Routledge
Taylor & Francis Group

FRSAD and the Ontology of Subjects of Works

JONATHAN FURNER

Department of Information Studies, University of California–Los Angeles, Los Angeles, California, USA

Critics of the Functional Requirements for Subject Authority Data (FRSAD) model have argued that the Functional Requirements for Subject Authority Records (FRSAR) Working Group failed to make explicit the ontological assumptions underlying the model, and/or failed to make explicit the reasoning behind the choices that were made among competing conceptions. In this article, the philosophical assumptions underlying the design of the FRSAD model are identified and precisely described; the full range of alternatives are discussed and evaluated; and the implications of the Working Group's choices among those alternatives are clarified.

KEYWORDS   aboutness, data modeling, FRSAD, subject authority data, subjecthood

INTRODUCTION

The primary purpose of information systems such as search engines and library catalogs is to help users find, and obtain access to, *resources* of the kinds that they want. Typically, users' *discovery* of resources such as works and editions is facilitated by prior activity (sometimes manual, sometimes automated, sometimes a combination) in which *descriptions* of resources, and descriptions of related phenomena such as the authors and subjects (i.e., topics) of resources, are produced and organized in the form of database *records*. The *data* which comprise the content of these records are what are

processed in the course of identifying the resources to be presented to users in response to their queries.

The theory and practice of resource description may be studied using any of various methods, and with any of various goals in mind. One possible approach that may be taken is philosophical—more specifically, *ontological*—in nature. Its goal is to understand the fundamental nature of participating phenomena, so that those phenomena may be modeled appropriately in the systems that are built to support our interactions with them. For example, an ontological approach may be taken to the study of bibliographic resources and relationships, with a view to answering basic questions such as "What kind of thing is a work?"; "What kind of thing is an edition?"; "What kind of thing is the relationship between two editions of the same work?"; and so on. In particular, an ontological approach may be taken to the study of *subject analysis*, with a view to answering basic questions such as "What kind of thing is a subject (i.e., a topic) of a work?," or (in other words) "In what does the subjecthood of a subject consist?"

International Federation of Library Associations and Institutions' (IFLA's) Functional Requirements for Subject Authority Data (FRSAD): A Conceptual Model[1] presents a data model[2] that, in combination with sister models such as the Functional Requirements for Bibliographic Records (FRBR)[3] and Functional Requirements for Authority Data (FRAD)[4] models, is intended to guide the design and construction of resource discovery systems. The FRSAD model focuses on requirements for the production and organization of descriptions of the subjects of resources, and its construction was guided by the compilers' resolving, for pragmatic reasons, to agree on the precise way in which several basic philosophical questions about the subjects of works and subject-related phenomena should be dealt with. That way was, understandably, to ignore them. The rationale, had we seen a need to be explicit about it, might have run something like this: (a) These philosophical questions are too complicated, and/or too abstracted from ordinary experience, and/or too difficult to articulate, for us to address them in a document that is primarily intended to be of immediate practical use; and (b) in any case, whatever the results might be of our addressing these abstruse questions, the implications of those results will be of little or no significance for the structure of the model itself, or for the ways in which the model could or should be applied. In other words, no matter how we might decide to answer the philosophical questions, it would make no difference to the form, content, or use of the model in practice.

The pragmatists' consensus is most succinctly summarized in this statement that appears in Section 2.3 of the FRSAD report: "Ultimately, the FRSAR Working Group does not take a philosophical position on the nature of aboutness; rather, it looks at the problem from the user's point of view."[5] The implication here is that, not only is it *desirable* to refrain from taking a philosophical position on the nature of aboutness when modeling

bibliographic and authority data, but also that it is indeed *possible* to so refrain. On reflection, I have to admit that I am not comfortable with the Working Group's implicit endorsement of the latter claim. I am not sure that it is possible to avoid taking a philosophical position on this matter. For a start, it seems to me that the decision to look at the problem "from the user's point of view" is, in fact, the result of our taking a particular philosophical position: namely, one that assumes that "the user's" point of view[6] is the one that will supply the insights necessary for the construction of the best kind of model (regardless of how the goodness of kinds of model may be evaluated). Neither is "the user's" point of view itself immune from philosophical analysis. No user is ever excused from bringing ontological assumptions to bear on the continuous task of making sense of the world. Two concepts that many users discover, interpret, and apply in this context, often unreflectively, are those of *aboutness* and *subjecthood*. Different users have different philosophical attitudes towards concepts of these kinds. So, for systems designers or data modelers to privilege one such attitude by treating it as the most appropriate is to take a philosophical position at not one but two levels: (a) at the level at which a particular conception of aboutness or subjecthood is endorsed; and (b) at the level at which a particular method of choosing among rival conceptions (viz., polling the members of a given group of users) is endorsed.

Some early criticism of the FRSAD model—criticism that is as yet largely unpublished, but that (in the present author's experience) is nevertheless recurrent in informal discussions of the model—has included arguments to the effect (a) that the Working Group failed to make explicit their assumptions, and/or failed to make explicit the reasoning behind their choices among competing conceptions, and (b) that the particular choices that were made among alternatives were (for whatever reason and in whatever sense) the wrong ones. It would seem that progress cannot be made in evaluating these choices unless the assumptions are laid bare. In this article, which builds on the author's prior, more preliminary assessments,[7] the philosophical assumptions underlying the design of the FRSAD model are identified and precisely described; the full range of alternatives are discussed and evaluated; and the implications of the Working Group's choices among those alternatives are clarified.

JUSTIFICATION OF THE PHILOSOPHICAL APPROACH

Resource description is an activity that is central to the practice of librarians and other information professionals, and that is studied by scholars of Library and Information Science (LIS) and related fields. Some of the questions asked in LIS are philosophical questions.[8] Encountering LIS for the first time, we might wonder, for example, What is this thing they call "information"? In
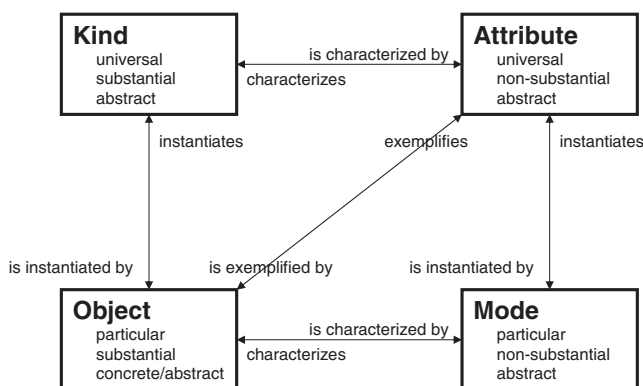
FIGURE 1 Lowe's Four-Category Ontology.

what way does it exist? Of what fundamental category of things is it an instance? What are its properties? What are the necessary and the sufficient conditions some thing must satisfy for it to be counted as information? The scope of LIS and its cognate fields is wide, and correspondingly there are fundamental "What-is-*x*?"-type questions to ask about information-related phenomena and activities of many different kinds. In addition to the basic question about the nature of information itself, there are many questions that arise in the particular context of resource description: What are resources, documents, data, records, metadata? What are works, texts, editions, versions, copies? What is the nature of the relationship between a document and the work that it instantiates? What is the nature of the relationships between a document and the classes of similar documents of which it is a member? And so on.

