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Towards a teleo-semiotic theory of individuation

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Abstract: This article attempts to develop a sketch or working model of a semiotic theory of individuation from a formalization of basic teleological structures. After caveats and provisional definitions, a formal apparatus is introduced that schematizes teleological structures by way of mathematical category theory. This is then combined with a commutation test for formal systems. Once the formal construction is sufficient, the extent to which the model can account for the operation by which objects, modes, kinds, and attributes become individuated from the "pure multiplicity" of indeterminate being is analyzed. Subsequently, the model is applied to a series of well-known problems in metaphysics and ontology – persistence, change, vagueness, coincidence, mereology, and universals – in order to demonstrate its effectiveness. The metaphysical picture that results from this application is positioned between the conventional extremes of realism and anti-realism: a semiotic anti-/realism. Empirical evidence is then also marshalled in support of the model by way of invocation and analysis of recent research into the development of the perceptual capacities of infants.

Keywords: teleology, commutation, individuation, identity, ontology, metaphysics

Take an ocean, the Atlantic Ocean, for example. How is it that it is the individual object that it is? How is it that this particular expanse of water is distinguished from others spatially contiguous or internal to it and given the status of an entity, a thing, an object? Philosophers have traditionally referred to a variety of supposed necessary and sufficient conditions in answer to this question. For example, a typical response has been that relative movement is such a condition.[1] But in this case, this cannot be necessary, since the ocean does not move

1 Descartes and Spinoza, for example, are commonly considered to have held this sort of position. See Descartes 1983: Part II, Section 25, and Spinoza 1985: IIP13–IIP14.

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relatively to anything, and it cannot be sufficient, because sections of water within the ocean move relative to other sections, but remain unindividuated. Others have referred to a single spatiotemporal trajectory as the defining feature of individual objecthood.[2] But this cannot be sufficient since every possible subdivision of the ocean has a unique spatiotemporal trajectory, but most are unindividuated. And it would be possible to imagine a distinct object, an enormous shoal of fish, for example, that was co-spatiotemporal with the ocean. And it cannot be necessary, since if the continents moved together to annihilate the ocean, and then moved apart again, it would plausibly be the same ocean again – despite a breach of its spatiotemporal trajectory. Some, such as E. J. Lowe (2008, in particular), have argued that a distinct causal role is necessary or at least sufficient to grant individual objecthood. But by most accounts of causation, there are all manner of causal relationships operating all the time between all the unindividuated bits of the ocean. To then deny that this is the case, and to insist that causal relationships only operate between individuated sections would appear to presuppose, rather than to explain, individuation. And what distinct causal role does one wave play that cannot be played by two proximate waves? Yet two waves are said to be two individuated objects, and one wave is said to be one. The neo-Aristotelian medieval accounts that instead use the twin categories of form and matter and the concept of substance would succumb to similar analyses (King 2000; Barber and Gracia 1994), while Duns Scotus' invocation of haecceity appears to straightforwardly beg, rather than answer, the question. And there are plenty of alternative accounts that we have no space to touch on here.

1 Caveats, provisional definitions, and precedents

Rather than dwell here on the various significant successes and failures of these traditional proposals, the aim of this paper is to sketch – with an economy of detail – a teleo-semiotic account of individuation.[3] These terms all require provisional explication.

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2 See, for example: Williams (1956–1957); Armstrong (1963); Shoemaker (1963); Wiggins (1967); Coburn (1971); Hirsch (1971); Kellman and Spelke (1983); Spelke (1990); Xu and Carey (1996).

3 It should be explicitly recognized at the outset that there is, of course, something paradoxical about projects to ground individuation and identity absolutely. Insofar as one has recourse to a basic principle, operation, condition, etc., at least one identity must always remain outstanding; as Agrippa's trilemma makes clear, the only other two options are circular reasoning or an infinite regress. Thus, apart from the attempts mentioned in passing above, just for illustration:

By an "account of individuation," I mean a systematic theory of the conditions or criteria, ideally necessary and sufficient, and processes by which an entity becomes determinate as the entity it is and thereby distinguished or marked off from other entities and bestowed an identity. It proposes an answer to the question of why it is that some bits of the world, but not others, get the ontological value of an *entity* – an *ontology*, then; not merely an epistemology of the conditions by which cognizers come to recognize individuals. Just insofar as entities' identities are functions of individuation conditions, that is, results of the operations of individuation – although that could be considered controversial – this will also amount to an account of identity.[4]

If the accounts are successful in these regards, I should then have the conceptual resources on hand to provide a theory of numerical identity, that is, of persistence through change, of how it is that on successive occasions we identify two different manifestations as manifestations of the same thing.

The account begun here will be a semiotic account because the marks that will be taken to individuate one entity from another are marks of meaning or *signification*. The account will suggest that the operations by which entities are individuated are undertaken by the marks that enable entities first to signify, that is, originally possess meaning. It thus constitutes a sketch of a semiotic ontology. This is intended to open a middle way between two competing trends in modern ontological studies: between the various forms of metaphysical realism, on the one hand, which is the default, if not the most popular, position in the modern debate about identity, mereology, persistence, etc., and the sort of linguistic idealism or anti-realism that reduces competing ontological schemes to different ways of talking, all of which have a *prima facie* validity. Entities will here be construed as semiotic units – neither as wholly independent reals, in the traditional sense, nor as mere phantoms of our language games. Since

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Heidegger (1957) makes identity prior to being but only as an issue of *Ereignis* (Deleuze and Simondon presuppose "fields of fluid intensive factors," of "pre-individual singularities"; see Deleuze 2004: Ch. 3); Kant presupposes a "transcendental unity of apperception" and the pure form of intuition of space for the individuation of appearances; and Harman, Bryant, and other so-called speculative realists simply do without individuation conditions entirely and presuppose ready-to-go differences or objects (see Harman 2011; Meillassoux 2008; Bryant 2011, for example). To be explicit: my presupposition, as will soon be seen, apart from the undifferentiated real, is merely a teleological functor.

