



Modeling the aesthetic axis of information organization frameworks, part 2

Case studies

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Abstract

Purpose – The purpose of this paper is to propose a theoretical framework, based on contemporary philosophical aesthetics, from which principled assessments of the aesthetic value of information organization frameworks may be conducted.

Design/methodology/approach – This paper identifies appropriate discourses within the field of philosophical aesthetics, constructs from them a framework for assessing aesthetic properties of information organization frameworks. This framework is then applied in two case studies examining the Library of Congress Subject Headings (LCSH), and Sexual Nomenclature: A Thesaurus.

Findings – In both information organization frameworks studied, the aesthetic analysis was useful in identifying judgments of the frameworks as aesthetic judgments, in promoting discovery of further areas of aesthetic judgments, and in prompting reflection on the nature of these aesthetic judgments.

Research limitations/implications – This study provides proof-of-concept for the aesthetic evaluation of information organization frameworks. Areas of future research are identified as the role of cultural relativism in such aesthetic evaluation and identification of appropriate aesthetic properties of information organization frameworks.

Practical implications – By identifying a subset of judgments of information organization frameworks as aesthetic judgments, aesthetic evaluation of such frameworks can be made explicit and principled. Aesthetic judgments can be separated from questions of economic feasibility, functional requirements, and user-orientation. Design and maintenance of information organization frameworks can be based on these principles.

Originality/value – This study introduces a new evaluative axis for information organization frameworks based on philosophical aesthetics. By improving the evaluation of such novel frameworks, design and maintenance can be guided by these principles.

Keywords Evaluation, Analysis, Bibliographic systems, Indexes, Retrieval languages, Philosophy

Paper type Research paper

In part 1, sections 1-2 (appearing earlier in this journal) we reviewed the background of IOFs, identified the appropriate discourses in philosophic aesthetics and formulated propositions appropriate to IOFs from them, and addressed incipient criticism. In part 2, sections 1-3, we develop an evaluative rubric, apply the rubric in two case studies, and discuss the results.

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1. Methods

Following methods similar to the philosophical approach to aesthetics, we test the appropriateness of applying aesthetic analysis to IOFs by employing the seven propositions identified previously in an evaluation of two IOFs. This is a thought-experiment, typical of aesthetic analysis, to test whether our framework yields intuitively appropriate appreciation of the aesthetic axis of the IOFs. This should be understood as a preliminary work in a larger project. If our framework does provide analysis that is intuitively appropriate, then it will be worthwhile in extending the project and developing more rigorous applications. If the provided analysis is obviously deficient in some way we will see that further foundational work needs to be done.

1.1 Key propositions applied to IOFs

The seven propositions we identified from the field of philosophic aesthetics as apt to assessing the aesthetic value of IOFs are recapitulated here. For a given IOF each of the propositions may or may not identify aesthetic properties of that IOF; rather, of the aesthetic properties of an IOF, they may be identified in one or more of the following ways:

- P1. Aesthetic properties may depend simply on the work's structure.
- P2. Aesthetic properties may depend on the work's invocation.
- P3. Judgments of aesthetic properties depend on the context of variation.
- P4. Aesthetic properties may depend on the work's origination.
- P5. Aesthetic properties may depend on accessibility of category.
- P6. Aesthetic properties may depend on the work's historical context.
- P7. Aesthetic properties may depend on the work's cultural context.

These propositions are predicated on the understanding that a work is an action type, and that this is the appropriate understanding for IOFs, since we are interested in the work processes of an IOF, not simply its documentary outcome. We model these propositions graphically in Figure 1, numbers in parentheses refer to the seven propositions shown previously.

The circle in the center represents the IOF, and the box on the left the individual approaching the IOF. The arrows then show the relationships between the IOF and the individual embodied in the key propositions. For example, proposition 1, that aesthetic properties may depend simply on the structure of the IOF, is represented by an arrow directly from the IOF to the individual. The other propositions represent more complex relationships; for example, P2, that aesthetic properties may depend on the invocation of the IOF, shows as an arrow the expansion of the concept of invocation, that it is the relationship between the particular IOF and its category. The arrow from the arrow showing the concept of invocation, then shows the apprehension of such aesthetic properties by the individual. The further propositions are discussed in part 1, section 2.2, and are not explained again here.

