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The Metaphysics of Groups

ABSTRACT: If you are a realist about groups (e.g. religious institutions, football teams, the Mafia etc.) there are three main theories of what to identify groups with. I offer reasons for thinking that two of those theories (groups as *sui generis* entities and groups as mereological fusions) fail to meet important desiderata. The third option is to identify groups with sets, which meets all of the desiderata if only we take care over which sets they are identified with. I then canvass some possible objections to that third theory, and explain how to avoid them.

1. Group Realism

Examples of groups include construction companies, football teams, religious institutions, governmental bodies, the Mafia, the Vienna Circle, the Caterpillar club etc. Like other items we apparently quantify over, you may believe that we are ontologically committed to such things: you would then be a *group realist*. Numerous metaphysicists have endorsed group realism. Some have made explicit what types of entity they take them to be (examples are given below), whilst others have not stated allegiance to any identification, such as McTaggart [1921: ch. 15] and van Inwagen [1995] (who believes in just two groups – the Church and the Israelites).

For the purpose of argument, set aside whether a commitment to groups is wrong headed for this paper is concerned only with what groups should be identified with given the supposition of group realism. §2 examines the theory that groups are sui generis entities, and finds that identification wanting. §3 looks at the identification of groups with fusions of their members, and finds that identification wanting also. In §4 I introduce my preferred option, identifying them with sets. I detail a technique for avoiding the most common objection to that identification, and then in §5-9 I solve a variety of other problems facing the theory. I conclude that, on balance, group realists should identify groups with sets.

2. Theory One: Sui Generis Groups

Uzquiano [2004] argues that groups are sui generis entities, not to be identified with entities from other categories (such as properties, sets etc.). Such an identification is not to be recommended.

Problem one: If our first instinct was to reify as sui generis all of the entities that we end up being committed to, then our ontology would become increasingly bloated. For instance, take alleged commitments to possible worlds, properties, holes, works of music etc. In those cases where people think they have commitments to such things, identifications are made between those things and entities we are already accustomed to. Possible worlds are identified with separate spacetimes or sets of propositions (or states of affairs, or sentences etc.) [see Melia 2003: ch. 5-7 for a survey]; properties are oft identified with sets of their instances [Lewis 1986: 50-69] or sets of tropes; holes have been identified with hole linings [Lewis and Lewis 1978] and regions of spacetime [Wake *et al* 2007]; works of music have been identified with fusions of their performances [Caplan and Matheson 2006] and so on and so forth. So there is a presumption that, where we can, we make such identifications. Thus we have this desideratum:

> **Identification (I):** Groups should be identified with entities we are already committed to.

(I) is not sacrosanct, and in failing to meet (I) Uzquiano's theory is not fatally wounded. If no theory could meet (I), or could only meet (I) at great cost, we would have good reason to believe groups were sui generis *pace* our parsimonious urges. Indeed, that is Uzquiano's argument for groups being *sui generis*: that alternative theories *do* incur such costs. However, as it will transpire below, this is not the case, and this theory's failure to meet (I) does count against it.

Problem two: Imagine that sui generis groups were Platonic (i.e. existing outside of spacetime). You can either say that Platonic groups exist at no times (in that they exist outside spacetime) or exist at every time (in that, at all times, the Platonic groups fall under the existential quantifier). But intuitively groups (and not just their members) exist at *some* but not *all* times, so either disjunct spells bad news. For instance, the Everton football team came into existence in 1878 when Church parishioners decided to form it, and will presumably (and, for the fans, lamentably) one day cease to be. So if groups were Platonic entities, they would fail to meet this second desideratum:

Temporary (T): Groups can exist at some times without existing at every time.

Problem three: Alternatively, we might take sui generis groups to be located in spacetime (i.e. non-Platonic). They would (presumably) occupy the regions that their members occupy (e.g. Everton would occupy a region in Britain and not, say, a region somewhere on Pluto).[1] But now it seems that when the Church parishioners made a verbal agreement to form a football team a new sui generis entity appeared *ex nihlio*, exactly located where the footballers were. I think this is strange, for I think it is strange that merely speaking and intoning certain phrases could cause anything to *exist* (except, of course, for the words and intonations themselves). Note that this is different from saying that speaking and intoning certain phrases cannot cause anything to fall under certain *predicates*. For instance, people who get married become husbands and wives solely because of speaking and intoning certain phrases (i.e. those that make up the conventional practice of people being married having undergone a certain ceremony). But that's just a change in what predicates apply to what objects, *not* a change in what things *exist*. The thought is that only wizards and warlocks can bring things into existence by merely by uttering a few phrases. So let us add another desideratum, one that is not met by spatiotemporally located sui generis groups:

Causation (C): The mere intonation of words does not cause groups to exist.

