

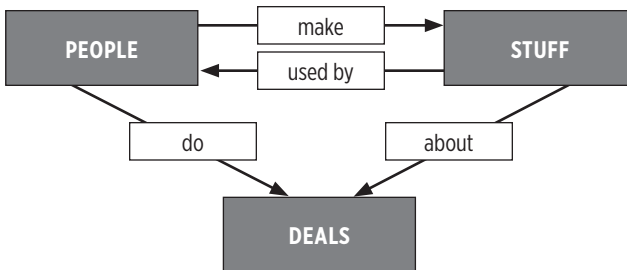
WHAT IS MODELED IN FRBR?

An E-R analysis serves to resolve category boundaries and assign attributes to categories of things or functions. That said, for any given data, there can be any number of E-R models developed, depending on the functionality desired, the requirements of your data management system, and the workflow you need to support. The same is true for bibliographic data. The top-level model developed by the publishing industry has three primary “things”: people, stuff, and deals (figure 7.1).

This represents a bibliographic model that primarily supports commercial functions around intellectual resources. The library model developed as FRBR could be described as “people, stuff, and subject access.” Each model reflects the needs and views of its community.

The simpler your goals, the simpler your data model can be. However, the FRBR Study Group had a rather complex set of goals. One goal had to do with simplifying the bibliographic record for international sharing, with the purpose of cost savings. Another goal required the Study Group to make a connection

FIGURE 7.1

<index> commercial view of intellectual products

between user needs and bibliographic data elements. This was related to the first goal, because the data elements most needed by users would also be the ones that truly should be in the data model. There also seem to have been goals that group members brought to the effort, such as codifying bibliographic relationships between described resources. The use of E-R modeling was itself a goal, which was possibly included because some members assumed that a future bibliographic record would be stored in relational databases, or that sharing would be easier if the data were packaged as separate entities. Because the FRBR Final Report doesn't address technical issues or a record format, those goals are not clarified in the report.

FRBR defines three groups of entities. The groups are not named; they are called only Groups 1, 2, and 3. The groups themselves are included in some of the E-R diagrams as boxes around the entities of the group, but are ignored in further modeling. This means that there are no functions or qualities that belong to the groups themselves. Each entity is treated as separate. There are no group/entity relationships that would create a type of class/sub-class structure. There is also no entity or identified class that represents a whole bibliographic description.

This brings up the question of whether the groupings of entities in FRBR are meaningful at all. Gordon Dunsire, who has created the FRBR representations in RDF for the IFLA FRBR Review Group, appears to have been instructed that the groups are not to be used as classes in the RDF sense.

FRBR Group 3 is not represented in RDF as a class, following clarification from the FRBR Review Group: the Groups are used to simplify the entity-relationship diagrams, and are not intended to be super-classes. Instead, 10 separate properties are represented in RDF, all with domain Work and each with one of

the Group 1, 2, or 3 entity classes as range, corresponding to Figure 3.3 in the FRBR report. (Dunsire 2012, 736)

Each of the FRBR groups has a different conceptual structure. Group 1, which could be thought of as representing a bibliographic description, consists of four mutually dependent entities that are modeled as a chain from work to expression to manifestation to item. Although the diagram does not specify whether the entities and relationships are mandatory, it is clear to most readers that all four are needed for a complete bibliographic description, and that having, for example, an expression entity with no work or manifestation entity would not be meaningful. It isn't clear, however, whether the model intends to make all four mandatory as part of a description.

Group 2 consists of *person* and *corporate body*, and these have agent- or actor-type relationships with entities in Group 1. The Group 2 entities, unlike the Group 1 entities, have no relationships that link them to each other analogous to the intra-group relationships of Group 1. They also do not share any attributes. They could have been modeled as members of a class because logically they do share some attributes, like the relationships linking them to the Group 1 entities. Both of these entities could be an author, a publisher, a performer, etc., and therefore those attributes could be assigned to a class that includes all Group 2 entities, but they were not.

