objects and concepts, they play different roles in each one. Ana plays the role of being who loves Mary according to the first proposition and the role of being who is loved by Mary according to the second proposition. These roles are different, even if they are of the same type.

- It satisfies our pre-theoretical intuitions that propositions are about their constituents since these are just the usual objects and concepts that are the referents to the sentences we use to communicate them. Furthermore, it also respects the traditional thesis that propositions that are about the same thing have a common constituent representing that aspect of reality they have in common. In this sense, propositions have 'sharable' constituents. *Miles Davis is a jazz musician,* for example, has something in common with the proposition that *John Coltrane is a jazz musician*, namely, the components in *being a jazz musician,* and something different in common with the proposition that *Miles Davis released "Kind of Blue",* namely, the component Miles David.

- It gives plausible conditions of epistemic access to propositions. It explains both why we can not grasp the proposition, for example, that *Paris is a city* if we do not possess the concept of city or some kind of epistemic access to Paris while at the same time explaining why we can grasp a proposition, for example, that *Paris is a city*

and yet not be able to identify Paris under certain circumstances. Remember that, since constituents are not parts, they are not fully in the proposition they are constituents of and thus we do not need to fully grasp them in order to grasp the proposition. Yet, at the same time, we cannot fully grasp a proposition without being able to identify its constituents **as** the entities that play their roles. So, for example, we may not need to have a full grasp of Paris to grasp that *Paris is a city*, but we may still need to have enough of a grasp to understand it as playing the role of being a city according to the proposition.

- Explain how thoughts stand in logical and semantic relations to one another because of their form. Traditionally, the occurrence of logical operators in a proposition determines its logical rom. Thus, in order to have one logical form or another, a proposition must have some constituents or others. My account respects this intuition by allowing logical operators like modal operators, negation, etc. to be constituents of the proposition. Furthermore, my account explains why formal logical inference is not only necessary, but also productive. Remember that in my proposal, we may grasp two propositions that share constituents without realising that they do, but this is precisely what is required by formal logical inference. One cannot be properly said to be performing a *modus ponens*, for example, if one is not aware, at some level, that one of the premises is the antecedent of the other one. In general, one cannot be said to be properly performing a formal inference if one is not actually relying on the formal properties of the premises in performing the inference, and it is impossible to identify the formal properties of propositions without being able to identify at least some of their constituents. Thus, my proposal explains why formal inference are not always obvious or trivial, but instead sometimes require significan cognitive effort.

- It explains how constituents form truth-evaluable contents. In this proposal, the proposition that *Miles Davis is a jazz musician* is not a list, fusion or set of objects and properties: it represents Miles Davis (because it has him as a constituent) as being some way. It takes very seriously the intuition that objects and concepts play different roles in the proposition. Furthermore, through the recognition that roles can be of different types depending on what kind of objects or concepts can play them, it incorporates the distinction between ways of classifying or grouping things as instances of a general kind and the kind of things that get classified or grouped by concepts.

- Finally, since the same objects and concepts can play different roles in the same propositions, components are freely recombinable.

In general, one way of understanding the basic idea behind my account is like this: traditional theories of composition failed because our theories expected constituents to have properties that were jointly inconsistent. My solution was to avoid the inconsistency by ascribing some (but not all of the) properties traditionally attributed to the constituents to the roles they play in the proposition.

Furthermore, the account is general enough that it can be generalized to any structured entity, such as concepts (Knobe et. al. 2013, Prasada et.al. 2013), baseball teams (Shapiro, 1997), events (Dorr 2004), etc.

Of course, this proposal has a cost. We need to accept *roles* into our ontology and introduce the notion of *role playing*, but I hope to have successfully argued that we may want them in our overall picture of the world independently of our theory of propositional composition. Also, one might think that roles are well and good for modelling the behaviour of social groups like corporations, baseball teams or rock bands, but that propositions are different enough to think that appealing to roles to account for the relation between a proposition and its components is at most metaphoric. However, it is not obvious that propositions are not social entities of the same kind as teams and bands, and furthermore, roles are also found in the natural world. As Cummins (1975) has accurately pointed out, when biologists describe the workings of systems like the digestive system or similar, they appeal to the functions of the organs that compose such systems in a sense that is different from the sense in which evolutionary biologists talk about function. What they mean instead when they talk of an organ's function within a system is nothing but what I have called its *role*, i.e., its contribution to the overall functioning of the whole system. Thus, appealing to roles in explaining the relation between propositions and their constituents is natural and fruitful. Furthermore, it succeeds where similar attempts, appealing to grounding, hylomorphism, etc. fail.

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