1.2 Operationalization of model in an evaluative rubric

The seven propositions as listed previously are stated in a highly abstract way. In order to apply these to IOFs we construct the following evaluative rubric with guiding

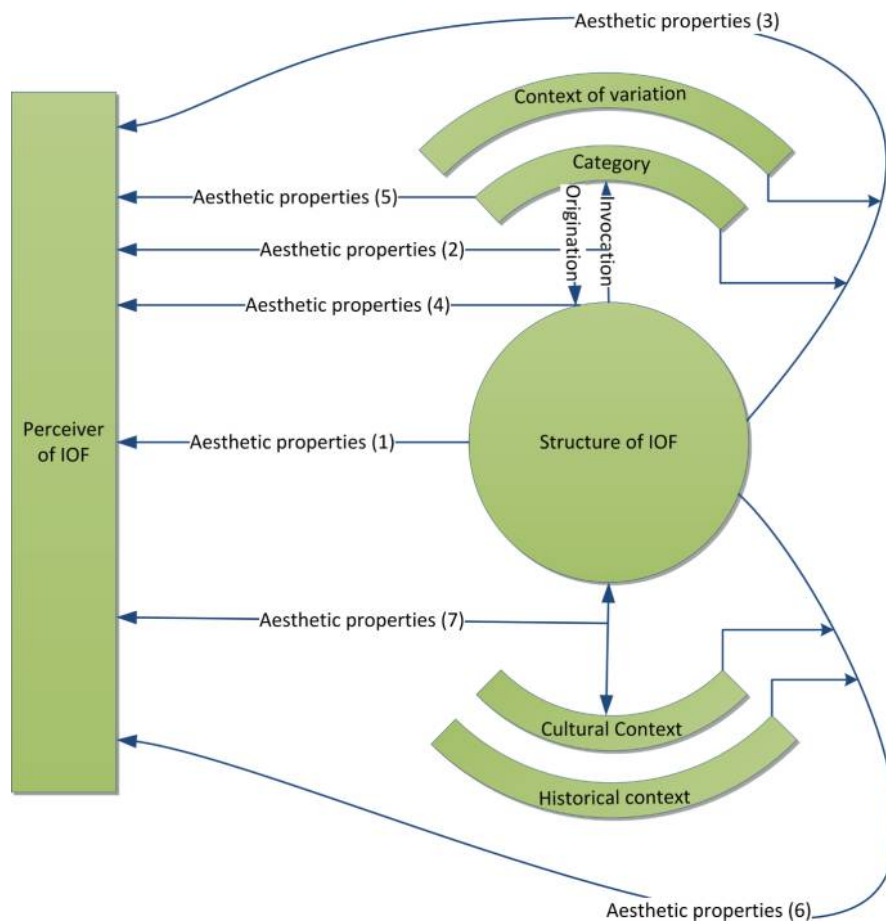


Figure 1.
Dependencies of aesthetic
properties

questions as to how the propositions can be used to identify and evaluate the aesthetic properties of the IOF, what an appropriate method of responding to those questions might be, brief examples of IOFs that would be considered “fine” or “poor” in terms of that guiding question, and exceptions or special considerations to be kept in mind in applying the guiding question. Following the rubric, we include some further examples to clarify the concepts the rubric is meant to test before going on to apply the rubric to our two main subjects.

1.2.1 Evaluative rubric. The rubric appears in Table I. Column 0.3 and 0.4 are examples. Table I is explained in detail in section 1.2.2 with further examples of the guiding questions and sample applications to IOFs.

