¿What's in a structure?

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Early Draft. Comments Welcome

I. On Propositional Structure

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. As Speaks (manuscript) has noticed, "Structured propositionalists have not always been as clear as they could have been, either about what the claim that propositions have constituents means, or about what, exactly, this claim is supposed to explain." Still, looking at the literature, one can identify at least 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 else, 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.

- Explain the metaphysical dependence (if any) between propositions and the world, in general, and those parts of the world they are about, in particular. Thus, the proposition that *The sky is blue* depends on the existence of the

sky in so far as it has it as one of its constituents. So, the theory of propositional constituents reduces the dpeendance of propositions on what they are about to the dependance of a composite on its constituents.

- 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. "What propositional knowledge one is capable of attaining seems dependent on what concepts one possesses—one cannot know that the sun is a star unless one can have the thought that the sun is a star, and one cannot have that thought unless one possesses the concept *star*." (Earl 2017)

- Explain how thoughts stand in logical and semantic relations to one another because of their form (Salmon 1989).

- 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*. (Cresswell 1985, Davidson 2001)

- 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.

Unfortunately, proponents of structured propositions have said next to nothing about exactly what sort of relation linking propositions to their constituyents. This is what I call the problem of propositional constitution. This problem ought to be distinguished from other important metaphysical issues in the neighborhood. In particular, it does not aim to answer the question *what is a proposition*? or much the less serve as an argument for why should we believe that propositions are structured in the first place (even though not being clear about what it means for a proposition to be structured is definitely a strike against the hypothesis that propositions are structured). Furthermore, it must also be distinguished from the problem of the unity of the proposition that so interested Frege, Russell and, more recently, Graham Priest (2014), i.e., the issue of what makes the proposition that *Miles Davis is a jazz musician* be **one** proposition instead of a mere multiplicity made up of Miles Davis and the concept of being a jazz musician. Finally, it must also be distinguished from the related question of why propositions represent, an issue recently tackled by Merricks (2015), King, Soames and Speaks (2014) among others. In this regards, one must be careful when one says something like that a theory of propositional structure ought to explain how propositions manage to represent things a certain way, since this later expression is ambiguous between:

A. Explain why propositions represent things the way they do instead of representing things some other possible way.

B. Explain why propositions represent at all (instead of not representing anything).

Solving the problem of propositional structures might help to reach the first goal, but has nothing whatsoever to do with the second issue.[1]

II. Antecedents and Main Ingredients

Gasiunas (*manuscript*), 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.

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

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[1]. It is not hard to see that many of the aforementioned goals (specially the first one) flesh out goal A, while I know of no structured propositionalist who has tried to use the notion of structure to pursue goal B (while Speaks and Merricks are certainly no friends of the structured propositions hypothesis), thus I will ignore B among the desiderata a good theory of propositional structure ought to satisfy.

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

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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. In general, I know of no other way to make sense of the fact that, sometimes, different entites might have the same constituentes and thus, that the identity of some entities cannot be reduced to the identity of their constituentes. So, it seesm to me that, in cases like this, we need to appeal to something like a structure. I do not know whether roles belong to the fundamental furniture of the world, if such a thing exists, but I am sure 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.

Notice that even though I have borrowed the world "role" from natural language, I am also givign it a very specific and technical sense in my metaphysics. Nevertheless recognising the importance of what I am calling "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 positions - 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, and is what is at stake in order to make sense of propositional constitution.

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. If one were to determine, for example, what is the relation between a proposition like, say, that *Tarkan Tevetoğlu was born in Germany* and one of its constituents, let's say, Tarkan Tevetoğlu, the common sense answer would be to say that Tarkan Tevetoğlu is the entity of which the proposition says that he was born in Germany. My proposal is to take seriously this commonsense intuition so that this is what makes it that Tarkan Tevetoğlu is a constituent of *Tarkan Tevetoğlu was born in Germany*. The idea is to hold that to say that Tarkan Tevetoğlu *is* the

entity of which the proposition says that he was born in Germany is just like saying that Sandy Madera *is* Los Diablos first base infielder. The "is" involved is not identity, but role playing. This means that Tarkan Tevetoğlu is the entity that plays the role of being that of which the proposition says that he was born in Germany is **just like** Sandy Madera is the person who plays the position of 1st base infielder in Los Diablos Rojos.