Admittedly, this desideratum is debatable. Some philosophers *do* find it acceptable for (certain) things to come into existence solely due to our conventional practices. For instance, Thomasson states explicitly that the existence of social institutions, such as groups, is (partially) dependent upon our conventions and intonations in such a way such as to breach (C) [2003]. Not wanting to get dragged into the debate over this issue, I'll say just a few things. First, what I will have to say will still appeal to many philosophers who *do* endorse (C) (such as Sider [2001: 157]). Secondly, even for those who take Thomasson's position, if a theory *could* be found that met this desideratum, it must count for *something* – if only that given such a theory we need not get embroiled in the controversy over whether things can be conjured into existence solely by speech acts. Avoiding metaphysical disputes is always a plus, even if you think you're going to win them. So with that in mind, I leave (C) as a desideratum, even though different people will weigh differently how important it is.

Problem four: For clarity, distinguish the relation people have to groups ('group membership') from the relation things have to sets ('set membership'). Distinguish this with an appropriate subscript, and call the relation between people and groups 'membership$_G$'. If groups are sui generis entities then there is no analysis of the membership$_G$ relation and it has to be taken as an extra primitive. Using fewer primitives is always desirable, so add in this final desideratum:

Primitives (P): Membership$_G$ should be analysable (using familiar terms).[2]

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[1] An alternative is that they exist at the times that their members exist at, but no-where in space (i.e. are located at times, but not spatial regions). However, I have difficulty understanding how that is supposed to work in relativistic spacetimes (such as our own!) where distinctions between time and space are notoriously hard to come by.

[2] Ross Cameron has pressed me over the distinction between conceptual and metaphysical primitives. If a theory introduces conceptual primitives it brings about only complexity in *theories*, rather than (as in the case of metaphysical primitives) complexity *in the world itself*. One might claim (as Cameron put to me in conversation) that conceptual primitives are 'freebies', and shouldn't count against a theory. So (P) is a desideratum only if the primitives are metaphysical. Grant the distinction and the claim, for the dialectic demands we are concerned with metaphysical primitives for here we are assuming realism about groups. It would be odd (although, admittedly, not inconsistent) to then think that the commitments of our group talk demands added complexity in the world with regards to what exists, but that group talk doesn't carry an analogous demand regarding complexity in the world with regards to membership$_G$.

As with (I), failing to meet (P) does not scupper a theory. But it does count against it if the competition can do better (which, it will turn out, it can).

So sui generis groups fail to satisfy most of these desiderata. If you take groups as Platonic they could satisfy only (C), otherwise they can satisfy only (T).

3. Theory two: Fusionism

We might instead identify groups with fusions[3] of their members$_G$. Call this *fusionism*. It is a popular position endorsed by Copp [1984], Macdonald and Pettit [1981: 108], Martin [1988: 343-59], Oppenheim and Putnam [1958: esp. 9-11], Quinton [1976], Sheehy[4] [2006] and Sider [2001: 151-2] (it is also discussed, but not endorsed, by Gilbert [1989: esp. 428-31] and [Ruben 1985: ch. 2]).

Fusionism does quite well with two of the desiderata. With regards to (C), it is not our mere talk that causes fusions of members$_G$ to exist, for our words alone do not cause objects to compose. So to meet (C), the fusions must exist regardless of how we talk. Since it is possible that there is a group with any combination of members$_G$, we should expect some variety of unrestricted composition will be necessary to guarantee the (intonation independent) existence of the appropriate fusions. I believe that this fits the bill:

> **Unrestricted Diachronic Composition (UDC):** For any class of time instants, I, and any function f assigning a non-empty class of objects, $f(t)$, to each t in I, there is something, x, that exists exactly at the times in I and that at each such time t is composed exactly of the objects in $f(t)$. [Varzi 2007: 182].

So given UDC there is an object that exists from midday today to midday tomorrow, that has myself and Tony Blair as parts for the first six hours, and then only myself for the remaining time. That object exists regardless of mere verbal intonations. But were myself and Tony Blair to create a charity starting at midday, where six hours later Tony left that charity and then I disbanded it eighteen hours afterwards, that charitable organisation would then be identical to that (already existing) fusion. Thus it appears fusionists can meet (C). (Though there appear to now be too many fusions. As I do not defend fusionism, I won't dwell on this problem, but presumably it can be dealt with in the same manner that a theory that takes groups to be sets deals with that problem – see §8).

Fusionism can also meet (T). Clearly material objects come into, and go out of, existence. If groups are material objects, then they will do likewise, coming into existence when they first have members$_G$ and ceasing to be when they have their last member$_G$. Clearly, then, fusionism can meet (T).

However, fusionism is less successful with the final two desiderata. (I) is met only if you already have independent reason to accept the plethora of fusions that groups are to be identified with i.e. only if you already accept UDC. But many philosophers are antagonistic towards UDC. The first reason for such antagonism is that it is twinned with perdurantism [Sider 2001: 120-39][5] and not everyone is a perdurantist. The second reason is that some favour a restricted composition [Markosian 1998; Merricks 2001; van Inwagen 1990] which is obviously incompatible with an unrestricted composition such as UDC. People moved by either reason won't already believe in the relevant entities, so fusionism fails to uncontentiously meet (I).

