

Stuff and Distributional Properties

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I've suggested in effect that words like 'snow' always occur explicitly or implicitly as parts of predicates like 'is made of snow', and that these predicates aren't really further analysable. But sometimes it looks as if they *do* have an internal structure. For example, 'This is made of snow and dirt' doesn't seem to mean the same as 'This is made of snow and is made of dirt', but it's implausible to suggest that 'made of snow and dirt' is simply a third unanalysable predicate into which the separate meanings of 'snow' and 'dirt' don't enter. (Prior 1976: 185)

Problems for anyone

Presupposition: there is stuff, and it is 'neither singular nor plural'. Model: Kit Fine's "variable embodiments": the water in the river, the members of a club, organisms.

With respect to Cartwright's gold ring – "The gold of which my ring [ASR] is made is the same gold as the gold of which Aunt Suzie's ring [HCR] was made" (Cartwright 1970: 27) – McKay (2008: 313) says:

When I say that some gold G constituted ASR and HCR, I am not saying that it was some distinct individual from ASR and HCR. It is some stuff, and they are the individuals. The gold G is never identical to one of those individuals, it is the stuff, the constitutive matter, of each of them.

Of general interest, problems for everyone:

- how should we understand property exemplification by stuff?
- – in particular, how do we understand stuff's having some intrinsic structure?
- – in particular, how do we understand stuff's undergoing intrinsic change?
- how should we understand handedness?

Background: Russell's defense of relations

I will call "relation" any property (entirely qualitative entity) that has at least one possible exemplification which involves more than one particular. Let us focus, for simplicity, on the dyadic case: we may take " R " to express a relation because it is possible that there are two things, a and b , such that aRb . That R is thusly exemplified by a and b means:

- that it imposes a direction on them: in the relational fact aRb , R goes *from* a to b , in so far as a is its *first* relatum and b is its *second* relatum;
- that it orders or structures a and b : in the relational fact aRb , a is R -related to b while b is such that a is R -related to it,¹ in so far as a is in the domain, while b is in the codomain of the relation R .

While properties may have directions and impose order or structure, only relations exhibit both features.

In his *Principles of Mathematics* (§212) Russell criticised both monadism and monism. Monadism (defended, according to Russell, by Leibniz and Lotze) holds that any truth of the form " aRb " is equivalent to some truth of the form " $Fa \wedge Gb$ ", while monism (represented, for Russell, by Spinoza and Bradley) replaces " aRb " by some predication of the whole consisting of both relata taken together, " $H(ab)$ ".

¹Using converses, we can attribute the same property to b by " b is \check{R} -related to a ".

Against monadism, Russell urges that relational properties cannot be understood except as involving relations. Against monism, he argues, that it is unable to distinguish the two directions characteristic of (binary) asymmetric relations other than by distinguishing the two parts of the whole by some other asymmetric relation, thus embarking on a regress.

Against fundamental relations

Preliminaries:

- Question does not concern (in)eliminability of relational vocabulary.
- Russell's critique of monadism accepted (Humberstone's result).
- Russell's critique of monism accepted (Hochberg's argument: no 'reduction' to relational properties).
- Question of relative priority of relationality and structure left open, however.

The problem of converses arises because relations have 'senses':

"A relational proposition may be symbolized by aRb , where R is the relation and a and b are terms; and aRb will then always, provided a and b are not identical, denote a different proposition from bRa . That is to say, it is characteristic of a relation of two terms that it proceeds, so to speak, *from* one *to* the other. [...] It must be held as an axiom that aRb implies and is implied by a relational proposition $bR'a$, in which the relation R' proceeds from b to a , and may or may not be the same relation as R . But even when aRb implies and is implied by bRa , it must be strictly maintained that these are different propositions." (Russell 1903: 95–95, §94)

Problem 1 : ontological profligacy.

"If a book is on a table, *on the table* is a relational character truly predicable of the book. But this is inseparable from another relational character predicable not of the book but of the table. How are these two relational characters connected with each other? We may be tempted to say that the difference between them is purely verbal, so that, whether we say the *book is on the table* or the *table is under the book*, we are merely expressing the same fact in different language. But this cannot be true; for *being on* is different from *being under*; killing from being killed; loving from being loved. Yet it is plain that a single indivisible fact is referred to whether we say that the book is on the table or that the table is under the book." (Stout 1940: 121)

"...it is hard to see how the state s might consist *both* of the relation *on top of* in combination with the given relata and of the relation *beneath* in combination with those relata. Surely if the state is a genuine relational complex, there must be a *single* relation that can be correctly said to figure in the complex in combination with the given relata." (Fine 2000: 4)

Problem 2 : indeterminacy. How can it be, Ramsey (1925: 14, 406) asked in the spirit of Leibniz's quote above, that $(\lambda x(aRx))b$, $(\lambda y(yRb))a$ and $(\lambda x, y(xRy))(a, b)$ represent (are logical forms of) the same proposition, given that they have different components? If they represent the same proposition, and stand for the same fact, however, what are their constituents? If relations are different from their converses, what could give us a reason to take one, but not the other, to be a constituent of a relational fact?