Thus, just like baseball teams have positions as parts and these positions are played by players which, in turn, are the team's contituyents, 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 metaphysical criteria, i.e., it must be well formed. A simple way to determine when a fusion of roles corresponds to a proposition by adapting an idea originally developed by Frege. For Frege, propositional constituentes were of two general types: objects and concepts. Combining an object and a concept gives us a proposition, but combining two or more objects without a concept or two or more concepts without an object does not, and the reason has nothing to do with anything external to the object and the concept. It is the very intrinsic nature of object and concepts themselves (in particular, the predicative nature of concepts and the substantial nature of objects) that makes it impossible for, say, two objects with no concept to become a proposition. We can adapt this idea expanding our ontological categories to more than two and applying it, not ot the constituents themselves but to their roles. Thus we can 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.[2] 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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[2]. 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.[3]

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 are 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.[4] 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 idiosyncratic 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.

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[3]. Even though I am using the linguistic notion of type to illustrate my notion of type, it is very important to clarify that it is **not** the same notion. As I stress in the body of the text, that a role is of a certain type does not mean anything but that it can be played by a certain kind of object. As such, my notion of type is not a linguistic notion. Furthermore, my theory does not require there to be any necessary relation between the logical type of a role and the linguistic type of the expression that expresses its respective constituent in the sentences we use to communicate such proposition. We can expect that, usually, propositional constituents will be just the usual objects and concepts that are the referents to the expressions that make up the sentences we use to communicate them, but this need not be so. Nothing in my theory excludes the possibility that an expression of type <e> can be used to express a constituent that plays a role of type <e, p> in the corresponding proposition. Thus, for example, sentence "Pegasus flies" can express a proposition where the constituent corresponding to "Pegasus" may be not of type <e> but of a different type, perhaps a singular concept. I thank Ray Elguardo for pressing me on this point.

[4]. Thanks to Jeremy Goodman for bringing this point up to me.

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.

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.

Traditionally, it is commonly held that explaining the structure of a proposition like *The Empire State Building is tall* presents no special challenge since its two parts *The Empire State Building* and *being tall* are so different **in themselves** that when you put them together, there is only one way they can interact: the concept – being tall – cannot but be predicated of the object – the Empire State Building. When you put an object and a concept in a proposition, each one cannot play but a single role in the proposition. Being an object restricts the roles the Empire State Building can play in a proposition. It cannot be predicated, for example; but concepts can be predicated of it. Similarly for a concept like *being tall*: its being a concept restricts the kind of roles it can play in a proposition in such a way that when it is joined with an object, it is predicated of such an object. In other words, their interaction is determined by their identity. In contrast, in a proposition that involves an asymmetric relation like *John saluted Leo*, something extra seems to be required. If we bring together *John*, *saluted* and *Leo*, we need something extra to make sure that they each play their proper roles so that we get the proposition that *John saluted Leo* instead of *Leo saluted John.*

This problem is commonly known as the problem of asymmetric relations, because it is presumed that it does not hold for symmetric relations and non-relational propositions or facts (hence, Corr's attempt at eliminating *only* this sort of relations from his ontology). However, this presumption is mistaken, for the problem is also present in all kinds of propositions (or facts). Consider the proposition that *parachuting is awesome.* Instead of an object and a concept, what we have here are two concepts: *parachuting* and *being awesome.* Thus, bringing them together is not

enough to determine the structure of the proposition. Bringing two concepts together in a proposition does not tell us which one is predicated of which.

One might want to argue that given than *being awesome* is not the kind of thing that can *parachute*, then it is still true that the only way we can bring together these two concepts is by predicating *being awesome* to *parachuting* and thus this is not a counter-example to the general claim that, except for propositions involving asymmetric relations, the interaction between the constituents of a proposition is determined by their identity. In other words, since saying "being awesome parachutes" makes no sense, joining *parachuting* and *being awesome* together in a proposition can only result in the proposition that *parachuting is awesome*.

But this reply is unsatisfactory, for we can just change the example a little and find another example, completely analogous where each concept could be applied to each other resulting in different propositions, like *being awesome is enviable*. Once again, the problem is that bringing together *being enviable* and *being awesome* in a proposition does not determine what the resulting proposition would be: it could have been that *being enviable is awesome*.