4 The following two questions are conceptually distinct, even if they are not usually distinguished in discussions of individuation: a) How does a particular piece of the world get individuated into an entity, as opposed to not-an-entity, in the first place? b) How does an entity become the particular *determinate* entity that it is? In what follows, however, they will turn out to have the same answer since determinate semiotic markings will be held responsible for individuating an entity first of all. Individuation and identity arrive together.

signification fundamentally concerns the express relation of one being to another, my account can be construed as a relational or structural ontology – as thus another attempt to contribute part of a response to Saussure's (2013) challenge of a general theory of signs.

The account is also a *teleo*-semiotic account since the conditions of individuation, i. e., the conditions of originary signification, will be located within structures conformed by teleological relationships, that is, by relationships of purpose, goal, end, etc. A whole variety of psycho-teleological phenomena could be manifest by such relationships: need, demand, desire, wish, want, intention, inclination, proclivity, drive, instinct, ambition, hope, fear, etc., but for the most part distinctions between such phenomena will be left out of focus here for the sake of the simplicity and generality of the semiotic account.

On the basis of such an orientation as this, the account offered here could be taken to suture with existential and even existentialist ontologies grounded in theories of *transcendence*, and, in particular, with Heidegger's *existenziale Analytik* of *Da-sein* (Heidegger 1967). And to this extent, the paper can be taken as an attempt to further systematize and develop the pioneering forays into existential semiotics of Eero Tarasti (2000). It also sutures with Derrida's thought, at least as it is presented in the first section of *Of Grammatology*, where Derrida explicitly intimates that *desire* subtends and grounds the logocentric semiosphere (Derrida 1998: 49).

Semiotics has always been a multifaceted and syncretic approach to phenomena, drawing on many academic traditions. Such a precedent, combined with the needs of the particular subject of my focus, justifies my breadth of reference across the so-called "analytic" – "continental" philosophical divide.

Finally, I should emphasize that the model that follows poses as neither conceptually complete nor as philosophically definitive. In the first place, this account should not be assumed to have universal applicability: it may be the case that different sorts of entity have different sorts of individuation conditions (individuation pluralism). In particular, I am not sure how this account can straightforwardly apply to individuals that are organisms, or to persons, or to abstract objects, such as numbers (although I expect that it could be expanded appropriately to do so).[5] Secondly, this presentation should not be construed as making definitive claims: what I am providing is a possible account of individuation – a model – that may or may not apply, or function, in fact – if, indeed, there are any facts.[6]

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5 It should be possible, at least, to extend it to incorporate our bodies and "egos" or "I's" insofar as they must be – as should become clear – nodes of functional syntagms.

6 Philosophy as model construction is the methodological response adopted here to the crisis in philosophy ensuing from the problematizing of the basic conceptual configurations of

1.1 The ontological square

In order to gain some initial clarity and organization to facilitate our progress, we will invoke and assume axiomatically the Aristotelian so-called "ontological square" as a guide to the most basic categories of what is. The ontological square, proposed and discussed recently, by E. J. Lowe (2006), Luc Schneider (2009), and Katherine Munn and Barry Smith (2008), among others, consists of four basic divisions or categories. Fixing our terminology:

- *objects* (e. g., Nelson's column) individual beings – Latin, *ens*;
- *modes* (e. g., the greyness of Nelson's column), the particular properties that characterize particular objects;
- *kinds* (e. g., statues), the sorts of objects;
- *attributes* (e. g., grey), the sorts of modes

Certain formal ties bind the categories together: kinds and attributes are *instantiated* by objects and modes respectively; whereas modes characterize objects (Nelson's column is grey), and attributes characterize kinds (statues are colored).

Following E. J. Lowe's (2006) nomenclature, we will reserve the word "individual" to refer to the first two of these four categories, i. e., for objects and modes, and the word "sortal" to refer to the last two, i. e., for kinds and attributes. Our task is to unearth semiotic individuation conditions for things of each of the four categories here enumerated. Part of the semiotic account will have to be a demonstration of the grounds by which it is warranted to propose that there are these four, and just these four, ontological categories, which will, of course, amount to an account of the individuation conditions of these four categories themselves.

1.2 "The 'one' is not"

One further controversial presupposition should be made explicit at the outset: Alain Badiou's dictum that "the 'one' is not" (Badiou 2001: 25). This is here

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metaphysics and its associated conceptions of truth. This approach stands in deliberate and stark contrast to several contemporary directions, such as Laruelle's "non-philosophy," the "speculative realism" of Harman, Meillassoux, et al., deconstruction, etc., and shares more in common with the affirmation of Badiou's (2005, 2009) *Being and Event* books. Crucially, it has the following implication for the status of the claims made here: *rather than being transcendentally grounding truths, they are mere devices of explanation; rather than being expressions of knowledge they are mere facilitators of understanding. My hope would be, not that they capture "the truth," but that they provide one possible horizon, perhaps among others, for making sense of individuation*. In this case, appropriate assessment of the model will rest on its explanatory power, its coherence, and the plausibility of its implications.

