Ontology on Shaky Grounds

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In *Realistic Rationalism*, J. J. Katz introduces a specific ontology based on a certain choice of categories. The categories he suggests are certainly non-standard and uneconomical, but Katz claims that the benefits greatly outweight the costs. As we will try to show in this short paper, we believe that Katz's categories are improperly construed. It is on these grounds that it will be claimed that his ontology rests on shaky grounds. This is not meant to imply that Katz's ontology itself is inadequate, but only his presentation of it.

The basic category Katz tries to develop is the category Object of objects. Katz wants to clarify the kinds of objects there can be. His goal is to show that there are abstract, concrete and what he calls "composite" objects, and that these are disjoints and jointly exhaustive categories. Thus the world, for there is only one world according to Katz, would be made up of abstract, concrete and composite objects. How does Katz distinguishes these categories? He first introduces a distinction between homogeneous and heteregenous objects. Informally, an object is homogeneous if its constituants each have the same ontological status as the object itself. Objects are therefore made up of constituants, and generally have a structure, since these constituants are related to one another in a certain manner. These constituants, though, can have a different ontological nature than the object they constitute. Katz explicitly claims that the

relation "being a constituant of" is transitive: if x is a constituant of y and y is a constituant of z, then x is a constituant of z (pp. 121-122). So far, so good.

Then, Katz offers what appears to be a more formal definition: "an object O is *homogeneous* with respect to the concept C if and only if, for any atomic object, it is homogeneous with respect to C just in case the object falls under C, and, for any structured object, it is homogeneous with respect to C just in case it and all its constituents fall under C. If an object is not homogeneous with respect to C, it is *heterogeneous* with respect to C." (p. 122) Notice immediately the relativity of the concept of ontological homogeneity: an object is homogeneous *with respect to a concept C*, not in any absolute sense. Katz offers a few examples of homogeneous objects: he says that "numbers are homogeneous with resepct to the concept 'abstract' for the realist and homogeneous with respect to the concept 'mathematical' for everyone." (p. 121) Another example would be animals and our bodies which are homogeneous with respect to the concept 'matter', at least for mind-body dualists like Descartes.

The first problem with Katz's analysis arises here: nowhere are we told which concepts C are admissible in the definition of homogeneity. Two immediate concerns come to mind. First, what assures us that one and the same object O will not turn out to be homogeneous with respect to a concept C and heterogeneous with respect to a different concept C'? Water, for instance, is homogeneous with respect to the concept "being material", at least for materialists. But consider the concept "being liquid". Water is certainly liquid, but I, for one, would not claim that *each* water *molecule* is liquid, although it seems unproblematic that water molecules are the constituants of water. Thus water is not homogeneous with respect to the concept "being liquid". Hence, water is homogeneous with respect to a concept C and not homogeneous with respect to a concept C'. Second, it is extremely hard to resist constructing a concept C which would lead to a paradoxical situation. Presumably, concepts are objects, since concepts ought to count as abstract objects for Katz and, as we will see, abstract objects are objects. Thus, we can question whether a concept is homogeneous or not with

respect to a concept. Nothing prevents us from questioning homogeneity with respect to the concept itself. It is then easy to construct paradoxes: consider the concept C = "not being homogeneous". But C does not appear to be well formed, since homogeneity should be relative to a concept. We could certainly modify C thus: C = "not being homogeneous with respect to any concept". We can then simply ask whether C is homogeneous with respect to C and a paradoxical situation immediately follows. If this particular case is not convincing, it should nonetheless be enough to open the door to more serious cases. Third, and in a somewhat different vein from the previous remark, if concepts are objects, how are we then to analyse their constituants? Are concepts atomic objects? If not, then what is their structure? This point is particularly important given Katz's views on mathematics and logic. But let us move on, since these points do not constitute our main objection to Katz's approach. The main problem with Katz's analysis resides elsewhere. Before we go on to discuss this, it will be important to introduce Katz's distinction between abstract and concrete objects. The distinction is given thus:

(D) An object is *abstract* just in case it lacks both spatial and temporal location and is homogeneous in this respect. An object is *concrete* just in case it has spatial or temporal location and is homogeneous in this respect. (p. 124)

We will leave it to others to judge whether this definition is acceptable. Notice the concepts involved in the definition. It could be reformulated it in the following manner: let C be the concept "lacking both spatial and temporal location", then an object is abstract just in case it falls under C and is homogeneous with respect to C; let C' be the concept "having a spatial or temporal location", then an object is concrete just in case it falls under C' and is homogeneous with respect to C'.

