Ontological Scope and Linguistic Diversity: Are There Universal Categories?

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ABSTRACT

The aim of this paper is to address a longstanding concern about the linguistic ‘relativ- ity’ of ontological categories, and resulting limitations in the scope of ontological theo- ries. Given recent evidence on the inﬂuence of language on cognitive dispositions, do we have empirical reasons to doubt that there are ontological categories that have uni- versal scope across languages? I argue that this is the case, at least if we retain the stan- dard ‘inferential’ approach within analytical ontology, i.e., if we evaluate ontological interpretations of L-sentences relative to certain material inferences in L. Research in linguistic typology suggests that types of entities postulated for the domain of Indo- European languages cannot capture the ontological commitments of the (much larger group of) non-Indo-European languages. Ontological category theory thus seems to have three options. The ﬁrst option is to abandon the standard ‘inferential’ approach to ontological category theory. Alternatively, if we stay with the inferential approach, we face the following choice. Either ontology must let go of its ambitions to provide *general* domain descriptions for *any* language and settle for the more modest project of reconstructing the ontological commitments of a group of natural languages. Or else analytical ontologists should turn to linguistic typology in order to accommodate the diversity of inferential structures embedded in natural languages. I recommend and ex- plore this third option, illustrating a strategy for how to construct a domain theory that can be used across languages. In a ﬁrst step I show how linguistic research on the se- mantics of verbs and nouns (studies on so-called “Aktionsarten” and “Seinsarten”) can be used to identify the inferential patterns of ten basic concepts of modes of existence in time and space. In a second step I show how these inferential data can be inter- preted ontologically within *General Process Theory*, an ontological framework based on nonparticular individuals (“dynamics”).

In the course of the 1930s Rudolf Carnap and Willard v. O. Quine presented a new method for the justification of ontological categories. According to this approach, on- tological commitments of common sense and scientific reasoning (e.g., our commit- ments to things, persons, or molecules) can be reconstructed by describing the structure of the referential domain of *some* natural or scientific language L in which

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we reason about (e.g.) things, persons, or molecules. As epitomized in the “quantifi- cational criterion of ontological commitments,” an ontological domain theory for L was to preserve the inferential structure of L while eliminating inferential redundan- cies by suitable “ontological reductions.”1 Most importantly for present purposes, the ontological categories or types of entities that the domain theory of L postulated as denotations for a predicate N in L were to be tested relative to certain (“material”) inferences licensed by N in L.

Considered along very general lines, bracketing all disagreements about form, content, and metaphysical status of ontological domain descriptions, this ‘inferential’ approach to the analysis of our ontological commitments and the validation of onto- logical categories became the dominant methodological paradigm in so-called ‘analyt- ical ontology.’2 Typically, when reconstructing the ontological commitments of our common-sense reasoning, analytical ontologists evaluate ontological claims in terms of what ‘we’ ‘would say’ or ‘would not say.’

This is done largely without explicit reflection on the scope of such a ‘we’ or on the scope of linguistic data invoked. During the last decade, however, epistemologists have pointed at cultural differences in “conceptual intuitions” concerning epistemo- logical notions, raising quite general worries about the scope of inferential data used in conceptual analysis.3 In a sense, in ontology such concerns about cultural and lin- guistic relativity have long been in view, at least since the 1960s when Quine’s argu- ments for “ontological relativity” explicitly alerted ontologists to the possibility that the grammatical differences of natural languages could affect the material inferences (in more recent parlance: ‘conceptual intuitions’ or ‘conceptual judgments’) of speakers of the language.4

But Quine’s observations about grammatically induced categorial biases were not aimed to question the scope of ontological theories. Rather, they served to highlight the empirical underdetermination of ontological classifications, as part of a larger effort at debunking classical semantic behaviorism and verificationist aspira- tions to epistemic certainty. Due to this particular epistemological context, it seemed that Quine’s concerns about the linguistic relativity of ontological classifica- tions could be set aside in ontology. Taking their task to be conceptual analysis “at home” relative to a shared language L, with the L-specific linguistic “apparatus of individuation” and other elements of the inferential structure of L safely in place, ontologists treated Quine’s concerns about the translinguistic projectability

of categories as an *epistemological* issue about possible empirical justifications for such projections.5

However, there are two rather different questions pertaining to the relationship between ontology and the empirical investigation of languages that should have been kept apart and each fully in sight: (a) Can we empirically verify that a category suit- able for the ontological interpretation of one language can be applied to interpret other languages as well, i.e., can category projection across languages be empirically justified? (b) Do we have empirical reasons to doubt that certain categories can be projected across all languages, i.e., do we have empirical reasons to assume that cer- tain categories will have limited projectability? The first question, which Quine’s rela- tivity arguments were designed to bring into focus, pertains to a *general*

epistemological theme and can be answered by adopting with Quine a pragmatist ac- count of empirical confirmation. The second question, however, which calls for an examination of the scope of ontological categories, is a methodological issue specific to ontology. As I will argue in this paper, it is an issue that ontologists have ignored for all too long and cannot continue to do so, given the current state of empirical re- search on linguistic diversity and linguistic relativity.

In the following I will set aside ontological analyses of scientific theories and, for reasons of simplicity, terminologically identify ‘analytical ontology’ with investiga- tions of the ontological commitments of common-sense reasoning. The contempo- rary research discussion in ‘analytical ontology’ in this sense assumes without ado that ontological categories have ‘wide scope’ across languages—we discuss ontologi- cal accounts of persons, material objects, or dispositions, but not accounts of ‘per- sons in German’, ‘material objects in English’, or ‘dispositions in French.’

Such confidence in the translinguistic applicability of our familiar categories seems quite problematic, however, in light of recent research in cognitive science and cogni- tive linguistics, and, even more directly, by recent results in linguistic typology, the branch of linguistics that investigates the range of variation among the world’s lan- guages. As I will try to show in the following, drawing mainly on linguistic typology, we have sufficient reasons to doubt the wide—let alone universal—applicability of precisely those ontological domain theories that appear most ‘natural’ and appropri- ate for the modeling of ontological commitments of Indo-European languages. More specifically, to the extent to which ontologists operate with a basic category of con- crete, countable, particulars (e.g., ‘objects’, ‘stages’, ‘tropes’), these ontological analy- ses must count as ‘provincial’ from a typological point of view—they are tailored to the peculiarities of the noun semantics of only a small fraction of the world’s (approx.) 6500 languages.6

In view of the typologically parochial status of the language group whose mate- rial inferences guide theory construction in present-day analytical ontology, we are left with three options in ontological category theory. The first option is to aban- don the inferential approach and adopt another method for the justification of on- tological reconstructions of the ontological commitments of common sense reasoning. However, since it is quite likely that any of the means we could use to evaluate ontological interpretations (e.g., phenomenological introspection) are equally affected by the cognitive habituations induced by grammatical structures, this option does not appear promising.7 The second option consists in retaining the inferential approach and letting go of the assumption of ‘wide scope.’ We could simply accept that analytical ontology as currently undertaken by speakers of Indo-European languages can be used to reconstruct the ontological commitments embedded in the inferential structure of just this small group of natural languages. The third option, which I will recommend and explore in this paper, is to retain the inferential approach *and* the ambition to operate with categories that have wide scope of application across languages. This we can achieve, I argue, if we use research in linguistic typology as heuristics for the development of new categories that can better accommodate the diversity of inferential information embedded in linguistic structures.

I proceed as follows. After a brief reconstruction of the ‘inferential’ approach and the role of inferential patterns for the evaluation of ontological categories, I illustrate the recommended third option. I show how typological research on the semantics of verbs and nouns (studies of so-called “Aktionsarten” and “Seinsarten”) can be used to identify ten inferential patterns that represent ten basic concepts of modes of exis- tence in time and space. Then I show how these inferential data can be interpreted ontologically within *General Process Theory* (GPT), an ontological framework based on a new category of nonparticular individuals that has the desired wide scope of ap- plicability across languages.