taken to mean that being as such, *indeterminate being*, to use Hegel's vocabulary, is not differentiated into distinct or individuated entities, but is rather undifferentiated – a "pure multiplicity," as Badiou calls it. Only a subsequent *operation*, an operation the basic procedures of which we shall here attempt to sketch out, renders being determinate, that is, distinguishes or individuates one being from another. This presupposition is taken as it is presented by Badiou: as a necessary corollary of the removal of the creative power of God from the conceptuality of the philosophical enterprise. Invoking Plato's metaphor in the *Phaedrus* (Plato 2003: 265e), metaphysical realists such as Theodore Sider (e. g., 2011) frequently talk of basic objects, or, in any case, "the fundamental furniture of the universe," as individuated by nature's "joints." Philosophically, this will not do. In the first place, this is, of course, merely a metaphor and cannot pass as an adequate foundational explanation without substantial cashing out. And how such cashing out could be effected is, at least to this author, profoundly unclear. In the second place, it begs the question: what individuates the joints? Why are certain bits of nature – its joints – individuated in the first place, subsequently to individuate objects? Simply to call them fundamental is to re-state rather than answer the question. Thirdly, even if it does make sense to talk of nature's joints, why should these joints be taken to have any bearing on what there is, or any bearing on our truth-claims about what there is? Why such a grounding relation? This must be explained rather than presupposed. And, after all, what does this metaphor of "joints" reveal about our understanding of individuation and objecthood? That it is based upon the possibility of relative motion? But why should we accept that sort of account of objecthood without justification? Badiou's thought is that, without recourse to a concept of God, there can be no philosophical justification for the claim that nature has any joints. If there is no God, there is no designer: there are no joints that can claim ultimate reality.

2 The teleological syntagm: Formal presentation

The presentation is organized into two parts: on the one hand, I will outline a purely formal account of the structures necessary for our proposal; and, on the other hand, I will attempt to demonstrate and illustrate the applicability of the model to thorny metaphysical problems concerning individuation. Presentation of the formal part will be facilitated by the vocabulary and schema of mathematical *category theory* (not to be confused with ontological or metaphysical category theory). Mathematical category theory can be construed as a general

theory of relation, and its tools and notations can therefore be of use to a formal presentation of structures, such as that which follows. It should be noted that nothing at all is supposed to hang on this mode of presentation: it is simply a vehicle. And no prior familiarity with this branch of mathematics is here assumed.

2.1 Projection

We start with the formal structure of teleology. For my purposes here, I take this to be, in general, a basic, unqualified, unidirectional, asymmetric relationship of *projection* (in the sense of its etymological origin as "thrown forth"). It can be conceived as a simple negation, and thus as a pure differential opposition. And can thus be schematized as per Figure 1, where, using some of the vocabulary of category theory, *A* is the *source* and *B* is the *target*. We will refer to this basic relation of projection as the *teleological functor*. In laymen's terms, it would be the most general structure of desire, where this should be taken to include the whole variety of teleo-psychological phenomena, some of which we mentioned earlier.

Figure 1: Teleological functor.

On the frame of this original relationship, two further relationships are founded, based on the possibility of *composition*: the useful or *means*, and the useless, or *non-means*. These can be schematized around the teleological functor as per Figure 2, where *C* is a useful means that *commutes* the teleological functor such that

$$h_0 g = tf$$

where this reads: *h* after *g* is a realization of *tf*; and *D* is a useless non-means that fails to commute it.

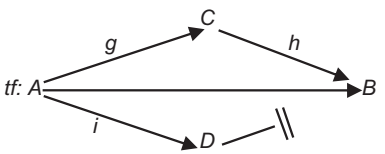

Figure 2: Teleological syntagm.

Call this four-way distribution of determinacy a *teleological syntagm*. In general, a teleological syntagm comprises nodes and arrows (the latter called "morphisms" by category theorists) arranged around an axial teleological functor. The nodes are determinate, but only insofar as they stand in relationships to other nodes. Their determinacy is just the sum of these morphic relationships.

2.2 Polysemy

It can then be demonstrated that any given node is *polysemic*, since it can support further *multiple* relationships. These are the result of the *composibility* and *overlapping* of distinct teleological syntagms.

2.2.1 Vertical polysemy: Composibility

Within any given node of a teleological syntagm, there may be further functions, as per Figure 3, where a function, *i*, is enmeshed within *C*. Category theory uses the word composibility to describe this structure. Further, the target, *B*, can itself be composed in some further syntagm insofar as it is itself a means to some further target, as per Figure 4.

In principle, such composibility or "enmeshment" is infinitely extendable in both directions. This is what we can call the vertical dimension of polysemy: in

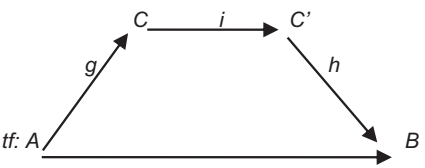

Figure 3: Composibility 1.

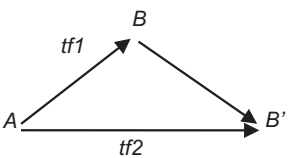

Figure 4: Composibility 2.

general, a node occupying a position within a syntagm is determined by other syntagms in which its syntagm is composed and/or by other syntagms which are composed in its syntagm.

2.2.2 Horizontal polysemy: Overlapping

On the other hand, polysemy has a horizontal dimension. Horizontal polysemy is due to the *overlapping* of teleological syntagms. A given object or node can be the target of more than one teleological functor (Figure 5).

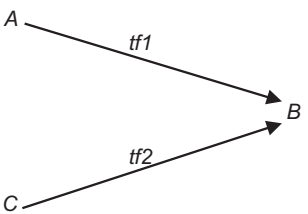

Figure 5: Overlapping 1.

And a given object or node can be the means of more than one syntagm (Figure 6).

In both cases, the determination of the means and target is a function of the sum of their relationships. Again, in principle, the overlapping of nodes of syntagms is unrestricted. A given node may function within any amount of overlapped syntagms.

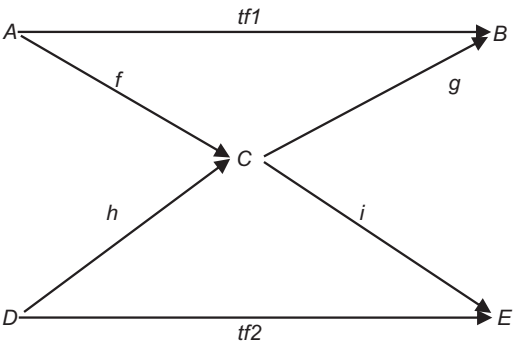

Figure 6: Overlapping 2.