Group 3 includes four entities that can have a “subject” relationship to the work entity in Group 1: *concept*, *object*, *event*, and *place*. These, too, have no links between them and are not members of a mutual class. Although these four entities are a group called “Subject” in the FRBR text, in fact all entities from Groups 1 and 2 can also have a subject relationship with a work entity. This means that logically all FRBR entities could be sub-classed to a subject class. Group 3 appears to round out the entities needed for subject assignment, but isn't itself a complete list of subject types even though it is referred to as the subject group.

FRBR AS A CONCEPTUAL MODEL

FRBR is not a data model. FRBR is not a metadata scheme. FRBR is not a system design structure. It is a conceptual model of the bibliographic universe. (Tillett 2005)

The name “Functional Requirements for Bibliographic Records” evokes a much more concrete outcome than was actually presented in the FRBR Final Report.

Functional requirements generally speak to actions, workflows, and methods. A bibliographic record, at least as most of us think of it, is a defined set of data elements that identify and describe a resource. The entity-relation model is also intended to provide a workable model that could eventually be instantiated in some type of computer application. However, the result of the FRBR Study Group's work has often been described as something much less concrete than the name might imply, that is, a conceptual model.

The FRBR Final Report's section 2.3 on methodology gives the reasoning behind the use of entity-relation modeling technique:

The methodology used in this study is based on an entity analysis technique that is used in the development of conceptual models for relational database systems. Although the study is not intended to serve directly as a basis for the design of bibliographic databases, the technique was chosen as the basis for the methodology because it provides a structured approach to the analysis of data requirements that facilitates the processes of definition and delineation that were set out in the terms of reference for the study. (FRBR Final Report, 9)

Entity-relation modeling is a multistep technique that begins with a high-level conceptual analysis of the data universe that is being considered. To quote once again from the FRBR Final Report:

The first step in the entity analysis technique is to isolate the key objects that are of interest to users of information in a particular domain. These objects of interest or entities are defined at as high a level as possible. That is to say that the analysis first focuses attention not on individual data but on the "things" the data describe. Each of the entities defined for the model, therefore, serves as the focal point for a cluster of data. An entity diagram for a personnel information system, for example, would likely identify "employee" as one entity that would be of interest to the users of such a system. (FRBR Final Report, 9)

This is a very good description of conceptual modeling. So it is either puzzling or disturbing that most readings of FRBR do not recognize this difference between a conceptual model and either a record format or a logical model. In part this is because it is easy to view the diagrams in the document as statements of data structure rather than high-level concepts about bibliographic data. This may also be because most members of our profession are not familiar with the stages of modeling that are used in formal database design.

One of the common assumptions about FRBR is that the entities listed there should be directly translated into records in any bibliographic data design that intends to implement FRBR. For example, there is much criticism of BIBFRAME for presenting a two-entity bibliographic model instead of using the four entities of FRBR. This reflects the mistaken idea that each Group 1 entity must be a record in whatever future bibliographic formats are developed. As entities in a conceptual model oriented around database design, there is absolutely no direct transfer from conceptual entities to records. How best to create a record format that carries the concepts is something that would be determined after a further and more detailed technical analysis. In fact, the development of a record format might not logically be a direct descendent of the E-R model, because the E-R modeling technique has a bias toward the structure of relational database management systems, not records. In addition, should a conceptual design like FRBR be used to inform the next steps toward a database design, there is no guarantee that the final design will retain the high-level structure of the conceptual model. Few assumptions can be made about the potential technical implementation based on a conceptual design; only further analysis, with a specific technology as its target, can reveal that.

One also cannot make assumptions about record design based on a database design model. For many databases there is no single record that represents all of the stored data. Databases are often a combination of data from numerous departments and processes, and they can receive and output many different data combinations as needed. The database does not define the record format although they must share the definition of the atomic elements that both carry.