In turn, many philosophical questions can be construed as *ontological* questions. Ontology is the branch of metaphysics that is concerned to identify and understand the fundamental *categories* or kinds of things that exist in the world. For any information-related phenomenon, we may ask, What *kind* of thing is it? A concrete thing (existing in space–time as a datable, locatable object or event that is capable of undergoing change and/or of causing effects), or an abstract thing? A universal (that is instantiable or exemplifiable), or a particular? A substance (that is characterizable), or a property? An object or an event? A set or an element? One of the tasks of ontology is to identify, characterize, and relate these different categories in a coherent framework. The main structural features of one such framework—Jonathan Lowe's "four-category ontology," whose antecedents may be traced at least as far back as Aristotle—are depicted in Figure 1.[9]

Different thinkers have different views on the existence (i.e., the reality) or otherwise of entities in various categories—in other words, they have different ontological commitments, and may be regarded as *realists* or

anti-realists with respect to the entities in any given category. In the philo-
sophical literature, authors typically make their ontological assumptions well
known, especially if those assumptions form the foundations on which are
built understandings of the concepts under analysis. In LIS, on the other
hand, such views are not frequently made explicit, notwithstanding their
equal importance for the development of cohesive and powerful conceptual
frameworks. One consequence of the tendency for ontological assumptions
to be left unstated is a general perception within LIS that contributions to the
philosophical literature are of limited relevance to LIS debate. One of the mo-
tivations for writing the current article is the belief that, on the contrary, it is
essential that ontological questions be addressed in LIS, and that the ontolog-
ical commitments underlying our theories, arguments, and knowledge-claims
be revealed. The idea is that our answers to ontological questions—answers
that can only be supplied by carrying out careful analysis of the concepts
or categories that we construct and use to think about real-world substances
and properties—will help us to clarify our thoughts, strengthen our argu-
ments, and improve the quality of the decisions and actions taken on the
basis of the conclusions of those arguments. In particular, it is anticipated
that ontological analysis will help us to make decisions about the precise
ways in which information-related phenomena such as works and subjects
may be fitted into a categorical structure, and about ways of modeling the
kinds of entities and relationships about which information is to be stored
in databases.[10]

ANALYSIS OF ABOUTNESS AND SUBJECTHOOD

One of the ways in which a philosophical approach is potentially productive
in LIS is to carry out the "proper" (i.e., epistemically valuable) analysis of
concepts that are central to the field. One such concept is that of *aboutness*;[11]
others are *relevance*[12] and *work-instantiation*.[13] In each of these three cases,
a substantial and relevant body of literature exists in mainstream philosophy,
resulting from the efforts to understand these concepts made by philosophers
of logic, language, and being. And in each of these cases, the extent to which
the philosophical literature has received attention in the literature of LIS is
small, despite the importance of these concepts and the corresponding extent
to which they have been the object of analysis in LIS.

Of the three concepts mentioned, aboutness is the one that is most im-
portant to debates surrounding FRSAD. The primary question about about-
ness that has attracted the attention of analytic philosophers since the early
part of the twentieth century may be paraphrased as follows: What do we
really mean when we say that a given sentence, statement, or proposition s
is *about* a given thing z? In other words, what do we really mean when we
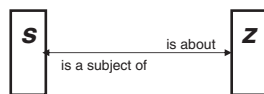say that a given sentence s has a given *subject* or topic z?

FIGURE 2 *t*: *s* Is about *z*; *z* Is a Subject of *s*.

Consider the simple *sentence*, or sequence of words, *s*: "Lubetzky is wise." (Instead of, or in addition to, treating *s* as a mere sequence of words, we might wish to characterize *s* as a statement or expression, in subject[14]–predicate form *xA*, of the attribution of property *A* [being wise] to object *x* [Lubetzky].) By speaking or writing down these words, it seems that we're saying something *about* Lubetzky (viz., that he is wise). Indeed, we might express our judgment on that matter—in response, say, to a question like "What is sentence *s* about?" or "What is the (semantic) subject (i.e., the topic) of sentence *s*?"—with a sentence like *t*: "'Lubetzky is wise' is about Lubetzky" or "The topic of 'Lubetzky is wise' is Lubetzky." (Again, we might think it appropriate to characterize *t* as a statement or expression, in subject–predicate form *yB*, of the attribution of property *B* [being about Lubetzky] to object *y* [sentence *s*: "Lubetzky is wise"].)

In determining how we might make sense of sentences or statements like *t*—that is, subject statements, or statements of instances of aboutness, of the kind depicted in Figure 2—a number of philosophical questions arise. Initially, we might wish to distinguish between these two:

1. The *aboutness* question: What is the *logical* nature of the relationship between a sentence *s* and the thing *z* that *s* is said to be about?
2. The *subjecthood* question: What is the *ontological* nature of the thing *z* that a given sentence *s* is said to be about?

Given a conventional understanding of *documents* as sequences or aggregations of sentences, or of *works* as sequences or aggregations of propositions, it requires little imagination to see the questions listed above as having direct analogs in LIS. Instead of asking such questions about sentences like "Lubetzky is wise," we might ask them about documents like Svenonius and McGarry's "Introduction" (xi–xxiii) to *Seymour Lubetzky: Writings on the classical art of cataloging* (Englewood, CO: Libraries Unlimited, 2001). If we were to identify *s′* as the aggregate of sentences that comprise the text of this document, we might respond to the question "What is sentence-aggregate s′ about?" with a sentence like *t′*: "*s′* is about *z′*," where *z′* would stand for the subject of (e.g.) cataloging.[15] Establishing (1) the *logical* nature of the relationship between a given sentence-aggregate (or document, or work) *s′* and the thing *z′* that *s′* is said to be about, and (2) the *ontological* nature of the thing *z′* that *s′* is said to be about, is not only of purely academic interest, but has a bearing on very practical matters such as the design of library catalogs.

Any sentence t' of the form "Work s' is about subject z'" is an example of a kind of statement—a subject statement—that is found in millions of catalog records around the world, and that is one of the basic objects of interest to the designers of the data models that lie at the foundations of such catalogs.