Even if (I) does not worry you, fusionism fares badly with regards to desideratum (P). The only analysis of membership$_G$ appears to be

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[3] x is a fusion of the ys at time $t =_{df}$ each x is a part of y at t, and every part of y overlaps at least one of the xs at t.

[4] Sheehy denies that groups are 'mere aggregates', but does think they are material particulars 'constituted' by individuals [101]. In this context I don't know how to read 'constituted' except as 'fusions of'. Certainly fusions are not all 'mere aggregates' in Sheehy's sense as they need not have their parts essentially.

[5] Although some philosophers think endurantism is compatible with UDC, pairing endurantism with it is deeply problematic [Varzi 2007].

x is a member$_G$ of group *g* at time $t =_{df}$ *x* is a part of *g* at *t*.

But the transitivity of parthood ruins this [Uzquiano: 136-7]. Given groups are fusions, not only the footballers but *all of their parts* (lungs, kidneys etc.) will (wrongly) turn out to be members$_G$ given this definition. We might restrict the definition to certain sorts, e.g. *x* is a member$_G$ of group *g* at time $t =_{df}$ *x* is a person and *x* is a part of *g* at time *t*. But this illegitimately rules out non-persons from being members$_G$ of groups (for instance, team mascots which are animals). Trying to avoid this problem by broadening the sortal restriction to cover *any* living organism won't work as then the individual *cells* from each footballer will be members$_G$ (nor can it be avoided by allowing all living organisms *except* cells to be members$_G$, for not only is it *ad hoc* but some biologists may form a football team with an archaea as a mascot). Thus fusionism cannot meet (P). *Pace* Uzquiano the failure to meet (P) is not fatal. We could still take membership$_G$ as a primitive which, in comparison to Uzquiano's theory of groups as sui generis entities, is entirely reasonable, for Uzquiano has to introduce that primitive anyhow. But, again, it'd be nice to have a theory that *did* meet (P). Similarly, whilst we could deny the transitivity of parthood (an option that is not unprecedented [Cruse 1979; Rescher 1955]) it would be nice to have a theory that met (P) without revising our mereological beliefs in that fashion.

4. Theory three: Setism

All desiderata can be satisfied if we identify groups with sets. Call that theory *setism*. Of course, a group cannot be any old set. It would not do to identify Everton with ∅, the Catholic Church with { ∅ }, the Mafia with { { ∅ } } etc. and then take membership$_G$ as a primitive between the sets and members$_G$. That would be intolerably *ad hoc*, so some correlation between groups and sets is called for. We might identify a group with the set of its members$_G$, and concurrently identify membership$_G$ with set membership (membership$_S$). The oft-recounted objection to this move is that sets cannot change members$_S$ over time whereas groups can change members$_G$ over time, so groups cannot be such sets [Sharvy 1968; Uzquiano: 135-6]. In the literature, that objection has been taken to be fatal to setism. I believe this to be mistaken, for it is not set in stone that we take groups to be sets of their members$_G$. For instance, Sheehy toys with the idea of groups as sets of certain properties [2006: 18], whilst Bunge represents (if not identifies) groups with ordered triples of sets of (i) the members$_G$, (ii) objects in the environment and (iii) the relations between those things [1979]. So the setist need not limit themselves to identifying groups with sets of their members$_G$. With that in mind, consider this definition:

g is a group $=_{df}$ *g* is a set with only ordered pairs as members$_S$ such that (i) every instant is the first member$_S$ of exactly one of those ordered pairs and (ii) the second member$_S$ of each ordered pair is either the empty set or a set of individuals.

So a group is any set of the following form: [6]

$\{ \langle t, \{ xs \} \rangle, \langle t', \{ ys \} \rangle, \langle t'', \{ zs \} \rangle \ldots \}$

with one ordered pair for every instant. Next, don't identify the membership$_G$ relation with membership$_S$. Instead, define it as follows:

x is a member$_G$ of *g* at $t =_{df}$ (i) *g* is a group; (ii) *g* has *y* as a member$_S$ where *y* is the ordered pair that has *t* as its first member$_S$; (iii) *x* is a member$_S$ of the second member$_S$ of *y*.

This allows us to retain the fixed membership$_S$ of sets across time, but still allows groups to have variable membership$_G$. For example, in the case of a group which had the ordered pairs $\langle t_1, \{ x_1, x_2 \} \rangle$ and $\langle t_2, \{ x_1, x_3 \} \rangle$ as two of its members$_S$, the above definition means x_1 and x_2 are the only members$_G$ of that group at time t_1, whilst x_1 and x_3 are the only members$_G$ at t_2. So the membership$_G$ varies, but the membership$_S$ remains the same (since that set *always* has those ordered pairs as members$_S$). Not only does this technique avoid the standard objection to

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[6] Where the pluralities might be empty, and thus the set would be the empty set.

identifying groups with sets, it simultaneously meets (P). Further, as sets in general are not caused to exist by anything (except, perhaps, their members_S existing) we also meet (C).