The FRBR Final Report has a section recommending areas for further study. In that section the FRBR Study Group states that the report “is intended to provide a base for common understanding and further dialogue, but it does not presume to be the last word on the issues it addresses.” Areas for further study include expanding the analysis to authority data, which is being taken up by the ongoing working group within the IFLA Cataloguing Section. The report also suggests performing studies to verify the validity of the attributes listed for the FRBR entities. And finally, it addresses the potential of the entity-relation model to inform a new record format:

The entity-relationship analysis reflected in the model might also serve as a useful conceptual framework for a re-examination of the structures used to store, display, and communicate bibliographic data. Further study could be done on the practical implications of restructuring MARC record formats to reflect more

directly the hierarchical and reciprocal relationships outlined in the model. An examination of that kind might offer a new approach to the so-called “multiple versions” issue. The model could also be expanded in depth to create a fully developed data model that would serve as the basis for the design of an experimental database to assess the efficiency and effectiveness of a database structure patterned on the model. (FRBR Final Report, 6)

This recommendation has not had follow-up, and most likely will not, at least not in the sense described here. By the time that the FRBR Final Report was issued in 1998, relational models were on the wane. By 2008, even the successor technology, the object-oriented model, was being supplanted by the data design concepts of the Semantic Web and linked data. Had the library world embraced a relational data design by the end of the 1980s, library data and library systems might have been in line with common information technology development. As it is, the time for a relational design has passed.

GROUP 1

WORK, EXPRESSION, MANIFESTATION, ITEM

Group 1 of FRBR comprises the main entities of bibliographic description: work, expression, manifestation, and item (WEMI). There is a set of relationships between these entities, and they are described in a linear pattern. The FRBR Final Report presents the entities from work to item, moving from the most abstract to the most concrete. One could also take the view of the cataloger’s workflow, which begins with the item in hand, and moves through manifestation and expression to work. However, FRBR does not describe the process of creation, but rather a fully realized resource. There is no temporal order implied between the entities of Group 1.

It is the relationships between these entities that complicates Group 1 and also that leads to different interpretations of what possibilities exist to make use of the different combinations of entities. It also creates some complication in the relationships with other entities because each Group 1 entity has separate bibliographic relationships with other FRBR entities. This means that there are not only relationships between work, expression, etc., but there are so-called “bibliographic relationships” between works, between expressions, between works and expressions, and so on. The resulting picture is of a very complex web of relationships.

The FRBR Work

As we saw in a previous section, numerous definitions of “bibliographic work” have been developed in the library field over time. FRBR defines the work entity as “a distinct intellectual or artistic creation.” In reference to FRBR work, Barbara Tillett, in her 2003 Library of Congress Pamphlet *What Is FRBR?* defines work as “the conceptual content that underlies all of the linguistic versions, the story being told in the book, the ideas in a person’s head for the book.” The work as idea is however not entirely borne out by the Final Report text. The FRBR Final Report declares changes in form (e.g., from a book to a movie version of the same story) to be different works, which hints at a more precise definition of work than being a story or idea. This illustrates how difficult it will be to form a widely accepted definition of work. In fact, the FRBR Final Report acknowledges that work may be defined differently in different communities.

Because the notion of a *work* is abstract, it is difficult to define precise boundaries for the entity. The concept of what constitutes a *work* and where the line of demarcation lies between one *work* and another may in fact be viewed differently from one culture to another. Consequently the bibliographic conventions established by various cultures or national groups may differ in terms of the criteria they use for determining the boundaries between one *work* and another. (FRBR Final Report)

The FRBR Final Report also states that “We recognize the *work* through individual realizations or expressions of the work, but the work itself exists only in the commonality of content between and among the various expressions of the work.” This is considerably different from the definitions given in the previous paragraph. In this definition, the work is a set of all of its expressions. This would make the work a dynamic entity that changes depending on the presence of particular expressions in the bibliographic universe, similar to Patrick Wilson’s bibliographic families that grow as new family members are born. Thus the work is presented both as a fixed a priori abstraction (in the mind of the creator) and as a dynamic entity that is the sum of its expressions.

The work is consistently referred to as an abstraction in library literature about FRBR, but the work as defined in FRBR has the characteristics of something quite concrete: it has a creator, a genre, and subject designation, which is actually quite a bit of “realness” for something that is “an idea in a person’s head.” It also has a work title, which could be considered especially odd for something that has not been expressed or manifested yet. However, the work title (along with the

creator) serves as the bibliographic identifier for the work, so it has a necessary bibliographic purpose. This is an important point: the definition of the entities in FRBR is not the expression of a philosophical or theoretical declaration of a bibliographic ideal; it is fully grounded in library bibliographic practices, and the model is intended to support those practices.