Of course, it is possible that answers to questions of the kind "What is work s' about?" may be quite different in form from those to "What is sentence s about?" or indeed that such answers may be arrived at only if approaches of correspondingly different kinds are taken. It might be considered surprising, nevertheless, that the topic of document-aboutness or work-aboutness (as distinct from sentence-aboutness or proposition-aboutness) does not seem to have captured the imagination of many working in philosophy of logic or indeed in philosophy of literature. For scholars working in LIS, of course, document-aboutness is of far more immediate concern than sentence-aboutness; but few have taken a philosophical approach, noted the analogy between document- and sentence-aboutness, or cited the philosophical literature on the latter.[16] Understanding the ontological commitments that are inscribed in the FRBR and FRSAD conceptual models requires us to take such an approach.

FRBR AND FRSAD ON ABOUTNESS AND SUBJECTHOOD

One of the aims of the designers of conceptual data models like the one presented in the *Final report* of the International Federation of Library Associations and Institutions' Working Group on Functional Requirements for Bibliographic Records (FRBR) is to identify the fundamental categories or classes of entities that are of interest to users of bibliographic data, including not only "the products of intellectual or artistic endeavour that are named or described in bibliographic records" (such as works), but also those entities that are capable of serving as "the subjects" of works.[17]

The original FRBR model allows for the following classes of entities to serve as subjects: *Concept* (each of whose instances is "an abstract notion or idea"), *Object* ("a material thing"), *Event* ("an action or occurrence"), and *Place* ("a location"), as well as *Work, Manifestation, Expression, Item, Person,* and *Corporate body*.[18] In this sense, the FRBR model amounts to an ontology of subjects: the claim that is being made is that anything that is an instance of one of these entity classes can sensibly be treated as the subject z' of a given work s'. Furner[19] notes that the entities that are listed in the FRBR *Final report* as examples of instances of *Object*, *Event*, and *Place*, are similar in that they are all individual named things—they are concrete particulars that exist in space–time (i.e., they are "datable and locatable") and that are not themselves instantiable but that instantiate universals. Meanwhile, the examples given of instances of *Concept* do not include kinds of objects, events, and places, but the implication is that such universals (i.e., kinds of concrete particulars) are to be considered as concepts, along with "abstract notions or ideas" such as
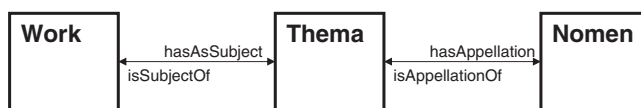
FIGURE 3 The FRSAD Model.

"Economics," whose status as universal or particular, or indeed as abstract or concrete, is as ambiguous in the FRBR context as is the ontological status of any instance of *Work*.

In contrast with the FRBR model, the FRSAD model is deceptively simple. (I say "deceptively," because the apparent simplicity of the model hides the relatively complex web of ontological assumptions on which the model rests.) In the FRSAD model, there are three basic entity classes:[20] *Work*, *Thema*, and *Nomen*.[21]

- A work—that is, an instance of the entity class *Work*—is "a distinct intellectual or artistic creation."[22]
- A thema—that is, an instance of the entity class *Thema*—is "any entity [i.e., any entity-instance] used as a subject of a *work*."[23]
- A nomen—that is, an instance of the entity class *Nomen*—is "any sign or sequence of signs (alphanumeric characters, symbols, sound, etc.) that a *thema* is known by, referred to, or addressed as."[24]

Additionally, in the FRSAD model, there are two basic relation classes.[25] Individual works and themas may enter into individual *hasAsSubject/isSubjectOf* relations, while individual themas and nomens[26] may enter into individual *hasAppellation/isAppellationOf* relations (see Figure 3[27]).

Almost all of the essential features of the FRSAD model are outlined succinctly on p. 12 of the FRSAD report:

> Both "has as subject/is subject of" and "has appellation/is appellation of" relationships are many-to-many relationships. Any *work* can have more than one *thema* and any *thema* can be the subject of more than one *work*. We can take "A brief history of time: from the big bang to black holes" by Stephen W. Hawking as an example. The *work* has several *themas*: "cosmology," "space and time," "unification of physics," "black holes," "big bang," "history of time," "universe," etc. There are many other *works* about any of these *themas*. For any of the *themas* in this list (presented here as terms in English) there are other possible *nomens* in other languages and in different controlled vocabualries.
>
> Some works are perceived as having no *thema* as subject (such as certain musical works or abstract artwork), and no subject access is provided to them. These cases are not covered by FRSAD. The cases of a *thema* without a *nomen* are also beyond the scope of this model.[28]

In an influential article published several years before the finalization of the FRSAD report, Tom Delsey identifies three "broad objectives" to be met by re-examination of the ways in which the FRBR model analyzes data relevant to subject access, the first of which is "to ensure that the scope of the entities [i.e., the entity classes] ... is sufficient to cover everything that a user of a library catalogue might view as a 'subject.'"[29] Delsey goes on to pose two "key questions" that arise in the context of this first objective: "The first [of the key questions] is whether the entities are defined in sufficiently broad terms to cover fully what we might characterize as the 'subject' universe. The second is whether the categorizations represented by the entities defined in the models are appropriate and meaningful for the purposes of clarifying the bibliographic conventions through which that 'subject' universe is reflected."[30] In other words: (a) Are the entity classes *collectively exhaustive*? Does the model cover the whole universe of subject-related entity classes? (b) Are the entity classes *individually appropriate*? Does the model carve up the universe of subject-related entity classes in the "right" way?[31]

Appendix A of the FRSAD report—"Modeling Aboutness"[32]—describes the process through which the members of the FRSAR Working Group (WG) considered the pros and cons of a number of different scenarios as responses to Delsey's two "key questions" about (a) the collective exhaustivity, and (b) the individual appropriateness, of the entity classes used to characterize the "subject universe." The WG might have categorized those scenarios (but ultimately chose not to do so) as follows:

- Continuation—that is, (a) Yes, (b) Yes: The entity classes specified in the original FRBR model are both collectively exhaustive and individually appropriate. In other words, the original model should not be changed.
- Expansion—that is, (a) No, (b) Yes: The entity classes specified in the original FRBR model are not collectively exhaustive, but they are each individually appropriate. In other words, one or more entity classes should be added to the original set.
- Revision—that is, (a) Yes, (b) No: The entity classes specified in the original FRBR model are collectively exhaustive, but at least two are not individually appropriate. In other words, the definition or scope of two or more of the original entity classes should be reviewed and revised.
- Revolution—that is, (a) No, (b) No: The entity classes specified in the original FRBR model are neither collectively exhaustive nor individually appropriate. In other words, the original model should be radically modified.