What of (I)? If you already believe in the existence of the members_G and times, then given Zermelo-Fraenkel set theory (ZF) you are already committed to the existence of the relevant sets. The existence of the members_G is obviously uncontroversial, so groups as sets meeting (I) is as plausible as the existence of times and the truth of ZF. ZF (or saliently close variations thereof) is readily accepted by most philosophers, far more so than UDC and perdurantism. So in that regard, the theory is superior to fusionism with regards to (I). The commitment to times is more controversial, for it may entail substantivalism. But it remains an open question which is more contentious, substantivalism or the combination of UDC/perdurantism (I myself favour the former). Moreover, it may still work without substantivalism, for even in lieu of a plenum of spacetime points, we might nevertheless identify times with fusions of instantaneous temporal parts of events[7] (such that each part of that fusion is simultaneous with every other part, and no instantaneous temporal part of any event that is simultaneous with any parts of the fusion is disjoint from that fusion). So it is only those relationists who eschew events who will still be excluded, and they will be few and far between. So a setist ontology is more inclusive than either fusionism (which excludes non-perdurantists and those who don't accept UDC) or one that takes groups to be sui generis entities (which excludes those striving for ontological parsimony).

5. The Location Problem

That just leaves (T). We might initially think setism has the same problem from §2 that Platonic groups had, for received wisdom holds that sets are abstract, and thus either exist at all times or no time. I believe setists should repudiate received wisdom in this case, and instead locate (certain) sets in spacetime. Both Lewis [1991: 31-3] and Maddy [1990: 58-60] think this is plausible. Both think that, if it is philosophically expedient to do so, we should locate sets and endorse the following conditions:

> Set *s* is located at *r* at *t* iff *r* is the union of every region occupied (at *t*) by a members_S of *s*.

Maddy says it *is* expedient to accept this (for she needs sets to be located so as to be perceived, a fundamental part of her philosophy of mathematics) whilst Lewis remains agnostic over the issue. However, endorsing *those* conditions won't help setism, for groups have ordered pairs as members_S, where the pairs have between them, as members_S, every instant. So groups would be located where every instant was located. A natural identification of times with hyperplanes of points leads to groups being located where every hyperplane is located i.e. located *everywhere* in spacetime (so Everton *would* be located on Pluto!). So setists must endorse a different set of conditions, such as:

> Set *s* is located at *r* at *t* iff *r* is the union of every region occupied (at *t*) by the members_S of the second member_S of the ordered pair (where that ordered pair is a member_S of *s*) that has *t* as its first member_S.

If those conditions were correct, then we could avoid the location problem, for groups would be located only at those regions of spacetime that they had members_G. So, just as with the fusionist position, the groups would come into, and go out of existence, with their first and last member_G, and (T) would be met.[8] Given setism, there is good reason for thinking those latter conditions are correct, and not the former, for it is only a small step from thinking that if

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[7] I use events because it is relatively uncontentious that events have temporal parts, whereas the same cannot be said of material objects.

[8] That is unless the group has no membership_G at times between when it has its first and last member_G. Then it would exist intermittently. I don't see any philosophical problem with things having an intermittent existence (although others may demur) and there's no intuitive problem with groups not existing when they have no members_G and then coming back into existence when they do. Indeed, I find the idea that a group ceases to be when it has no members_G to be quite intuitive.

philosophical expediency is served by endorsing the former conditions then they're true, to thinking that if philosophical expediency is served by endorsing the latter conditions then *they're* true. As the latter conditions help setism to meet desideratum (T), they *are* expedient, and so we should, all other things being equal, think that sets are located in accord with the later conditions (rather than the former).

There are four reasons to think all things aren't equal, and that should sets be located then they are located as per the former conditions, not the latter:

Reason one: You might think the former conditions are intuitively true, whereas the latter are not. But this won't wash. As it stands no-one thinks the former conditions are *intuitively* true, rather they think we should take them to be true on the grounds of expediency. I follow Lewis in thinking that whether sets are located or not is a mystery; a mystery that is only decided by weighing up the virtues of a theory that locates them in spacetime against those virtues of a theory that doesn't. If expediency is the *only* determining factor as to whether or not they are located, it seems reasonable to think it is the *only* determining factor in figuring out what the conditions are for what locations they end up having. So supposed intuitions about the location of sets seem misplaced.

Reason two: It leaves some sets unlocated (those sets without sets of ordered pairs of a time, and a set of individuals, as members$_S$), but this is not a problem for given the former conditions some sets were unlocated in any case, namely the pure sets.[9] As *some* sets are unlocated given the first set of conditions, it is not a problem that given the second set of conditions the same is true. Albeit *more* sets are unlocated – more than simply the pure – but if the nature of sets is mysterious and expediency is the only guide we have in determining whether or not a particular set is located, then there is little wrong with all pure and some non-pure sets being unlocated whilst others are located.