1.2.2 Examples of information organization frameworks evaluated with the rubric. In this section we provide examples of the application of each of the guiding questions from the rubric to IOFs; these examples are not meant to be exhaustive analyses of the IOFs considered here, but to be illustrations of the usefulness of the guiding questions outlined in Table I. A further example of the sort of evaluation to be conducted in row 1

Table I.
Evaluative rubric

0.1 Evaluation/field	0.2 Method	0.3 Fine example	0.4 Poor Example	0.5 Exceptions
1.1 What aesthetic properties does the structure of the IOF have? (proposition #1)	1.2 Narrative: identify and provide examples of properties such as balance, symmetry, coherence, etc.	1.3 A thesaurus that evenly distributes terms among the branches of its content-field demonstrates balance	1.4 A thesaurus whose distribution of terms fails to reflect its content-field balance	1.5 Aesthetic properties applicable here are (for now) attributed intuitively, but should reflect a property of the relationships between concepts organized by the IOF, rather than other (e.g. historical) attributes of the IOF. Perceptual properties are to be judged within the context of variation for the category of IOF considered (proposition #3)
2.1 Does the IOF meet its standard (if a published standard is not available or not applicable reference is made to the theoretical formulation of the category of the discourse of the IOF)? (proposition #2)	2.2 Checklist; address: What is the relevant (e.g. NISO) standard? Are the requirements of the standard met?	2.3 Meets NISO standard, e.g. a thesaurus indicates both hierarchical and associative relationships	2.4 Substantively deviates from NISO standard; e.g. a thesaurus indicates only hierarchical relationships	2.5 If no appropriate standard is available, or if the instance deviates from the standard to solve an emergent problem or take advantage of an emergent technique, then the principle of origination takes precedence; described under 5.2

(continued)

0.1 Evaluation/field	0.2 Method	0.3 Fine example	0.4 Poor Example	0.5 Exceptions
3.1 Is the invoked standard manifest? (proposition #5)	3.2 Checklist; address: Is the standard declared? Are standard features present? Are contra-standard features avoided?	3.3 An index EITHER explicitly cites NISO-TR02-1997 OR (The standard features stated in NISO-TR02-1997 are manifest from a casual inspection AND No contra-standard features contraindicated by NISO-TR02-1997 are manifest from a casual inspection)	3.4 An index DOES NOT explicitly cite any appropriate standard AND (too few standard features are readily manifest to determine the standard OR Contra-standard features are manifest)	3.5 Contra-standard features need not be considered a flaw IF they are introduced in a principled manner to solve a particular problem or take advantage of an emergent technique (as in 2.5). Casual inspection should suffice to reveal the problem or technique at stake
4.1 Does the manifest standard fit its historical context? (proposition #6)	4.2 Narrative; address: Is the standard appealed to the most recent standard at the time of the creation of the IOF? What additional techniques does the IOF exploit or ignore which could be expected to be known at the time of its creation?	4.3 An index created in 2000 appeals to NISO-TR02-1997, not ANSI Z39.4-1984 Basic Criteria for Indexes. AND no emergent problems or techniques render NISO-TR02-1997 inappropriate to the use of the index	4.4 An index, intended to be implemented electronically, created in 2000 appeals to ANSI Z39.4-1942 Basic Criteria for Indexes, not to NISO-TR02-1997	4.5 The selection of an anachronistic standard could conceivably be made for aesthetic (or even functional) reasons; for example, the creators wish to demonstrate that an earlier standard is a better conceptual fit to their subject matter, or that a new standard is incoherent in some way. Such a principled deviation should be assessed as origination and described in 5.2

(continued)

Table I.