How did the FRSAR WG choose among the scenarios that fell in these categories? An indication of the empirical method used is given by the summary included in Appendix A of the two small studies, undertaken by WG members, of users' interpretations of a set of six entity classes: *Abstract*

stuff, *Concrete stuff*, *Event*, *Place*, *Time*, and *Other* (where *Abstract stuff* and *Concrete stuff* were considered broadly equivalent to *Concept* and *Object*, respectively).[33] In the first study, four participants (students and faculty members at Kent State University's School of Library and Information Science) categorized 3,000 of the subject terms assigned to resources in the U.S. National Science Digital Library (NSDL). Participants were asked to categorize each term in one of the six entity classes. Concurrently, and using the same set of entity classes, one of the members of the WG categorized the subject terms used as examples in two library science textbooks. In general, participants found it difficult to distribute terms among the entity classes, apparently because the meanings of terms were perceived as ambiguous or obscure, and frequently found none of the five non-*Other* categories to be the best match for a given term. Notwithstanding the small number of participants and the (deliberate) withholding of guidance to participants in distinguishing between "concrete" and "abstract stuff," the results of these studies also indicate that people engaged in such categorization tasks find it difficult to interpret what is meant by "concrete" and "abstract," and find it difficult to confidently categorize named particulars (i.e., specific objects, people, events, and places).

In the absence of an explicit statement of other criteria, it might seem as if it were primarily on the basis of the results of these empirical studies (as well as on the basis of discussions of the supposed disadvantages of each of the alternative scenarios listed in Appendix A) that the decision was ultimately taken to reverse the approach to the categorization of subject-related entities taken in the original FRBR model. Rather than attempt to enforce standardization of a set of entity classes that (as the studies seemed to show) few users would understand, the WG's recommendation, encapsulated in the FRSAD model, was to replace the original set of Group 3 entity classes with a single entity superclass—*Thema*—that would in fact encompass all existing entity classes (not just the Group 3 ones).[34] There's no point in building an ontology like Lowe's[35] into FRSAD's categorization of subjects (so the argument seems to run), because (a) nobody understands the categories or the distinctions between them, and/or (b) everybody disagrees on how subjects should be assigned into categories.

I believe that Appendix A sells the WG's method short. The WG recognized the need to identify a set of principles or criteria that would allow for the evaluation of each of the alternative scenarios, and for a choice to be made among them. The principles that were identified as relevant and significant in this context include the following:

- *accuracy* (or degree of *correspondence* with reality)
  - collective *exhaustiveness* of the universe of subject-related entity classes;
  - individual *appropriateness* of each entity class;

- *consistency* (or *coherence*)
  - ○ internal coherence among the constituent components of the FRSAD model;
  - ○ consistency with the original FRBR model, as already implemented in many settings of various kinds;
  - ○ consistency with the Functional Requirements for Authority Data (FRAD) model, as was being concurrently developed by the FRANAR WG;[36]
- *usability*
  - ○ *simplicity*: for example, the number of entity classes should not be multiplied beyond what can be readily held in the reader's mind;
  - ○ *comprehensibility*: for example, the distinctions between entity classes should not rest on concepts that are arcane or obscure to the layperson;
- *utility*
  - ○ *practicality*: for example, the model should serve as "a clearly defined, structured frame of reference for relating the data that are recorded in subject authority records to the needs of the users of those records" (as per the second of the FRSAR WG's "Terms of reference");[37]
  - ○ *flexibility* and *extensibility*: for example, it should be possible for the model to be readily applied, and for applications to be readily implemented, in any real-world setting; and
  - ○ *interoperability*: for example, the model should allow for the "international sharing and use of subject authority data within the library sector and beyond" (as per the third of the FRSAR WG's "Terms of reference").

My personal view is that it is vital to provide this clarification of criteria for evaluation, and simultaneously to recognize the disingenuousness of the statement that the WG "does not take a philosophical position on the nature of aboutness,"[38] before we can expect the FRSAD model successfully to resist some of the criticism it is attracting. Others, perhaps, can suggest the outlines of the further user studies that might be necessary to demonstrate the usability and utility of the model; an overview of the philosophical considerations that bear on any assessment of the accuracy and internal consistency of the model is the goal of the following discussion.

ABOUTNESS AND SUBJECTHOOD IN FRSAD: A CLOSER LOOK

Once we start to engage a little more deeply with the fundamental questions of (1) aboutness and (2) subjecthood presented earlier, a number of subsidiary questions present themselves. It is clearer in some cases than in others whether each question is more appropriately treated as a question of philosophical logic or as a question of ontology, or as a question of a different kind again. Some seem to require investigation of both logical and ontological matters; while some seem to be epistemological in nature.

Logical Questions

1. Given the example of t': "s' is about z'," presented earlier: Is z' (i.e., cataloging) the only thing that s' (i.e., the aggregate of sentences that comprise the text of Svenonius and McGarry's document) is about? Or is it possible that sentence-aggregate s' is simultaneously about some or all of the other things (e.g., Lubetzky himself) to which its elements refer? Or about some or all of the classes of things (e.g., library operations; librarians) of which those referents are instances? Is s' about all these things, but about them to some lesser extent than it is about cataloging? Could s' also be about the classes of non-librarians and non-Lubetzkies (since "Lubetzky is a librarian" is logically equivalent to "Non-librarians are non-Lubetzkies")? Would that mean that sentence-aggregate s', like every sentence-aggregate, is about everything? Or is it only about the particular state of affairs or situation represented by the propositions that were intended as the speaker-meanings of the sentences making up s', and nothing else—not the activity of cataloging, nor the concept or idea of the activity of cataloging, nor even the term or label "cataloging"? It seems likely that our evaluation of the pertinence of such questions of logic will depend on our assessment of the process of determining aboutness as one that is primarily *deductive* or not. This latter is an epistemological question.

2. Are statements of aboutness instances (e.g., statements such as t': "The semantic subject of s' is cataloging") *analytic*, or *synthetic*? In other words, are such statements true by definition or by logical form (and therefore analytic), or not?

3. Are the elements of an aboutness instance (i.e., s' and z') related *necessarily*, or *contingently*? In other words, is it impossible that the pairing could ever be different, or not?