Once more, let us repeat that it is not our intention to take issue with Katz's definition as such. Let us merely observe that "not being abstract" is not the same as "being concrete" and conversely "not being concrete" is not the same as "being abstract". For, as can be seen from the definitions, an object O is *not abstract* just in case it has a spatial or a temporal location or is not homogeneous with respect to the

concept "lacking both spatial and temporal location". But this is not the same as being concrete. Indeed, "not being homogeneous with respect to the concept 'lacking both spatial and temporal location'" can mean that an object lacks both spatial and temporal location but that some of its constituants have a spatial and temporal location. Standard counterexamples to the abstract/concrete distinction come to mind: institutions, species, and so on. Similarly, an object O is not concrete just in case it both lacks spatial and temporal location or it is not homogeneous with respect to the concept "having a spatial and a temporal location". Again, this is not the same as being abstract. It leads to the extraordinary possibility of an object having both temporal and spatial location, but at once being such that some of its constituants do not have this property. Perhaps the equator fulfills this caracterization. It could be argued that, as such, the equator has a definite spatial and temporal location but that it cannot be identified with any specific point on earth and therefore none of its constituants have a spatial or a temporal location. Be that as it may, it is clear that Katz's definition does not entail that the complement of "being abstract" is the same as "being concrete" and vice versa. This should not bother Katz, since he admits readily that it does not follow from his caracterization that an object is either abstract or concrete. Thus, "not being abstract" should include more than "being concrete".

But what does follow from Katz's definition? Later in the book, Katz points out that his definition (D) *does not* entail the following principle:

(D1) if something is an object, then it is homogeneous. (p. 140)

This is important, since if (D) were to entail (D1), then not only would it be hard to see how it is possible that "not being abstract" is not the same as "being concrete" and vice versa, but more importantly, Katz would not be able to handle a series of counterexamples to the distinction between abstract and concrete objects. But let us pause to observe, and this is the beginning of the real problem, that there is something strange about (D1) indeed. For the relativity to a concept has disappeared and the

notion of homogeneity is mentioned in absolute terms, so to speak. It seems that (D1) should instead read as follows:

(D1.a) if something is an object, then it is homogeneous with respect to a concept C.

More formally, it could perhaps be written as follows:

(D1.b) if something is an object, then there is a concept C such that it is homogeneous with respect to C.

The problem here is that it is hard to see what the connexion between (D) and these versions of (D1) ought to be. Clearly, (D) could not entail (D1.a) anymore than (D1). In (D), we have fixed the concepts relative to which the homogeneity is defined. Nothing in (D1) refers to these concepts. However, (D1.a) or (D1.b) might very well be independently true of (D). In fact, (D) might very well be compatible with (D1.a) or (D1.b). Given an object O, how do we know a priori that there is no concept C such that O is homogeneous with respect to C? Being a claim about what exists, I can always maintain that we simply have not found the concept C yet. What is the ontological principle which prevents this possibility? We have been unable to find one in Katz's book.

Katz claims that there are no grounds for (D1). He suggests that (D1) be replaced by the following principle:

(D4) if something is an object, it is either homogeneous or heterogeneous.