The FRBR work has many potential relationships with other entities. It has a primary relationship with one or more expressions. (Primary relationships are defined in the FRBR Final Report as the ones visible in the entity-relation diagrams.) It also has primary relationships with persons and corporate bodies. It is the only entity that has a “has subject” relationship with other entities.

The FRBR Expression

The FRBR expression is “the intellectual or artistic realization of a work in the form of alpha-numeric, musical, or choreographic notation, sound, image, object, movement, etc., or any combination of such forms” (FRBR Final Report, 19). The expression is also an abstract entity in that there is no physical realization of the expressed work until it is manifested in a physical format. It has a form of expression (e.g., “text” or “music”) and its attributes include a date, a language (for textual works), a medium of performance (for music or other performed works), and scale and project (for cartographic works). The expression excludes, however, “physical form . . . that [is] not integral to the intellectual or artistic realization of the *work* as such” (FRBR Final Report, 19). Therefore, the expression is the artistic realization of work in every aspect except the physical form. It does include “the specific words, sentences, paragraphs . . . or the particular sounds, phrasing, etc. resulting from the realization of a musical work.” The expression has all the qualities of a creation, but stops short of any physical attributes. So it is a text, but without a “typeface and page layout.” It is music without any readable notes or carrier of sound.

Here we immediately face one of the key issues of the FRBR Group 1 entities: what is the nature of the Group 1 entities in relation to what is essentially a single thing that has been described in four parts? The expression is a realization of a work, and as a realization of a work it not only is not separate from it, it actually is the intellectual content of the work in some form. Although in the entity-relation diagrams and in the lists of attributes the work and the expression are treated as separate, conceptually the expression cannot be separated from the work because the work is the intellectual content of the expression.

The expression is generally considered the most conceptually elusive of the Group 1 entities. Although the work is abstract, it has creative content, creators, and subjects. The manifestation has a physical description and most of us have considerable experience with manifestations in our lives. The expression is described as a text that has no particular physical form, something that seems impossible because just calling it a text must mean that it exists in some form or another.

The expression is also potentially the result of an editorial process or some other third-party contribution, because the FRBR Final Report speaks of expressions with glosses, illustrations, and augmentations. For anyone who envisions WEMI as a directional flow from work to item, or vice-versa, expression is a sticking point because it doesn't have a single direction. The expression is the entity of translations of texts and performance of music, but also of annotated editions and selected works.

It is worth noting here that there is no concept of the creator's original expression in FRBR. All expressions have equal weight. This is potentially an area where Patrick Wilson's second kind of power would come into play, and some qualitative assessment of expressions, along with a family genealogy, could be offered to users seeking the best content for their need.

The FRBR Manifestation

The FRBR manifestation is “the physical embodiment of an *expression* of a *work*” (FRBR Final Report, 20). Like the expression, the manifestation has content that has carried over from the preceding entities. A manifestation may be a unique, stand-alone object, as in an author's manuscript, or it can be a set of mass-produced things made publicly available, or it can be anything in between. The physicality of the manifestation is a primary characteristic:

When the production process involves changes in physical form the resulting product is considered a new *manifestation*. Changes in physical form include changes affecting display characteristics (e.g., a change in typeface, size of font, page layout, etc.), changes in physical medium (e.g., a change from paper to microfilm as the medium of conveyance), and changes in the container (e.g., a change from cassette to cartridge as the container for a tape). (FRBR Final Report, 22)

This brings us squarely into the “multiple versions” territory, one of the compelling cataloging issues of the 1990s: does a change of physicality require a new

catalog record? The answer in the FRBR Final Report is clearly that a change in physical form is a different manifestation. Therefore a hardback book and a trade paperback of the same book would be different manifestations, and each e-book format would also be a different manifestation. This would be in keeping with the distinctions managed by publishers of these materials, and in the assignment of a specific ISBN to each physical format. However, considering that resources in digital formats, such as electronic books, can be converted to different digital formats at the time of access, it could be said that the physical stability of the manifestation is becoming a thing of the past.

