new computability-theoretic connections between various Ramsey-theoretic principles that seem well worth exploring.

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M. Carrara, A. Arapinis, and F. Moltmann, editors. ***Unity and Plurality: Logic, Philosophy, and Linguistics***. Oxford University Press, 2016.

Unity & Plurality is an ambitious anthology. It brings together diverse perspectives on plurality from logic, philosophy, and linguistic semantics. This is significant because philosophers and linguists tend to adopt opposing approaches to plurality: while philosophers tend to adopt "the plural reference approach" wherein plural NPs plurally refer to multiple individuals at once, linguists tend to adopt "the singularist approach" wherein plural NPs refer to single collective entities like sums or sets. Yet there has been very little interaction between advocates of these different perspectives. Hence, the chief aim of *Unity & Plurality* is to bridge this theoretical divide. However, this ambition, while laudable, also leads to the main weakness of the anthology, namely that because the individual contributions vary so widely in their themes—Plato's conception of relations, Basic Law V, plural marking—it is often easy to lose track of how they relate to each other and to this overarching dichotomy. In what follows, I will briefly summarize two of the contributions—Øystein Linnebo's and Alexandra Arapinis'—and relate them in a way that hopefully illustrates the kind of interdisciplinary conversation *Unity & Plurality* aims to generate.

Linnebo's contribution focuses on Frege's infamous Law V. According to Linnebo, Law V is best viewed as a principle which "collapses" certain higher-order entities (concepts) into single objects (extensions). Seen this way, a less familiar version of Law V can be formulated within plural logic as Law V*, where xx is a plural variable:

$$(Law V^*)\{z \,|\, z \prec xx\} = \{z' \,|\, z' \prec yy\} \leftrightarrow \forall z. \, z \prec xx \leftrightarrow z \prec yy.$$

In effect, Law V* states that individuals referred to plurally, or what Boolos called a "manifold," can always be converted into sets containing the objects belonging to that manifold.

As Linnebo mentions, Law V* can be factored into two components, Plural Collapse (PC) and Plural Individuation (PI).

(PC) Every manifold forms a set.
(PI) If x and y are sets formed from manifolds, then $x = y$ iff the same objects belong to those manifolds.

Jointly, these are equivalent to Law V*, and so are paradoxical. However, they encode an attractive intuition, namely that collections viewed as multiplicities, or what Russell called "collections as many," can also be viewed as unities, or Russell's "collections as one." Linnebo proposes salvaging this intuition by modalizing PC and PI, so that e.g., PC* now states that every manifold *potentially* forms a set, and by adopting an appropriate interpretation of the resulting modal operators, whereby worlds represent stages of an individuation procedure, thus rendering Law V* consistent.

Interestingly, PC has a direct analog within linguistic semantics. On Landman's influential account, pluralities—often modeled as sums of individuals—are distinguished from groups—a special sort of singular individual (Landman, F. 'Groups I', 'Groups II'. *Linguistics and Philosophy* 14, 1989, pp. 559–605, 723–744). To illustrate, consider this example from Landman, which is ambiguous:

(1)   The Leitches and the Latches hate each other.

On one interpretation, enough Leitches stand in the mutual hate-relation, as do enough Latches. On a second, enough members from opposing clans stand in that relation. In

Landman's system, the first arises if 'the Leitches and the Latches' denotes a single plurality, the second if 'the Leitches' and 'the Latches' refer to different groups.

Roughly put, pluralities and groups correspond to Russell's different ways of viewing multitudes, thus leading to the following analogy:

Russell	Collections as many	Collections as one
Plural logic	Manifolds	Sets
Linguistic semantics	Pluralities	Groups

Though distinct, pluralities and groups are related semantically via certain operations: ↑ ("group formation") is an injective, non-surjective function mapping pluralities to groups, while ↓ ("membership specification") is a non-injective function mapping groups to pluralities. Crucially, it follows that while pluralities having the same singular individuals as parts are identical, it is possible to have distinct groups having the same members.

This helps explain substitution failures like in Landman's example:

(2) a. The judges are on strike.
    b. The hangmen are on strike.

Even if everyone knows that the judges are also the hangmen in our town, those condemned to die would be ill-advised to conclude (2b) from (2a). This makes sense if 'the judges' and 'the hangmen' denote different groups corresponding to a single plurality, as different individuals can have different properties. Landman concludes that groups, unlike pluralities, are inherently *non-extensional*, i.e., they are not identified by their members.

In her contribution, Arapinis argues that the phenomenon of partial involvement, illustrated in (3b), leads to a similar conclusion.

(3) a. John, Paul, George, and Ringo played last night.
    b. The Beatles played last night.

Whereas (3a) is true only if each of the Beatles played last night, (3b) would be true even if Ringo was ill and had to be replaced. This is puzzling if the two subject NPs refer to the same plurality, and if 'played in Columbus last night' is a distributive predicate applying to each of its parts. Ultimately, Arapinis argues that partial involvement is best explained as a function of lexical semantics, and in particular whether the denotation of an argument is "integrated" with respect to a dimension specified by a predicate. This requires a strictly non-extensional analysis of groups, Arapinis explains: "Integrative predications are in fact [non-extensional] in Landman's sense, that is, in the sense that they involve considering the argument not from a merely extensional point of view, but under a certain integrative guise." (p. 241)

To summarize, English appears to presuppose a semantic distinction between pluralities and groups, and these are related via ↑ and ↓. Note, however, that ↑ is just the semantic analog of Plural Collapse: every plurality forms a group. As such, it threatens to be paradoxical if unrestricted. On the other hand, notice that the (modalized) semantic analog of Plural Individuation is implausible given the non-extensionality of groups:

(PI*) For any way of individuating pluralities, if x and y are groups formed from pluralities, then $x = y$ iff the same singular individuals are parts of those pluralities.

Here is our predicament. A familiar and seemingly plausible principle appears to threaten inconsistency within the foundations of linguistic semantics. Ideally, this threat would be nullified by extending Linnebo's modalization technique to pluralities and groups. But this presupposes PI*. After all, the analog of Linnebo's individuation procedure would appear to require that groups are identifiable across worlds by their members. Thus, the question of whether Linnebo's strategy for harnessing Law V can be extended to domains like semantics, as he intends, remains.

I began by applauding the primary ambition of *Unity & Plurality*, namely bridging the divide between theorists in the plural reference and singularist traditions. My hope is that by connecting Law V and partial involvement in the way suggested, I've illustrated some of the potential advantages of bringing linguistic considerations to bear on philosophical projects,

and vice versa. More generally, I hope that *Unity & Plurality* will encourage more volumes like it, and thus more interdisciplinary collaboration of this sort.

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