2.2.3 Concreteness and function

Call a syntagm *concrete* if it pertains in fact, i. e., if it is actually supported by what we might call an "existential subject" (in fact, I have argued elsewhere that the semiotic "subject" can be reduced without remainder to a set of concrete polysemic schemes [Duits 2012]). Call a node or morphism *functional* insofar as it configures a concrete syntagm.

3 Individuation and the commutation test

The task now is to show how the relationships here outlined and schematized as a teleological syntagm are sufficient to ground the individuation – the original determinacy – of the four categories of entities of the ontological square. We shall tackle these two at a time: first individuals, second sortals.

3.1 The individuation of individuals

The first two theses to be proposed here are that:

O. Objects are to be defined as the functional nodal invariances of concrete, polysemic, teleological syntagms. Sources, targets, means and non-means in concrete syntagms are all objects. The criterion of objectual identity that would accompany this account of individuation would therefore be the following: objects *A* and *B* are identical if, and only if, *A* and *B* bear the same teleological syntagmatic relationships.[7]

M. Modes are to be defined as the functional morphisms conformed between the nodes of concrete, polysemic teleological syntagms. The corresponding criterion of modal identity would be: modes *f* and *g* are identical if, and only if, *f* and *g* form the same relationship between the same nodes in the same teleological syntagms.

On our proposal, then, what accounts for the individuation of objects – such as the Atlantic Ocean, for example – and their modes, is originally their functional roles in teleological syntagms.[8] The well-known semiotic tool of *commutation testing* is needed to illuminate the operation.

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7 The criteria for objectual and modal identity here given must be taken in light of the discussion of change and persistence conditions in Section 4.1 below.

8 While I do not intend to develop the proposal here, I would claim that the individuation of events and associated modes can be given the same analyses. If the individuation of objects and

The commutation test has generally been conceived as a tool for analyzing the units, classes and structures of systems – in the semiotic case, of significative systems. Systematic substitution, transposition, addition and deletion of the matter of the system – phonemes, for example – enable one to identify and classify the units significant to the functioning of the system. Given a primitive or originary teleological functor, and a field of indeterminacy, sources, targets, means and non-means are individuated as commutable, that is, as significant elements, unities, individuals, and thus constitute a functional syntagm. They are distinguished or determined – *unified* – from the indeterminacy of "pure multiplicity" by the commutable relevance they bear to the teleological functor projected. By this originary operation, they are individuated.

To take our previous example of the Atlantic Ocean: from the indeterminacy of the regions of pure multiplicity in general, it is individuated as a watery expanse to be explored, as a means of obtaining food, as a target for sailors, as something to be mapped for geographers, as an obstacle to getting to the New World, as a desperate watery desert, etc. Its modes are correspondingly individuated as the relations that determine it as a means, target, etc. So it is abundant in food, a challenge to rowers and sailors, lying in between Eurasia and Africa to the east and the Americas to the west, too large, inhospitable, wet and cold, etc. The set of properties of the ocean are the set of these morphic relations within the relevant concrete teleological syntagms. The objecthood and modes of the Atlantic Ocean are subsequently fixed and secured by language and convention.[9]

For those who like formal languages, the characterization of an object by a mode can be expressed approximately, using the notation of first order logic, as a straightforward disjunction – a disjunction of two conjunctions:

$$\forall x \in \$,\ G\varkappa \leftrightarrow \exists y(G\varkappa \rightarrow Y \bullet \neg\, G\varkappa \rightarrow \neg\, Y) \vee (G\varkappa \rightarrow \neg\, Y \bullet \neg\, G\varkappa \rightarrow Y)$$

events can be accounted for by the same set of conditions, this is an advantage over any theory that references time as a condition of individuation, and thus must provide different accounts for each.

9 Identities that serve a collaborative purpose become enshrined – no doubt in a disordered and haphazard way – in a language as the referents of words and statements. Syntagms and their components can thus be communicated. While I will not develop this claim here, it is worth noting that such a theory of individuation perhaps may serve to shed light on some of the traditional problems in the philosophy of language. Are names abbreviated definite descriptions, or is the causal theory of names correct? (See Kripke 1980.) A name may well refer *rigidly* to a given individual, but it is the associated definite descriptions that situate the referent in locations within semio-syntagmatic networks. Thus what ensures that someone refers to the same individual as another when using a given name is not, *contra* Kripke, some opaque causal relation, but the perpetuation of continuous locations within determinate semio-syntagmatic networks.

For all *x* belonging to the syntagm *S*, to say that *x* has property or mode *G* is to say that there exists a *y* such that, if *x* has *G*, then *y*, and, if *x* does not have *G*, then not *y*, or, if *x* has *G*, then not *y*, and, if *x* does not have *G*, then *y*.[10]

I say "approximately" since this disjunction would not be sufficient were *x* and *y* not related as terms of a teleological syntagm, but first-order logic has, of course, no proper resources to express this. I have tried to articulate the restriction by importing the set-theoretic notion of *belonging* (in this case to a syntagm).

On this account there can be no "bare particulars," contra some commentators' construal of Locke (cf. Locke 1979: Bk. II, Ch. xxiii, § 2), that is, objects without modes, just as there can be no "free-floating" or unattached modes.

3.2 The individuation of sortals

In order to incorporate sortal concepts into our model, whether they be kinds, which find their instantiation in objects, or attributes, which find their instantiation in modes, we invoke once more the much-used semiotic tool of commutation.