4. Must we choose between aboutness-as-relation and aboutness-as-property? That is: (a) Is it ever useful to assume that the pair made up of (i) the sentence-aggregate s' and (ii) the semantic subject z', is an instance of a relation (that we might choose to call "aboutness")? At the same time, (b) is it ever useful to assume, independently of any answer that we might give to (a), that sentence-aggregate s''s being "about z'" is an instance of a property? In the former case, the assumption is that aboutness is most usefully modeled as a *relation* between (on the one hand) things such as sentences and (on the other hand) things such as people; in the latter case, the assumption is that aboutness is most usefully modeled as a *property* of things such as sentences. In order to select among assumptions such as these, it would be desirable to have some sort of basis for understanding the stakes involved. What kinds of difference (if any[39]) could it possibly make to us—whether we were to model aboutness as a relation or as a property, or as something different again? In order to answer *that*

question, it seems that we would need to inquire into the nature of relations and properties—i.e., into their ontology. We might be led to rephrase the question in this form: Must subjects be *substances*—or can they be *properties*? In other words: Must subjects be characterizable—or not? Our answer to this question will constrain the range of possible answers to question #4.

Ontological Questions

5. What kinds of things can subjects be? Are activities and people, for example, really the kinds of things that sentences can be about? To the extent that sentence-aggregate s' is about Lubetzky, is it literally about Lubetzky himself—the actual librarian who exists in space–time? Presumably, if people and activities do indeed have the potential to be the semantic subjects (i.e., topics) of sentence-aggregates, they are not the *only* kinds of things that sentence-aggregates can be about. But what, precisely, are these other kinds of things that are eligible for subjecthood? Objects, events, places; classes, kinds, types, sets; ideas, concepts; works, texts, editions, items; propositions, statements, sentences, utterances; names, terms, expressions? Alternatively, if actual people or actual activities cannot be semantic subjects, what kinds of thing *can* sentence-aggregates be about? Is s' not really about the activity of cataloging, but about some idea or concept of the activity of cataloging? (Does it even make any sense to make this distinction?) Or is it about the term or label "cataloging" that is used to refer either to the activity of cataloging or to the idea of that activity?

6. Irrespective of our answer to #5: Must every instance of any of these kinds of things be something that something else is about? Or is it possible for an individual person, class, concept, work, etc., to be something that no other thing is about? Or (for maybe this is something different again) that nothing is about?

7. What kinds of things can have semantic subjects? Are sentence-aggregates really the kinds of things that can be about other things? In the case of s', what kind of thing is it, precisely, that is about cataloging? Is it literally the sequence of words that comprise sentence-aggregate s'? If sentences do indeed have the potential to have semantic subjects, are they the *only* kinds of things that can be about other things, or are there any other kinds of things (e.g., statements, meanings, propositions; or aggregations of any of these, such as documents or works) that *also* can be about things? Alternatively, if sentences cannot have subjects, what are the kinds of things that *can* have subjects? Is it not really sentence-aggregate s' that is about cataloging, but the propositional content or meaning of sentence-aggregate s'?

8. Irrespective of our answer to #7: Must every instance of any of these kinds of things be about something? Or is it possible for an individual sentence, proposition, document, work, etc., not to be about anything? Or (for maybe this is something different again) for it to be about nothing?

9. Must subjects be *concreta*—or can they be *abstracta*? In other words: Must subjects exist in space–time (i.e., be "datable and/or locatable"), or be capable of undergoing change, or be capable of causing effects—or not? For example, we might identify Lubetzky as a concretum (i.e., a concrete object), because he is located in space–time, and the concept (i.e., the kind or class) we call "librarian" or "librarians" as an abstractum (i.e., an abstract object), because it is not located in space–time.

10. Must subjects be *particulars*—or can they be *universals*? In other words: Must subjects be non-instantiable (or non-exemplifiable), or exist contingently (i.e., non-necessarily)—or not? For example, we might identify Lubetzky as a particular, because he is not instantiable, and the concept we call "librarian" or "librarians" as a universal, because it is instantiable.

11. Must things currently *exist* in order to be capable of participating in an aboutness relation (or property), or can things that no longer exist (e.g., dead people like Lubetzky) or things that have never existed (e.g., fictional characters like Harry Potter) be subjects?

Epistemological Questions

12. Is our knowledge of the subjects of sentence-aggregates *a priori*, or *empirical*? In other words, is such knowledge justifiable without appealing to experience, or not?

13. Are statements like t': "s' is about z'" true or false *objectively*, that is, independently of any of our beliefs about their truth? And is there a way of determining their truth-value objectively, that is, independently of any examination of people's beliefs about their truth? If there is no such way, does that mean that aboutness varies in accordance with (a) the identity of the agents who make the statements that express the aboutness instances, and/or (b) the dates on which such statements are spoken? In which case, is aboutness more appropriately conceived as a four-place relation (statement–subject–agent–date) rather than a mere two-place relation?

14. What method of or procedure for identifying instances of aboutness (i.e., for determining the subjects of, e.g., sentence-aggregates) is most reliable or most useful?

Questions of these kinds have been addressed in several contributions to philosophy of logic since at least the 1930s, and different philosophers have answered such questions in different ways.[40] These answers involve several technical concepts that have historically received much additional

attention in philosophy of logic, philosophy of language, and ontology. One prerequisite for understanding and evaluating candidate answers is an appreciation of a number of distinctions that are commonly made in philosophical discourse—distinctions, for example, between linguistic things and non-linguistic things; among linguistic things, between utterances and sentences, and between sentences and expressions; among expressions, between subject-terms and predicate-terms; among non-linguistic things, between mental and material things; among mental things, between concepts and propositions; among material things, between objects and situations; between substances and properties, properties and relations, objects and concepts, classes and instances, sets and members, types and tokens, abstracta and concreta, universals and particulars, and so on. The list is long. Other distinctions that are commonly made in the presentation and development of theoretical frameworks in logic, metaphysics, and epistemology include those between analytic and synthetic propositions, between necessary and contingent truths, between a priori and empirical knowledge, and so on. Different philosophers have different ideas about the reality and importance of, and relations among, such distinctions. Much of the history of twentieth- (and now twenty-first-) century philosophy of logic and language is the history of debates about the nature of the relations between words, concepts, and objects.[41]

To what extent, and in what ways, has an awareness of this history influenced the designers of the FRSAD model? Reading between the lines of p. 12 of the FRSAD report allows us to guess (with greater or lesser confidence) at some of the answers that, if pressed, the compilers might give to the specific questions suggested above.

1. Q: Is the process of determining the thema of a work a primarily deductive one?
   A: No.
2. Q: Are subject statements (i.e., statements of work–thema relationships) analytic?
   A: No.
3. Q: Are works and themas related necessarily?
   A: No.
4. Q: Must we choose between aboutness-as-relation and aboutness-as-property?
   A: Yes. In FRSAD, aboutness is modeled as a relation between *Work* and *Thema*, not as a property (a.k.a., attribute) of *Work*. But here the stakes are low. Adopting the view of the world that is reflected in this choice does not appear to have any serious effect on our ability to change that world.
5. Q: What kinds of things can works be about? That is, What kinds of things can themas be?

