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Ontology that matters: binding relations

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Abstract

In this paper I defend an ‘ontology of binding relations’ entailed in a critical examination of the concept of ‘being’ based on a new perspective of the human organism (though not exclusively) conceived as a Space-Time-Event-Motion (STEM) entity or containment-field of being. As such the paper serves to defend the viability of ontology by way of revising how we ought to engage in ontological thinking. Central to this analysis is to demonstrate what explanations can be deduced by examining what otherwise have remained disparate ontological categories such to enable a new view of two major metaphysical problems: the ‘problem of identity and persistence’ and associated ‘problem of composition’. As a result of this examination a candidate coupling formulation emerges to serve as a principle of individuation. Part of this analysis is to examine the nature of substance, the concept of energy, and to establish what is required to situate energy as one kind of primary substance.

Keywords: Binding-relation; Energy; Ontology; Principle of Individuation; Space-Time-Event-Motion (STEM); Signature-Energy-Frequency (SEF).
Introduction

This essay serves to fulfill four basic aims; firstly, to respond indirectly to the protracted attack against metaphysics broadly construed, dating back to David Hume, culminating with the logical positivist movement. For the positivists, meaningful enquiries are drawn from one of two paths: either from empirical enquiries answerable to observations, or from ‘logical enquiries founded on relations of meaning’. It was construed that traditional metaphysical enquiries fall within neither of these two paths and consequently, its enquiries are ill-founded and metaphysics as such rendered a mere ‘self-sustaining game connecting with nothing in reality’ (Price, 1997, p.4).

Secondly, this essay builds on the impetus initiated from the recent publication of Metametaphysics (2009) edited by Chalmers et al. drawing on the insights and recommendations presented therein. My concern here is to demonstrate why a grounding in an ontology of binding relations is fundamental to revising ontological categories as a basis for our capacity to understand our world for both epistemology and metaphysics given that these two fields arguably converge on the quest to understanding ‘what it is - to know’. This aspect of the paper builds on the recommendations spelt out by Jonathon Schaffer (2009) that metaphysics is about ‘what grounds what’ by spelling out the structures of the world, about what is fundamental, and what derives from it. In this philosophers have much to offer the discourse of what there is.

Thirdly, indirectly, given the advance of quantum theory and physics in general, there is a need to review the manner in which the ontological categories of old require substantive revision as opposed complete rejection. Central to this process requires answering two fundamental questions both directly and indirectly respectively: 1) What is ontology? 2) Why is ontology of binding relations significant for the way in which we think about being, that is anything in the universe (real or idea-of)?

Fourthly, this paper attempts to dispel the ‘problem of identity and persistence’ and the associated ‘problem of composition’ when seen from the perspective of Space-Time-Event-Motion (STEM) concept, as the process of motion and change is built into the concept of composition through the constitution of this new perspective forming a principle of individuation.

What is ontology?

Fred Sommers in Types and Ontology (1963) defined ‘ontology’ as the ‘science of categories’ operating as the systematic process of establishing what categories are, ‘how they are determined, and how they are related to one another’ (p. 351). George Englebretsen (1990) explains that a category is a group of things, not simply a class, but a special kind of class. A class consists of all things of which some given term is true. Simple enough, though establishing a robust and fixed ontology for class/es is nonetheless problematic. One of the major problems associated with the idea of classes is this notion ‘true of’ in relation to negation. As Sommers describes this problem pointing to contemporary logicians, that from the kinds of negation applicable in a natural language sentence, as amounting to the negation of the entire sentence. Sommers also made distinct what a term is ‘true of’ and what it ‘spans’ (1963, p. 329). Significantly, spanning is not defined in terms of truth, as a term and its negation are never true of the same things; however, they both (true and false)
span the same things. So while classes are defined in terms of truth, less problematically, categories, Englebretsen (1990) elucidates are defined in terms of spanning (in turn defined in terms of sense). Further as Englebretsen (1990) interprets Sommers, a category regarding term ‘X’ will include the class of X things and some of the counter-class of X things (pp. 4-5). So the class of married things, for example, will include married members of that class. The counter-class will include anything of which married is not true. Importantly the category regarding married will include married members in addition to those members to whom the question of being married may sensibly be asked even though it may be false, for example, like my son Tristan being married (Tristan is not married). For while married is false of my son it spans only those individuals for whom the question could sensibly be raised as being married and not of other objects for example, Pluto or a Mulberry bush. A class of things may be subject to change over time and not be eternally fixed.