Note that manifestation is not separate from the expression of the work as described here; it *embodies* it. In fact, the FRBR Final Report says that the manifestation embodies an expression of a work, and therefore is defined as the whole Group 1 minus the item. That it *embodies* makes it sound like the manifestation is a kind of container for the expression and the work. That it *manifests* instead sounds more like it manufactures or creates. In addition, the manifestation contains certain elements provided by the publisher, like a title page, often an index, and in some cases some prefatory material, which then brings into question if or when the publisher's additions constitute the creation of a new expression. In some instances, any one particular expression is only one of the creations that is manifested in a publication. Such publications are referred to in FRBR as "aggregates." Although addressed in the FRBR Final Report, aggregates pose some difficult problems and had to be addressed by a special sub-group of the FRBR Study Group. At this point it should be obvious to the reader that the four boxes and few arrows of the diagrams in the FRBR Final Report are a gross simplification of the bibliographic domain that FRBR attempts to capture.

The FRBR Item

Item is the most neglected of the Group 1 entities in most discussions, possibly because it is also the most clear. "The entity defined as *item* is a concrete entity" (FRBR Final Report, 24). An item *exemplifies* a single manifestation. However, even here the meaning has some caveats. An item may consist of more than one physical object, such as a multivolume monograph, or a film or sound product issued on multiple disks. Each item exemplifies a single manifestation. In certain cases, such as with copies of special interest, there may be some variation between a single item and other items of the same manifestation, such as books that are signed by the author, or items that are damaged.

GROUP 2

PERSONS, CORPORATE BODIES, FAMILIES

In the FRBR Final Report, Group 2 has two entities, person and corporate body. Subsequent work on the Functional Requirements for Authority Records (FRAD) has added a third entity, *family*, which is now assumed to be included in FRBR. The FRBR document does not add any new features to persons and corporate bodies compared to current authority records, although FRAD does expand the attribute list to include others, such as gender and places of birth, death, and residence for persons, and language, history, and field of activity for corporate bodies.

As with the other groups, there is no whole that would unify Group 2 as a meaningful unit, even though the entities are treated as a single unit in the text. Without a more general class or entity to which these could belong, some characteristics, like roles, will logically need to be defined separately for each entity, with a significant amount of redundancy. For example, both persons and corporate bodies can be publishers, collectors, dedicatees, defendants, and so on. The lack of a super-class that unifies Group 2 means that it will be necessary to decide which roles are appropriate for each Group 2 member. As we will see, those implementing FRBR as a conceptual model usually develop a super-class for the entities in this group, which also enables working with data where the identity of the agent (especially person or corporate body) has not been clearly determined.

GROUP 3

SUBJECTS

The nature of the third FRBR group is something of a miscellany: concept, object, event, and place. It isn't made clear in the text how FRBR Study Group members arrived at these entities. They do not match the elements of the Library of Congress Subject Headings, which are *topic*, *form*, *chronology*, and *place*.

While Group 3 is known as the subject group, it is not the full range of subjects in FRBR. All of the FRBR entities can be in a subject relationship to the work.

The diagram also depicts the “subject” relationships between *work* and the entities in the first and second groups. The diagram indicates that a *work* may have as its subject one or more than one *work*, *expression*, *manifestation*, *item*, *person*, and/or *corporate body*. (FRBR Final Report, 17)

Robert Maxwell (2008) notes in his book on FRBR that the limitation of subject relationships to the work entity ignores some cases in which expressions or even manifestations can have a need for topical access on their own. He suggests that “it might be preferable in FRBR simply to define Group 3 entities as ‘entities that serve as subjects of Group 1 entities’” (Maxwell, 15). Actually, that definition would also have to be applied to Groups 1 and 2, because all entities can be the object of a “has subject” relationship.

We don’t learn any more about the Group 3 because the only attribute provided for each of the entities is “term.” The document expressly limits the use of the Group 3 entities to subject access, although in the introduction there is an acknowledgment that an entity like “place” might have use within the bibliographic description, because it would also be logical for an object to have a place, and for that place to have a name and a geographical location with longitude and latitude.