Reason three: There might be good reason to think the former conditions are more expedient than the latter. For instance, Maddy argues that her philosophy of mathematics favours locating sets where their members$_S$ are located i.e. expediency favours the former conditions. This is a point well taken. If you have prior commitments that demand the former conditions are true (as Maddy does) then you cannot accept setism (at least, not without giving up on (T)). So be it: that one metaphysical theory (i.e. setism) is not neutral with regards to another (i.e. Maddy's philosophy of mathematics) is not fatal for either theory. As there is not widespread acceptance of a theory like Maddy's (one that finds the former conditions particularly expedient), setism will remain appealing to a broad range of philosophers.

Reason four: It seems bizarre that sets which are groups are located whilst very similar sets (such as the set { < { *x*s } , *t* >, < { *y*s } , *t*' >, < { *z*s } , *t*'' > … } where the order of the ordered pairs are reversed) are not. Isn't it just arbitrary to think one is located whilst the other floats free of spacetime? Perhaps, but set aside this problem, for I deal with such arbitrariness below in §9.

6. The Essentiality Problem

The next problem is that sets have their members$_S$ essentially whereas groups have their members$_G$ accidentally [Ruben 1985: 17-19; Sheehy 2006: 18-20; Uzquiano 2004: 139-40].

We can solve this problem by reduxing the tactic used to give groups variable membership$_G$ over times to give them variable membership$_G$ across worlds by redefining the terms:

> *g* is a group $=_{df}$ (a) *g* is a set with only ordered pairs as members$_S$; (b) every possible world is the first member of exactly one ordered pair that is a member$_S$ of *g*; and (c) the second member of each such ordered pair is itself a set of ordered pairs such that (i) every instant is the first member$_S$ of exactly one of those latter ordered pairs and (ii) the

[9] That is, unless you take Lewis' stance of identifying the null set with the fusion of every individual, which is surely not a *precondition* of accepting that sets are located

second member$_S$ of each of the latter ordered pairs is either the empty set or a set of individuals.

So groups turn out to be sets of the form:

$$\{ \langle \omega, \{ \langle t, \{ xs \} \rangle, \langle t', \{ ys \} \rangle, \ldots \} \rangle, \langle \omega^*, \{ \langle t, \{ x^*s \} \rangle, \langle t^*, \{ y^*s \} \rangle, \ldots \} \rangle \ldots \}$$

We can then redefine membership$_G$:

> *x* is a member$_G$ of *g* at *t* at world $\omega =_{df}$ (i) *g* is a group; (ii) *g* has the ordered pair *z* as a member$_S$ where (iii) *z* has ω as the first member$_S$ and (iv) *z* has *z** as its second member$_S$; (v) *z** has as an ordered pair *y* as a member$_S$ where (vi) *y* has *t* as its first member$_S$ and (vi) *x* is a member$_S$ of the second member$_S$ of *y*.

(Similarly, we will have to redefine the conditions under which an object is located in spacetime). Whilst more of a mouthful, the redux does not require additional primitives, or additional sets (for regardless of whether one identifies groups with such sets, the sets were – given ZF – always there anyhow), so it is just as parsimonious. It also seems a natural move to make given the previous tactic of dealing with variable membership$_G$ across times.

Moreover, it doubles as a solution to a related problem from Uzquiano [146-7]: that two distinct groups can have identical members$_G$ but two sets cannot have identical members$_S$. This poses a problem for my (pre-redux) version of setism if two distinct groups had the same members$_G$ over time (for only then would those two groups have the same members$_S$). Indeed, as Uzquiano makes clears, there could be such cases e.g. that the members$_G$ of the Supreme Court Justices have been, and always will be, members$_G$ of the committee organising the Washington Law Club Lounge. But given the redux, the problem can be avoided as two groups with the same membership$_G$ over time will still have different members$_G$ at different possible worlds, *a fortiori* they will have distinct memberships$_S$. Problem solved. Uzquiano responds to a similar tactic by considering two groups with a *necessarily* coextensive membership$_G$. However, whilst Uzquiano gave the above example of two groups with a contingently identical membership$_G$ across times, he doesn't give an example of groups with a necessarily coextensive membership$_G$. Nor do I think any example is forthcoming, for how can two distinct groups have the same membership$_G$ by logical necessity? In lieu of any compelling example of distinct groups with necessarily coextensive membership$_G$, I set aside Uzquiano's rejoinder.

The redux does, however, incur a cost in requiring possibilia to exist (for, given this option, if Gandalf the Wizard *can* be the member$_G$ of a group then he *is* the member$_S$ of some set). However, there are three reasons not to count this cost as prohibitive. *Reason one:* As possibilia are needed for possible world semantics [Melia 2008: 142-3] there seems to be good reason to introduce them independently of considerations to do with group realism. *Reason two:* Compared to groups as sui generis entities, setism still comes out on top. Both theories introduce a category of entities, sui generis groups and possibilia respectively, but at least possibilia do double duty in helping translate modal talk. So possibilia, in being more useful, are better to have in your ontology than sui generis groups. *Reason three:* Compared to fusionism, setism still comes out on top as fusionism looks likely to need possibilia in any case. Fusionism also has difficulties accounting for two groups having the same membership$_G$ across time. Two such groups would be composed of the same parts and (as fusionists will presumably endorse the thesis that for any *y*s those *y*s can compose at most one thing) must be identical. The standard tactic at this point is to bite the bullet and accept that, under those circumstances, the groups would be identical. Then, to account for the two groups possibly having different membership$_G$, counterpart theory is introduced. So whilst there is but one object identical to both groups (at the world where they have the same membership$_G$ over time) that object has different counterparts in different contexts. So it has 'Supreme Court' counterparts but *different* 'Washington Law Club Lounge Committee' counterparts. Thus, the fusionist can escape the problem [see Uzquiano 2004: 147]. Here's the rub: counterpart theory demands possibilia exist in order to be the relata of the counterpart relation. So, as it looks likely that the fusionist will resort to possibilia, setism's commitment to their existence is no cost in comparison.