* 1. . ONTOLOGY AS THEORY OF MATERIAL INFERENCE

The ‘project’ of ontology, the core agenda common to all efforts at ontology, both historical and contemporary, can be abstractly reconstructed as follows. An ontology is an instantiation of the quintuple <M, TM, *f*, *S, D* >: there is a (typically entirely

implicit) assignment function *f* that correlates the elements of a class *S* of true (i.e.,

taken as true) sentences of a language L with simple and complex ontological corre- lates in the domain M as described by the ontological theory TM; the assignment function *f* is to preserve as many elements of a set of data *D.* Such an abstract charac-

terization of ontology may not seem very informative, but it can serve to remind us that ontology, unlike some other philosophical disciplines, is a ‘data-driven’ enter- prise. Ontologists in the historical tradition took these data to be synthetic *a priori* conceptual truths, or phenomenological insights. The particular hallmark of the ‘in- ferential approach’ or analytical ontology is the focus on linguistic data: on the infer- ential roles of expressions in L.

For example, assume that the proponent of a trope ontology TO suggests that the ontological correlate of what we in our common-sense reasoning call a (live, healthy) ‘human body’ is a four-dimensional structured array C of tropes. To test this pro- posal, analytical ontologists investigate whether the definition of the postulated onto- logical correlate C, within the inferential context of the trope theory TO, ‘captures the inferential space’ connected with the notion of a human body, or, as this is com- monly put, fits with ‘what we would say (and not say)’ about human bodies (in ac- tual and hypothetical situations): if we know that x is a human body, we can infer that if x was in one place at time t, x cannot have been in another place at t, that there are at least two times at which x exists, that x has finite existence in time, that x has a determinate location in a bounded and connected region at any time at which it exists, and so forth.

In short, the viability of the proposed ontological interpretation for ontological commitments of common-sense reasoning is judged relative to the inferential role of an expression within a given language. The inferences in question are “material” in- ferences in Carnap’s sense, general principles of reasoning that a linguistic commu- nity endorses as articulating the generic part of its “world knowledge.”

To take the inferential structure of one natural language as data for ontology is the crux of the inferential approach, both its particular virtue and its potential predic- ament. While traditional metaphysics often resorted to pure speculation, analytical ontology postulates and justifies ontological accounts on the basis of data that are

intersubjectively accessible and that can clarified and agreed upon discursively—this is its particular virtue.8 Its potential predicament lies in the fact that, as we shall fur- ther explore below, there is a close connection between grammatical structure and the material inferences licensed by the expression of a language.

The methodological requirement that ontological interpretations should cover the inferential role of the expressions of the language (here: “theory”) is obliquely in- cluded in the—notoriously puzzling—modal expression in Quine’s formulation of the quantificational criterion:

A theory is committed to those and only those entities to which the bound var- iables of the theory must be capable of referring in order that the affirmations made in the theory be true. ([1953](#_bookmark28), 13f)

Whether a variable is ‘capable of referring to’ a certain type of entity depends on whether the definition of this type of entity fits with the inferential structure of *L*. Much would need to be said about the conditions and constraints of this ‘fitting with’, but for present purposes we can set aside a more detailed discussion of the requirements of the assignment function *f* or, in common parlance, of the “truth- making relation.” For present purposes it suffices to point at two quite uncontro- versial minimal principles of fit. The first of these I call the ‘completeness principle’:

(CP) A domain theory TM should aim to describe a rich (if possible, a com- plete) model M for *L*—that is, as much as possible of the inferential structure of *L* should be taken into account.

The second requirement I call the ‘no inferential surplus principle’ (NISP): (NISP) The domain theory T must not augment the inferential content to *L.*

In other words, the ontological correlates that the ontological domain theory TM

postulates as denotations of an L-expression (e.g., a predicate or sentence) must not engender within TM any inferences that do not have—via the inverse of the assign- ment function *f—*analogues in the inferential structure of L. For example, an ontol- ogy whose basic entity type is that of a four-dimensional bounded material region

would not seem a viable interpretation for our common-sense commitments to gases, economies, or sounds, where common-sense reasoning does not imply spatial topological features.

Let us say that a category is a basic entity type postulated by TM and let us call the terms used to name these basic entity terms ‘category terms.’ From (CP) and (NISP) it is then clear that in analytical ontology the main task is to identify category terms that are, within the context of TM, inferentially ‘rich’ enough to allow for definitions of many derived entity types by means of mereological or set-theoretical relations, *vide* (CP); but at the same time, *vide* (NISP), these category terms should be also be inferentially ‘poor’ enough so as not to add to the inferential structure of

L—ontology, if it is not to become speculative metaphysics, should not increase our ‘world-knowledge’ by definitional fiat.

If natural languages, due to the diversity of grammatical structures, license differ- ent material inferences, two problems may arise for the translinguistic application of an ontology TM that was originally developed to cover the inferential data of a lan- guage L1. First, the categories of TM, while rich enough to accommodate the material inferences of L1, are too ‘poor’ to capture the more fine-grained inferential structure of L2. That an ontology has better ‘data coverage’ with respect to one language rather than with respect to another is an effect of linguistic relativity that may not seem so troublesome—new inferential resources can always be added to TM that render TM more complete with respect to L2. However, such an extension of TM must avoid getting into the second and much more detrimental problem of the translinguistic application of ontologies, namely, the situation that TM creates an inferential surplus in the inferential structure of L1, or in the inferential structure of L2.

In the following I illustrate both of these scope problems that arise for the inferen-

tial approach due to the linguistic relativity of material inferences.9 In the next sec- tion I reconstruct, working from linguistic research on verbal aspect and “Aktionsarten,” four inferential patterns that express concepts for how entities exist in time; these inferential patterns are data that standard analytical ontology has all but neglected, since the working languages of analytical ontology happen to have few verbal aspects. This has the effect that most analytical ontologies of events either have narrow scope, i.e., hold only for a small group of natural languages, or else vio- late (CP). Then (section 3) I turn to the more severe type of scope problem and show that most analytical ontologies fulfill (NISP) only for a small group of lan- guages—working from the linguistic theory of “Seinsarten” I reconstruct six inferen- tial patterns representing concepts of modes of existence in space and show that, to the extent to which ontological domain theories retain particularist presumptions, their categories are too ‘rich’ for an ontological interpretation of a large group of nat- ural languages.

* 1. THE INFERENTIAL PATTERNS OF FOUR CONCEPTS FOR MODES OF EXISTENCE IN TIME

Five decades ago Z. [Vendler (1957)](#_bookmark49) developed a classification of “action types” based on an analysis of (exclusively) English verbs. The criteria Vendler used I reconstruct here as follows (‘NP’ is a placeholder for a noun-phrase in L and ‘V’ is a placeholder for a verb in L):

(C1: *Dynamicity*) ‘NP is V-ing’ is a well-formed L-sentence.

(C2: *Unboundedness*) ‘NP ﬁnished V-ing’ is not a truly applicable L-predicate. (C3: *Distributivity*) For every temporal interval [t], if ‘NP V-ed during [t]’ is true then ‘NP V-ed during [t’]’ is true for every period [t’] that is part of [t]. (C4: *Homomerity*) Any temporal part of the denotation D of ‘V’ is of the “same nature” as the whole of D.

(C5): *Completeness condition:* ‘NP is V-ing’ implies ‘NP has V-ed’.

By means of these criteria and certain temporal inference patterns Vendler intro- duced a fourfold division of concepts of occurrence types in terms of the inferential roles of classes of (English) verbs:

‘V’ is an “activity verb” iff V fulfills all four conditions (C1) through (C5) and licenses the temporal inference (“associated time schema”): ‘NP was V-ing at t’ is true means that t is on *a* time stretch throughout which NP was V-ing. Examples of activity verbs are *run, walk, swim, push*.

‘V’ is a “state verb” iff V fulfills conditions (C2) through (C4), but not (C1) or (C5), and licenses the temporal inference: ‘NP V-ed between t1 and t2’ is true means that at any instant between t1 and t2 NP V-ed. Examples of state verbs are *have, possess, like, dominate*.

‘V’ is an “accomplishment verb” iff V fulfills condition (1), but not (C2) through (C5), and licenses the temporal inference: ‘NP was V-ing at t’ is true means that t is on *the* time stretch in which NP V-ed. Examples of accomplish- ments are *paint-a-picture, build-a-house, recover-from-illness, grow-up*.

‘V’ is an “achievement verb” iff V fulfills condition (C2) but not (C1), and licenses the temporal inference: ‘NP V-ed between instants t1 and t2’ is true means that the instant at which NP V-ed is between t1 and t2. Since predications ‘NP V-ed’ are true at an instant, conditions (C3) through (C5) are trivially fulfilled as well. Examples of achievement verbs are *start, reach-the-summit, win-the-race, die, find*.