We also learn little about the use of these entities, because other than defining these entities and showing an E-R diagram with the subject relationship, subjects are not mentioned in the document. Quite astonishingly, they are not listed in the discussion of the user tasks. The find task lists:

the attribute or relationship is typically used as a primary search term for locating the entity (e.g., the title of a *manifestation*, the relationship between a *work* and the *person or corporate body* principally responsible for the *work*). (FRBR Final Report, 84)

We should remember that subjects were not initially included in the Terms of Reference, but were added to the list of entities when the document was reviewed at the IFLA meeting in 1992. It is evident that there is a strong separation between descriptive cataloging and subject cataloging in library practice, and this has an effect on the FRBR Study Group’s attention to the subject aspect of user needs. This points out a chasm between library cataloging and user service that FRBR does not address.

THE BIBLIOGRAPHIC RELATIONSHIPS

Nearly all attention on FRBR today focuses on the ten (or eleven, if you count family) entities. Little attention is given to the bibliographic relationships that FRBR defines. Although they echo bibliographic relationships in current cataloging, in FRBR each relationship is designated as being between specific FRBR

Group 1 entities. These bibliographic relationships are distinguished from the primary relationships that exist between the FRBR entities, and which are shown in the diagrams in the FRBR Final Report. The bibliographic relationships, when added to the basic FRBR entity-relation diagram, create a very complex web of connections.

Both Barbara Tillett (1988) and Richard Smiraglia (2001) conducted quantitative studies of the relationships that exist in library catalogs. Tillett did her study on a large portion of the Library of Congress MARC file. Smiraglia researched the catalogs of a small number of research institutions, including two specialized collections, one of theology and one of music, and focused on works and work families (the latter included many relationships that FRBR would define as between expressions). Both found a high number of related resources in the catalogs they studied, although exact numbers are difficult to assign because making bibliographic relationships manifest is optional in library cataloging. Relationships are generally provided only in notes, and only if the cataloger deems that the note is needed for clarity.

It isn't clear if the presence of bibliographic relationships in FRBR implies that they are to be coded as actual links between descriptions, or if they are simply a conceptual rendering of the idea of bibliographic relationships. If one decides that the relationships should be treated as links between entities, then the optionality of explicit relationships described in the report becomes problematic because not all related entities would be linked. In section 7 of the FRBR Final Report, where the basic level record is defined, each of the notes that defines a bibliographic relationship has a footnoted explanation to the effect that such notes are made only if the relationship cannot be inferred from other information in the record. However, if the relationship, as implied in the use of an information technology model for the entities and relationship, is intended to be actionable in a database or other information system, there is no means to "infer" relationships; all data to be acted on must be explicitly coded. Thus, the assumption that FRBR represents a machine-actionable model is clearly contradicted in this area of the FRBR Final Report, leaving us to wonder exactly how we should interpret the use of the entity-relation model vis-a-vis the catalog record data.

Summary

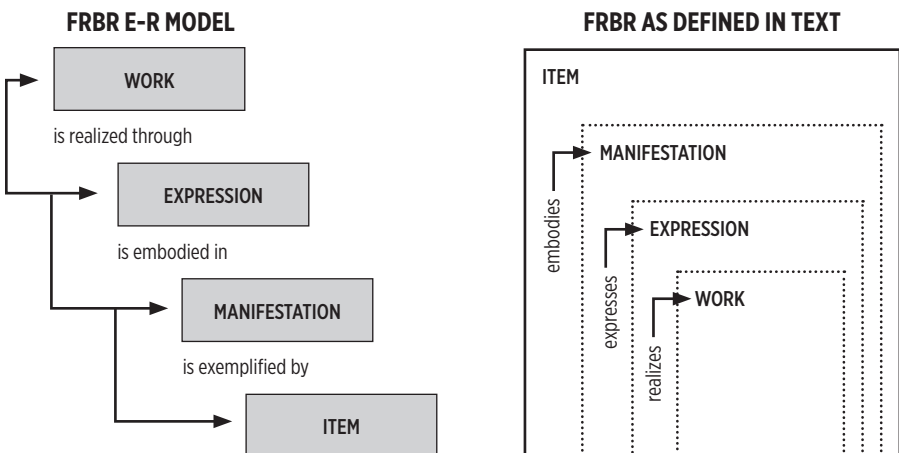
Group 1, as defined in the FRBR Final Report, exhibits some distinct differences between how it is defined in the text and how it is depicted in the entity-relation diagram. The entity-relation diagram shows four separate entities, and these entities are given each a separate set of attributes. This is consistent with a relational

database model that creates separate entities based on an analysis of redundancy of data elements. This does not mean that those entities are separate in “real life.” We can use the example of a car model and color options. Obviously there is no car being offered that has no color, but color options can be stored in a separate table from car models in a database so that models and colors can be combined as needed in database output. This is similar to the separation of attributes into the WEMI entities in FRBR.