(D4) is extremely important for Katz, for if it is true then one is authorized to introduce a *new* category of objects, namely so-called "composite" objects. Informally, composite objects are heterogeneous objects which are neither abstract nor concrete, or to put matters a bit more precisely, objects which are in some sense at once abstract and concrete. Thus definition (D) serves as a foundation for the distinction between abstract and concrete objects, which are both homogeneous objects and definition (D4) underlies the introduction of composite objects, which contains the usual counterexamples to the traditional distinction between abstract and concrete objects. Moreover, once the definition of heterogeneity is spelled out, it is very hard to see how (D4) could not be true. Indeed, it becomes:

(D4.a) if something is an object, it is either homogeneous or it is not homogeneous.

Hence it seems that if we accept the law of excluded middle, we should admit (D4). Something strange, however, is afoot. For (D1) seemed to be highly problematic, whereas (D4) is tautological.

However, as the reader certainly expects by now, (D4) is not as trivial as it appears. In fact, as it stands, it is ambiguous. As for (D1), because Katz has given (D4) without specifying the concepts relative to which the homogeneity and the heterogeneity are relative, they seem to be taken in an absolute sense. It thus seems reasonable to reintroduce a form of relativity in (D4). However, this can be done in four different ways, depending on how one quantifies over concepts in the disjunction. Let us explore these possibilities systematically.

(D4.1) if something is an object, then there is a concept C such that either the object is homogeneous with respect to C or heterogeneous with respect to C.

This seems to be rather weak. In fact, once the concept of heterogeneity is again written explicitly, we obtain:

(D4.1.1) if something is an object, then there is a concept C such that either the object is homogeneous with respect to C or not homogeneous with respect to C.

Again, in this form, the principle seems to be trivially true. It seems plausible that one can find a concept C such that given an object O, it will be either homogeneous with respect to that concept C or it won't be. There is nothing in this that allows us to define a new category of objects. So, let us try again.

A different possibility is raised by the following:

(D4.2) if something is an object, then it is either homogeneous with respect to a concept C or it is heterogeneous with respect to a concept C'.

This reading allows for the possibility that the concepts C and C' be different and that there is no concept such that the object is homogeneous and heterogenous relative to that concept. It is for this reason that (D4.2) is not logically equivalent to (D4.1). Again, being more explicit about the notion of heterogeneity, we obtain:

(D4.2.1) if something is an object, then either this object is homogeneous with respect to a concept C or it is not homogeneous with respect to a concept C'.

What are we to think of this principle? Again, it seems to be plausible enough. For consider what happens if we cannot find a concept C such that an object is homogeneous with respect to C. Then, clearly, there is a concept C such that the object is not homogeneous with respect to it and we are done. For purely symetric reasons, we can argue in a similar manner for the heterogeneity. Thus, we do not see how this principle guarantees the existence of a new category of objects.

We now have to try to quantify over all concepts:

(D4.3) if something is an object, then for all concepts C, either the object is homogeneous with respect to C or it is heterogeneous with respect to C.

Again, this is certainly true and not what Katz intends since it is a special case of the law of exluded middle. Indeed, to repeat the foregoing definition of heterogeneity simply says that if something is an object, then for all concepts C, either this object is homogeneous with respect to C or it is not homogeneous with respect to C. This seems plausible enough. However, still a different interpretation remains:

(D4.4) if something is an object, then it is either homogeneous with respect to all concepts C or it is heterogeneous with respect to all concepts C'.

Once more, this can be rewritten as:

(D4.4) if something is an object, then it is either homogeneous with respect to all concepts C or it is not homogeneous with respect to all concepts C'.

Equivalently: if something is an object, then it is either homogeneous with respect to all concepts C or there is no concept C' such that this object is homogeneous with respect to C'.

Clearly, (D4.4) is not equivalent to (D4.3). Furthermore, (D4.4) seems to be false. Indeed, it seems extremely unlikely that an object could be homogenous with respect to all concepts or that it would not be with respect to at least one. Once more, it does not yield the desired new category of objects.

Have we missed something? Perhaps. For what Katz *needs* is something much weaker than any of these interpretations. Indeed, when one looks closely at Katz's final ontology, one realizes that the concepts C needed are fixed and that the *general* notions of homogeneity and heterogeneity with respect to a concept C are not used at all.