Independently of Vendler, and with even greater focus on inferential patterns, A. [Kenny (1963)](#_bookmark17) arrived at a similar classification of occurrence types with three divi- sions. However, the subsequent discussion of the ‘Vendler-Kenny’ proposal identi- fied, among others, the following decisive difficulty. While Vendler and Kenny thought that lexical meanings (of English verbs) could be used to distinguish types of occurrences, a look at verbal predications in other languages showed that the non- lexical, aspectual meaning of verbal predications was found to play an essential role for any such classification. Aspectual meanings are expressed by bound morphology (‘verbal aspect markers’) or periphrastically (by paraphrase). Differences in aspectual meaning account, for instance, for the difference in meaning between the sentences *Tom crossed the street* and *Tom was crossing the street*.10 Vendler’s and Kenny’s classifi- cations thus neglected the ‘phenomenon of type shift’, i.e., the fact that a shift in the aspectual meaning of a sentence can produce a shift in the occurrence type denoted by the sentence. Moreover, as Vendler’s early critics noted, type shifts can also be ef- fected by changing the verb complement: *Tom smoked a cigarette* (accomplishment)

vs*. Tom smoked cigarettes* (activity), or by changing the subject: *A soldier passed the*

*house* (accomplishment) vs. *soldiers passed the house* (activity). In general, it became clear that the type of occurrence—or in linguistic terminology, the “Aktionsart”—

denoted by a sentence is not determined by the lexical meaning of the verb but by the entire predication, i.e., by the compositional function of the semantic properties of predicate, arguments, and ‘adjuncts’ (e.g., adverbials).11

Vendler’s and Kenny’s project received little attention in ontology but was fol- lowed up in linguistic research on verb semantics, partly within the field of formal se- mantics, partly constituting the new research area of “aspectology.”12 Since linguistic aspectology investigates linguistic encodings of ‘processual information’ (i.e., infor- mation about the dynamic properties of the denotations of predicates or sentences) within and across natural languages, aspectological research provides a rich field of data for any ontological analysis of occurrence types that aims for linguistic general- ity.13 This does not imply, however, that ontologists are bound to adopt the linguist’s choice for a formal or systematic presentation of these data. For the purposes of on- tology concepts of ‘occurrence types’ (activity, accomplishments, etc.) should be ex- pressed in inferential patterns. This is possible by presenting the aspectual information of sentences in complex “networks of aspectual inferences.”14

For example, consider the sentence S: ‘Tom is running.’ S has a verb in the continu- ous form, which is often taken to be an English verbal aspect marker for the progres- sive aspect. If we change the verb tense to the perfect, we receive the sentence S\*: ‘Tom has run’ which is taken to have perfective aspectual meaning. Let us call S\* an ‘aspectual variant’ of S, and use the expression ‘S\* with progressive (perfective etc.) as- pectual meaning’ to distinguish between different aspectual variants of S.15 According to the aspectual network account we should say that S denotes an entity that the speaker of S conceptualizes as an activity if and only if the following inferences hold:

1. ‘Tom is running’ implies ‘Tom has run’, i.e., S\* with progressive aspect implies S\* with perfective aspect
2. ‘Tom has run’ allows one to infer either ‘Tom is running’ or its negation ‘Tom is not running’; i.e. S\* with perfective aspect implies ‘either (S\* with progressive aspect) or (not (S\* with progressive aspect))’
3. ‘Tom is running’ implies ‘Tom has been running’, i.e., S\* with progressive aspect implies S\* with perfective and progressive aspect
4. ‘Tom runs’ implies ‘Running is something which Tom does habitually or periodically’, i.e., S\* with neutral aspect implies S\* with habitual aspect’.16

In general, there are at least four concepts of ‘occurrence types’ or ‘modes of exis- tence in time’ that can be defined in terms of interference patterns holding for a set of aspectual variants of predications. In the following the abbreviations ‘prog(S\*)’, ‘hab(S\*)’, ‘neut(S\*)’, ‘r-perf(S\*)’, ‘e-perf(S\*)’, and ‘perf(S\*)’ stand for aspectual variants of S with progressive, habitual, neutral, resultative-perfective, experiential- perfective, or perfective aspect, respectively. 17 Note that the negations of certain inferences are here taken to be important components of the processual information determining an occurrence type.18

(M1) A sentence S denotes an entity that the speaker of S conceptualizes as an *activity* iff all of the following inferences hold:

1. If perf(S\*), then (prog(S\*)) or it is not the case that (prog (S\*)))
2. If neut (S\*), then hab (S\*)
3. If prog(S\*), then perf(S\*)
4. If prog (S\*), then (perf þ prog) (S\*)

(M2) A sentence S denotes an entity that the speaker of S conceptualizes as an *accomplishment / development* iff all of the following inferences hold:

1. If perf(S\*), then it is not the case that prog(S\*))
2. If neut(S\*), then hab(S\*)
3. If prog(S\*), then it is not the case that perf(S\*)
4. If prog (S\*), then (perf þ prog)(S\*)

(M3) A sentence S denotes an entity that the speaker of S conceptualizes as an an *achievement / result* iff all of the following inferences hold19:

1. It is not the case that (if perf(S\*), then neut (S\*))
2. If neut(S\*), then perf(S\*)

(M4) A sentence S denotes a *state* iff all of the following inferences hold:

1. If r-perf(S\*), then neut(S\*), and if neut (S\*), then r-perf(S\*)
2. It is not the case that (r-perf(S\*), then prog(S\*))
3. It is not the case that (e-perf(S\*), then neut (S\*))
4. It is not the case that (neut(S\*) then e-perf(S\*))

Since the *definientia* of these four definitions are conjuncts, well-known problems with ambiguities in processual information can be easily resolved.20

In sum, guided by linguistic typological research on verb semantics it is possible to arrive at a systematic and *language-inspecific* presentation of the inferential data for an ontological interpretation of ontological commitments to various types of occur- rences as these are articulated in many, perhaps all, natural languages. In order to ful- fill the completeness principle (CP), analytical ontologies of occurrences need to work from the data of these (and perhaps other) complex inferential roles expressing the concepts of *activity, development, result,* and *state* without reference to language specific criteria such as English adverbs or English verb morphology. As long as the inferential data of an ontology of occurrences are formulated in terms of criteria that are specific to a language *L*, there is no guarantee that the ontological domain de- scription can have wide scope across natural languages as intended.

* 1. THE INFERENTIAL PATTERNS OF SIX CONCEPTS FOR MODES OF EXISTENCE IN SPACE

According to English standard grammar most English nouns fall into two major clas- ses, ‘mass terms’ and ‘count terms.’ Typical instances of mass terms are terms for masses or material stuffs (‘wood’) and typical instance of count terms are terms denoting kind of things (‘car’, ‘table’). What formal semanticists and ontologists dis- cuss as the “mass-count distinction” is, however, but a small part of the semantics of

noun phrases viewed from the vantage point of linguistic typology. According to J. Rijkhoff’s ([1991](#_bookmark31), [2004](#_bookmark32), [2007](#_bookmark33), [2008](#_bookmark34)) typological study of nouns in the world’s lan- guages, the familiar mass-count distinction should be embedded within a more com- plex division among six types of nouns, based on morphosyntactic criteria that dovetail with semantic distinctions:21

1. “Singular object nouns” are nouns for which plural marking is obligatory— among these are ‘count nouns’ of European languages such as *table, tree, cat*. Singular object nouns contain number information—singular form and plu- ral form are indications that one unit or several units are denoted.
2. “Set nouns” on the other hand are nouns that are “transnumeral,” i.e., these nouns do not indicate whether one or more than one item is denoted and can be directly combined with numeral expressions without change in form (English: ‘one sheep, ten sheep’). Set nouns are found—as a regular and substantive noun class—in, for example, Oromo (Kenya, Ethiopia), Lango (Uganda), Georgian (Caucasus), and Galela (Halmeheira, Indonesia). 22
3. “Sort nouns” occur in many classiﬁer languages such as Chinese, Korean, Thai, or Burmese. These are nouns that denote nonlocalized features “and, for this reason, are incompatible with direct quantiﬁcation.”23 They can only be combined with a numeral if they are also combined with an extra element, a so-called “‘sortal classiﬁer’ [a classiﬁer expres-

sion] ... typically used in connection with discrete objects.”24 Sortal clas-

siﬁers—also often called “individualizers”25—come in two varieties and are used to count single entities or discrete entities in groups, respectively. Compare the following example of a sort noun, the Burmese noun ‘myi?’ expressing (as we might try to understand it) *river-feature* that is sorted into eight different kinds:26

noun numeral classifier

myi? t@ ya? river one place (e.g., destination for a picnic) myi? t@ tan river one line (e.g., on a map)

myi? t@ hmwa river one section (e.g., a ﬁshing area) myi? t@ 0 sin river one arc (e.g., a path to the sea)

myi? t@ *h*w*e* river one connection (e.g., tying two villages) myi? t@ 0 pa river one sacred object (e.g., in mythology)

myi? t@ khu0 river one unit (e.g., in a discussion on rivers in general) myi? t@ myi? river one river (the unmarked case)

