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# Information Metatheory

Pieter Wisse

*Information Dynamics*, [pieter@wisse.cc](mailto:pieter@wisse.cc)

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## Information Metatheory

Pieter Wisse  
Information Dynamics, The Netherlands

### Abstract

This essay continues a report on the design of information metatheory. My general idea of a metatheory, or framework, is that it primarily reflects differences, rather than similarities (leave alone identity, or Platonic form), i.e. it helps to control variety. Grounded on differences, a metatheory is essentially about (their) coordination. I have already reported on two design steps toward a metatheory for information. The first argues for "Multiple axiomatization in information management" (Wisse 2002b). The second design step establishes the "Dia-enneadic framework for information concepts" (Wisse 2003). Here, a third step synthesizes previous work. A more comprehensive framework, or information metatheory, results. Some remarks follow on qualifying information systems and information management, respectively, and on how information metatheory is indispensable to meet increasingly variable, dynamic requirements.

**Keywords:** information metatheory, information concept, dia-enneadic framework, semiotic ennead, multiple axiomatization, philosophy of science, methodology, interdisciplinarity, rigor and relevance

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# Information metatheory

Pieter Wisse

Information Dynamics, Voorburg

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## Synthesis

Multiple axiomatization<sup>1</sup> rests on the (meta)assumption that — scientific — explanation, and design, too, for that matter, is causal. A first constraint is that whatever causes and effects any model features should be of one and the same type. There are three such causal types: 1. physical, 2. impulsive, and 3. motivational.<sup>2</sup> As a second constraint, the level of aggregation of phenomena should be consistent for any explanatory model. Aggregation can change between the particular (unique) and the universal (general).

Figure 1 sketches how these constraints are translated into dimensions, thus defining an ordered space for models. Figure 2 demonstrates how one model could be related to another, etcetera, through shifting causal type and/or level of aggregation.

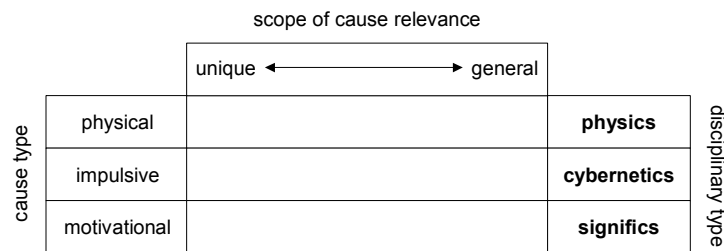


Figure 1: A classification space for models.

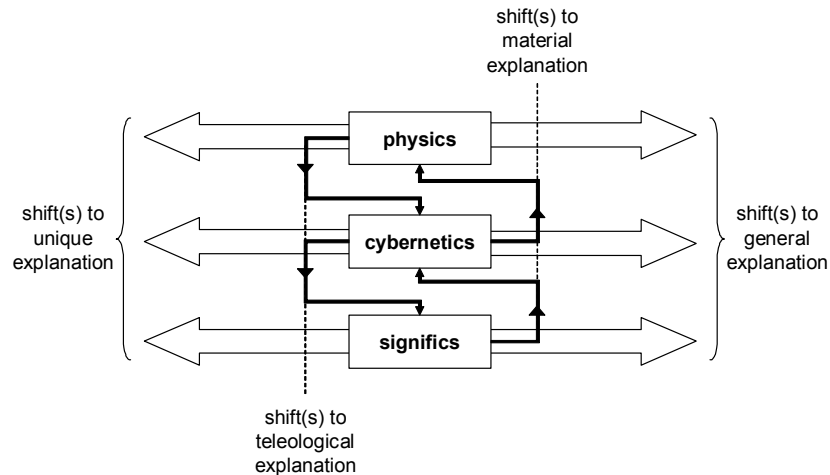


Figure 2: An orderly progression between models.

The basic disciplinary types correspond to the cause types. How those disciplinary types are related can also be shown against the background of the Peircean semiotic triad. The extent of so-called irreducibility is now seen to depend on cause type. For physics, the irreducible system consists of objects, i.e. objects are its (only) irreducible elements. Cybernetics takes object and impulse as irreducible. As for significs, or semiotics, Peirce (1906, p 282) already argues that semiosis

is, or involves, a cooperation of *three* subjects, such as a sign, its object, and its interpretant, this tri-relative influence not being in any way resolvable into actions between pairs.

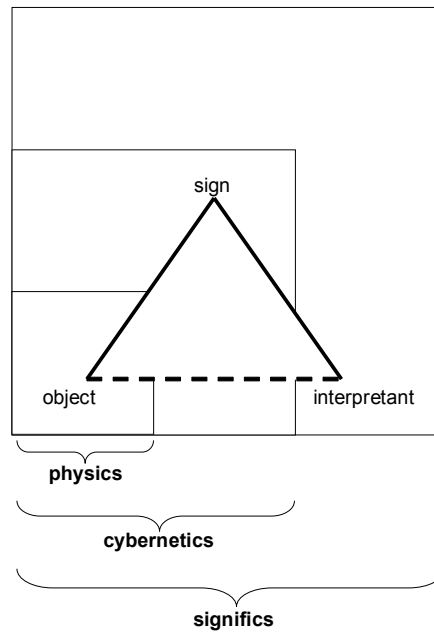


Figure 3: The variable extent of irreducibility.