Problem 3 : regress.

"...when we analyze them, *greater* obviously differs from *less*; thus the two propositions [" A is greater than B " and " B is less than A "] seem to be composed of different constituents, and therefore to be necessarily distinct. To deny that they are distinct, it would be necessary to hold that both *greater* and *less* enter into each proposition, which seems obviously false, or else to hold that what really occurs is neither of the two, but that third abstract relation of which Leibniz speaks [...]. In this case, the difference between *greater* and *less* would be one involving reference to the terms A and B . But this view cannot be maintained without circularity: for neither the greater nor the less is inherently the antecedent, and we can only say that, when the greater is the antecedent, the relation is *greater*, when the less, *less*." (Russell 1901: 41/300)

Structure as prior to relations

Take, again, Othello's loving Desdemona. The fundamental fact making true the relational predication is the exemplification, by the mereological sum of Othello and Desdemona, of the structural property of loving. Because the mereological sum is not simple, the structure imposed on the whole, i.e. what Russell calls the 'form' of the complex, is further analysable as the exemplification, by Othello and Desdemona respectively, of the two relational properties I have called "rôles" of *loving Desdemona* and *being loved by Othello*. The exemplification of these two properties is grounded in the exemplification of the metaphysically prior structural property of loving.

We may, following Leibniz, describe the relational complex on this non-fundamental level of analysis by "Othello loves in so far as Desdemona is loved" or "Othello loves and eo ipso Desdemona is loved". This analysis has three parts:

- (i) it ascribes to Othello the relational property of loving Desdemona and the non-relational property of loving (ie. loving someone, being a lover);
- (ii) it ascribes to Desdemona the relational property of being loved by Othello and the non-relational property of being loved (ie. being loved by someone, being someone beloved);
- (iii) it ascribes to the facts stated by (i) and (ii) the relation denoted by "*p* in so far as *q*" or "*p* and eo ipso *q*".

This three-pronged analysis allows us to keep what is right in the alternative accounts:

- In this sense of (i), we may say, with Fine, that the asymmetric relation *R* distinguishes between two parts of the sum that exemplifies it by coordinating them with different things, e.g. lovers and beloved ones. This allows us to say that Othello, Don José and Abelard, say, have something in common: they are lover parts of fusions exemplifying the neutral amatory relation.
- The "*p* in so far as *q*" and "*p* and eo ipso *q*" locutions express that "*p*" and "*q*" have the same truthmakers.

Distributional properties

Distributional properties: properties as a result of the exemplification of which you are qualitatively heterogeneous.

Problem 1: irreducible adverbialism.

Problem 2: no account of change: "It makes no sense to speak of an object changing its distributional properties. Why? Because what change is on the account being offered is to instantiate (at each moment of your existence) a non-uniform distributional property. Being red at one time and then orange at some later time, for example, is to be analysed as instantiating (at all times) the distributional property being red-then-orange. To speak of an object changing its properties is a loose way of saying something about the distributional property it has that says how it is across time; it makes no sense to speak of an object gaining or losing the property that says how it is across time." (Cameron 2011)

Problem 3: spurious distinctions.

Incongruent counterparts

A way of biting the bullet?

"Leibniz would probably have said to such an assertion that, although it is perfectly clear that in a world in which there are both left-hand and right-hand gloves one can make the distinction between the two, in a universe which consists solely of a single glove, this is not the case." (Ishiguro 1990: 115)

Throughout his career, Kant repeatedly used incongruent counterparts to show that our representations of space and time are intuitional rather than conceptual², in effect relativising the intrinsic/extrinsic distinction to the epistemic capacity by which we access the property³

²He says in his inaugural dissertation that "between solid bodies which are perfectly similar and equal but incongruent [...] there is a difference, [...] in spite of the fact that, in respect of everything which may be expressed by means of characteristic marks intelligible to the mind through speech, they could be substituted for one another. It is, therefore, clear that in these cases the difference, namely, the incongruity, can only be apprehended by a certain pure intuition." (1992: 403; "in solidis perfecte similibus atque aequalibus, sed discongruentibus [...] sit diversitas, [...] quanquam per omnia, quae notis, menti per sermonem intelligibilibus, efferre licet, sibi substitui possint, patet: hic non nisi quadam intuitione pura diversitatem, nempe discongruentiam, notari posse."; A₂ 20, 1983: V, 58)

³In the *Prolegomena* (A 59, 2004: 403), Kant says that the distinction between the right-hand and the left-hand glove is intrinsic to the senses ("innerlich, so weit die Sinne lehren") but is only possible by the relations of them to the whole of space of which they are

Their apparent possibility may be either taken as an argument for a substantialist account of space-time or as showing the need to acknowledge handedness as an intrinsic irreducible properties of spatial objects.