D.C. Williams, in *The Elements of Being* informs that First philosophy, in the traditional sense, ‘is analytic ontology, examining the traits necessary to whatever is, in this or any possible worlds’ (p. 57). Williams’ maintains that ‘metaphysics is the thoroughly empirical science’. He goes on to state that ‘… [e]very item of experience must be evidence for or against any hypothesis of speculative cosmology … and every experienced object must be an exemplar and test case for the categories of analytic ontology’ (p. 57).

In *Logic and Ontology* (2004) Thomas Hofweber reports that there are several conceptions of logic as there are several conceptions of ontology. Metaphysics, I contend, is a viable enterprise worthy of resistance against the current debate to reduce metaphysical concerns to scientific concerns since they deal with different types of questions. Though open dialogue among the respective practitioners should be encouraged. Kit Fine in *The Question of Ontology* (2009) states that the ‘commonly accepted view … is that ontological questions are quantificational questions’ (p. 158). Again however, reducing metaphysics to quantification or similarly other linguistic devices as, for example, Quine has shown in challenging Carnap’s analytic-synthetic distinction, remains incomplete and so problematical because ‘linguistic rules are never absolute, and pragmatic restructuring is never entirely off the agenda’ (Price 1997, p. 8). Certainly one of the most constraining problems associated with quantification and predication that requires truth-bearing is ‘change’ – for example, Aristotle (translated by E.M. Edghill) in Section 1 Part 5 of the *Categories*, taught that a statement can be both true and false. ‘The same statement ‘he is sitting is true, yet, when the person in question has risen, the same statement is false, [and] the same applies to opinions’ (p.6).

Change affects persistence. How then do we tackle problems such as the ‘problem of identity and persistence’, and the ‘problem of composition’? Karen Bennett explains: ‘some think composition never occurs – there are simples and that these simples have various properties, and stand in various interesting relations’ (2009, p. 44). Bertrand Russell (1948, Part IV, ch. 8) proposed a new version of property realism (rejected the traditional notion of substance) known as a ‘bundle theory’ since it regards ordinary objects as bundles of properties (universals) he called *compresence*. The immediate problem encountered by bundle theorists is how to provide an explanation for the ontology of individuals where issues like the problem of individuation and identity and persistence loom large (Swoyer, C. 2000). In relation then to Sommers’ analysis if nothing can sensibly be said that does not include the possibility of its negation or denial then it only seems plausible that there
should be disputes about ‘what is’ and ‘what isn’t’. Life – Existence; Death its negation! Concepts like ‘attraction’ – ‘repulsion’ may mean ‘simples’ that bind (attraction) or not bind (repulsion); but this is not a sufficient analysis. One major stumbling block concerns the property realist’s insistence that universals must be immutable, however, this restriction may be overcome without affecting the substantive nature of a universal; particularly so if the universal is energy capable of instantiating multiple forms enabled by the conservation of energy principle. This important point is developed as we progress.

No serious philosopher would doubt that applicable questions of enquiry into the nature of the world emerge from the framework or methodology grounding the enquiry. Karen Bennett (2009) argues that many disputes among philosophers revolve around ‘difference-minimizing’, that is ‘…debates in which everyone takes the data to be largely the same. All the participants want somehow to preserve our ordinary judgments of persistence, of sameness and difference, of what there is and isn’t’ (p.72). She adds that not all metaphysical problems are difference-minimizing. Surprisingly from Bennett’s analysis her claim ‘… is not that work on the metaphysics of material objects is pointless, but rather that we have more or less done it already’ (2009, p. 73). I disagree; one need only look at the status of modern physics to appreciate the level of disagreement on various fronts (e.g. quantum mechanics) notwithstanding the plethora of philosophical disagreements.

I think one thing is obvious, that ontological categories, since Aristotle first enumerated their kind, arguably require a substantive role in philosophy/metaphysics to qualify above the ranking of a mere classification system. Classification I take to mean a systematic process of naming and grouping types of things in the universe, which inherently suffers incompleteness. Evidence of this view is still resonant as David Manley (2009) claims that ‘… metaphysics still has an important mission: to identify the best language in which to take inventory of the furniture of reality’ (p. 28). Prompting the question: Is the role then of metaphysics just the listing of apparent things in the universe? One may be inclined to deny metaphysics any role of listing all the elements in the universe insisting that it is the endeavour of predicate logic or quantification theory as long as the language employed is consistent. This presupposition seems however to be missing an important point about the purpose behind the discipline of metaphysics I dare say. Defending ontology built on classification alone, suffers incompleteness due to change and evolution. Any linguistic system suffers internal incompleteness subject to its own self-referential nature, requiring an internally structured proof domain to bolster its own constituent terms and grammar. It is no wonder then that there is no branch of philosophy that has suffered such protracted attacks against its viability than metaphysics and its sub-branch ontology if ‘taking inventory’ is all that is required of it. So how do we move forward?