It is not right or wrong to call an impulse and/or a sign ‘information.’ Systemically, though, impulse is different from sign (as they are each elements in a characteristic ‘irreduction’).

Information metatheory should provide a system of information concepts. From significs, or semiotics, as the most inclusive disciplinary type, the dia-enneadic framework<sup>3</sup> points to possible concepts of information. The semiotic ennead is an extension of Peirce’s triad (Wisse 2002a). With semiosis attributed to participants, communication is modeled with corresponding enneads. Reduced to dyadic communication, a dia-enneadic model, or framework, results.

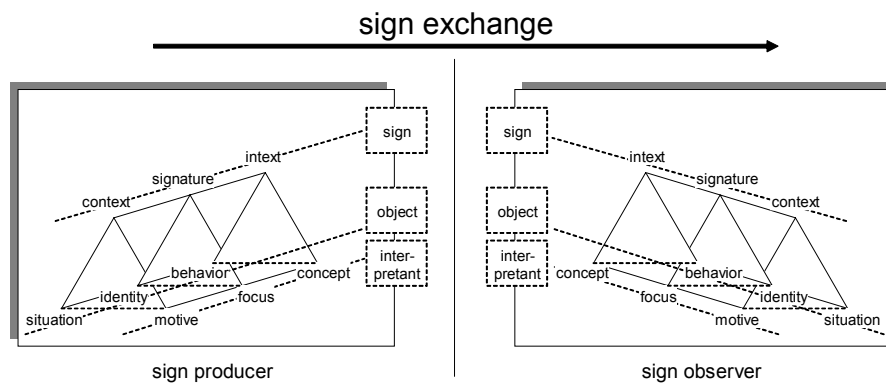


Figure 4: Dia-enneadic framework for information concepts.

The dia-enneadic framework contains  $2 \times 9 = 18$  elements. Then, the most comprehensive information concept contains all 18 elements. It is required to explain a unique act of communication where motivated individuals are involved. Referring to figure 1, above, the model occupies a position down at the left of the classification space for — scientific — explanation/design.

Likewise, other subsets<sup>4</sup> of the dia-enneadic framework suggest information concepts. Enumerating them, and providing comments, lies outside the scope of this design of information metatheory. A general remark may help further orientation, though. Subsets of the dia-enneadic framework only pertaining to objects level are immediately irrelevant for information. Another major demarcation is what separates interpretation (significs) from the ‘merely’ impulsive (cybernetics) for different extents of irreducibility are at stake (see the discussion above).

Additional synthesis originates from the semiotic ennead’s support for shifting aggregation. The ennead should be viewed as a triad of threesomes, where

(object)  
 situation : identity : behavior =  
 (sign)  
 context : signature : intext =  
 (interpretant)  
 motive : focus : concept.

The elements of each threesome are relative, i.e. the subtriad identity/signature/focus can be shifted. When it is moved toward generalization, the linearly ordered collection constituting the subtriad situation/context/motive ‘shrinks’ accordingly while the subtriad behavior/intext/concept expands. A move toward specialization has the opposite effect in the model.<sup>5</sup> Figure 5 suggests the degrees of freedom for shifting toward generalization and specialization, respectively.

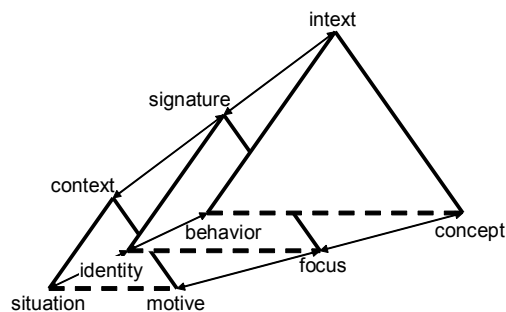


Figure 5: Relative elements for shifts in aggregation.

Figure 6 completes the synthesis. The ennead’s representation is slightly modified (rotated) to fit the classification space for models (see figure 1, above). It is important to recognize that the terminology

of the ennead's elements bears witness to irreducibility with respect to signific/semiotic explanation. At the level proper of cybernetics, what is 'left' is — at the most — a hexad. Then, of course, more 'impulsive' terminology is favored to properly reflect the reduced cause type.