A: Any kinds. This is the cornerstone of the FRSAD model (but see below).

6. Q: Must every thema be the subject of at least one work?
   A: Yes. The subjecthood of any given thing depends on its having been identified as a thema of a work.

7. Q: What kinds of things can have subjects?
   A: Works. In FRSAD, expressions, manifestations, and items do not enter into *hasAsSubject/isSubjectOf* relations. This raises the important question: What kinds of things are works? In particular, what are the ontological relations among the hierarchies of work–expression–manifestation–item, proposition–sentence–utterance, concept–word–type–word–token, and so on? To address this question properly would require more space than we have here.

8. Q: Must every work have at least one thema?
   A: No. It is not the case that the workhood of any given thing depends on its having been identified as having a thema.

9. Q: Must themas be concreta?
   A: No. Abstracta like the concept we call "whales" can be themas.

10. Q: Must themas be particulars?
    A: No. Universals like the concept we call "whales" can be themas.

11. Q: Must things currently exist to be identified as themas?
    A: No. Once-existing things and never-existing things can be themas.

12. Q: Is our knowledge of the themas of works a priori?
    A: No; it is empirical.

13. Q: Are subject statements (i.e., statements of work–thema relationships) true objectively?
    A: No. But, problematically, there is no provision within the FRSAD model of enforcing the attribution of agent and date information to such statements.

14. Q: What method of producing subject statements is the most useful?
    A: The FRSAD model is deliberately agnostic on this issue.

The blunt response given to #5, above, is that anything can be a thema. But a couple of caveats are in order. To explain what is at stake here, we might begin by noting that, strictly speaking, the models at the core of FRBR, FRAD, and FRSAD are not ontologies of the universe in precisely the same sense in which Lowe's four-category ontology (for example) is an ontology of the universe.[42] The FRBR models are not even ontologies of particular parts of the universe (regardless of how we might decide to define those parts). Rather, the FRBR models are conceptual data models: and the functional difference between ontologies such as Lowe's and data models such as FRBR's should be made clear. Sometimes the distinction is difficult to make (or seen as unnecessarily pedantic) because of the way in which we habitually talk about the instances of the entity classes defined

in data models. For example, we naturally tend to talk about individual "works" (i.e., the instances of the *Work* entity class) and individual "themas" (i.e., the instances of the *Thema* entity class) as if those instances are the *actual* works and themas—abstract things like Melville's *Moby-Dick* and the subject whales—that exist in their own right in the real world. But, strictly speaking, the instances of *Work* and *Thema* are *not* the actual works and themas; rather, they are *descriptions* of those works and themas. The instances of *Work* and *Thema* are made up of data values that specify the properties of the actual works and themas to which the instances correspond. The instances of *Work* and *Thema* are not identical with the actual works and themas themselves: rather, they are statements about (descriptions of, expressions of, representations of, surrogates for, records of) those actual works and themas. Just as any description of Melville's work *Moby-Dick* is a different, separate thing from Melville's work *Moby-Dick*, any description of the subject whales is a different, separate thing from the subject whales.

No matter how pedantic all that might sound, the more important observation to make at this point is that, even if we are careful to honor this distinction between instances of *Thema* and the actual themas of which those instances are descriptions, the things that are described by instances of *Thema* (namely, the actual themas) are real, existing people, places, events, objects, concepts,[43] works, and so on. They are not somehow to be considered as ideas, notions, concepts,[44] images, of other mental representations of those universals and particulars. The work that is said to be about Lubetzky is literally about Lubetzky himself, not about some idea of Lubetzky or the name "Lubetzky." The work that is said to be about whales is literally about (the universal) whales, not about some idea of (the universal) whales or about the term "whales."[45] (Of course, this is not to deny the possibility of a different work being about the idea of whales or the term "whales.")

Setting aside these conceptual niceties, the main conclusion to be drawn from an analysis of the constellation of ontological assumptions underlying the FRSAD model is that it is located toward the realist pole of a nominalist–realist spectrum of views about aboutness and subjecthood. The significance of this claim is explored in the next section.

NOMINALISM VERSUS REALISM IN ANALYSES OF ABOUTNESS

The author in LIS who has engaged most productively with philosophical analyses of aboutness is Patrick Wilson, in Chapter V, "Subjects and the sense of position," of his *Two Kinds of Power*.[46] Wilson's general conclusion is that "[t]he notion of the subject of a writing is indeterminate."[47] Wilson contrasts works (which he calls here "writings") with physical objects that are "determinate in every respect," and that "must have some definite shape and size and so on, at any moment," whether or not we are able to discover

what the values of those variables are.[48] For Wilson, works are not like physical objects, and the subjects of works are not like the shapes or sizes of physical objects. Not only is it the case that different methods of determining the subjects of a work produce different results: there is no way in principle of deciding which of two equally specific or equally exhaustive subject statements is the "correct" statement, because (for Wilson) works do not "have" subjects in the same way that physical objects have shapes. Wilson claims that "being on a given subject" contains a "quasi-technical term which is nowhere explained" in libraries or in the literature of librarianship.[49] The claim is that, "to the librarian, 'being on a given subject' means [nothing more nor less than] 'being the sort of writing which our methods of assigning single locations assign to the positions with such and such a name.'"[50]

Wilson's position exemplifies a family of views of the nature of document/work-aboutness and semantic subjecthood that may be placed at one of the two ends of a spectrum of such kinds of view.[51] At this pole—which might conveniently be called *nominalist* or (following Hjørland[52]) "idealist"[53]—we may locate views that comprise some or all of the following component claims:

- aboutness can not sensibly be conceived as a property of works, but rather as a relation between sets of works, subjects, agents, and dates;
- what we call subjects are merely linguistic expressions that serve as labels or names for sets of works or for positions within a sequence or hierarchical structure;
- subjects do not exist independently of the thoughts and actions of humans;
- the sets of documents designated by subject labels are nominal kinds, not natural kinds: it is not possible to specify an intensional definition of such a set;
- it makes no sense to speak of documents "having" subjects, of subjects "inhering in" documents, or of "the" subject of a document (unless the intention is to designate the expression that happens to be attributed to the document by a particular agent on a particular date); and
- it is not possible to determine the truth of the sentence "Document s' is about subject z'" objectively (i.e., without reference to the thoughts or actions of humans), either on an a priori basis or empirically: it is not possible to specify any regular procedure by which document s' may be analyzed in order to discover or generate "the" subject of s'.