We can move forward by examining how the simple idea behind Quine’s reform is captured by the claim ‘To be is to be the value of a bound variable’. In other words, ‘to be’ is ‘to be’ in some kind of binding relation, in this case, a relation of value as assigned in relation to a bound variable. To commit to ‘things that are F’ entails a quantificational sentence whereby establishing the truth requires ‘the existence of at least one object o that makes [Fx] true when o is assigned as [the] value of ‘x’’ (Soames, 2008 p.4). Hence an ontology of relations remains fundamental when examining how particulars and universals can exist, how to understand quantum entanglement, and in which its denial (relations) destroying the possibility of any
kind of engagement even genuine connection of any sort would be rendered impossible. Indeed the very possibility of any sort of predication is realised, made cognizant necessarily, via ontology of relations. But of course there are several ways to think about the notion of relations.

On relations

The concept of ‘relation’ has several modes of operation. I will present a version of ‘binding relations’ (connective role) drawn from Aristotle’s initial conception and sense of relation expressed in terms of ‘toward-ness’ (aditas). I will argue that this version is required in order to ground what would constitute the basis for at least some ontological categories. Currently in mathematics and epistemology there are several relation types such as ‘void relation’; ‘universal relation’; ‘asymmetric relation’ etc. these and more are based on the idea of one set. But in each case the catalytically combinatorial action required for binding is missing. Identity, for example, is commonly thought to be a relation involving reflexive, transitive and symmetrical properties. Any relation with these three properties is called an ‘equivalence relation’. Nature exhibits a natural propensity for things to combine, e.g. atoms into molecules, cells into multicellular organisms. Electromagnetism is responsible for combining atoms into molecules that further combine to create the plethora of phenomena in the world. This is arguably a physical activity involving a compositional or binding relation process.

For our purposes an explanation of the Aristotelian concept of relation as ‘toward something’ is at the heart of this investigation. Our analysis in the first instance will be enriched by briefly exploring how the Empiricists made use of the concept of relation. David Hume is important in this context for his distinction between ‘Relations of ideas’ and ‘Matters of fact’ (Hume, D. 1910 Section 4 Part 1) and particularly for the significant role the ‘imagination’ serves in his philosophy. The imagination for Hume operates as the mechanism involved in bringing together impressions and breaking apart ideas to form new complex ones. The idea of relation also serves as an important platform in John Locke’s An Essay Concerning Human Understanding in which Book 2, Chapters XXV – XXVIII are entirely devoted to this concept.

When the mind so considers one thing that it does, as it were, bring it to and set it by another and carry its view from one to the other, this is, as the words import, relation and respect; and denominations given to positive things, intimating that respect, and serving as marks to lead the thoughts beyond the subject itself denominated to something distinct from it, are what we call relatives; and the things so brought together related” (Locke p.168).

The idea of relation is indeed pivotal in Locke’s philosophy and it appears the greater sense of the connective role it served escaped his own scrutiny. Locke argued that the mind is a tabula rasa filled by experience in the form of sensation and reflection which provide the basic materials, simple ideas, from which most of our more complex knowledge is constructed. It is in the second action of the mind that ideas of relation emerge when the mind brings together two ideas whether simple or complex so as to take ‘a view of them at once’ (Locke, p. 168) without uniting them (Uzgalis, W. 2007, p. 11). What one gleans from this analysis is a connective or binding activity of the mind dependent on ideas of relation such to provide a new
idea. Indeed a new way of seeing the world and of understanding. Remarkably not much has been said about this important idea of binding relation.

Over sustained periods medieval philosophers argued about the nature and ontological status of relations that provides much insight for this research. An excellent treatment and thorough analysis of this area of medieval philosophical debate was recently conducted by Francisco Suárez and John P. Doyle (2006). Medieval philosophers, in their analysis of Aristotle’s work explored the division of relation into real and rational.

*Relation is usually divided into that which is real or that which is only rational, which some interpret such that they teach that the categorical genus, ‘toward something’ (Ad aliquid) includes both relations and that this division is therefore univocal, indeed that it is a division of a genus into its species.*

In order to establish what can be regarded as real in the world distinct from thought real, an examination of how the very concept of relation as ‘toward something’, as determined by Aristotle became the subject of further investigation.