Applied to a teleological syntagm, such that the nodes and morphisms constituting the scheme are variously but systematically substituted, re-ordered, deleted and added, commutation *classes* can be constructed of both objects and modes. Similarity of commutation is ultimately a guide to similarity of function within a given scheme. Sortals are sets of commutation functions:

K. The commutation classes of objects are called *kinds*. Take teleological functor *AB* and means *C*. If *D* can be substituted for *C* without affecting the functionality of the scheme, then *C* and *D* – with respect to teleological functor *AB* – belong to the same commutation class. They are, in this respect, of the same kind.

A. The commutation classes of modes are called *attributes*. Take teleological functor *AB* and means *C*, where *f* is the mode that makes *C* a means to *B*. If *D* can be substituted for *C* because it has mode *g*, then modes *f* and *g* belong to the same commutation class with respect to teleological functor *AB*. They are, in this respect, of the same *attribute*.

The construction of two commutation classes out of the two elements of teleological syntagms – morphisms and nodes – grounds the appropriateness of the

10 This rendering turns modes into "instrumental properties" and is indebted to Jonathan Bennett's account in his (1976: Ch. 2).

four category ontology of the ontological square. In this case, we have provided an account of the individuation of just these four categories.

4 Demonstrations and clarifications

Let us begin to test this model as it stands so far using a cluster of familiar metaphysical problems. This is demonstration only, so we will be unable here to treat these issues with the conceptual depth they warrant.

4.1 Persistence and change

It may be objected to this account that if identity is tied so closely to teleo-semiotic function, then any change in the syntagm will result in new individuals altogether: any change in the morphic relationships will produce identity changes in the nodes constituting the syntagm. Thus any change in qualitative identity would result in a change in numerical identity. This would be a particularly counterintuitive result. It would mean, for example, that my desk could not get a scratch on it. For, given that "scratched" is a mode, being scratched would bring with it a new desk entirely. (Note that this is true of objects but not of modes: modes cannot change their properties without being replaced by different modes, for their properties are their numerical identity. The color of my desk cannot change color without becoming a different color.)

In order to avoid this consequence, one needs an account of how an entity can *change*. Traditional – Aristotelian – accounts refer to a distinction between essential and accidental properties,[11] the basic idea being that an object can survive changes in its accidental properties, but not in its essential ones. But then one requires a non-question-begging and grounded account of this distinction. A currently popular alternative invokes perdurance antipodal to endurance, and argues that objects have distinct temporal parts.[12] But this four-dimensionalism, as it is known, is so unintuitive that one commentator thereof remarked: "I simply do not understand what [distinct temporal parts] are supposed to be, and I do not think this is my fault. I think that no one understands what they are supposed to be, though of course plenty of philosophers

11 See, for example, Aristotle 1984: 1031a. For recent approaches along these lines: Geach (1967), Wiggins (1967) and Hirsch (1971).

12 For the classic account of the doctrine of temporal parts, see Lewis (1986). For a more recent defence, see Sider (2001).

think they do" (Van Inwagen 1981). Roderick Chisholm (1969) offers a further account, invoking a distinction between "loose and popular" and "strict and philosophical" senses of identity. But this ends him with the unpalatable consequence that, in the "strict and philosophical" sense, an entity cannot change any of its modes without thereby becoming something numerically different. In any case, the model we have developed so far lends itself to another approach.

Objects are determined by the modes of indefinitely many teleological syntagms. Each of these bears on the object's identity in a different way. Take a hat. It may be at least determined by syntagms oriented around a need to keep warm, those oriented around a desire to look sharp, and those oriented around a preference for a particular color. Change occurs when one or more syntagms become dysfunctional while others continue to determine the entity. So, if the hat gets a hole in it, it may no longer support the desire to look sharp, but its capacity to provide warmth and its colors remain much the same.

Now kinds have been construed as sets of syntagmatic commutation functions. On this account, with the collapse of a syntagm, an entity is changed in respect of its kind. If the hat's brim falls off, for example, it ceases to belong to the kind *brimmed hats*. It nevertheless continues to belong to the kind *hat*. Such changes may accrue to a point at which we are no longer inclined to consider it a hat – perhaps it gets hopelessly torn or crushed. Nevertheless, it continues to exist subsumed under other kinds – spare felt, for example, or clutter.

An entity changes, then, when the set of syntagmatic relationships that determine it changes. Since each of these relationships bestows upon it membership of some kind or other, a change of an entity is always a change of its kind memberships.[13] Correlatively, when we say an object *persists* through change, we refer to the maintenance of some of its syntagmatic functionalities through collapses of other of its syntagmatic functionalities. A hat persists through the removal of its brim; a piece of felt persists through its manufacture into the shape of a hat, and the later destruction of that shape.[14]

As an account of the persistence or identity over time of everyday physical objects, this account differs from the standard contemporary approach that

13 Our account of change here also squares with Kripke's claim that there is no such thing as contingent identity – only contingently true identity statements (Kripke 1971). While an object may change its modes, such that predications concerning it are contingently true or false, it is necessarily the object that it is (although that is not to say, of course, that its existence is necessary).

14 Note that one does not need in addition to an account of persistence through change an account of identity over time. Indeed, much philosophical discussion of persistence appears to have been focused askew on the latter less fundamental question. Survival from *t*1 to *t*2 comprises persistence through (a temporal) change.

invokes, in one sense or other, spatiotemporal continuity (cf. note 2). Despite its popularity, however, the latter approach is unfit for purpose, for its explanans and its explanandum are at bottom the same: continuity through time is surely at least partly what is meant by identity over time. The semiotic approach offered here avoids the circularity.