On page 145, Katz presents his ontology in a succinct manner: at the top we have the category of objects (as well as other categories like Properties, etc.). Under the category Object are the categories Homogeneous Object and Heterogeneous Object. This is the delicate point. Katz does not say with respect to what homogeneity and heterogeneity are defined. In the case of homogeneous objects, this does not seem to pose a problem, since with his definition (D), he immediately introduces the categories of abstract and concrete objects. In other words, one could say that it is homogeneity with respect to the concept "having a spatial or temporal location or lacking both a spatial and temporal location". As far as heterogeneous objects are concerned, it seems that it would be enough for Katz to stipulate that what he has in mind are "not homogeneous with respect to 'having a spatial or temporal location or lacking both a spatial and temporal location'". Hence, if this is correct, there is absolutely no need for the general notion of homogeneity and heterogeneity.

In fact, Katz's analysis could be replaced by the following more straightforward approach. What Katz needs first is a transitive part-whole relation, what he calls "being a constituant". Assuming that we have such a relation and that we know what its basic properties are then the various notions involved can be introduced directly as follows:

a) an object O is *abstract* just in case it lacks both a spatial and a temporal location and for all constituants x of O, x also lacks both a spatial and a temporal location;

b) an object O is *concrete* just in case it has a spatial or a temporal location and for all constituants x of O, x also has a spatial or a temporal location.

Again, what makes the introduction of a new category possible is the fact that being not abstract is not the same as being concrete and vice versa. Indeed, as above, an object O is *not abstract* just in case it has a spatial location or a temporal location or there is a constituant x of O such that x has a spatial or a temporal location. Similarly,

an object O is *not concrete* just in case it lacks both a spatial and a temporal location or there is a constituant x of O such that x lacks a spatial and a temporal location. What this shows is that it is possible that "complex" or, as Katz wants to call them, "composite" objects exist. Notice that caution is in order here. For non abstract objects certainly include, as they should, concrete objects and, similarly, non concrete objects include, and again as they should, abstract objects. What we want to characterize are those objects which are not abstract but also not concrete. Thus, they could be defined thus:

c) an object O is *composite* just in case it is not abstract and not concrete.

This approach to composite objects is theoretically considerably different from Katz's analysis, although they both capture the same intuition and basically yield the same result. However, we believe that the foregoing definitions avoid another pitfall one finds in Katz's work. Indeed, after introducing his principle (D4) and hence the possibility of composite objects, he goes on to claim that "a composite object, like other complex objects, is a whole formed from objects in virtue of a relation (or patterns of relations) among them. The relation is 'creative', as we shall say, because, when the relation holds among some number of appropriate objects, there is a new object over and above them (with them as its components)." (p. 141) Katz *does not* offer a more precise definition of the notion of "creative relation". He is well aware that this is a difficult task. But the point of the relation is to allow for the introduction of a different mereological relation, specific to composite objects, namely the relation "being a component of". This is how Katz introduces it (p. 141):

(D5) A component of a composite object is one of the objects among which its creative relation holds.

Some problems emerge here. First, notice that if we are to take Katz's notion of "creative relation" seriously, there is no reason to limit it to composite objects. Indeed, everything that forms a system is a system in virtue of having a "creative relation". Consider once more the case of water. One could say, first, that each and every molecule of water is an object in virtue of "creative relations", namely the chemical

