Comparativism versus Absolutism 1

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Properties seminar

1. Comparativism vs absolutism

Dasgupta's terminology: "absolutists" take absolute statements, such as "x has 5 kg mass", to be more fundamental; "comparativists" take comparative statements, such as "x is more massive than y", to be more fundamental.

C1 Relations like $\succeq$ and C are fundamental relations

C2 Facts of the form "$x \succeq y$" and "$C(x,y,z)$" are fundamental facts.

A1 Mundy's relations $\geqslant$ and $*$ are fundamental relations.

A2 $\geqslant$ and $*$ are fundamental relations; and the properties standing in these relations are fundamental properties.

A3 Facts of the form "$X \geqslant Y$" and "$*(X,Y,Z)$" are fundamental facts.

A4 Facts of the form "$X \geqslant Y$" and "$*(X,Y,Z)$", as well as those of the form "object x has property X" (where X is one of the properties related by $\geqslant$), are fundamental facts.

2. Nominalism

At first glance, comparativism is friendlier to nominalism. E.g.:

C1$_N$ Predicates like '$\succeq$' and 'C' are fundamental predicates

(When talking about representation theorems, we aren't talking about fundamental facts.)

Nominalist-friendly absolutism?:

A5 Properties (or predicates) of the form "is r kg in mass" are fundamental

A6 Facts of the form "x is r kg in mass" are fundamental facts

Objection: "A5 and A6 privilege a particular unit". Reply: "we can make these claims for *all* units".

Objection: "you have infinitely many fundamental properties". Reply: "so what?"

Objection: "your theory lacks a basis for structural facts about mass—structural facts that are needed to justify the assignment of numbers and hence are crucial for science."

A "modality-based" metaphysician might say:

- I accept A5
- I accept talk of properties, as well as properties and relations of properties. All this talk is nonfundamental.
- I appeal to $\succeq$ and C to do measurement theory.
- $\succeq$ and C supervene on the holding of the absolute properties (predicates). So despite the fact that my theory makes essential use of them, I don't need to acknowledge them as fundamental, nor do I need to seek a basis for them in what I do regard as fundamental.

Root issue: is the following a good argument?

Indispensability argument "In our best theories (or: in the laws of our best theories), we need to appeal to a certain kind of property, relation, or fact; there doesn't seem to be any way to define that kind of property, relation, or fact in other terms; therefore the property, relation, or fact is fundamental"

A7 Properties (or predicates) of the form "is r kg in mass", as well as $\succeq$ and C, are fundamental

A8 Facts of the form "x is r kg in mass", as well those as of the form "$x \succeq y$" and "$C(x, y, z)$", are fundamental facts.

3. Existence assumptions

$\langle A, R_1, \ldots, R_n \rangle$ is *embeddable* in $\langle B, S_1 \ldots, S_n \rangle$ iff i) $A \subseteq B$ and ii) for each $a_1 \ldots a_m \in A$, $R_i(a_1 \ldots a_m)$ iff $S_i(a_1 \ldots a_m)$. Failure of existence assumptions (e.g. existence of copies) doesn't really threaten the representation theorem, since the empirical structure may well be embeddable in a larger partly mathematical structure that satisfies the existence assumptions, in which case the representation theorem will still hold.

Failure of existence assumptions is more of a threat to uniqueness theorems. Is that a problem?

You might think: not a big problem since the simplest laws will still be the right ones. E.g.:

Extrinsic law There exist homomorphisms f, m, and a, from the nonmathematical force, mass, and acceleration structures, respectively, into the relevant mathematical structures, such that for any object x, $f(x) = m(x)a(x)$

But you get a problem if you try to formulate simple intrinsic laws. Consider a simplified version of Newton's second law:

$$\frac{m(x)}{m(y)} = \frac{a(y)}{a(x)} \quad \text{for all } x, y \tag{1}$$

Intrinsic statement in the special case of rational ratios:

> For any objects x and y, and any integers c and d, if there exists something that is both c times as massive as y and d times as massive as x, then there exists something that is both c times as accelerated as x and d times as accelerated as y

For a more general intrinsic statement, use the fact that real numbers correspond one-to-one to the sets of fractions that are less-than-or-equal-to them. Thus, (1) is equivalent to:

$$\left\{ \frac{c}{d} : \frac{m(x)}{m(y)} \geq \frac{c}{d} \right\} = \left\{ \frac{c}{d} : \frac{a(y)}{a(x)} \geq \frac{c}{d} \right\} \quad \text{for all } x, y \qquad (c, d \text{ integers})$$

which is in turn equivalent to:

$$\frac{m(x)}{m(y)} \geq \frac{c}{d} \text{ iff } \frac{a(y)}{a(x)} \geq \frac{c}{d}, \quad \text{for any } x, y \text{ and integers } c \text{ and } d$$

To which there is a corresponding intrinsic statement:

Intrinsic law For any objects x and y and integers c and d: (everything d times as massive as x is at least as massive as everything c times as massive as y) iff (everything d times as massive as y is at least as massive as everything c times as massive as x)

But this might be false because of missing entities. No help to reword:

For any objects x and y and integers c and d: (something d times as massive as x is at least as massive as something c times as massive as y) iff (something d times as massive as y is at least as massive as something c times as massive as x)

4. Modality

Doubling in size, cheap haecceitism.

5. Dasgupta's grounding problem

Good paper topic (Dasgupta, "On the plurality of grounds")

6. Dasgupta's occamist argument

Argument against absolute mass that's analogous to the velocity-boost argument against absolute rest. But there are two ways to take that argument: as based on a prohibition against undetectable facts (Dasgupta's) or as based on a prohibition against explanatorily redundant structure (my preferred way).