*… those things are said to be relative whose whole being is such as “to have itself toward another.” But this is entirely and most properly fitting for relations of reason. For although the being of these is more imperfect and diminished than the being of real relatives, nevertheless, their being, such as it is, consists entirely in a disposition (habitudo) toward something else, just as properly as does the being of a real relation. Thus it turns out that, just like a real relation, a relation of reason can be neither known nor defined without a disposition to something else. … Nevertheless, we have to say, that only real relations make up the category, “toward something” (Suárez, F. Doyle, J.P 2006 pp. 79-81).*

The idea of relation ‘toward something’ is what makes this type of relation useful for the type required for compositional binding (connective-relation). So significant is the idea of relation ‘toward something’ as demonstrated by Suarez and Doyle in their examination of this medieval investigation as to warrant, the authors interpret, a separate ontological category for the relation ‘toward something’:

*[W]hen a relative is said in general to be that whose being is to be toward another, it is necessary to understand in that definition, “to another that is correlative.” Therefore, since the same thing cannot be related to itself by a real relation (about which we are now treating), it will be necessary that there is not one supreme genus, but rather two, which respect each other adequately and are in reality (in re ipsa) distinct (Suárez, F. Doyle, J.P 2006 p. 245).*

Perhaps what is most significant about this argument is the sense it provides for a systems analysis of how distinct objects, organisms so related, affectively, not only shapes habitats and ecosystems, but specifically living organisms whose various compositional systems are so integrated. Steven Rose (1997) reminds us that when we act with our environment we change it and are changed by it in this reciprocal relation. Interestingly, there is a direct correlation here to the fundamental nature of phenomenological enquiry in that consciousness is always directed toward something.
Conceptualising grounding categories

Jonathan Schaffer (2009) argues that the debate between Quine and Carnap pivots around their mistaken assumption that metaphysics is about existence questions such as whether numbers exist, etc. but as Schaffer points out with Aristotle the discussion is about substances (fundamental units of being). ‘For Aristotle metaphysics is about what grounds what’ and substance is its first part which he developed in the *Categories* (2009 p. 351-52). Ontological priority is the main criterion for selecting the primary substances and an entity is ontologically primary if other things depend for its existence on it (p. 351). Schaffer reminds us that metaphysics is the discipline that studies substances and their modes and kinds, by studying the fundamental entities and what depend on them (2009 p. 353). Schaffer acknowledges that existence questions do play a role for his type of neo-Aristotelian philosophy. He suggests that what exist are the grounds, grounding relations and the grounded entities (2009 p. 353). Categories are significant because they serve as ‘places in the dependence ordering; substances, for instance, serves as both root node and focal category’ (2009, p 356). The target of metaphysical inquiry, then, Schaffer argues, is an ordered hierarchy generated from, (i) a list of substances F, plus, (ii) a list of grounding relations G, (2009 p. 363). Grounding criteria he announces should be irreflexive and asymmetric (2009 p. 374). The type of ontology I am arguing for structurally meets Schaffer’s requirements.

In the following section an argument is advanced on what reasonably should be regarded as one of the primary substances and how to think about grounding relation i.e. binding relation. The subject we must first deal with is energy construed as a primary substance and not simply as a contingent property. This is a hot topic among physicists and philosophers of science and not an issue that can be completely resolved here. However we may add observations that indeed shed new light on the subject.

The grounding of a primary substance

Could ‘energy’ be a grounding primary substance? Should energy be thought of as just a property or something more substance-like? Energy is commonly understood as ‘the ability to do work’ which is simple enough to understand. But energy strictly defined in such a manner I contend misconstrues the concept affectively constraining the phenomenon to a property like term. For example, substances putatively understood always have heat energy expressed by the activity of vibrating atoms. Vibration in this sense should properly be construed as a property of atoms. Another example is water. Is water a substance? No, because water is a property of a collection of H₂O molecules. Take apart the molecules and atoms, delve inside the sub-atomic particles and you will not find water anywhere because water is just a property of something else. Physicists indeed hold that any property which is a ‘conserved’ property is also a substance-like entity. As such, energy seems to be much more fundamental, indeed substance-like.

In earlier work (2002) I grappled with the concept of energy to develop an understanding from a different angle. The concept of energy is an elusive term that required a richer metaphor in order to penetrate the conceptual extremes and multiplicity of frameworks it features in the physical sciences. I developed the conjoined concept Space-Time-Event-Motion (STEM) (a concept for concentrated
energy underpinning human form) to metaphorically extend beyond the particular but also to be employed as an intransitive verb, (not governing an object). This idea can now be thought of as a spanning notion for individual entities.