Conversely, at the opposite pole—which (again following Hjørland[54]), we might call *realist*—lie views made up of some or all of the following elements:

- aboutness is a property class whose instances are predicated of classes of works;
- what we call subjects are the things designated by the linguistic expressions that comprise subject statements: such things may be concrete (existing in space–time) or abstract, and they may be particulars (not instantiable) or universals;
- subjects exist independently of the thoughts and actions of humans;
- the classes of works of which aboutness instances are predicated are natural kinds that may be defined intensionally;
- we may speak sensibly of works "having" subjects, and of "the" subject(s) of any given work; and
- it is possible to determine the truth of the proposition that work s' is about subject z objectively, by specifying a regular procedure by which work s' may be analyzed in order to discover its subject.

The fact that, at this point in the history of theory in information studies, the nature of aboutness continues to be the subject of such debate in the field is a result not primarily of the inability of proponents of views at the two poles to persuade their opponents of the merits of those views, but rather of the largely unacknowledged influence of the realist view on the activity of designers and users of knowledge organization systems. It is difficult to find well-reasoned defenses of the realist view in the literature, yet most of us who are actively engaged in the tasks of designing bibliographic classification schemes, indexing documents in accordance with such schemes, and using those schemes as tools for finding documents of the kinds that we want, continue to *act* as if we accept at least some elements of the realist view as the correct ones. As is pointed out in the FRSAD report, "[o]f course, there are other points of view on aboutness that may be located either at intermediate points between these two poles, or on different spectrums."[55] Notwithstanding its compilers' explicit statement of agnosticism about such points of view, it seems clear that the assumptions underlying the FRSAD model place it toward the realist pole of the nominalist–realist spectrum.

CONCLUSION

Proponents (and even opponents) of FRSAD might well ask: Well, what did you expect? How could it be otherwise? What exactly would a nominalist model be like? What exactly would be involved in any effort to take seriously the idea that the subject of a work is not somehow a property that inheres in the work and is only to be *uncovered* by a cataloger, but is something whose contingent relationship to the work is *created* in a certain context at a certain time?
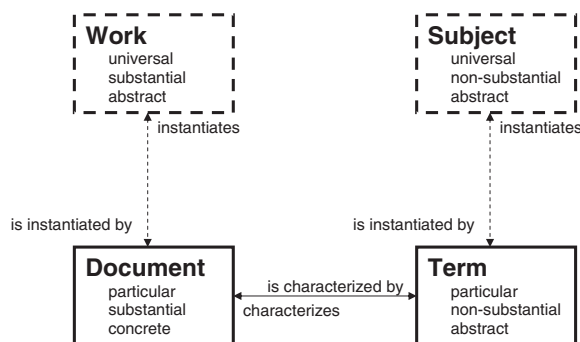
FIGURE 4 A Document/Term Model of Aboutness.

A productive option for future work might be to explore and evaluate ways of treating subjects as directly analogous to those other outcomes of creative activity—works. Just as works are realized through expressions that are embodied in manifestations that are exemplified by items, is it reasonable to suppose that subjects are realized through concepts that are embodied in term-types that are exemplified by term-tokens? If it is true (as I would argue it is) that works do not "have" subjects, might it be useful instead to build a data model that is based on the simpler assumption that items (or documents) may be assigned (or characterized by) term-tokens? Especially if we are already persuaded of the merits of reducing the number of subject-related entity classes to the single all-encompassing *Thema*, might we see the value of eliminating *Thema* entirely from the equation, in favor of a parsimonious model that recognizes only *Document* (or *Item*) and *Term* (or *Nomen*), as suggested by Figure 4?

Information retrieval theory, of course, has long been enriched by the ideas that documents and queries are ontologically equivalent, and that it is useful to treat instances of both kinds as bundles of term-related properties.[56] The next step for bibliographic data-model designers should be to consider the potential for productive connections to be drawn between the models developed in three communities of practice (knowledge organization, information retrieval, and ontology) whose concerns are closely related but whose efforts are all too rarely aligned in pursuit of a common cause.

NOTES

1. Marcia Lei Zeng, Maja Žumer, Athena Salaba, eds., and the IFLA Working Group on the Functional Requirements for Subject Authority Records (FRSAR), *Functional Requirements for Subject Authority Data (FRSAD): A Conceptual Model*, IFLA Series on Bibliographic Control, no. 43 (Berlin: De Gruyter Saur, 2011). The FRSAD report was prepared by a Working Group that included the author of the present article.

2. Each of the reports in the FRBR family is consistent in its use of "conceptual model" as the preferred label for the entity–relationship–attribute model it presents. In this article, "data model"

is used as a broader term to refer to any "abstract model of some real-world situation or domain of interest about which information is to be held in a database" ("Data Model," in *A Dictionary of Computing*, 6th ed., eds. John Daintith and Edmund Wright [Oxford, UK: Oxford University Press, 2008]). http://www.oxfordreference.com/views/ENTRY.html?subview=Main&entry=t11.e/238

   3. *Functional Requirements for Bibliographic Records*. Final Report. Approved by the Standing Committee of the Cataloguing Section on September 1997 as amended and correct through February 2009. http://www.ifla.org/files/cataloguing/frbr/frbr_2008.pdf

   4. Glenn E. Patton, ed., and the IFLA Working Group on Functional Requirements and Numbering of Authority Records (FRANAR), *Functional Requirements for Authority Data: A conceptual model*, IFLA Series on Bibliographic Control, no. 34 (Munich: K. G. Saur, 2009).

   5. Zeng, Žumer, and Salaba, *Functional Requirements for Subject Authority Data (FRSAD)*, 8.

   6. Given the diversity of possible points of view that may be taken by individual users, presumably the intention here is to refer to the point of view taken by a "typical" user, regardless of how such a user may be defined, identified, or characterized.

   7. Jonathan Furner, "The Ontology of Subjects of Works," panel paper presented at the 69th Annual Meeting of the American Society for Information Science and Technology (Austin, TX, November 3–8, 2006); Jonathan Furner, "Philosophy and Information Studies," in *Annual Review of Information Science and Technology: Vol. 44*, ed. Blaise Cronin (Medford, NJ: Information Today, 2010), 161–200.

   8. This section and the following one draw from Furner, "Philosophy and Information Studies," 161–200.

   9. Figure 1 is adapted from Figure 1.2, the four-category ontology, in E. J. Lowe, *The Four-Category Ontology: A Metaphysical Foundation for Natural Science* (Oxford, UK: Oxford University Press, 2006), 18.

   10. It is sometimes helpful to distinguish between the "pure" ontology of building systems of categories, and the "applied" ontology that encompasses the practical work of designing data models. See, for example: Barry Smith, "Ontology," in *The Blackwell Guide to the Philosophy of Computing and Information*, ed. Luciano Floridi (Oxford, UK: Blackwell, 2003).