One might also reply that *Parachuting is awesome* does not actually involve two concepts playing different roles in the proposition, but an object and a concept. This Fregean kind of reply is also difficult to make work, because one would have to explain what the object *Parachuting* is and how it is related to the concept *Parachuting*. Here, one has two options: either they are the same entity or they are different entities. If they are different entities, one has to explain how they are related, and this is no easy challenge –even though there have been well developed attempts, from Frege's courses of values, to set theory. The main challenge here, of course, is to avoid Russell's paradox and still provide appropriate objects for every concept. If they are the same entity, then we must explain what it is for *Parachuting* to work as an object sometimes and for it to work as a concept other times. We must also revise our notions of object and concept in order to make it coherent that something can be both a concept and an object or sometimes a concept and other times an object. If all we mean when we say that something like *Parachuting* is a concept is that it can be predicated of objects and all we mean when we say that it is an object is that concepts can be predicated of it, then we have no way of solving the problem, for when both *Parachuting* and *being awesome* come together in a proposition, both can be object and both can be concepts. Thus, we still need something extra that determines that, in this proposition, what is predicated of what. If all we mean when we say that something like *Parachuting* is sometimes a concept is that it sometimes is predicated of objects and all we mean when we say that it is

an object some times is that, on those times, concepts are predicated of it, no solution of the problem becomes available, for when both *Parachuting* and *being awesome* come together in a proposition, we still need something extra that determines, this time, one is the object and the other the concept in the proposition. In other words, we have just changed the notions of objects and concepts from ontological kinds that an entity has independently of becoming a component in a particular proposition, to roles such entity can play within a proposition. However, the challenge had always been to explain what role an entity plays in a proposition by appealing only to properties the entity has independently of the proposition, so this proposal fails to do so.

Finally, one could also argue that, actually, there are more components to the proposition that *Parachuting is awesome* hidden or unarticulated in the sentence we usually use to express it. For example, one could think that the idea is that the proposition does not predicate *being awesome* of *parachuting* but that it relates them in some other way, for instance, saying that *parachuting* implies *being awesome*. Thus, it is not surprising that the problem surfaces in this proposition, since it actually involves an asymmetric relation. However, I cannot see what other relation between the one of predication relates *being awesome* and *parachuting* in the proposition that *parachuting is awesome*. It is clear that it does not say that it is enough to parachute to be awesome or vice versa. What it says is awesome is not whoever parachutes, but parachuting itself. One could also argue that the proposition says, not that people who parachute are awesome, but that parachutings are awesome events. That is, being a parachuting entails being awesome. However, this proposal inherits the problems of the previous kind, since it introduces a difference between the concept *parachuting* as it applies to events and as it applies to people. Once again, the questions are: are these different concepts or a single one? And if so, how are they related and/or how do we determine when do we have one or the other. When we join *parachuting* and *being awesome* how do we know that we must take them to have events as their domain?

This, I think, is what Gary Ostertag was trying to get at in his CJP paper, and I agree with him, the problem has little to do with relations and all to do with roles existing only in propositions, not in their constituents. This means, even though OStertag seems to be wary of reaching this conclsuions, that constitution i.e., the relation between propositions and their constituents cannot be a kind of metaphysical grounding, for all the facts involving the components independently of their role in the propositions cannot seem to be enough to determine, not even the identity of the proposition.

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.

    One might be skeptical as to whether appealing to roles like this actually amounts to a genuine explanation in so far as it seems to kick the problem just from the level of Ana and Mary themselves to their roles. In other words, one may still raise the question of why are Ana and Mary's roles in *Ana loves Mary* different from those they play in *Mary loves Ana*. However, what kind of answer can be given to this question? At a certain level, the right answer is that Ana and Mary's roles in *Ana loves Mary are* different from those they play in *Mary loves Ana* precisely because they are not exchangeable, that is, because *Ana loves Mary are* and *Mary loves Ana* are different propositions. But if we are asking for an explanation as to why this is so, this is not much of an answer. Yet no better answer can be given. Consider an analogy. If I say that Rudolf is far from his husband, and someone asks me why, it would be a right answer to say that it is because Rudolf is in Siberia, while his husband is in the Caribbean sea. But if they replied, "well, yeah, but why is Siberia far from the Caribbean?" I cannot interpret this new question as asking for an explanation similar to the first case. It seems clear to me that all I could do here is maybe show a map or somehow similar that would show that Siberia is indeed far from the Caribbean. There is no <u>reason</u> or <u>cause</u> why one place is far from the other. To ask for something of the sort is to not understand how location works, not to understand what places are. Similarly, to ask why the roles Ana and Mary play in *Ana loves Mary* are different is to not understand what roles are and how propositions work.