1. “Mass nouns” are in Rijkhoff’s classiﬁcation nouns that combine with “mensural classiﬁers” i.e., expressions “which indicate size, volume, or weight and typically occur with nouns denoting non-discrete spatial enti- ties” (ibid.; such as the English ‘a liter of’, a ‘bag of ’).
2. “General nouns” are the nouns of classiﬁer languages that combine with “general classiﬁers,” i.e., classiﬁers that neither code that they apply to

something with spatial discreteness (sortal classiﬁers) nor to something lacking it (mensural classiﬁers). In Yucatec Maya, for example, “all nouns ... are neutral with respect to logical unit or shape” as shown in the following example:27

Numeral-classifier noun

’un-ts’´ıit h´a’as one-1 dimensional banana (e.g., the fruit [as long item]) ’un-waal h´a’as one-2 dimensional banana (e.g., the leaf)

’un-p’e´el h´a’as one-3 dimensional banana (e.g., the fruit) ’un-ku´ul h´a’as one-plant banana (e.g., the tree)

’un-ku´uch h´a’as one-load banana (e.g., a bunch) ’un-p’´ıit h´a’as one-bit of/some banana

1. Finally, “collective nouns” are morphosyntactically like singular object nouns, i.e., they can be directly combined with a numeral and have obliga- tory plural marking (e.g. ‘one family, two families’), but unlike singular ob- ject nouns they “designate a property of several discrete entities that are conceived as a unit” ([Rijkhoff 2004](#_bookmark32), 53).

The morphosyntactic and semantic differences between these six types of noun can be systematized, Rijkhoff argues, with two semantic binary parameters. That singular object nouns, set nouns, and collective nouns may be directly combined with a numeral suggests that they “designate properties as having a definite spatial outline,” i.e., the feature “þ shape,” which sort nouns, general nouns, and mass nouns lack (“- shape”). On the other hand, mass nouns and collective nouns are “cumulative (agglomerative) and—up to a point—dissective” in Goodman’s sense and thus designate properties as having the feature “þhomogeneity,” a feature which singular object nouns and sort nouns lack. Since general nouns and set nouns are indeterminate with respect to homogeneity, Rijkhoff summarizes his classification of noun types (“nominal subcategories”) in [Table 1](#_bookmark0) below, which classifies nouns according to how “the property [designated] is represented in the spatial dimension in terms of the features Shape and Homogeneity” ([Rijkhoff](#_bookmark32) [2004](#_bookmark32), 53).

Table 1. [Rijkhoff’s (2004](#_bookmark32), 54) noun classiﬁcation.

|  |  |  |
| --- | --- | --- |
|  | - *Homogeneity* | þ *Homogeneity* |
| *- Shape* | General nouns | |
| Sort nouns | Mass nouns |
| þ *Shape* | Set nouns | |
| Singular object nouns | Collective nouns |

Rijkhoff’s classification is not only a distinction of nouns; it is also, he argues, a distinction of “Seinsarten” or ‘modes of being’, in analogy to ‘Aktionsarten’ or ‘modes of occurrence’.

Languages do not so much differ in the *kind* of nominal properties they predicate of entities, but rather in the way the meaning definition specifies how the property is represented in the spatial dimension in terms of the features Shape and Homogeneity. Just as languages can make different choices as to the way they repre- sent verbal properties in the temporal dimension (*Aktionsart, verbal aspect*), lan- guages can also make different choices as to the way they represent nominal proper- ties in the spatial dimension *(Seinsart, nominal aspect*). ([Rijkhoff 2004](#_bookmark32), 59)

Just as verbal aspects may change the Aktionsart of a predicate, so a noun may shift its Seinsart due to a change in “nominal aspect” ([Rijkhoff 1991](#_bookmark31)). For example, in English, a language without nominal aspect markers, such shifts in Seinsart are ef- fected by using mensural quantifiers on count nouns or, vice versa, numerals on mass nouns: ‘more car for your money’, ‘two new Belgium beers’.

Rijkhoff’s classification of Seinsarten or ‘modes of being’ can be straightforwardly translated into inference patterns that express six concepts of modes of existence in space. The following inference patterns articulate how L-speakers conceive of the mode of existence of entity x denoted by N (here abbreviated with ‘D(N, x)’, where N is a metalinguistic placeholder for a noun in L):

(M5) N is conceived of in the mode of being of *a singular countable* entity (lin- guistically: N is a “singular object noun”) iff for any x denoted by N:

1. *x* is concrete (i.e., is in space and time) and can be placed (i.e., has unique, bounded, but not necessarily connected spatial location), and
2. for all *y* with D(N, y), if *z* is the result of adding *y* to *x,* then it is not the case that D(N, z).

(M6) N is conceived of in the mode of being of a *collective countable* entity (N is a “collective noun”) iff for any x denoted by N:

1. *x* is concrete and can be placed, and
2. for all *y* with D(N, y), if *z* is the result of adding *y* to *x,* then D(N, z), and
3. *x* can be divided to yield at least one z with D(N, z).

(M7) N is conceived of in the mode of being of *countable* entity (N is “set noun”) iff for any x denoted by N, it holds that *x* is concrete can be placed.

(M8) N is conceived of in the mode of being of a *sort* iff for any D(N, x) it holds that:

1. *x* is concrete and
2. for all *y* with D(N, y), if *z* is the result of adding *y* to *x,* then it is not the case that D(N, z).

(M9) N is conceived of in the mode of being of a *measurable* entity (N is “mass noun”) iff for any x denoted by N it holds:

1. *x* is concrete and
2. for all *y* with D(N, y), if *z* is the result of adding *y* to *x,* then D(N, z),
3. *x* can be divided to yield at least one z with D(N, z).

(M10) N is conceived of in the mode of being of a *feature* (N is a “general noun”) iff for any x denoted by N it holds that *x* is concrete. 28

Whether these formulations of the inferential content of cross-linguistic conceptions of modes of being are the most suitable remains to be seen, especially since they are not, unlike modes of occurrence (M1) through (M4) above, defined as aspectual in- ference networks.29 But I trust that already in their present formulation (M5) through (M10) can show that typological research on noun semantics can offer good leads to a systematic presentation of relevant inferential data that articulate concepts of modes of existence in space. In addition, the inferential differences between [M5] and [M10] should suffice to highlight a problem that arises for analyt- ical ontology if it is conducted with narrow linguistic focus.

[Table 1](#_bookmark0) above, which summarizes Rijkhoff’s classification of modes of existence in space, reveals at a glance that ontological domain theories developed for lan- guages with predominantly singular object nouns and mass nouns are at risk of vio- lating the (NISP). As long as ontology focuses only on the inferential data from such languages it seems justified to operate with a category of countable particular individuals to interpret what bound variables quantify over. Indeed, Western ontolo- gists presuppose, from Aristotle to the present day, that particular countable individ- ual entities—i.e., entities that are individuated by their locations in space and time and each ‘one of a kind’—are ‘what primarily exists.’ But such a category is too rich to be the ontological counterpart of the concepts for modes of being expressed by sort nouns or general nouns.30

That Western ontology projects, without further reflection, accidental linguistic features of European nouns into domain structures is especially awkward in view of the typological rarity of these features. An ontological domain of countable particu- lars consists of entities that are either determinately singular or determinately plural. However, as Rijkhoff points out,

from a cross-linguistic perspective obligatory number (plural) marking seems to be the exception rather than the rule, since in many, perhaps even most lan- guages, number distinctions in the [noun phrase] are on the whole consider- ably less relevant, i.e., either optional or altogether absent. ([Rikjhoff 2004](#_bookmark32), 45)

In sum, as long as analytical ontology retains the traditional particularist bias, it needs to abandon the goal of ‘wide scope’—particularist ontologies are domain theories for only a small group of languages. On the other hand, once the particularist presump- tion is abandoned, one can retain the inferential approach for the interpretation of

ontological commitments and develop domain theories for a wide range of natural languages.