4.2 Vagueness

No rigorous distinction between essential and accidental properties is drawn here. But what is bought for this price is the ability to incorporate into the account *ontological vagueness*, and to do so in a way alternative to epistemicism, super-/sub-valuationism, contextualism, the elaboration of many valued logics, or its reduction to linguistic vagueness. Mark Heller's so-called "step argument" demonstrates the difficulties in the naive metaphysical realist approach to vagueness (Heller 1996). On the other hand, Timothy Williamson's epistemicism is committed to the view that any apparent vagueness in the truth conditions of a given assertion is the result of ignorance and could properly be resolved only by epistemological improvement (even if such improvement is not possible in principle; Williamson 1994). The problem here is that a cursory analysis of natural languages reveals that the truth conditions of at any rate a great many assertions are established by socio-cultural conventions that are inherently imprecise. Take the conventions which have named different regions of the world's oceans "Atlantic" and "Pacific." No doubt there are regions of water concerning which it seems vague as to whether they are part of the Atlantic or part of the Pacific. However, a closer analysis or measurement of these regions cannot resolve the issue, because that relative to which an answer could be found is itself vague. The world cannot resolve for us vagueness in this case *in principle*. It makes very little sense, therefore, to characterize vagueness as purely an issue of epistemology. But this should not force us to the anti-realist dispositions of those who conceive vagueness as fundamentally a function of language.

On the contrary, our account is a sort of semiotic extension of Delia Graff's "interest-relative" solution to sorites-type paradoxes: "the semantics of vague expressions renders the truth conditions of utterances containing them sensitive to our interests, with the result that vagueness in language has a traceable source in the vagueness of our interests" (Graff 2000). Doing without a truth-conditional semantics, we can locate the source of the vagueness of expressions within the effect that the vagueness of our interests has on the ontological schemes of the relevant syntagms. Suppose I order from a bar two Bloody

Marys, one for me, and one for a friend. The bartender puts very little vodka and very little flavoring in the tomato juice, such that, when she takes a sip, my friend exclaims that it is not a Bloody Mary at all. I, on the other hand, liking my cocktails weak, declare that it is. The appropriateness of our respective claims is clearly relative to our interests, preferences, and desires. It is a Bloody Mary *for me – for my taste* – but not *for my friend*. As the bartender added vodka, etc., to the tomato juice, there came a point at which I was happy to declare the drink no longer a tomato juice but rather a Bloody Mary, whereas, for my friend, that point did not arrive – although presumably it would have done eventually had the bartender continued. The identity of being a Bloody Mary is thus vague, and determinate only relative to teleological structures, to a given set of interests, preferences, etc.[15]

4.3 Coincidence and composition

We have here also a response to the standard problematic of *coincidence* and *composition*: why is it that a statue can lose one of its gold atoms and still be the same statue, whereas the set of gold atoms that constitutes the statue at time *t* cannot lose any atoms without becoming thereby a different set? The statue can change in this particular way, but the set of atoms constituting it cannot. Conversely, if we melt the statue down, we lose the statue, but we retain the set of gold atoms. Here we have to do with two different objects, distinct both numerically and qualitatively, that have different persistence conditions because they support very different syntagmatic functions. They do happen to occupy the same space, of course, but spatiality is, on the present account, indeterminative of identity.

4.4 Wholes and parts: A mereology

Peter Van Inwagen (1987) asked a question that generated a lot of literature: how it is that when some objects are composed together, a *new* object emerges, and when other objects are composed together, or when the first objects are composed together in the "wrong way," nothing more than an assemblage of objects results. So, for example, when a bunch of metal components are fitted together in an appropriate way, you get a bicycle, but when a bunch of scrap metal is

15 It should be noted that insofar as our account tolerates ontological vagueness, it blocks Sider's (1997) argument from vagueness to four-dimensionalism.

thrown into a yard, there is nothing but bits of scrap metal. This raises the traditional problem of wholes and parts that so bothered Aristotle and Plato.

The account of individuation offered here may provide one solution to this issue: what would determine whether or not an assemblage constitutes a single object rather than merely an assemblage of objects is whether it supports some functional role within a teleological syntagm. So, for example, put together, in the right way, an assemblage of metal bits and a bicycle emerges, because a bicycle is a useful means of transport. Throw scrap metal into a yard and nothing especially functional results. Some new object could result, of course: an artwork, for example; but it could only be something of some teleo-semiotic value.

Similar considerations perhaps enable our model to account for the whole-part distinction in general. If a rock breaks into pieces, one gets fragments of rock, or, better, a bunch of new smaller rocks. One doesn't get several parts of one rock. This must be the case given what we know about geology and erosion, for otherwise all rocks would be termed parts of rocks. Take apart a bicycle, on the other hand, and one gets a bunch of parts or components of a bicycle – at least if one does so carefully, respecting the boundaries of the partially autonomous structures that constitute it. Reference to the concept of teleological function could, again, explain this: whether or not an object can be taken to be a part of a larger whole would depend upon whether it contributes in some functionally individuated way to the functionality of the whole. Thus, a bicycle wheel can be taken to be part of a bicycle, whereas a rock fragment cannot be taken to be part of larger rock. The fact that the latter might not be true in the case of a stone sculpture or statue would only serve to confirm the thesis.

Just as any adequate mereology must, this account neatly preserves *transitivity* in relation to parts: any part of any part of a thing is also thereby a part of that thing.

A possible objection to this account of parts might argue that such functional roles cannot be necessary for parthood since some proper parts of some things do not have such roles. For example, the part of my birthday cake that I am going to offer to you has, *prima facie*, no functional role distinct from any other equally sized segment of the cake. Be that as it may, a functional role within some teleo-semiotic syntagm is introduced just insofar as I decide to offer you a certain segment of the cake, or insofar as you choose such a segment. The part of the cake that I offer you thus comes into existence as a distinct part of the cake just insofar as it becomes teleo-semiotically functional. Before my decision or your choice, it has no part-hood.

A further standard issue for mereological theories concerns explanation of talk of parts that do not appear to be spatially or temporally distinct. Is the

vermouth part of my martini? Given that teleo-semiotic function is not dependent on spatial or temporal distinctness, such an example poses no special problem for my account: given that the vermouth adds a distinct flavor to the gin, it contributes in a functionally individuated way to the whole. It should therefore be considered a part of the cocktail.