A second worry comes from counterfactual statements. Imagine a nation is economically prosperous, but were its birth rate lower then it would be poor. Whilst the properties of the group appear to vary, at worlds at which the birth rate is lower the $membership_S$ stays the same. One might worry how that can be, for how can a set be different if its $membership_S$ remains the same? This problem leads us on to a more general issue.

7. Properties of Groups

That issue is what determines the properties that a group has. Because the properties of a group vary from time to time (and world to world) what determines the properties of that group must likewise vary from time to time (and world to world). Certainly the $membership_S$ of a group will not do the trick, for that is constant across all times and worlds, and the setist will have to rely upon something else. What they should rely upon is a good question, but one that is independent of the metaphysics of groups that one accepts. Think of it like this, the setist identification means groups are structured in two different ways – their $membership_S$ and $membership_G$. As already made clear, $membership_S$ won't help explain what determines the properties of a group. But the metaphysical structure groups would have under competing theories doesn't do any *better* than setism. For instance, the theorist who identifies groups with *sui generis* entities will have to explain what determines the properties of a group just as the setist must. But their entities have no metaphysical structure other than their $membership_G$. They might, therefore, rely upon the $membership_G$ of a group for the determination of the properties of a group. But as setists also have groups with $members_G$, and they agree with the *sui generis* theorist over what the $membership_G$ of the groups are, then the setist can make use of whatever theory the *sui generis* theorist offers to do the determining. Similarly for the fusionist. Fusions have more structure than *sui generis* groups for they have a mereological structure. But if we wanted a close relationship between the mereological structure and the properties of the group it quickly becomes apparent that most of the parts are irrelevant. For example, it is irrelevant to Barclays Bank PLC what the arrangement of the atoms in a board member's kidney are like, and the shape of a union member's left hand is irrelevant to what a trade union is like. So even though the kidney and the left hand would be parts of their respective groups, they are irrelevant to the properties of the group. Parts that might be relevant to determining the properties of the group would be the board member himself, and the trade union member himself. The fusionist would then be committed to saying that only *certain* parts of the fusion are relevant, namely the parts that are also the $members_G$. But, again, the setist and the fusionist agree that groups have $members_G$, and agree over what those $members_G$ are. So, again, whatever theory the fusionist looks likely to offer as to what determines the properties of a group is a theory the setist can buy into just as easily. (Similarly, if either the *sui generis* theorist or fusionist said it was just a brute fact what the properties of a group were, and that they had nothing to do with their metaphysical structure, the setist could say the same again).

So setism, fusionism and the *sui generis* theorist are all in the same boat when it comes to explaining what determines the properties of a group. Thus, whatever the correct theory turns out to be concerning this determination, setism will be as consistent with it as its competitors. Moreover, the correct theory will say that, as the properties of a group varies over time (and across worlds) what determines the properties of a group varies from time to time (and from world to world). For instance, the correct theory might be that it is the $members_G$ (and the properties of those $members_G$) that determined the properties of the group. As the $membership_G$ of groups varies across times and worlds, so too will their properties. So the nation from the example at the end of §6 would be economically prosperous at one world and not another because it has a different $membership_G$ at those worlds. Problem solved.

Of course, that might not be the correct theory. That the properties of a group are not determined by its $members_G$ is quite plausible [see Epstein 2009]. But whatever the correct theory is, it will agree that what determines the properties of a group varies across both times and worlds, and will be consistent with setism (or at least, setism will be as consistent with it as the competing metaphysical theories will be). So, no matter what the details, setism can help itself to that theory, and use it to avoid the counterfactual problem from §6.

8. The Abundance Problem

Given setism, there are too many groups. I am, no matter what I do, a member$_G$ of a group with Tony Blair, for the appropriate set exists no matter what; I am, no matter what I do, a member$_G$ of a group with Ghenghis Khan and all of his sons, for the appropriate set exists no matter what; I am, no matter what I do, a member$_G$ of a group along with every mass murderer that ever exists for the appropriate set exists no matter what; etc. These commitments are embarrassing and unwanted, for intuition has it that there are no such groups that I am a member$_G$ of.