* 1. . A DOMAIN THEORY WITH WIDE SCOPE: GENERAL PROCESS THEORY (GPT)

In the previous section I suggested that ontologists can glean inferential characteriza- tions for concepts of ten modes of existence, four modes of existence in time, and six modes of being or existence in space, from typological research on verb and noun se- mantics, respectively.31 Once the target data are in view, the ontologist’s next task con- sists in defining categories in terms of category features that entail the inferential data. Traditionally about 20 different category features have been used for this purpose (e.g., particular, general, unified, discrete, connected, individual, universal, concrete, abstract, unique, perdurant, endurant, dependent, independent), in terms of which at least 220 different categories could be defined in principle. However, Western ontology so far has explored only a small portion of this vast combinatorial space for category construction.

*General Process Theory* (GPT) is an ontology that postulates as basic entities non- particular and indeterminate individuals.32 GPT is based on the observation that in- dividuation is not tied to location: in common sense and scientific reasoning we often individuate concrete entities—especially stuffs and activities—in terms of their

‘functioning’ or typical behavior: ‘it is snowing now, not raining’, ‘the erosion runs all along the coast’, ‘the fire spread rapidly’, ‘the radiation has been slowly decreasing since Tuesday’, ‘sunlight warmed my face’. The basic entities of GPT I call ‘dynam- ics’. Just as new theoretical concepts in science (e.g., ‘harmonic oscillator’) are often introduced by means of a cognitive model (e.g., an ideal spring), the category fea- tures of a dynamics can be initially motivated by identifying a cognitive model: a “subjectless activity” (C.D. Broad; W. Sellars). A subjectless activity—often ex- pressed by a sentence with impersonal subject such as ‘it is snowing’—is an activity that is not the doing of a person or thing (or of a collection of persons or things). On the basis of our understanding of subjectless activities we can, I submit, make in- tuitive sense of dynamics that are *entities in their own right* (rather than dependent

modifications of things, persons, or media) as well as *individual, concrete, spatiotempo- rally extended, nonparticular, noncountable, and determinable*.33

GPT is a monocategoreal ontology, developed on the hypothesis that whatever we reason about in common sense and science can be defined as a simple or complex type of dynamics. Currently the classification of dynamics in GPT makes use of pa- rameters of five evaluative ‘dimensions’: mereological signature, participant structure, dynamic constitution, dynamics shape, and dynamic context. Here I elaborate only on the first of these dimensions, which suffices to define ontological correlates for the inferential patterns specified in sections 2 and 3, the four ‘modes of occurrence’ and six ‘modes of being’.

Stuffs are, in Aristotle’s original formulation “like-parted (homoeomerous) bod- ies ... composed of parts uniform with themselves.”34 Analogously, activities are ‘monotonous’ or ‘homogenous’ occurrences where the beginning, middle, and end of the interval of their duration are ‘of the same nature as the whole’.35 Just as any

spoon of a puddle of water is like the whole, namely, an expanse of water, so any minute of an hour of snowing is like the whole, namely, a period of snowing. Thus we can formulate a generalized notion of homomerity:

*Like-partedness or homomerity*: An entity of kind K is homomerous with respect to its spatial extent (temporal extent) iff all of its spatial parts (temporal parts) are of kind K.

Upon a closer look, however, stuffs and activities display an even more remarkable mer- eological feature than like-partedness. Since stuffs and activities are purely ‘functionally’ individuated, it does not make sense to distinguish between a stuff or an activity and their ‘natures’—stuffs and activities *are* ‘natures’ even though they occur concretely. We may say that every spatial part of the spatial region occupied by this wooden block is of the same nature as the whole, or that every temporal part of the temporal region ex- tended by yesterday’s hour of snowing was of the same nature as the whole, but then we are talking not about the stuff *wood* or activity *snowing* at all, but rather about a particular amount of wood or snowing. For the stuff or activity themselves, the following condition holds (where ‘all of E occurs in spatio-temporal region R’ is to be read as ‘it is not the case that E has temporal or spatial parts that do not occur in region R’):

*Self-containment or automerity:* An entity E is automerous iff for any spatio-tem- poral region r (r > 0): if r is a subregion of a spatiotemporal region R in which all of E occurs, then r is a region in which all of E occurs.

In other words, stuffs and activities are not only like-parted in space and time, respec- tively, they are also literally ‘the same’ (individual) or *recurrent* in space and time, respectively.

Some entities are uniformly structured only for a certain ‘grain size’ of parts (e.g., mixtures such as fruit salad and repetitive sequences such as folding shirts), and there are entities for which it holds that there are *no* parts like them or containing them, namely, things and events (developments). For example, computers and symphonies are not like-parted: no spatial part of my computer is a computer, and no temporal part of a symphony is again a symphony; and similarly for self-partedness.

These considerations suggest that the features of like-partedness and self- containment can be generalized in two respects: first, with respect to dimensionality, and, second, with respect to degree (cf. [figure 1](#_bookmark1) for a graphical illustration):

*Maximal, normal, minimal homomerity*: An entity *a* of kind K is maximally / nor- mally / minimally like-partedK in space (/time) iff *all / some but not all / none* of the spatial (/temporal) parts of the spatiotemporal extent of *a* are of kind K.36

*Maximal, normal, minimal automerity:* An entity *a* is maximally / normally / minimally self-contained in space (/time) iff a spatiotemporal region in which *a* exists has *only / some but not all* / *no* spatial (/temporal) parts in which all of *a* exists.

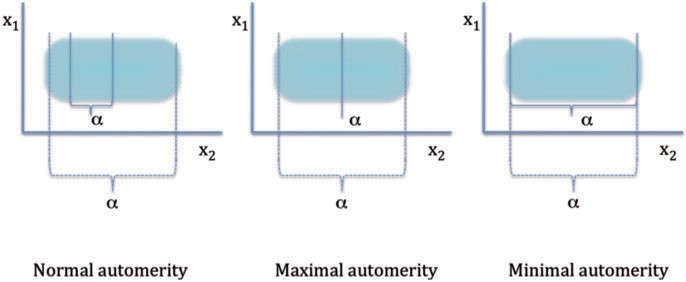


Figure 1. Graphical illustration of degrees of self-partedness (automerity) in space or time, depending on the interpretation of coordinates x1 and x2 (as spatial coordinates or with x1 as spatial and x2 as temporal coordinate, respectively; in the ﬁrst case one spatial dimension is suppressed, in the latter case two, as usual).

Classical individuals cannot be self-contained, since they are particular entities, i.e., individuated in terms of their location. Self-containment is a coherent concept only for functionally individuated entities, and it can be coherently defined only in terms of the relation ‘is part of’ in its common sense, where it has functional overtones (cf. “publishing is part of academic life,” “looking immaculate is part of what I do”). For example, breathing is part of walking, and so is moving your legs, lifting and placing your feet, swinging your arms, keeping balance, moving forward at a speed below four mph; assuming that these five activities are all of what is part of walking, we can coherently say that any hour in which walking exists has temporal parts in which all of (what is part of) walking exists.37

The predicates of (spatial or temporal) homomerity or automerity can be used to define ten different types of dynamics as ontological correlates for sentences that li- cense the inferential patterns (M1) through (M10) described in section 2.38

Type-1 dynamics: Dynamics *a* is the ontological correlate of an *activity* state- ment (i.e., a statement with inferential role [M1] as above) iff

1. *a* is temporally maximally automerous and
2. *a* is spatially maximally, normally, or minimally automerous.39

Condition (ii) highlights that the concept of activity implies spatial occurrence with- out further specification. The ontological correlates of sentences about activities may be spatially maximally automerous (cf. *the water is boiling, it is itching,* or *the light is shining*) or spatially normally automerous (cf. *Tom is chopping wood, the choirs are singing*), or spatially minimally automerous (cf. *the soccer team is singing, Tom is laughing*).