Assume, towards a contradiction that there was some further reason or cause why the role Ana plays in *Ana loves Mary* is different from the role Mary plays in such proposition. Without loss of generality, this would mean that there is a property Ana's role has that Mary's role does not and a property Mary's role has that Ans's role does not. Call the first property *firstness* and the second property *secondness*. Thus Ana's role has *firstness* (and Mary's does not) while Mary's role has *secondness* (and Mary's does not), and this explains why Ana's role in the proposition is different from Mary's. But if this was so, it would make little sense to appeal to roles now, *firstness* and *secondness* would be doing all the work. Let's call *firsthood* the property of playing-a-role-that-has-*firstness* and call *secondhood* the property of playing-a-role-that-has-*secondness*. Now we could say that the proposition that *Ana loves Mary* is different from the proposition that *Mary loves Ana* because Ana has *firsthood* in the proposition (and Mary does not) while Mary has *secondhood* in the proposition (and Ana does not). The same thing would need to be extended to propositions where it is necessary to distinguish among the roles two, three or more objects play, thus we would need to talk of *thirdhood, fourthhood, fifthhood*, etc. If you thing this makes any sense, then just think of these things – *firsthood, secondhood,* thirdhood, fourthhood, fifthhood, etc. as what I call roles. You will see there is no difference between saying that Ana has firsthood in *Ana loves Mary* while Mary has *secondhood,* than just saying they play different role. Nothing actual has been won.

- It satisfies our pre-theoretical intuitions that propositions are about their constituents since these will usually just be the usual objects and concepts that are the referents to the expressions 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.

Furthermore, notice that since constitution is not some kind of parthood, it is not transitive. Remember that for an object or concept to be a constituent of a proposition, it must play some role in it, and this condition is not transitive. And this is how it should be. Consider the following issue, raised to me by Ray Elguardo. Take the proposition that *Paris is a city*. By hypothesis, Paris is a constituent of that proposition. On some metaphysical views, cities are complex spatial objects some of whose parts are spatial objects. The Eiffel Tower is a part of Paris, and thus, it is a constituent of Paris. If the relation of *being a constituent of* were transitive, it ought to follow that The Eiffel

Tower is also a constituent of the proposition that *Paris is a city*. Yet, that proposition is not about The Eiffel Tower, thus it should not be one of its constituents. The assumption is that a structured singular proposition is about an object x iff x is a constituent of the proposition in question.

Here, we have several options: (1) deny that The Eiffel Tower is a constituent of Paris, (2) deny that the constituency relation is transitive, (3) deny that Paris is a constituent of the proposition that *Paris is a city*, (4) deny that the proposition is about Paris, or (5) deny that structured singular propositions are about their constituents. I reject (2), and I think that is the right alternative, since all other four options are non-starters. However, my rejection of (2) is not just to avoid this undesirable consequence, but follows directly from my view on constitution. On this view, a structured singular proposition is about x if and only if x is a constituent of the proposition, i.e, only if it plays a certain role in that proposition. That allows me to say that, yes, The Eiffel Tower is a constituent of Paris, because it plays some role in it, but since it plays no role in the proposition that *Paris is a city*, it is not one of its constituents. The proposition is not about The Eiffel Tower because, even though The Eiffel Tower is part of one of the proposition's constituents, it doesn't play any semantic role in the proposition whereas Paris does.

- 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 inferences are not always obvious or trivial, but instead sometimes require significan cognitive effort.

My hypothesis here is that logical forms are just logical relations. For example, having the form A∨B is just being related to a pair of propositions A and B so that it is the smallest proposition (under the ordering of logical consequence) that follows from each of them. This seems to have the explanation backwards, since we wanted logical form to ground logical properties and relations. But if logical form just is a logical relation, then this logical relation (the one I identify with the proposition's logical form) cannot be grounded on logical form without falling into a vicious circle!

In this regards, the moral we should draw is that logical and semantic properties and relations cannot be reduced to non-logical and non-semantic relations and properties. At most, what we can aim for is finding the fundamental logico-semantic properties and relations that ground all other logico-semantic properties and relations. This is what I hope to do: to find a proposition's fundamental logico-semantic relations and identify those with the proposition's compositional form.

- 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 has been 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. Constituents are there mostly to ground the link between

propositions and reality, while roles are there to explain semantic differences between propositions involving the same objects and concepts, while the distinction between them gives us a way out the paradox of deductive inference.

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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