It should be remarked that the account of vagueness offered above is intended to apply equally to our mereology: it is sometimes apparently vague as to whether something is a part of something – whether, to use a well-known example, a particular peripheral water molecule belongs to cloud. In this sort of case, again, vagueness would be the result of the relevant syntagms being conformed relative to interests.

4.5 The problem of universals

When confronted by the age-old problem of universals, the model presented here forges a middle way between the two traditional extremes of realism and anti-realism. When we predicate attributes to individuals – "The statue and the squirrel are grey" – are we invoking another, universal entity – greyness – besides the individuals? Or is there no additional referent here but merely a conventional way of talking?

The realist, traditionally, will postulate the existence of universals above and beyond the existence of particulars and their particular instantiations of attributes.[16] But such a postulation strikes many metaphysicians as queer: where are these universals? In a different realm or world altogether? Besides their instantiation in individuals, what are they like? What explains their origin and individuation? Don't the pressures of conceptual economy press us hard to avoid admitting such entities if at all possible? And do they provide sufficient explanation in any case? The famous "third man argument" of Plato's *Parmenides* asks what would explain why the universal "grey" is grey except a higher form, and so on (Plato 1996).

Problems such as these might motivate the turn to an anti-realism about universals. Here, the predicate is conceived merely as a referent-less linguistic or conceptual convention. The illusion of universal attributes arises because it is appropriate to use the same string of words or letters to describe different individuals. But then the problem is just pushed further back: what is it about the individuals – the statue and the squirrel, for example – that makes it appropriate to use the same particular conceptual or linguistic convention in

16 David Armstrong is perhaps the current reference point for advocates of this sort of position in the recent literature. See, for example, Armstrong 1978.

regard to them? Without pointing to some mode common to both, this seems inexplicable, yet doing so is just to restate the issue once more, if it is not to collapse into realism. Attempting to escape the problem by referring the conventions to resemblance or similarity is again to restate rather than to solve it: what constitutes the resemblance?

The teleo-semiotic account of these properties provides an alternative to this polar opposition. It has no need to posit absolute or wholly objective universals. It cannot, therefore, be accused of queerness – at least in this sense. On the other hand, it does provide an extra-conceptual/linguistic account of the grounds of commonality between individuals. Thus it does provide a horizon for explanation, and therefore a potential solution to the problem, as opposed to a disguised restatement of it.

It is because they share a commutable teleo-semiotic function – that is, a mode that belongs to the same teleo-semiotic commutation class – that the statue and the squirrel can both appropriately be called "grey." On this analysis, universals are to be construed as commutation classes of teleo-semiotic functions. They have no individuated reality apart from such syntagmatic functions; on the other hand, they give meaning and reference to the linguistic uses of predicates, and are thus not reducible to linguistic functions. Such a theory also offers an easy account of the notorious relation of "participation," the relation between particulars and universals: Given the organization into commutation classes of the nodes and morphisms in terms of their respective teleo-semiotic functions, individuals are necessarily associated with sortals.

4.6 Necessity and sufficiency

To what extent are these conditions necessary or sufficient? I submit that they are sufficient: any bit of the world that takes on semiotic value as source, means, non-means or target precisely thereby is individuated. Further, the property or properties that in this case determine it as source, means, non-means or target are also precisely thereby individuated. Given that it is unrestricted as to what the teleological functor relates together, then, in virtue of these conditions, any segment or property of reality can be individuated. On the other hand, very strange objects or properties might be particularly *transient*. The socio-cultural question of how an object or a property becomes conventional, assigned a linguistic value, and thus ensured of its individuation for a linguistic community is one I will not attempt to broach here.

But I do not want to suggest that these conditions are necessary. I have explicitly exempted persons and organisms and correlative, particularly

personal and organic properties from the analysis. But what about the constituents of the natural world – not oceans, but water molecules, hydrogen atoms, electrons, etc.? Can we claim that these are individuated only insofar as they receive a semiotic value? The model advocated here sanctions so-called *instrumentalism* about science. Humans evidence a desire for knowledge and explanation. The fundamental concepts of the respective natural sciences accord semiotic value to particles, compounds, laws and the like as means to such explanation and knowledge. The scientific endeavor is teleological: an attempt to furnish us with concepts sufficient for the explanation and prediction of the empirical world. Scientific experiments confirm our progress towards this goal and indicate where our concepts are inadequate, inutile or lacking altogether. The aim is then to improve our conceptual resources as means to the target. To make sense of this endeavor, we do not need to postulate anything individuated apart from it.

5 Individuation and the semiosis of infants

Before concluding, I want to marshal a little empirical support for the account here presented by briefly considering the processes of individuation observed in the development of the perceptual world of infants, and, in particular, by entering into dialogue with the recent work of developmental psychologist Fei Xu.

From a very early age, babies prioritize their visual systems as a means of learning about their environment. The visual system appears to be calibrated optimally to pick out lines, contours, and edges in particular orientations (Bower 1977: 15–16). These no doubt give the infant clues as to where to expect the motion parallax and binocular parallax that inform it of the relative motion of pieces of its environment. In the seminal Xu and Carey (1996), it is claimed that "In the case of ordinary physical objects, the most fundamental criteria [for individuation and tracing identity over time] are spatiotemporal. A single object cannot be in two places at the same time; and two objects cannot occupy the same space at the same time" (1996: 112). This presupposition provides the framework for a series of experiments concerning infants' processes of assigning numerical identity that are reported both in this article and in several articles subsequent.