This is quite similar in the case of type-2 dynamics, i.e., the ontological correlates of sentences about developments (accomplishments, events) such as *the plant’s grew from 10 cm to 2m, the chair toppled over,* or *the tenors sang the aria unisono* are

temporally minimally automerous—the ‘grain size’ of their temporal occurrence is the entire temporal extent of any temporal region in which occur. But as the last ex- ample of a collectively performed accomplishment shows, a type-2 dynamics may be normally homomerous and automerous in space.

Type-2 dynamics: Dynamics *a* is an ontological correlate for a *development* (accomplishment) statement (i.e. a statement with inferential role [M2] as above) iff

1. *a* is temporally minimally homomerous (and, in consequence, minimally automerous) and
2. *a* is spatially minimally automerous (and minimally homomerous), or spa- tially normally automerous (and normally homomerous).

The ontological correlates for ‘result’ statements and ‘state’ statements each include a sequential condition, i.e., they are dependent another type of dynamics. This is most obvious in the case of type-3 dynamics, the correlates of sentences expressing results (achievements), such as *Kim won the race*, which require a preceding develop- ment and a subsequent state:

Type-3 dynamics: Dynamics *a* is a truth-maker for a *result* statement (i.e., a statement with inferential role [M3] as above) iff

1. *a* is temporally maximally automerous and
2. *a* is spatially maximally, normally, or minimally automerous and
3. there are type-2 dynamics *b* and *c*, and a type-4 dynamic *d* such that *b*, *a*, and *d* are parts of *c* and *b* is earlier than *a* and *a* is earlier than *d*.40

In contrast, type-4 dynamics accommodate the ‘logical inertia’ condition (cf. clause [i] of [M4] above) of the mode of occurrence of states, which licenses the inference that the state continues.

Type-4 dynamics: Dynamics *a* is a truth-maker for a *state* statement (i.e., a statement with inferential role [M4] as above) iff

1. *a* is temporally maximally automerous and
2. *a* is spatially maximally, normally, or minimally automerous and
3. for any temporal region in which *a* occurs there is later temporal region in which *a* occurs.

The GPT account of predication is too diversified for a quick rehearsal in the context of this paper, but in general it holds that (i) the ontological counterpart of the ‘predicate’ (‘verb plus satellites’) of a sentence is of type-1 through type-4, and (ii) combines with the ontological counterparts of the noun phrases of the sentence to yield as the ontological counterpart of the entire sentence a complex dynamics that is again of type-1 through type-4. The ontological counterparts of noun phrases are dynamics of type-5 through type-10, defined in accordance

with the six modes of being set out above following Rijkhoff’s classification of types of nouns:

Type-5 dynamics: Dynamics *a* is an ontological counterpart for a *singular ob- ject noun* (i.e., an expression with inferential role [M5] as above) iff

1. *a* is spatially minimally automerous (and minimally homomerous) and
2. *a* is spatially normally homomerous and
3. *a* is temporally maximally automerous.

The dynamics denoted by the English noun ‘car’ for instance is spatially minimally homomerous and automerous: no spatial part of the extent occupied by a car is a re- gion where a car exists. Minimal automerity warrants unique bounded spatial exis- tence, as required by clause (i) of (M6) above, as well as the failure of additivity and dissectivity, as required by clause (ii) of (M6) above. Condition (ii) is added here to establish that *a* might be either an ‘integrated whole’ (e.g., a living organism) or a ‘lo- cally homogenous’ material expanse (e.g., *stone* or *lake*), but not an entirely arbitrary collection of things without any family resemblance amongst its members. Condition

1. states that type-5 dynamics persist by recurring, i.e., by being wholly present at any moment of their existence.41

Let us turn to the ontological counterparts of ‘collective nouns’ such as ‘herd’ or ‘society.’42 Collectives can be counted yet they may be divided into several collectives or combined to form one new collective, which can be accounted for as follows:

Type-6 dynamics: Dynamics *a* is an ontological counterpart for a *collective noun* (i.e., an expression with inferential role [M6] above) iff

* 1. *a* is spatially minimally automerous and
  2. *a* is spatially minimally or normally homomerousF
  3. *a* is temporally maximally or normally automerous.

A dynamics *a* that fulfills the application conditions of, for example, the English expres- sion ‘herd’ is not spatially recurrent—condition (1) is the ontological sense of the count- ability requirement that is a built-in feature of English collective nouns (above expressed in the semantic postulate that collectives denote “several entities conceived as a unit”). That dynamics *a* does not recur in any of its spatial parts does not exclude, however, that it has spatial parts that also fulfill the application conditions of the English expres- sion ‘herd.’ This is captured in condition (ii), allowing for the ‘additivity’ and ‘dissectivity’ of collectives. Condition (iii) accounts for the fact that some collectives (such as herds) persist by recurrence while others (such as tone sequences or families) do take time.

The third type of ‘transnumeral countability in space’ is a despecification of the previous two modes; the ontological counterpart of the mode of being expressed by a set noun is an entity that is ‘one or several’:

Type-7 dynamics: Dynamics *a* is an ontological counterpart for a *set noun* (i.e., an expression with the inferential role [M7] as above) iff

1. *a* is spatially minimally automerous and minimally homomerous, or
2. *a* is spatially normally automerous and normally homomerous, and
3. *a* is temporally maximally automerous

English does not have proper set nouns, but for the sake of illustration ‘sheep’ might do: the disjunction of clauses (i) and (ii) allows for the ontological counterpart of ‘sheep’ to be one or several entities. That counterparts of set nouns persist by recur- rence as stated in clause (iii) has the status of a preliminary hypothesis, relative to the illustrations for set nouns available, and may have been revised in analogy to clause (iii) of the definition of type-6 dynamics.

Modes of being (M5) through (M7) each express (or disjunctively include) a concept of bounded or shaped spatial existence. This concept dovetails with the pos- tulate that their ontological counterparts are spatially minimally automerous. The definitions of ontological counterparts for (M8) through (M10), on the other hand, postulate dynamics that are indeterminate with respect to shape and boundedness:

Type-8 dynamics: Dynamics *a* is an ontological counterpart for a *sort noun*

(i.e., an expression with inferential role [M8] as above) iff

1. *a* is spatially normally automerous and spatially normally homomerous, and
2. *a* is temporally maximally, normally, or minimally automerous.

English counterparts of the sort nouns of classifier languages are noun phrases of ge- neric sentences such as ‘the African elephant is at the brink of extinction’ or kind terms such as ‘humankind’. The ontological counterpart of ‘the African elephant’ or ‘humankind’ is normally automerous—some of the regions in which the African ele- phant or humankind exists are regions in which the African elephant or humankind exists. This entails indeterminate spatial location and accounts for the “inhomogene- ity” of sorts, i.e., the fact that there are minimal portions satisfying the noun ‘the African elephant’ or ‘humankind’. Condition (ii) again acknowledges that sort nouns can imply all varieties of temporal existence.43

(M9), our concept of the mode of existence of stuffs, requires that its ontological correlate does not come with a certain grain size of smallest spatial extent—every spatial part of water is water.44

Type-9 dynamics: Dynamics *a* is an ontological counterpart for a *mass* noun (i.e., an expression with the inferential role [M9] as above) iff

1. *a* is spatially maximally automerous and
2. *a* is temporally maximally automerous.

The most underspecified mode of being has an ontological counterpart that can only be disjunctively stated:

[type-10 dynamics:] Dynamics *a* is an ontological counterpart for a *general noun* (i.e. for an expression with inferential role [M10] as above) iff

1. *a* is spatially maximally, normally, or minimally automerous and
2. *a* is temporally maximally or normally automerous

A type-10 dynamics is the most inspecific variety of a dynamics: a concrete dynamic feature, whose ‘dynamicity’ might be either nontelic (non-directed) as typical for activities, or telic (directed) as typical for developments. Since the indeterminateness of the “general nouns” of certain classifier languages cannot be fully conveyed by English nouns, common-sense illustrations in English of type-10 dynamics are diffi- cult to come by. As an approximation one might consider the ontological counter- parts of ‘noise’ or ‘light’, but even here the categorial implications of the count or mass reading (‘a light’ vs. ‘much light’) resonate in the background.

The conditions that distinguish dynamics of type-1 through type-10 suffice to explain ontologically the inferences that express the conceptual content of the modes of exis- tence [M1] through [M10]. Of course they do not the full GPT interpretation of con- cepts of common sense reasoning—for example, the GPT correlate for ‘artifact’ contains the mereological conditions (“mereological signature”) characteristic for a type-5 dynam- ics, but also several other conditions.