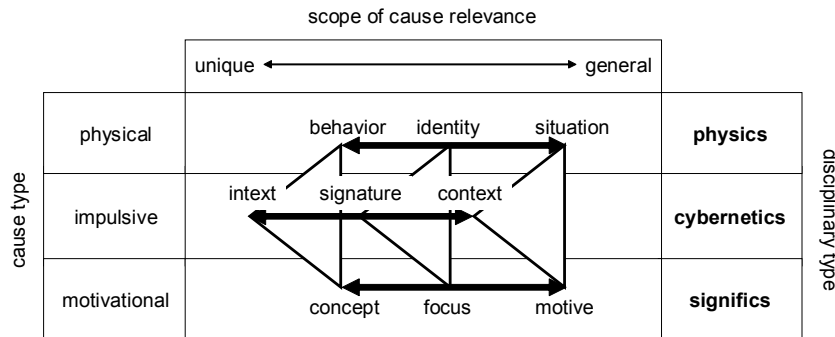


Figure 6: Information metatheory from an encompassing perspective.

### Some remarks

A metatheory helps to distinguish pluriformity from disorder. The former is positive, the latter negative. For example, fragmentation of information management is often bemoaned (Hirschheim and Klein<sup>6</sup> 2003). Complaints, however, are essentially groundless without an explicit metatheory.

Multiple axiomatization already suggests that different approaches may very well reflect organization, rather than fragmentation. On the other hand, it should be possible to rigorously identify where approaches, albeit different in vital respects, must also be consistent. Resisting relevant synthesis would be the mark of fragmentation.

Now my idea of order in pluriformity is not exhaustive enumeration. I will therefore not even attempt it for information systems. Rather, in this section I will offer some guidelines on qualifying information systems.

As the ennead clearly indicates, interpretation proceeds from focus. Applying the ennead reflexively, any element can constitute focus. For example, situations may be taken as the starting point for ordering information systems. Situations are usually roughly accumulated for that purpose. A popular denominator is 'business.' Indeed, upon even not much closer inspection the assumption of business application often holds for what is called information systems. But what about the public sector? About recreational applications?<sup>8</sup> And doesn't the business bias limit development of (more) integrative services, encompassing both private and public sector, involving people with both vocational and recreational motives, etcetera?

Mentioning motives is a first hint at the difficulties of maintaining a single focus. Is business really an aggregate concept for situations? Or is a business a means to an end, for example that of making a profit and/or performing satisfactorily at work?



Radically starting from motives, it is straightforward to include a psychotherapeutic encounter as an information system. Is there actually a strong argument for separating it from so-called business interactions? Again, what about consumers? Motives underlie consuming behaviors, if any.

At present, an immediate positive use of information metatheory is supporting analysis of existing classifications/positionings of information systems. It is precisely because the ennead emphasizes irreducibility that unproductive barriers are easily spotted. When, just mentioning another focus, is it productive to distinguish information systems on the basis of media? Does explanation/design at the cybernetic level carry on a difference determined as relevant at the signific level? If so, the signific distinction seems primary, nonetheless. Yet, it may secondarily justify a corresponding media specialization. But, then, how 'general' is such specialization at that level? Is it rather that only some media aspects — or whatever — require different treatment, to be combined with more generally applicable aspects?<sup>7</sup>

Developing information and communication technology drives dynamics. Information metatheory should establish a vantage point from where problems can be diagnosed and opportunities recognized. How information metatheory performs this function is by criticizing preset boundaries and limitations. Figure 6 illustrates how focus may shift, traversing across modeling space.

With the concepts of information system and information management becoming increasingly variable, an information metatheory with requisite variety can guarantee that specific concepts are arrived at to meet requirements.<sup>9</sup> At first, clientele from patrons to students may not realize they are kept locked in by traditional concepts of information system and information management and their (self-)appointed caretakers. But in the longer run, ignoring variety and dynamics amounts to becoming irrelevant. Interest groups such as professional organizations and academic departments, not to mention individual practitioners, should therefore rise to the challenge by deriving their overall orientation from an explicit metatheory. Certainly, information metatheory appears a bit daunting at first, but it is definitely not an academic exercise. It is instrumental for continued practice,<sup>10</sup> both relevant and rigorous<sup>11</sup> in its increasing dynamic variety.

#### Notes

1. For an introduction, see Wisse (2002b). Please note that multiple axiomatization is a general metaconcept of philosophy of science, i.e. it is not unique for information management.
2. Derived from Schopenhauer; see Wisse (2002b).
3. For an introduction, see Wisse (2003).
4. A set of  $n$  elements has  $2^n$  subsets. So, with 18 elements there are  $2^{18} = 262,144$  theoretically distinguishable information concepts.
5. For the threesome context, signature and intext, modeling dynamics are developed in Wisse (2001).
6. They refer to information systems, or IS, for short.
7. Information metatheory's relevance for curriculum development is obvious.
8. Has the market for computer games, for example, already eclipsed that for business hard- and software?

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Actually, what makes distinguishing those markets relevant? For educational institutions, perhaps? Are programming skills different, etcetera?

9. An information metatheory capable of accomodating such dynamics qualifies as a powerful modeling method in general. In fact, the metatheory outlined here is partly derived from metapattern which was purposely designed for modeling complexity (Wisse 2001).

10. Theory is a form of practice, too.

11. Conagram: The relevance of rigor is the rigor of relevance.

## Literature

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