0.1 Evaluation/field	0.2 Method	0.3 Fine example	0.4 Poor Example	0.5 Exceptions
5.1 Does the IOF innovate away from its manifest or nominal standard in order to address an emergent technique or problem? (proposition #4)	5.2 Narrative; address: What is the deviation? What technique or problem does it address? Is the solution particularly creative, elegant, etc.?	5.3 Emergent problems and/or techniques are addressed by the structure of the index (i.e. the principle of origination) which mark this index as having special (e.g. "creative") status	5.4 A thesaurus that is revised away from its standard for use in an electronic environment, but does not use hyperlinks (or automatic redirects) to send the user from lead-in terms to preferred terms 5.5 The value of origination can be very difficult to assess in its own historical moment; an innovation that seems obtuse at the moment could turn out to lay the basis for reconceptualizing the category of the IOF	
6.1 Are the IOF and its manifest standard culturally accessible? (proposition #7)	6.2 Narrative; address: Does the IOF/manifest standard fit the (e.g. linguistic) usage of the target discipline, national culture, or user-group otherwise defined? Does the IOF/manifest standard invoke an epistemological paradigm appropriate to its target discipline, national culture, or user-group otherwise defined? Do users prefer (select, feel more comfortable with, etc.) a more culturally accessible IOF?	6.3 A specialized thesaurus draws its terms from the discipline for which it is intended to provide access	6.4 The standard appealed to does not fit the epistemological paradigm of its users; for example, an abstracting service uses a positivist paradigm (focus on experimental data) for an arts-and-humanities abstract database	6.5 "Context" is to be understood very widely here. Consider the IS context the IOF is produced in, but also the human culture, including parallel artistic cultures the IOF is produced in. Part of the aesthetic value of the IOF is how well (cleverly, elegantly) it bridges the gap between its logical structure (e.g. thesaurus) and the human cultural context (e.g. Japan, 1998) in which it is to be used

can be seen from examining the Library of Congress Classification (LCC). If we examine the structure alone of the LCC it is clear that we receive the perception of “imbalance”. For example, on the broadest level, we are clearly dealing with a universal classification, but “History: General and Old World” is assigned one class (D), while “History: America” is assigned two classes (E, F). Similarly, “Science” is assigned a single class (Q), while its fairly restricted subsets “Military Science” and “Naval Science” are each assigned a single class (U, V). Again, class K (“Law”) is unique in having two levels of subclasses (e.g. KFO is decomposed as K, Law; F, US; O, Oregon) (Library of Congress, 2002). These are, of course, familiar examples, and they are explained by the history of the LCC as having been developed specifically for the Library of Congress, which, at the time (i.e. 1898) had the overriding mandate to support the Congress first, for which the disciplines of American history, law, and military/naval science had a special utility. We note here that these are separate considerations in aesthetic judgment. In row 1, we allow the perception from the structure of the IOF alone, in this case that the LCC is “imbalanced” or even “inconsistent” with regard to class K. The fitness of this imbalance to the historical or cultural context of the creation of the IOF are considered in rows 4 and 6, where we would draw rather different conclusions about the LCC (e.g. that its diversity of approaches in the different schedules is “apt” to the cultural context of the Library of Congress).

A further example of the sort of evaluation to be conducted in row 2 is the assessment of formation of indexing terms in various contexts. Since information professionals tend to think of in terms of establish standards formation of indexing terms is often thought of as “correct” when it meets the ANSI/NISO Z39.19-2005 standards (6.3-6.5), e.g.:

- Use a noun or noun phrase.
- Activities should be expressed by nouns or gerunds.
- Remove initial articles in common nouns.
- Retain initial articles in proper nouns.
- Count nouns are expressed in plurals.
- Mass nouns are expressed in singulars.

We often find objections to folksonomies and social tagging systems on the ground that they do not preserve this structure of term formation, as in Macgregor and McCulloch (2006). Folksonomies and social tagging systems, however, do not invoke ANSI/NISO Z39.19 as their standard, so we should not judge them as “deformed” if they allow terms of the forms “car, cars, drives, the driving experience, fuel efficiencies, etc.”. The usability problems raised by that lack of control is a separate issue from its aesthetics, but, whether it belongs is a matter of invocation: use of both “car” and “cars” is as much a standard property of a social tagging system as it is a contra-standard property of a thesaurus.