But compare this problem with that encountered by adherents of unrestricted composition. Given unrestricted composition, there are trout-turkeys and all variety of gerry-mandered objects that we don't normally believe exist. The standard rejoinder is to say that in most contexts (e.g. contexts other than metaphysical discussions) we are restricting our quantifiers so gerry-mandered objects are excluded [Goodman 1966: 51; Jubien 1993: 4-5; Lewis 1986: 213]. So statements asserting that there are no trout-turkeys are true, as long as we are in a context where the domain is restricted. Further, even though, normally, these gerry-mandered objects lie outside our domain of quantification, our actions and practices can make them contextually salient and bring these objects into the domain of our quantifiers. For example, given unrestricted composition there is a gerry-mandered fusion of random household objects. In most contexts, it is true to say that there is no such thing, for in most contexts that object doesn't fall in the appropriate domain of quantification. However an artist can bring our attention to that object by placing the fusion in an art gallery. Then, even in a normal context, it is now *true* to say that the gerry-mandered fusion exists for it is true to assert that the piece of artwork exists.

The setist can make similar moves. Even though, unrestrictedly, the entire gamut of possible groups actually exists, in most normal contexts our intuitions that there aren't certain groups are correct, for in those contexts we are quantifying over a restricted domain. But when myself and Tony decide to set up a charity together, our actions and practices are such that the set *is* quantified over, and so it *is* correct to say that the group exists. Just as the artist makes the gerry-mandered object salient, so that it falls within the domain of everyday quantification, people setting up charities, football teams etc. does the same for groups. So whilst there are (unrestrictedly) more groups than you first thought, this is no impediment to setism when armed with this strategy of restricting quantifiers. [10]

9. The Arbitrariness Problem

The final hurdle is a variant of Benacerraf's problem for identifying numbers with sets (*a la* Zermelo, von Neumann etc.): there are equally good candidate sets for setism to identify groups with, hence the identification that is made is arbitrary. The arbitrariness arises on three grounds.

The first is that I have used ordered pairs. It is arbitrary what we identify ordered pairs with [*cf* Armstrong 1986: 87]. Do we use Kuratowski's definition (i.e. $\langle x,y\rangle =_{df} \{\{x\},\{x,y\}\}$)? Weiner's definition (i.e. $\langle x,y\rangle =_{df} \{\{\{x,\},\phi\},\{\{y\}\}\}$)? Putnam's definition (where there are some things a and b such that any ordered pair $\langle x,y\rangle =_{df} \{\{x,a\},\{y,b\}\}$ [1979: 342])? If we use Kuratowski's definition then groups, in using ordered pairs, will be identical to one set. If we use Weiner's definition then the groups will be identical to a quite different set. If we use Putnam's definition then they will be identical to yet a third. The identification of a group with a particular set therefore appears to be arbitrary.

The second source is similar. I have used ordered pairs with times as the first member$_S$, and sets of members$_G$ as the second. But I could easily have reversed that order, and used ordered pairs with sets of members$_G$ first and times second (and then altered the definitions of what it is to be a member$_G$ of a group etc. accordingly). Those sets using this reversal would be distinct

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[10] Note that this may partly undermine the reason for thinking fusionism fails to meet (I), in that if you think this tactic is appropriate one has to wonder why you don't endorse UDC. However, you may dislike UDC not on the grounds that the restriction strategy doesn't work, but for other reasons [Comesaña 2007; Effingham 2007], or may accept unrestricted composition but disdain UDC for other reasons (such as it entailing perdurantism). In any case, fusionism's failure to meet (P) still gives Setism the edge.

from the ones my theory originally identifies them with, but they would appear to be equally good candidates to be identified with groups. Again then, the choice appears to be arbitrary.

The third source is that in those cases where a group has no members$_G$ at a time, the group has as a member$_S$ an ordered pair of that time and the null set. But we needn't have made that stipulation. Instead I could have left out that ordered pair entirely (i.e. the group would have as members$_S$ only ordered pairs of times paired with sets of its members$_G$ at that time, and at those times that it has no members$_G$ there is no ordered pair with that time as a member$_S$ at all). Again, the choice is arbitrary.

Thus we have arbitrariness in the identification. We have competiting options, each identifying a group with a different set, where those theories are apparently as good as one another. Since it is arbitrary to choose between them we should (if we followed Benacerraf's thinking) choose none of them.

There are three possible responses.

Response One: Ignore Benacerraf's line of thinking, bite the bullet, accept the arbitrariness and make the identification anyhow. This might be because the setist has a response to Benacerraf's argument, for not everyone agrees that it goes through [Katz 1996]. Alternatively, the setist may not have such a response to hand, but point out that numerous philosophers have identified things with sets involving ordered pairs. Relations [Quine 1987: 90; Lewis 1986: esp. 52*n*39], temporal parts [Pollock 1974: 139; Shoemaker 1984], institutional social practices [Tuomela 2002: 156] and *ersatz* times [Bourne 2006: 52-65] have all been identified with ordered pairs, and Russellian facts have been identified with ordered tuples. Each of these identifications face the same arbitrariness problem, and must provide some explanation of how to escape a Benacerraf-style dilemma. So if bullet biting does take place, at least the setist finds themselves in good company even if they can't provide an explanation for why Benacerraf is wrong.