* 1. CONCLUSION

The inferential approach is arguably the best methodological paradigm for ontologi- cal research, since it is driven by intersubjectively accessible data. However, as I have argued here, analytical ontologists may not simply assume that domain theories de- veloped for common-sense reasoning in English and other Indo-European languages have wide scope of application across natural languages. As linguistic typological re- search shows, *particularist* ontologies especially cannot have wide scope in this sense—in application to a large group of languages such ontologies violate the meth- odological principle that ontological interpretations should not enlarge the inferential structure of the language to be analyzed. However, as I illustrated, once we abandon the presumptions of particularism, we can define ontologies with wide linguistic scope. Drawing on typological studies of verb and noun semantics, “Aktionsarten” and “Seinsarten,” I defined ten inferential patterns that represent concepts of modes of existence in space and time across languages. In a second step I sketched ontologi- cal correlates for these ten modes of existence in space and time within the ontologi- cal framework of *General Process Theory*, a monocategorial ontology based on

nonparticular individuals.45

NOTES

1. For more detailed reconstructions of the history of early analytical ontology from 1920 to 1950 cf. Seibt ([1996b](#_bookmark39), [1997](#_bookmark41), [2000b](#_bookmark43)). Note that the basic idea of the quantificational criterion, often attributed to Quine, is Carnap’s, cf. *Die logische Syntax des Sprache* (1934); Quine reworked the idea and supplied the lucid slogan “To be is to be the value of a bound variable” ([1939](#_bookmark26), 708).
2. To emphasize, my focus is here on the idea that conceptual content can be cashed out in terms of inferences in L, and that the latter can be used, as a minimal requirement, to evaluate the viability of a category. There are many different branches of the inferential approach in twentieth-century ontology, e.g., those initiated by Carnap, Quine, N. Goodman, W. Sellars, D. Davidson, and D. Lewis, to name some major protagonists.
3. Cf. [Nichols et al. (2004)](#_bookmark24) and more generally the debate about “experimental philosophy.”

4. Cf. Quine ([1960](#_bookmark29), §12, [1968](#_bookmark30)).

5. Cf. Quine ([1968](#_bookmark30), 191ff).

1. Note that there are two measures for the scope of an ontological theory T: (a) relative to the number of languages that can be interpreted with T, and (b) relative to the number of speakers whose ontological commitments can be modeled with T. Since Indo-European languages currently have many speakers (partly due to colonialism), particularist ontologies are not provincial in the sense of measure (b), but I take it that measure (a), applicability across structural variation, is the philosophically relevant measure. On the number of natural languages, see [Gordon and Grimes, eds. (2005)](#_bookmark14).
2. The first option seems to be pre-empted by a host of studies in cognitive science and cognitive linguistics showing short-term and long-term cognitive biases, reflected in a speaker’s actions and phenomenologi- cal experience, that are linked to grammatical features. See in particular [Casasanto et al., (2004)](#_bookmark6), [Casasanto and Bottini (2010)](#_bookmark8), [Evans (2009)](#_bookmark12), [Gumperz and Levinson (1996)](#_bookmark15), and [Lucy and Gaskins](#_bookmark21) [(2001)](#_bookmark21).
3. We are all too accustomed perhaps to the inferential approach to appreciate the methodological progress it signifies, but in his early unpublished writings from the early 1920s Carnap is quite adamant about the sobriety of the new ‘analytical’ method where philosophical theories are evaluated in joint discussion rel- ative to intersubjectively established data sets.
4. It might be good to emphasize explicitly that these difficulties for a translinguistic application of ontolog- ical theories arise also if one insists that there are aspects of conceptual content that are not exhausted by an expression’s inferential role, e.g., some prelinguistic intuitive content. All that matters is that ac- cording to the inferential approach the data of an ontology are inferential roles.
5. Aspectual meaning consists in information about the dynamic organization of an occurrence or its rela- tionship to other occurrences as background or incident, i.e., verbal aspects characterize an occurrence as ongoing (progressive), attempted (conative), about to begin (prestadial), just begun (ingressive), in the middle (continuous), about to end (egressive), frequently recurring (iterative), habitual, or as a factual unit (perfective), etc. Cf. [Comrie (1976)](#_bookmark9) and [Dik (1997)](#_bookmark10).
6. Cf. [Verkuyl (1972)](#_bookmark50), [Mourelatos (1978)](#_bookmark23), [Rijksbaron (1989)](#_bookmark35). 12. See [Dowty (1979)](#_bookmark11), [Galton (1984)](#_bookmark13), [Sasse (2002)](#_bookmark36).

13. Cf. e.g., [Tatevosov (2002)](#_bookmark48), [Botne (2003)](#_bookmark5), [Papafragou, et al. (2006)](#_bookmark25), [Abraham, et al. (2008)](#_bookmark2). 14. Cf. Seibt ([2004](#_bookmark44), [2005](#_bookmark45)).

1. Aspectual variant may involve changes in bound morphology or changes in the periphrastic expressions of as- pectual meaning. For example, while the English continuous form is commonly taken to be a verbal aspect marker for the progressive aspect, German needs to use a paraphrase (‘beim/am þ [nominalized form of the verb]’); similarly, the habitual aspect is in Slavonic languages morphologically marked, while English (‘. . . used to [verb infinitive]’) uses a paraphrase. The final specifics of a typological theory of verbal aspects is a matter of ongoing empirical research in linguistics; I am here working from what currently count as uncontro- versial core insights of aspectology. To restate , ‘aspectual meaning’ is the meaning associated with the (pro- gressive, perfective, etc) “verbal aspect” as expressed by the bound morphology of verbal aspect markers in certain languages; since talk about ‘aspectual meaning’ is somewhat cumbersome, let me hereafter use ‘aspect’ to denote the aspectual meaning of a sentence in L independently of whether L expresses that sort of mean- ing by means of a verbal aspect marker (bound morphology) or by paraphrase.
2. The neutral aspect consists in the lack of aspectual information, cf. Smith (2010).
3. I here differentiate between a resultative perfective aspect and an experiential perfective aspect, corre- sponding to the distinction between the experiential perfect and the resultative perfect (cf. [Comrie](#_bookmark9) [[1976]](#_bookmark9)). Where the distinction is not inferentially relevant, I write ‘perf(P\*)’, which means that the rule holds for both the resultative perfective aspect and the experiential perfective aspect.
4. To restate, the inferences at issue are material; here I need to bracket the difficult question whether the ‘if-then’ can be read as the material condition of standard propositional logic or should be for- malized by means of newer theories of “common-sense entailment.” But note in particular that in the context of common-sense reasoning clause (i) of (M1) is not a ‘tautology’ but a distinctive piece of information. Note also that (M1) through (M10) below articulate strictly speaking not *the* inferen- tial role of a sentence, as I write here for the sake of simplicity, but only part of the inferential role of a sentence.
5. These four basic modes of occurrence could be further differentiated, e.g., by diversifying (M3) in ways that accounts for [Botne’s (2003)](#_bookmark5) four types of achievement.
6. The sentence *Tom is mending his shirt* denotes an accomplishment if we take this sentence to imply (a) that it is false that Tom has mended his shirt (clause [iii] of [M2]), and (b) that if it were true that Tom has mended his shirt, it would be false that Tom is mending his shirt (clause [i] of [M2]). On the other hand, the very same sentence, *Tom is mending his shirt*, denotes an activity if we take it to imply that Tom has mended his shirt is true (i.e., that it is true that Tom has done some ‘shirt-mending’; clause [iii] of (M1]), and if the truth of *Tom has mended his shirt* would not lead us to infer that Tom is not mending his shirt (clause [i] of [M1]).
7. Rijkhoff’s classification of nouns holds for a representative sample of the world’s languages; it is currently the only classification that holds for a wide range of languages and is commonly quoted as representing the current theoretical state of the art. Note, however, that the classification is restricted to nouns for concrete spatial entities, and accordingly all following claims about nouns, modes of being, and their on- tological correlates should be understood with this restriction. Moreover, as Rijkhoff stresses, and as is fa- miliar from the literature in philosophy and cognitive linguistics (e.g., [Quine [1950]](#_bookmark27), [Bunt [1985]](#_bookmark7), [Aarts](#_bookmark3) [[2004]](#_bookmark3), [Langacker [2006]](#_bookmark18)), the categorization of single nouns is not always clear cut: ‘hair’ is in some contexts a count noun (‘two hairs’) and in others a mass noun (‘much hair’). This may be due to percep- tual vagueness or due to the gradual nature of language change, during which nouns may change from one category to another ([Rijkhoff 2004](#_bookmark32), 117).