To expand the concept at issue in row 3, the clarity with which an IOF points to its standard, we consider the WorldCat Local discovery layer. There is, of course, no standard for the category “discovery layer”, but one of the key features claimed by OCLC for WorldCat Local is that it provides “faceted browsing” (OCLC, 2012). This, of course, means that search results can be limited by online availability, format, author,

year, language, content, and topic. On the one hand, the invoked standard of “faceted classification” is much different from what is meant in IS where it indicates an analytico-synthetic subject classification (Chan, 2007). On the other hand, there also seems to be little agreement among discovery layers about what constitutes “faceted navigation”. Yang and Wagner identify 18 facets that occur in discovery layers (none of which corresponds to a faceted system like Colon Classification or FAST) (Yang and Wagner, 2010). The point is that there is a lack of clarity as to what standard is being invoked, and that therefore it is difficult to determine whether the IOF meets its standard. Whether we judge this as an aesthetic flaw or as an elegant solution that provides some of the benefits of faceted searching within the constraints of not being able to reclassify an entire collection with (say) FAST subject headings is another matter. Whichever eventually seems more appropriate, it certainly has a different aesthetic effect than the “perspicacity” of an IOF that clearly and decisively meets its standard.

For row 4, whether the manifest standard fits its historical context, we may consider the debate over whether RDA (Resource Description and Access) should have prescribed ISBD (International Standard for Bibliographic Description) display as its predecessors AACR2 (Anglo-American Cataloguing Rules, 2nd edition) and AACR (Anglo-American Cataloguing Rules) had. For example, Michael Gorman inveighed heavily for the prescription of ISBD display, on the principle that their omission often made cataloguing displays “incomprehensible” (Gorman, 2007, p. vi). The objection may be seen as based partly on (implicit) aesthetic grounds. Viewed as belonging to a category for which ISBD display is a standard property, the records displayed without ISBD punctuation *are* incomprehensible. Viewing RDA as belonging to such a standard, however, does not fit its historical context. ISBD display was an elegant solution to standardizing bibliographic description in 1969 for a print/card-catalog environment. The punctuation is minimally obtrusive and easily decoded once the system was learned; standard ordering of elements meant reusability, and so forth. But in the historical context of RDA (ca. 2010, virtually exclusive online/hyperlinked environment) those solutions are no longer relevant: the meaning of an element is determined by the data field it occupies, not by order or punctuation; order is not necessary for reusability of the record, since databases can ignore order, and so forth. The solution that was “elegant” in 1969 is “otiose” in 2010.

In row 5 we address the issue of whether a deviation from the manifest standard should be acknowledged as “innovative” because it solves an emergent problem or makes use of an emergent technique. As a clarifying example, we may consider the first collaborative tagging systems (e.g. del.icio.us); in their historical context such systems appeared as deviating from the established systems of controlled vocabulary (bibliographic classification schemes, subject heading lists, and thesauri). On the other hand, they addressed the problems of the economic and personnel resources required by the established systems, the drawbacks of importing a non-native system, an imperfect fit with online environments. In addition they met these problems by taking advantage of emergent interactive web technologies (i.e. Web 2.0) (Macgregor and McCulloch, 2006). We therefore would view the pioneering collaborative tagging systems as “creative, innovative”; since their departure from earlier standards is a principled search for a new solution. Another example of the kind of innovation we have in mind here would be Feinberg’s framework for adding storytelling elements

such as purpose, pathos, and poetry to cultural heritage collections (Feinberg, 2010). Such storytelling elements are not a standard property of a collection, but their use can be seen as an attempt to communicate the meaning of a collection to its audience.

In row 6 we consider whether the IOF is culturally appropriate, specifically in linguistic and epistemological terms, but also more broadly in terms of human culture. As a clarifying example we consider the *Joint Thesaurus* of the Energy Technology Data Exchange and International Nuclear Information System (International Nuclear Information System, Energy Technology Data Exchange, and International Atomic Energy Agency, 2004). The thesaurus is in English, which is appropriate as the *de facto* international language of science at the time of the thesaurus' composition. The subject terms in this thesaurus are given in a highly technical form (e.g. ACETOACETIC ACID ESTERS), but this is appropriate for the stated domain of the thesaurus ("The domain of knowledge covered by the Joint Thesaurus includes physics ([. . .]), chemistry, materials, earth sciences, radiation biology, radioisotope effects and kinetics [..]" (International Nuclear Information System, Energy Technology Data Exchange, and International Atomic Energy Agency, 2004, p. ix)). Subject terms are understood to be unequivocal and their meaning self-evident; scope notes are very rare and mostly used to give the full form of entries in the form of acronyms. These correspondences point to a positivist epistemological paradigm underlying the thesaurus, which is again appropriate to the natural sciences which operate primarily from that paradigm. The aesthetic effect of this close fit between the culture of the thesaurus and the culture of its users is that for its intended users the thesaurus seems "transparent, realistic, direct"; that is the users are not drawn to notice the thesaurus itself, but to see through it to the content it represents. (Compare Danto's discussion of realism in painting (Danto, 1981, pp. 161-4).)