STEM refers to a biophysical process (animation) that incorporates the change and motion of an event whose measured duration can be coherently defined given the context of acquisitional requirement i.e. definitional, explanatory or experimental work. That is, processes observed in causal terms within a region (I refer to as a containment-field, an embodying, and localising principle) would exact differing levels/desegrees of energy and hence, embrace the core notion of STEM. Why? The answer is that time is associated with the mass of an object, which is the measure of inertia whose influence is directly responsible for physically affecting the curvature of space-time as defined in relativity theory. Significantly, the degree of curvature of spacetime is thus proportionally related to the inherent energy (mass) of an object in question. Matter, according to relativity theory is reducible to energy (i.e. E=MC²).

Arguably, whatever energy is, it seems to be the most pervasive stuff in and of the Universe. Indeed time, then, is a constitutional part of the very fabric of the Universe. Spacetime in-forms mass by way of how to move and mass in-forms spacetime by way of how to curve. The fabric of the Universe, at least in an empirical sense, is fundamentally physical (The term ‘physical’ I take to mean anything that can be acted upon in a causal manner.). If time is physical, it is reducible to energy according to relativity theory. If time is not physical, it cannot have any effect on the physical objects of the Universe! The Universe is made up of physical things (if not completely at least in part). Ergo, time is physical.

The question we must now answer is: what is required to construct an individuation principle? Particularly poignant when confronted with ‘the problem of identity and persistence’ and the ‘problem of composition’ since most thinkers engaging in these issues have presumed an entity exists in space and is subject to change construed in temporal terms. Consequently, I contend the presupposition is ill-founded. Address these same problems from the STEM perspective and immediately they are not so intractable, indeed, I dare say, they dissolve. My point is that phenomena, i.e. humans and other individuals are made up of STEM as part, if not the whole, of their constitution. Spatiotemporal change is constitutional because all entities as such are in motion. The simple analysis is to make this observation. An individual’s life is an existent event (duration of one’s life) in physical terms. Motion is integral to life. So from the above construction, a living, existing, individual is a STEM causal agent.

This STEM concept is formed from what I am arguing is one type of binding-relation. This STEM concept is relevant when referring to organisms exhibiting self-organising capacities, like human beings, such that the expression of activity or the process of an entity’s life is a relation ‘toward-something’ as being in engagement with its external and internal environments. For Aristotle this is akin to the notion of ‘potency’ dealt with in Book V Chapter 12. Aristotle says that ‘[p]otency means a source of motion or of change, either in something else or in something as something else’ (Aristotle, p. 92). Yet from this analysis thus far, as many before me have proclaimed, that the ontological categories Aristotle pronounced need revision to account for the way in which the world exhibits itself in the 21st century. How are we to understand the notion of substance if it is not subject to empirical investigation? Let us explore this from another angle that takes us closer to how this all relates to energy.
Time and measurement are handmaidens and there is a direct relation between these concepts and energy. The most accurate measuring procedure is the atomic clock based on the regular vibrations associated with atoms and the standard form of atomic clock is based on caesium atoms. That is ‘...the spectrum of caesium includes a feature corresponding to radiation with a precise frequency – 9,192,631,770 cycles per second’ (Gribbin, 1998:29). One second is defined as that amount of oscillations of radiation. The caesium clock is one part in \(10^{13}\) (one in 10,000 billion), or one second in 316,000 years accurate (Gribbin, 1998:29). In physics, ‘Planck’s constant’ is described as the constant proportionality between the energy emitted or absorbed by an atom and the frequency of emitted or absorbed light as an electromagnetic wave (Jibu & Yasue, 1995). Planck’s constant suggests that energy and frequency and consequently ‘time’, as far as measurement is concerned, are all interrelated concepts. John Maddox (1998) concludes that the greater the frequency, the greater the energy of the quanta. This equates then to what I have termed Signature-Energy-Frequency (SEF). Further, Einstein’s theory of relativity demonstrates that time is a relative concept and that travelling at near speeds of light produces ‘time-dilation’, a slowing down of time. Motion is an important conjunct in this observation. Matter and its properties such as ‘mass’ and ‘charge’, according to the theory of relativity are all reducible to energy. Therefore, energy is indeed the fundamental substance of the Universe definable in terms of frequency. Thus, the adjoining concept Signature-Energy-Frequency (SEF) operates on both the quantum and classical levels that form STEM containment-fields, metaphorically subsuming the concept of the principle of individuation (see Naimo, J. 2002 & 2009).

Concluding remarks

The main thrust of this paper was to demonstrate the manner in which the problem of identity and persistence or composition seen from a differing framework can provide much needed light and perspective. I introduced a new type of relation namely a binding-relation as a means to think of STEM as the constitutional fabric of individuation. An argument was advanced suggesting that energy should be considered one of the primary substances that form the matrix of establishing relevant ontological categories.
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