22. Cf. . Rijkhoff ([2004](#_bookmark32), 30, 38–41,105ff).

23. Cf. [Hundius/ Ko¨lver (1983)](#_bookmark16) as quoted in [Rijkhoff (2004, 50)](#_bookmark32).

24. Ibid., 48.

25. See e.g. Lyons ([1977](#_bookmark22), 462).

1. Cf. [Becker (1975)](#_bookmark4) as quoted in Rijkhoff ([2004](#_bookmark32), 76).
2. Cf. [Lucy (1992)](#_bookmark20) as quoted in Rijkhoff ([2004](#_bookmark32), 51).
3. The operational predicates ‘dividing’ and ‘adding’ in (M5) through (M10) denote actions that effect that the material content of one connected spatial region occurs in two disconnected spatial regions, or its converse, respectively. In the context of these six inferential patterns the two operational predicates de- note actions that L-speakers have performed or can imagine.
4. The typological neutrality of the formulations of (M5) through (M10) depends on whether dividing, adding, and placing are operational ‘universals’ or, more generally, whether the predicates used to formu- late the patterns have suitable counterparts in other languages. The present formulation of (M5) through (M6) is due to the fact that even though some nominal aspects have been identified ([Rijkhoff 1991](#_bookmark31)), a typological theory of nominal aspectual meaning is not yet available. In other words, relative to the cur- rent stage of linguistic research it is—as far as I can see—not yet possible to define modes of being in terms of sets of inferences between the ‘aspectual variants’ of a sentence, now understood as variations of nominal aspectual meaning.
5. It would be akin to interpreting sentences about quantum-physical entities in general (without reference to experimental set-up) within an ontological domain of classical particles with determinate properties. Proponents of particularist ontologies might point out that constructions that consist of, e.g., sort nouns *plus* numeral classifiers seem to have the inferential role of ‘singular object nouns’ (M5). But this move is unsatisfactory given that nouns that express an indeterminate mode of existence such as (M8), e.g., the nouns of Mandarin Chinese, may be used without classifiers, even in subject position, cf. Li ([1989](#_bookmark19), 130).
6. Whether these ten concepts are exhaustive and to what extent speakers of different languages have equal cognitive access to all of them are questions for further empirical research outside of ontology.
7. GPT has been worked out, in slightly different terminological guises (“dynamic mass theory” and “the- ory of free processes”), since 1990; cf. e.g. my ([1995](#_bookmark37), [1996a](#_bookmark38), [1997a](#_bookmark40), [2000a](#_bookmark42), [2002](#_bookmark43), [2004](#_bookmark44), [2005](#_bookmark45), [2008](#_bookmark46), [2009](#_bookmark47)) in which I argue that GPT resolves traditional dialectical stalemates in the ontology of things (in- dividuation and persistence) and offers new routes for the ontological interpretations of interaction (cau- sation, causal mechanism, function, emergence), and some notions of quantum field theory (field quanta of free fields).
8. Two brief commentaries on these features (otherwise see Seibt [2005](#_bookmark45), [2009](#_bookmark47)): That dynamics are not modifications of other more basic entities is an ontological claim, not a physical claim. Most ‘subjectless’ activities of common-sense reasoning are affectations of a medium. Electromagnetic radiation in ‘empty’ space might be a suitable physical example, though. That dynamics are spatio-temporally extended does not preclude that a dynamics can be ascribed to any point in the time period during which it is going on, analogous to our ascriptions of velocity-at-an-instant.
9. Cf. *History of Animals* (487a2). Note that Aristotle actually speaks of ‘homoiomerous’ rather than homo- merous entities, i.e., ‘similar-parted’ (with parts of a similar kind) in contrast with ‘like-parted’ (with parts of the same kind).

35. Cf. e.g., [Vendler (1957)](#_bookmark49), Mourelatos ([1978](#_bookmark23), 431).

1. Let a be the ontological counterpart of the noun ‘fruit salad’. Commonly the feature K relative to which a is said to be like-parted (homomerous) is determined by the application conditions of the noun in question. That is, in order to determine whether the dynamics *a* that is the ontological counterpart of ‘fruit salad’ is spatially normally like-parted we rehearse the application conditions of ‘fruit salad’ for an entity that is located in a spatial part of a region occupied by *a*. However, we might also wish to take into account uniformities of *a* relative to features F determined by the application conditions of other nouns. In this case I will say that we test *a* for its ‘similar-partednessF’ or homoiomerityF and signal the difference in comparative focus by an index F. For example, the ontological counterpart of ‘body’ is mini- mally like-parted (homomerous) but normally similar-partedflesh (homoiomerousflesh).
2. The common-sense part relation ‘is part of’ can be axiomatized within a nonstandard (extensional) mer-

eology that operates with a nontransitive relation. Elsewhere (2004b, 2009) I outline the basic construc- tional principles of such a “leveled mereology.” Within this nonstandard mereology the familiar transitive part-relation on spatio-temporal regions can be reintroduced, in order to arrive at a formal definition of self-containment.

1. Zemach’s (1970) fourfold classification of entity types in terms of “bound” and “continuous” occurrence in spatial and temporal dimensions is cognate in spirit, but there are some decisive differences: Zemach’s classification is not driven by typological data and does not operate with degrees of automerity and homomerity; automerity and homomerity are not clearly distinguished. Note that minimal homomerity does not always imply minimal automerity: the entity that is denoted by *balan*, the word in the Australian language Dyirbal that “includes women, fire, and dangerous things ... but] also some birds that are not dangerous” (Lakoff 1987, 5) is minimally homomerous but normally automerous. Similarly, maximal automerity mostly, but not always, implies maximal homomerity: the entity that is first a cater- pillar and then a butterfly is maximally automerous (along the temporal dimension) but not maximally homomerous (along the temporal dimension).
2. Occasionally it has been argued in the literature that activities are merely normally automerous: some temporal parts of your running, such as lifting your right leg, are not periods of running. These argu- ments involve a clandestine ‘type shift’, however, recasting the activity of running as a sequence of developments.
3. For present purposes the definition of achievements is abbreviated; the full definition relies on two auxil- iary definitions, the notion of a linear temporal ordering and the notion of some dynamics being a ‘linear phase’ of a type-2 dynamics.
4. On persistence as recurrence see [Seibt (2008)](#_bookmark46). Note that on the recurrence account of persistence type-1 dynamics and type-5 dynamics, the ontological counterparts of our talk about activities and about things persist in the same way: by recurring. On the notion of ‘homoiomerity’ see footnotes 34 and 36 above.
5. Here I disregard—following Rijkhoff’s definition—functionally structured groups such as football teams.
6. To operate again with English counterparts for illustration, the ontological counterpart of ‘the African el- ephant’, ‘humankind’, and ‘the stickleback’s mating ritual’ are temporally maximally, normally, and mini- mally automerous, respectively.
7. The appearance to the contrary arises only if we perform a clandestine shift in our conceptualization of the concrete feature in question and treat stuff terms as terms for collective nouns: ‘water’ or ‘rice’, for in- stance, can also refer to a collective of (spatially) minimally homomerous entities, (H2O molecules or corns of rice, respectively). As pointed out above we often shift our conceptual ‘perspective’ on occur- rences, conceiving them in one context as (temporally) maximally homomerous happening (*snowing* as activity) and in another context as collective of (temporally) minimally homomerous single develop- ments (*snowing* as a plurality of falls of snowflakes). In tandem with this familiar phenomenon of “verbal aspect shift” there is the even more frequent phenomenon of a ‘nominal aspect shift’ involving transi- tions among all of the conceptualizations/modes of being [M5] through [M10]. Shifts in nominal as- pects from “count to mass” and vice versa, or from “physical object” (i.e., [M5]) to “type” (i.e., [M10];

e.g. “Mary likes books”) received attention among linguists but not much, so far, among ontologists. I have argued elsewhere that our talk about persistence and change systematically involves nominal aspect shifts between [M9] and [M5], respectively; cf. [Seibt (2008)](#_bookmark46).

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