That, of course, only takes care of one source of arbitrariness i.e. those involving ordered pairs. But it is unlikely the second source will be worrying, for in the case of a relation (or temporal parts, or times, or facts) identified with <*a*,*b*> there seems to be no impediment to identifying it with <*b*,*a*> instead. So, again, in biting the bullet setism is only making commitments that other respectable metaphysical theories are likewise lumbered with. That leaves only the third source. But it seems strange to say that arbitrary identifications of things with sets are fine when we are worried about ordered pairs but intolerable when we worry whether we should include the null set or not. So this response does deal with all sources of arbitrariness.

Response Two: We could instead mimic a tactic that Argle uses for holes [Lewis and Lewis 1970: 209-10]. Argle identifies holes with hole linings. However there are many equally good candidate hole linings for any given hole, and it would be arbitrary to identify a hole with any one of them and not the others. To avoid this, Argle coins a new relation: '__ the same hole as__' (where this predicate is not to be confused with identity). So whilst the hole linings are distinct, they are nevertheless the same hole as one another. (Alternatively we might identify holes with the set of the candidate hole linings – that move is unavailable to Argle because he eschews abstracta such as sets, but is obviously open to the setist, so I will mention it parenthetically).

The setist can do likewise. We have multiple candidates for what a group is, but can nonetheless coin a new predicate: '__ the same group as__'. So whilst the candidate sets are distinct, they are nonetheless 'the same group'. Just as Argle goes on to create ways to paraphrase how to count holes, how to talk about the properties of holes etc. in light of having lots of hole candidates standing in an equivalence relation to one another (i.e. '__ the same hole as__') the setist could do the same and develop similar paraphrases as to how to count groups, how to talk about the properties of groups etc. in light of having lots of sets standing in the '__ the same group as__' relation to one another. (Alternatively, we could make life easier and identify groups with the set of the candidate sets that stand in the '__ the same group as__' relation to one another, mimicking the move that the abstractaphobic Argle ignores. Sets of group candidates are easy to count, and can bear the properties attributed to groups just as easily as any other set can etc. so this method is simpler than the paraphrasing strategy that copies Argle).

Response Three: We might instead mimic one of the responses to Benacerraf's problem, namely structuralism. Whilst Zermelo, von Neumann etc. identify numbers with different sets the identification always leaves us with exactly the same structure. As their name makes clear, it is the structure and not the things instantiating that structure, that structuralists take to be important. Setists could copy the tactic of those structuralists, such as Resnik [1997] and Shapiro [1997], who go on to reify structures.[11] So, just as the mathematical structuralist believes in reified structures, identifying numbers with *places* in that structure (places that can be filled by a wide variety of different things, including sets) the setist can make a similar move, reify the structure and identify groups with places in that structure.

We are not, however, left with setism anymore for groups are no longer identified with sets. We instead have a new theory: group structuralism. But this new theory is not a far cry from the former, and still meets the desiderata if you already accept mathematical structuralism. (I) is met because groups are identified not with sui generis entities but with places in reified structures, a type of entity that – if you accept mathematical structuralism – you will be happy to accept. (T) is met because, in the same way that the structuralist gets to assert the same properties of numbers as those theorists who identify them with some arbitrary set, the group structuralist can assert the same properties of groups as the setist does. As the original setist managed to have sets exist temporarily, that is a property that the group structuralist can likewise assert of the place in the structure. So groups, for the group structuralist, can also meet (T). Similarly, just as the mathematical structuralist can avoid taking relations such as '__ the successor of__' as additional primitives, the group structuralist can avoid taking relations such as '__ is a member_G of __' as an additional primitive. (Of course, they will likely have to add in primitives dealing with structures and places, and the relations between them, but given mathematical structuralism these won't be *extra* primitives, they will be primitives already accepted and deployed in the mathematical cases). Finally, the structures that groups will be a part of (whether those structures are *ante rem* and exist eternally, or *in re* and exist only when exemplified) do not exist because of the mere intonation of words. Instead they exist because the set theoretic hierarchy (or whatever you believe exemplifies the appropriate structure) exists: so (C) is met. Whilst group structuralism takes us some way from setism, it is nevertheless an open option, at least if you find mathematical structuralism to be an open option as well.

Thus concludes a survey of the problems facing setism. As it has advantages over its rivals, setism (or perhaps group structuralism) is the best contender for what the group realist should accept. At the least, it should be preferred over fusionism and identifying groups with sui generis entities.[12]

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[11] We could mimic the tactic of structuralists who don't reify structures but then, whilst we are left with a way of accounting for talk about groups, we haven't included groups in our ontology. Maybe that would be a good theory, but following the mission statement laid down in §1, this paper is concerned only with *realists* about groups, so I set aside discussion of such possibilities.

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Nikk Effingham
University of Birmingham

nikk.effingham@gmail.com