

Mereological Bundle Theory  
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*Bundle theory* takes objects to be bundles of properties. Some bundle theorists take objects to be bundles of instantiated universals, and some take objects to be bundles of tropes. Tropes are instances of properties: some take instantiated universals to be tropes, while others deny the existence of universals and take tropes to be ontologically fundamental. Historically, the bundling relation has been taken to be a primitive relation, not analyzable in terms of or ontologically reducible to some other relation, and has been variously characterized as, e.g., “compresence,” “concurrence,” or “consubstantiation.” Bertrand Russell (1940) defends compresence of universals, and Hector-Neri Castañeda (1974) defends consubstantiation of universals. John Bacon (1995) defends concurrent tropes and Keith Campbell (1990) defends compresent tropes. Jonathan Schaffer (2001) bucks this trend, endorsing compresence understood as co-location in spacetime, but this brings with it undesirable consequences such as the impossibility of distinguishing between objects (such as electrons or other microentities) with the same location.

Mereological bundle theory improves upon traditional bundle theory by taking the primitive relation of bundling to be the more familiar relation of fusing or composing, such that objects are fusions of properties or fusions of property instances. Hence, mereological bundle theorists endorse a property mereology: a mereology where properties or property instances can be parts of objects. An advantage of the approach derives from the fact that standard mereologies take composition to be primitive or define it using a different primitive mereological notion (such as primitive parthood). Thus, taking the basic primitive of bundle theory to be composition can reduce the need for

additional primitives in one's overall ontology and substitutes a familiar type of relation relied upon elsewhere in ontology for an unfamiliar type of relation unique to the bundle theorist.

In addition to being able to reduce the mysterious relation of bundling to the composition relation, mereological bundle theorists can restrict composition in order to avoid a proliferation of unwanted objects, and take advantage of associated mereological notions such as overlap and distinctness to construct accounts of how, for example, numerically distinct objects can occupy the same place at the same time (Paul 2006). Moreover, taking objects to be fusions of properties or property instances rather than, say, sets of properties or sets of property instances, respects the natural intuition that fusing things together creates objects. (Composition has a certain oompah-pah.)

Goodman (1951) develops a version of a property mereology that takes qualitative parts to be appearances of spatiotemporally located trope-like entities, and describes the mereology of appearances of property instances (or what he calls "moments of experience"). Building on an interpretation of Rudolf Carnap's (1928) phenomenalistic construction of quality classes in the *Aufbau*, Goodman (1951) held that fusions of such (appearances of) property instances that counted as (appearances of) objects were those to which the primitive predicate of "togetherness" applied. The predicate "togetherness" is needed because Goodman endorses unrestricted mereological composition, and hence must endorse the existence of fusions of (appearances of) property instances such as *squareness* and *roundness*. But there are no (appearances of) round squares because there are no fusions of (appearances of) instances of *squareness* and *roundness* to which "togetherness" applies. Goodman's system expands upon the little-noticed point that

Leonard and Goodman's (1940) formal calculus of individuals included property instances as parts along with spatial and temporal parts.

Paul (2002, 2006) defends a mereological bundle theory where some objects are fusions of multiply locatable properties and other objects, including ordinary objects, are fusions of property instances. Unlike Goodman, Paul is giving an account of objects and properties, not of appearances of objects and properties. Also, Paul does not take fusions of properties, in the first instance, to be fusions of trope-like spatiotemporally located entities, but to be fusions of primitive properties that can be multiply located. Thus, the ontology is of objects rather than appearances of objects, and overlap can occur across locations, even while objects can be fusions of property instances by being fusions of properties that include locational properties. Paul (2006) takes property composition to be restricted, eliminating the need for Goodman's primitive predicate of togetherness. Paul also distinguishes between a property mereology and spatiotemporal mereology, taking the former to be more fundamental than the latter.

Mereological bundle theory can also be found in the work of D.C. Williams (1953, 1986). Williams was an early defender of objects as bundles of tropes, and in his 1953, made suggestive remarks about tropes as the "abstract parts" or "finer parts" of objects, where such parts are explicitly taken to be tropes or property instances. As such, he counts as an early mereological bundle theorist. However, unlike Goodman and Paul, Williams gives no explicit definition of qualitative parthood, no mereological axioms or definitions, no information about whether fusion is restricted or unrestricted (and if it is unrestricted, how to treat it), and no account of how qualitative parthood connects to spatiotemporal parthood. As Williams is not even minimally explicit about how a trope-

theoretic mereological approach is to be formulated, he cannot be seen as venturing beyond more than a straightforward adoption of (a nonphenomenalist version of) Goodman's system.

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