   11. See, for example: Patrick Wilson, *Two Kinds of Power: An Essay on Bibliographic Control* (Berkeley: University of California Press, 1968), 69–92; M. E. Maron, "On Indexing, Retrieval and the Meaning of About," *Journal of the American Society for Information Science* 28, no. 1 (1977): 38–43; Birger Hjørland, "The Concept of 'Subject' in Information Science," *Journal of Documentation* 48, no. 2 (1992): 172–200.

   12. See, for example: Wilson, *Two Kinds of Power*, 41–54; Stephen P. Harter, "Psychological Relevance and Information Science," *Journal of the American Society for Information Science* 43, no. 9 (1992): 602–615; Luciano Floridi, "Understanding Epistemic Relevance," *Erkenntnis* 69, no. 1 (2008): 69–92.

   13. See, for example: Wilson, *Two Kinds of Power*, 6–19; Elaine Svenonius, *The Intellectual Foundation of Information Organization* (Cambridge, MA: MIT Press, 2000), 31–51; Richard P. Smiraglia, *The Nature of "a Work": Implications for the Organization of Knowledge* (Lanham, MD: Scarecrow Press, 2001).

   14. In the phrase "subject–predicate," the word "subject" means subject in the grammatical sense—in contrast to the way in which the word "subject" is used on most occasions in this article, when it is roughly synonymous with "topic."

   15. The question of whether z' should be treated (a) as the very activity of cataloging itself, (b) as the concept or idea of the activity of cataloging, or (c) as the name, term, or label that we use to refer either to the activity of cataloging or to the concept of idea or the activity of cataloging, is an important one that is raised later in the article.

   16. Notable and influential exceptions include Wilson, Maron, and Hjørland, as cited earlier and further discussed later.

   17. *Functional Requirements for Bibliographic Records*. Final Report. Approved by the Standing Committee of the Cataloguing Section on September 1997 as amended and correct through February 2009. http://www.ifla.org/files/cataloguing/frbr/frbr_2008.pdf, 12.

   18. Ibid., 16.

   19. Furner, "The Ontology of Subjects of Works."

   20. In the FRSAD report, the term "entity" is used instead of "entity type" or "entity class."

21. In the FRSAD report, entity classes are indicated by labels that are sometimes italicized, sometimes not; sometimes in bold, sometimes not; sometimes in all lower-case, sometimes with an upper-case initial letter, and sometimes in all upper-case. Here, we adopt the convention of formatting entity-class labels in italics, with an upper-case initial letter.

22. *Functional Requirements for Bibliographic Records.* Final Report, 16.

23. Zeng, Žumer, and Salaba, *Functional Requirements for Subject Authority Data (FRSAD)*, 12.

24. Ibid.

25. In the FRSAD report, the term "relationship" is used instead of "relation type" or "relation class."

26. The plural form in Greek (not, as the FRSAD report suggests on its p. 13, in Latin) of thema is themata; the plural form in Latin of nomen is nomina.

27. Figure 3 is adapted from Figure 3.2, FRSAD conceptual model, in Zeng, Žumer, and Salaba, *Functional Requirements for Subject Authority Data (FRSAD)*, 12.

28. Ibid.

29. Tom Delsey, "Modeling Subject Access: Extending the FRBR and FRANAR Conceptual Models," *Cataloging & Classification Quarterly* 39, no. 3/4 (2005): 50.

30. Ibid.

31. Furner, "The Ontology of Subjects of Works"; Zeng, Žumer, and Salaba, *Functional Requirements for Subject Authority Data (FRSAD)*, 40–41.

32. Zeng, Žumer, and Salaba, *Functional Requirements for Subject Authority Data (FRSAD)*, 39–44.

33. Ibid., 41.

34. The assignment of "superclass" status to Thema (see the FRSAD report, p. 13) is not a tactic that has avoided all criticism.

35. Lowe, *The Four-Category Ontology*. See also Figure 1 in the present article.

36. The IFLA Working Group on Functional Requirements and Numbering of Authority Records (FRANAR) was charged with the design of a conceptual model of Functional Requirements of Authority Data (FRAD; formerly Functional Requirements of Authority Records, or FRAR). The result was published as: Glenn E. Patton, ed., and the IFLA Working Group on Functional Requirements and Numbering of Authority Records (FRANAR), *Functional Requirements for Authority Data: A Conceptual Model*, IFLA Series on Bibliographic Control, no. 34 (Munich: K. G. Saur, 2009).

37. Zeng, Žumer, and Salaba, *Functional Requirements for Subject Authority Data (FRSAD)*, 6.

38. Ibid., 8.

39. Some contemporary understandings of the function of conceptual models include the view that any decision to treat a given thing as a relationship or as a property is a trivial consequence of a more-or-less arbitrary choice made by the designer of the model, rather than the important result of a reasoned analysis of reality.

40. See, for example: Gilbert Ryle, "'About,'" *Analysis* 1, no. 1 (1933): 10–12; Hilary Putnam, "Formalization of the Concept 'About,'" *Philosophy of Science* 25, no. 2 (1958): 125–130; Nelson Goodman, "About," *Mind* 70, no. 277 (1961): 1–24.

41. See, for example: Jason Stanley, "Philosophy of Language," in *The Routledge Companion to Twentieth-Century Philosophy*, ed. Dermot Moran (London: Routledge, 2008), 382–437.

42. Lowe, *The Four-Category Ontology*. See also Figure 1 in the present article.

43. Here "concepts" is used in the FRBR sense to mean either universals (i.e., kinds of particulars) or abstracta.

44. Here "concepts" is used to mean mental representations of things.

45. A source of potential confusion is that, according to the FRBR model (if not the FRSAD model), the thema whales would be described by an instance of the *Concept* entity class. But this does not mean that this thema should be viewed as a mental representation, but rather that it is a universal.

46. Wilson, *Two Kinds of Power*, 69–92.

47. Ibid., 89.

48. Ibid., 90.

49. Ibid., 92.

50. Ibid.

51. This section originated as a draft written for the FRSAD report: an edited version survives on pp. 7–8 there.

52. Hjørland, "The Concept of 'Subject' in Information Science," 172–200.

53. Some commentators have found my apparent conflation of nominalism and idealism confusing. But I am not equating the two. I am simply pointing out that Hjørland uses the label "idealist" to refer (slightly misleadingly, in my opinion) to a set of loosely related claims that I am choosing to call "nominalist." The fact that several of these claims are entailed by denials of the existence either of universals or of abstracta is what prompts me to characterize them as nominalist.

54. Hjørland, "The Concept of 'Subject' in Information Science," 172–200.

55. Zeng, Žumer, and Salaba, *Functional Requirements for Subject Authority Data (FRSAD)*, 7.

56. See, for example, chapter 6 in: Gerard Salton, *Automatic Information Organization and Retrieval* (New York: McGraw-Hill, 1968).