A further complication: processes

We may naïvely think that the whole truth about temporal reality factorises into what is true of temporal objects at given instants, where this may involve relations they may have to things at other instants. Looking at the world from this perspective, the fundamental question seems to concern the relation that enduring objects, say Aristotelian substances, have to their spacetime regions, or, by semantic ascent, whether everything that is true of them may be said to be true of them *at* some instant or other. This is the familiar debate about how substances persist in time, often misleadingly called the 3D/4D controversy.⁴

Take me and my life, and assume that I am wholly present at every instant at which I exist, while my life has temporal parts. In at least one, hopefully unproblematic, sense, both I and my life exist. Different predications are true of us, however: my life may be short, even if I am tall, I may be boring even though my life is not. Most importantly, we all think, I hope, that our lives might have been different. Presumably, some of us even believe that they might have had lived the life of another person, living or dead. Even though we both exist, and are different, I have a very intimate relation to my life: my life began with my birth; if you end my life, you kill me. The interdependence is not only one of existence: if I die young, my life will be short; if my life is boring, it is me who is dissatisfied with it; if I am a philosopher, my life will in part be a philosophical one.

Some philosophers have argued that I am my life, and have either tried to provide truthmakers for predications about me in terms of properties had by and relations among my temporal parts or else ‘tense’ the true predications about my life so as to make them attributable to me.⁵ Even if such a reductive project were to succeed, however, it would leave the metaphysical question unanswered.

It also rests on an unargued-for assumption: that that temporally extended entities such as my life are resolvable into, or ‘nothing but’ their temporal parts. If things may be temporally extended without perduring, the question about the relative priority of temporal wholes and parts will not help us find out how objects persist, nor will it provide a solution to the ‘problem of change’. I think that there are temporally extended enduring things and will call them “processes”. That we need more than the ordinary fourdimensionalist resources to account for them has already been recognised by the founder of tense logic:

“There is, however, a genuine difficulty, which I do not know how to solve, about the representation of past-tense facts as the former being-the-case of present-tense ones. Since the present is an instant, the only past-tense facts which we can represent by ‘It was the case that *p*’ or ‘It has been the case that *p*’, where *p* is in the present tense, are facts about what was the case at an instance or at a succession of instants. [...] Whatever *goes on for* a period of time can be fitted into this pattern, since *it is going on at* each instant in the period. But what *takes* time eludes this representation.” (Prior 1968a: 7–8 and 2003: 24)

Let us be clear about the difficulty: it does not concern the questions (i) whether spacetime is ‘gunky’ or composed of points (cf. Hawthorne 2007: 271), (ii) whether tense logicians may quantify over extended instants (or help themselves to what Brogaard (2007) calls ‘span operators’), nor (iii) whether instants or intervals are more fundamental. Nor does it concern the issue of (iv) whether some dynamic properties are intrinsic or extrinsic to objects-at-times, though our question will have implications for this debate.⁶ While there is an even tighter link to the issue (v) whether some temporal entities are essentially temporally extended, the

a part (“die innere Bestimmung eines jeden Raumes ist nur durch die Bestimmung des äusseren Verhältnisses zu dem ganzen Raume, davon jener ein Teil ist (dem Verhältnisse zum äusseren Sinne), d.i. der Teil ist nur durch das Ganze möglich”).

⁴Misleadingly, because the dimensionality of objects is a question orthogonal to the question of persistence: four-dimensional objects may well be ‘wholly present’ along one of their dimensions, while three-dimensional objects may have temporal parts, but still not persist *in virtue* of them.

⁵These two strategies map unto the two most prominent dissolutions of the so-called “problem of temporary intrinsics”: to explain why the contradiction inherent in “*a* is both *F* and not *F*” is removed by adding “at *t*₁ and *t*₂ respectively” (for *t*₁ ≠ *t*₂), perdurantists interpret the sentence as attributing *F* to *a*-at-*t*₁ and ¬*F* to *a*-at-*t*₂, while endurantists interpret it as attributing *being F at t*₁ and *being F at t*₂ to the very same *a*.