bonds between atoms of hydrogen and oxygen. But it could also be said that a body of water itself is an object in virtue of "creative relations" — again, the chemical bonds between molecules. It would be all too easy to provide a plethora of similar examples. Thus it seems that both abstract and concrete objects could have components in this sense. Second, it is clear that what Katz is after is an appropriate mereology of composite objects, for it is too obvious that the fact that they are neither abstract nor concrete makes their constitutive principle rather obscure. Indeed, we now have a fairly good idea of how (at least some) concrete objects are constituted — although there is still much to be learned — and we also have a fairly good idea of how (at least some) abstract objects are constituted although in this case too many questions remain unanswered. In both cases, we are dealing with *systems* of certain kinds which have a certain uniformity at least with respect to certain levels of analysis. (These are certainly the intuitions which guided Katz in his analysis.) Since composite objects are defined in a negative fashion, i.e., by stipulating that they are objects which are neither abstract nor concrete, they are necessarily of different non-uniform kinds and thus seem to have a different ontological status than abstract and concrete objects. For the latter are defined with respect to some definite properties and constitution whereas composite objects are defined in a purely negative manner. It is as if we should consider the kind "non-raven" as a genuine ornithonological kind and on a par with the kind "raven" itself. But there is of course no such kind. This is not to say that the concept 'non-raven' is not useful in one way or another, but that it does not occupy a 'niche' in our ontology.

In a more positive fashion, we could say that a composite object is an object which is either abstract and such that some of its components are concrete or concrete and such that some of its components are abstract. Clearly, an impure set, that is a set with urelements, would be an example of the first kind, and so would be biological species, whereas a book, an actual book, is a concrete object with abstract components, namely the senses of the sentences (this might not be the best example, but this case is at first more strange than the first one). This way of putting it brings to the fore another

important aspect of this category. There seems to be a genuine asymmetry between the cases of abstract objects with concrete parts and the cases of concrete objects with abstract parts, although it is seldom mentioned in the literature. Anyone defending an ontology of composite objects has to explain *why* examples of the first sort seem to be natural whereas examples of the second kind seem to be deeply bizarre; in other words one has to explain why the symmetry between these objects *is* broken in the ontology. There seems to be no a priori reason why there ought to be "more" abstract objects with concrete components than concrete objects with abstract components. There is absolutely nothing in Katz's ontology that explains this state of affairs. His examples of composite objects are all of the standard type: abstract objects with concrete parts. Why is it that the other type of composite objects is not even considered?

Be that as it may, the main problem now is of course the underlying mereology. We have assumed that there is a basic primitive relation, namely "being a constituant of", whose only formal property is transitivity. It is far from clear that such a relation can do all the work we would want it to do. Can we talk about the constituants of an abstract object in the same way that we talk about the constituants of a concrete object? I, for one, am not sure that we can. Katz wants to introduce a different, non-transitive relation, "being a component of", to account for the constitution of composite objects. This seems to be reasonable enough: consider a composite object O which is abstract with concrete components. We would not in general want the constituants of the concrete components to be components of O. For instance, an impure set with, among other things, a human being as an element does not have the parts of that human being as an element. However, this is a *general* problem which has nothing to do with the fact that we are considering composite objects. Consider the standard and well-known example of a football team. The parts of a team are the players of that team, but the parts of the players are not parts of the team. Once again, it would be easy to find similar examples, both of abstract and concrete systems. We are in fact facing the general problem of the mereology of systems, a problem which any ontology has to

struggle with. The problem in this particular instance is not that we have too many part-whole relations. On the contrary, it might be that we do not have enough of them!

In the end, it is difficult to see whether the category 'Object' makes any sense at all. For, as it is well-known, we do not have a general principle of identity for objects as such. We do have various principles for various *kinds* of objects, i.e. objects falling under a definite type. Furthermore, it is reasonable to think that a type, by the very fact of being a type, comes equipped with a principle of identity and that there is no such thing as a universal principle of identity. In addition to these difficulties, one has to keep in mind that, even when we do have a principle of identity for entities of a certain type, we might still need various part-whole relations for these entities which have to be related in a systematic fashion to the given principle of identity. Katz's goal is to make sense of the distinction between abstract and concrete entities. We do indeed need a good deal of clarification on these matters. Katz will have to provide us with a more precise and systematic proposal, for his latest attempt falls short of being convincing and for purely methodological reasons. Until then, the distinction remains a purely theoretical possibility.

Bibliography:

Katz, J.J., 1998, *Realistic Rationalism*, Cambrdige: MIT Press.