The original set-up (which is a modelled on an experiment conducted by Spelke and Kestenbaum [1986]) consists of a stage facing the infant with two screens on it. Two objects, toys, for example, are shown to the infant emerging from the screens and returning behind them, from the left side of the left screen

and from the right side of the right screen. Between the screens, there is a space. Because no spatial continuity seems to be possible between the two manifestations of the toys, since no toy is seen crossing the space between the screens, adults would standardly infer that there are two toys behind the screens. According to Xu and Carey's analysis, infants of just ten months make the same inference. They draw this conclusion from the results of recording infants' looking times when the screens are removed to reveal either one or two objects. Ten-month-olds, overcoming a baseline preference for looking at two objects, look longer at one object outcomes. The methodology here draws on Fantz's method of analyzing "preferential looking" (Fantz 1964) as a way of measuring aspects of infant cognition.

The experiments appear to establish that, contrary to our model above, 10-month-olds (and adults alike) use spatiotemporal information to assign numerical identities. But as we noted at the outset and again in Section 4.1, spatiotemporality does not provide necessary or sufficient criteria for the individuation, or indeed the tracing of numerical identity over time, of "ordinary physical objects." Oceans, at least, appear to be counterexamples. Can we make sense of the results of these experiments in correlation with the model articulated so far?

Xu and Carey's results are indeed consistent with an alternative interpretation. Thomas Bower points out that "We can only investigate a baby's perceptual world by engaging his *interest*" (1977: 24, my italics). Indeed, the whole methodology of "preferential looking" rests on this limitation. This implies that it is not possible to control for interest as a variable, since, in the absence of interest, experiments cease. Interest, of course, is teleo-psychological, etymologically *inter-esse*, between being. Applying our model, then, it would be interest that forms the condition of individuation and numerical identity – "infants' metaphysics." Spatiotemporal criteria, on the other hand, would merely provide criteria, conditions or guides to possible interest, to what infants might be interested by. In all such experiments, the only bits of any given infant's environment that are individuated, that take on semiotic values, are those bits that the infant is interested in, those that are illuminated by some nascent desire. A perceptual system, intact, but uninterested – infant or indeed adult – will gain no knowledge of its environment. Her interest engaged, the infant's reaching out and grasping of the object constitutes a basic form of exploratory activity (Adolphe 1997), through which the infant learns about the various physical and sensory possibilities that the object opens up.

If interest, and thus the formation of incipient teleological syntagms, individuates the first entities for infants, one would be unsurprised to find that functional commutation classes and thus rudimentary sortal concepts were

formed relatively early in infants' development. One particularly significant result of Xu's experiments is that infants appear to begin to use elementary kind concepts to determine or identify entities towards the end of their first year. In one experiment (Xu et al. 1999), infants were shown a display consisting of a toy duck perched on top of a toy car; either the duck was glued to the top of the car or it was not. The experimenter then lifted up the duck. If the infants had used kind information to parse the display into two objects, they would be surprised when the car lifted up as well. Using again a methodology of preferential looking, Xu et al. (1999) found that 10-month-olds did not individuate the two entities, and thus did not express surprise when the car lifted up with the duck, whereas 12-month-olds did. Since kind information was the only individuating information available to them, Xu et al. (1999) conclude that infants begin to be able to individuate on the basis of kinds towards their first birthday.

This research corroborates previous work. According to Anne Pick, infants parse the world into objects by distinctive features, i. e., properties relevant to their classification, not by "sense-specific items" (Pick 1965). According to Bower, the infant is apparently hardwired to make use of rules (Bower 1977: 33–44). Bower notes that infants are particularly good at recognizing and remembering connections and sequences: what goes with what. Once such rules are available, it is inevitable that commutation classes will be formed based on relevantly similar functional characteristics. Baldwin et al. (1993) found that infants of between nine and 16 months infer that objects of similar appearance have the same functional properties: if one toy makes an interesting noise, they persistently attempt to get a second, visibly similar toy to make the same noise.

Nevertheless, the objects, modes, attributes, and kinds individuated by these processes are never entirely arbitrary. Undifferentiated reality is the same for all; human babies all share certain physiological characteristics in common; and infants are quickly inducted into a ready-made language that has always already fixed the semiosphere – saving identities for later, as it were – and grants it access to a prefabricated system of entities.

6 Concluding remarks

I would like to conclude with a couple of condensed remarks concerning implications of this model for metaphysics and the concept of truth.

It should have become clear that we are proposing a *mid-way* between realism and radical anti-realism in ontology for certain sorts of entity: *a semiotic*

anti-/realism. Objects, modes, kinds, and attributes are not individuated apart from semiotic schemes. There is no need, however, to assume that they are entirely subjective, or even dependent upon language games, or such like. Semiotic schemes may be universal to human or sentient nature: they may be objective even if not absolute. Nor is it the case that *indeterminate* being, that is, being prior to any semiotic operation of individuation, is not, in an important sense, real. It is just indeterminate.

However, our model may not be reconcilable with the traditional account of truth as the correspondence of a proposition and reality; nor with an account of truth in terms of conceptual coherence. Instead, due to its foundation in the relation of projection, it advocates turning towards something like the so-called "interactive concept of truth," which has found its most recent defense in the work of Australian philosopher Richard Campbell (2011).[17] Here, truth is seen as irreducibly teleological and tied to *success* – be that success in action or in explanation and understanding. Campbell puts it: "someone's assertive speech-act is true or false, depending upon whether that act succeeds in fulfilling its intrinsic goal" (Campbell 2011: 193). Since the intrinsic goals of assertive speech-acts, according to Campbell, are, among other things, to draw attention to aspects of the world, to explain, to predict, etc., my assertion is true if it succeeds in doing the appropriate one of these things; that is, if it realizes its goal. No reference is here needed to anything like a relation of correspondence between a proposition and the world as it is in itself.

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17 Note that Campbell's theory of objecthood – that objects are "invariant nodes within webs of interactive potentiality" – is a philosophical stone's throw from ours.

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