⁶The standard arguments for taking instantaneous velocity to be extrinsic – the Ockhamist view (Bigelow & Pargetter 1989: 290), the Russellian view (Zimmerman 1998: 268), and the at-at view (Arntzenius 2000: 187–189) – take it to be determined by taking the limit of a sequence of distance-time pairs – that is, by measuring distance over time as the temporal interval approaches zero – and *thus* to be determined by reference to the location of the object at other times. The instantaneous velocity being extrinsic is thus taken to *consist* in its being relational with respect to other temporal parts of the object. This argument, whatever its worth for perduring objects, is much less plausible for enduring objects.

question of processes does primarily concern how things persist, not whether they have properties essentially which presuppose temporal extension.⁷

What then, is the specifically metaphysical question of processes? Temporally extended, but enduring things like processes are of interest to the metaphysician of time because their conceivability, and even more their metaphysical possibility, shows the conceptual independence of three questions:

1. ontological dependence: whether or not some category of temporally extended thing can exist without its temporal parts;
2. individuating, essential dependence: whether or not some category of temporally extended thing could be what it is without its temporal parts being what they are;
3. ways of taking up time: in virtue of what temporal extension is produced, what the principle is by which some temporally extended thing is so extended;

The first of these questions concerns the nature of time, and of temporal parthood and could be argued, e.g., by an argument for the conceivability, possibility or perhaps even actuality of temporally extended simples. The second question concerns the priority issue that is left open by four-dimensionalism, at least of the Siderian variety. Even of things that are, at any given time, identical to their temporal part existing at that time, we may ask, as we have seen above, whether they are prior or posterior to this temporal part, or rather, to avoid a superficial conflict with the irreflexivity of grounding, whether it is of their nature to stand in the parthood or temporal counterparthood relations that they do.

Even of things that are ontologically dependent on their temporal parts and have them essentially, as part of what they are by their very nature, we may ask *how* they take up time. I will mark two possible answers by the technical terms ‘perdure’ and ‘unfold’. Events, and event-like things (such as wholes, successions or ‘courses’ of events) take up time by perduring, i.e. by existing successfully at different instants, where the property (or property-like feature) of *existence* is intrinsic to their respective temporal parts. We may, for present purposes, settle on the following definition:

an object *o* *perdures* : \iff *o* persists during interval *I* in virtue of being such that there exists intrinsically, at every instant *t* of *I*, a thing which is, at *t*, a part of *o*.

Perdurance is to be contrasted with another way for temporally extended things to take up time, which I stipulate to be characteristic of processes:

an object *o* *unfolds* : \iff *o* persists during interval *I* in virtue of being such that it a-temporally have parts which extrinsically exist at every instant *t* of *I*.

Perdurance and unfolding, so defined, differ in two crucial respects:

- temporal vs. atemporal having of temporal parts: Temporal parts, as defined by Sider, are short-lived entities which at the time of their existence are part of the temporally extended whole the persistence of which they ground. Their parthood relation being time-indexed allows the perdurantist to have ‘temporary intrinsics’, i.e. intrinsic exemplification of temporary properties. Suppose object *o* is red at *t*₁, but not red at *t*₂. To give a non-contradictory account of this situation, it is not enough for the perdurantist to postulate two different temporal parts, only one of which is (timelessly) red, but it is furthermore required that these things are not part of the persisting object *o* at the same time. Unfolding things such as processes are different in this respect: they have their temporal parts *simpliciter*, as well as at some given time.
- intrinsic vs. extrinsic temporal existence: To play their rôle in the ‘solution’ (or rather dissolution) of the problem of temporary intrinsics, the temporal parts of the perdurantist are “loose and separate” – their existence at their time does not depend on, nor does it somehow else ‘involve’, the existence of other temporal parts at other times. While it is difficult to cash out this notion of temporal intrinsicness,⁸ at least their existence must be intrinsic to perdurantist temporal parts if they are to play their rôle as fundamental bearers of (existence-entailing) temporary properties. Processes, on the other hand, have extrinsically existing, top-down or ‘holistically’ determined temporal parts, which are parts, but also *mere* parts, of their unfolding.

⁷Prior’s talk of such entities “taking time” is perhaps in this respect misleading: while processes like giving a lecture (one of Prior’s examples) may plausibly be taken to be of such a nature that they cannot last only an instant, this itself to be explained by their special and sui generis way to persist, i.e. their *taking up* time rather than *lasting for* some time.