At the same time, the text of FRBR describes the entities as realizing or embodying or exemplifying other entities, which implies less separation than the entity-relation diagrams describe. Conceptually, an item is a concrete example of a manifestation that embodies the expression of a work. When you hold the item in your hand, you are holding something that has within it an entire Group 1. This statement results in a very different diagram from the entity-relation diagrams in the FRBR Final Report.

FIGURE 7.2

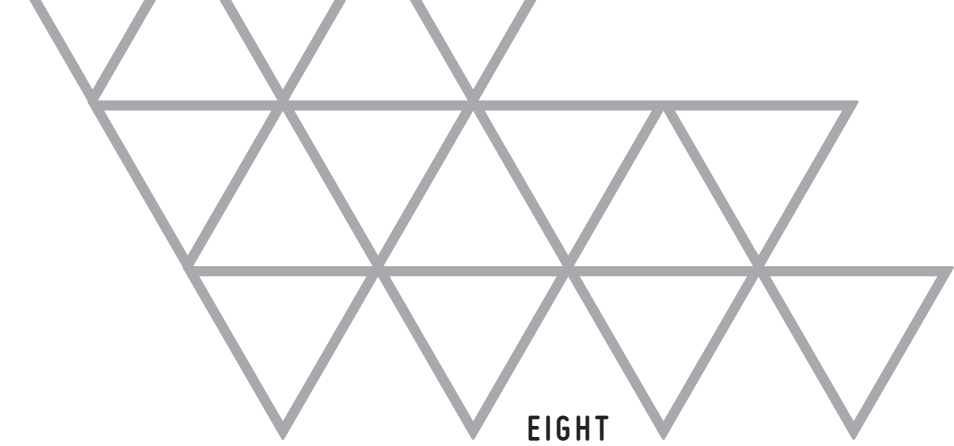
E-R diagrams versus definitions in the text



Both of these pictures of WEMI can be valid because they represent different views of the same thing. On the left of figure 7.2, we have a diagram of how WEMI will be expressed as stored metadata, in particular metadata that has been subjected to an entity-relation analysis. On the right, we have a diagram of a conceptual view of those same entities, without the need to separate the entities for the purposes of data efficiency. In fact, the diagram on the right, if it were

realized as a data format, would entail a great deal of redundancy of data. It is, by the way, very close to the data format that we use today. Which brings us back to FRBR as an entity-relation analysis of bibliographic data as it was created in libraries at the end of the twentieth century. If we add the two main authority files to the diagram on the right, we essentially have the equivalent of FRBR's entities prior to an entity-relation data analysis.

Looking at FRBR from this same point of view, it is clear that Group 1 represents a single thing, but that thing can be separated into parts for the convenience of managing nonredundant attributes. FRBR also describes the elements of a full bibliographic description. It is less clear, though, how those two views interact in practice, whether in the act of cataloging an item in hand, in sharing cataloging data, or in serving the library's users. Because FRBR was instantiated in the twenty-first-century cataloging rules, Resource Description and Access (RDA), the first of those questions may have been answered. The other questions, at the time of this writing, are still open.



EIGHT

DOES FRBR MEET FRBR'S OBJECTIVES?

Many people want to evaluate a conceptual model like FRBR using “true or false” criteria. While one can say that a model is “true” to the extent that it explains accurately and “false” to the extent that it does not, this is not a very helpful way to look at these models. A more useful way to evaluate these models is to ask whether they are successful at fulfilling their purposes.

—*Alison Carlyle, 2006, 266*

The FRBR model has resulted in unprecedented change in our thinking about catalogs and cataloging. Since the mid-nineteenth century, cataloging has focused on a unitary description of a physical item and a primary trinity of access points: title, author, and subject. This model has been disrupted by new technologies of communication, from the recording of sound and moving pictures to the digitization of nearly everything. Added to that disruption is the ever-increasing rate of production of creative resources of all types.