⁸This is due to the fact that most of the discussion of intrinsicness has taken the form of a critical examination of several successive definitions by David Lewis, which presuppose the latter’s ‘four-dimensionalism’.

References

- Arntzenius, Frank, 2000. Are there really instantaneous velocities? *The Monist* 83: 187–208.
- Bigelow, John C. & Robert Pargetter, 1989. Vectors and Change. *The British Journal for the Philosophy of Science* 40: 289–306.
- Brogaard, Berit, 2007. Span operators. *Analysis* 67(1): 72–79.
- Cameron, Ross P., 2011. Truthmaking for Presentists. In Bennett, Karen & Dean W. Zimmerman (editors) *Oxford Studies in Metaphysics*, volume VI, pp. 55–101. New York: Oxford University Press.
- Cartwright, Helen Morris, 1970. Quantities. *The Philosophical Review* 79(1): 25–42.
- Fine, Kit, 2000. Neutral Relations. *The Philosophical Review* 109(1): 1–33.
- Hawthorne, John, 2007. Three-Dimensionalism vs. Four-Dimensionalism. In Sider, Theodore, John Hawthorne & Dean W. Zimmerman (editors) *Contemporary Debates in Metaphysics*, pp. 263–281. Contemporary Debates in Philosophy, Oxford: Basil Blackwell Publishers.
- Ishiguro, Hidé, 1990. *Leibniz's Philosophy of Logic and Language*. 2 edition. Cambridge: Cambridge University Press.
- Kant, Immanuel, 1983. *Werke in zehn Bänden*. Darmstadt: Wissenschaftliche Buchgesellschaft. Herausgegeben von Wilhelm Weischedel.
- Kant, Immanuel, 1992. *Theoretical Philosophy 1755–1770*. Cambridge: Cambridge University Press. Trans. and ed. by D. Walford with R. Meerbote.
- Kant, Immanuel, 2004. *Prolegomena to any Future Metaphysics that will be Able to Present Itself as a Science*. Oxford: Oxford University Press. Ed. G. Zöllner, trans. P.G. Lucas and G. Zöllner.
- Laycock, Henry, 2006. *Words Without Objects. Semantics, Ontology and Logic for Non-Singularity*. Oxford: Oxford University Press.
- McKay, Thomas J., 2008. Critical Study of Laycock (2006). *Canadian Journal of Philosophy* 38(2): 301–324.
- Prior, Arthur Norman, 1968a. Fugitive truth. *Analysis* 29: 5–8.
- Prior, Arthur Norman, 1968b. *Papers on Time and Tense*. Oxford: Oxford University Press. New edition: Prior (2003).
- Prior, Arthur Norman, 1976. Things and Stuff. In *Papers in Logic and Ethics*, pp. 181–186. London: Duckworth. Edited by Peter Geach and Anthony Kenny.
- Prior, Arthur Norman, 2003. *Papers on Time and Tense*. Oxford: Oxford University Press. New edition of Prior (1968b) by Per Hasle, Peter Øhrstrøm, Torben Braüner and Jack Copeland.
- Ramsey, Frank Plumpton, 1925. Universals. *Mind* 34(136): 401–417. Reprinted in Ramsey (1931: 112–137); cited after reprint in Ramsey (1990).
- Ramsey, Frank Plumpton, 1931. *The Foundations of Mathematics: Collected Papers of Frank P. Ramsey*. London: Routledge and Kegan Paul, Ltd. Edited by Braithwaite, R.B.
- Ramsey, Frank Plumpton, 1990. *Philosophical Papers*. Cambridge: Cambridge University Press. Edited D.H. Mellor.
- Russell, Bertrand Arthur William, 1901. On the Notion of Order. *Mind* 10(37): 30–51. Reprinted in Russell (1993: 291–309).
- Russell, Bertrand Arthur William, 1903. *The Principles of Mathematics*. Cambridge: Cambridge University Press. 2nd edition: Russell (1937).
- Russell, Bertrand Arthur William, 1937. *The Principles of Mathematics*. 2 edition. London: George Allen & Unwin.
- Russell, Bertrand Arthur William, 1993. *Towards the Principles of Mathematics*. Number 3 in The Collected Papers of Bertrand Russell, The McMaster University Edition, London: Routledge. Edited by Gregory H. Moore.
- Stout, George F., 1940. Things, Predicates and Relations. *Australasian Journal of Psychology and Philosophy* 18(2): 117–130.
- Zimmerman, Dean W., 1998. Temporal Parts and Supervenient Causation: The Incompatibility of Two Humean Doctrines. *Australasian Journal of Philosophy* 76: 265–288.