2. Results

Once the purpose, content, and usage of the guiding questions are clarified, we apply them to two IOFs. We select as our first subject the Library of Congress Subject Headings, as a familiar but highly complex IOF from which we could expect a wide variety of aesthetic properties to be identified. As our second subject we selected *Sexual Nomenclature: A Thesaurus* (Brooks and Hofer, 1976) (hereafter SNT) both as a historically/contextually bound IOF and as one that could be compared to a clear standard. We carry out this application guided by our neopragmatic stance. Follow Rorty's discussion of the kind of knowledge social science should create; we followed his epistemological line of reasoning, and have made usefulness as the criteria for our statements (Rorty, 1982). We hope that the findings from this research will create a vocabulary that will help us cope with the social world, specifically the social world of information organization frameworks – their similarities, differences, and various criteria for usefulness. This approach has been acknowledged as a fruitful path in LIS (Sundin and Johannisson, 2005). We assume that by taking on this conceptual view from Walton and Currie; we are not taking the final word on the aesthetics of the LCSH. We are also following a tradition of conceptual work in knowledge organization (e.g. Hjørland, 1992; and Mai, 2004). What we expect from this analysis is that we can now ask guiding questions for an aesthetic judgment of this IOF. As a result, we consider this the beginning, not the final definitive assessment.

2.1 Rubric applied to Library of Congress Subject Headings (LCSH)

The LCSH is a good example of a highly complex IOF, demonstrating the three aspects of IOFs identified previously. Its structure consists of the subject headings themselves, as imagined in their full extension (e.g. including not only enumerated headings, but headings produced by pattern subheadings, free-floating subheadings, and the like, *and* the relationships between headings). Its work processes include the procedures by which proposals for new subject headings are evaluated, subject headings are revised, and the like. Its discourse includes the official documentation of the LCSH, for example the *Subject Headings Manual* (Library of Congress, 2008) and scholarly literature describing, analyzing, and evaluating the LCSH. As such, the LCSH are particularly amenable to the aesthetic framework proposed here, which seeks to identify the aesthetic properties of the work as an action type (i.e. in terms of its work processes) which are partly identifiable by its structure (corresponding to the structure of an IOF) and partly identifiable by its heuristic (corresponding to the discourse of an IOF). Given its size and complexity, we do not propose to identify every aesthetic property of the LCSH, but enough aesthetic properties to test whether our rubric can identify the right sorts of aesthetic properties. Our application of the rubric to the LCSH follows.

2.1.1 Guiding question 1: what aesthetic properties does the structure of the IOF have? From this guiding question we are looking for aesthetic properties that depend on the structure of the IOF, on the arrangement or selection of subject headings themselves, independent of the cultural or historical context of the LCSH. Assessment of these properties, however, may be influenced by their context of variation, as discussed previously.

The dominant property of the LCSH themselves is monumentality; there are approximately 265,000 enumerated entries, not including headings constructed from pattern subdivisions or free-floating subdivisions; if name authorities are included, the number rises to over 5,000,000 (Library of Congress, 2003). That this is “monumental” approaches being self-evident, but we can compare with other large controlled vocabularies, such as the *Art and Architecture Thesaurus* (AAT) which contains about 34,880 records with 245,530 terms (including entry terms) (J. Paul Getty Trust, 2011), or the Medical Subject Headings (MeSH) which has 26,142 descriptors with over 177,000 entry terms (National Library of Medicine, 2011).

Other properties of the LCSH more clearly require reference to the context of variation. For example, another property of the LCSH is “orderliness”. While this is clearly a property of the work, we achieve a rather more subtle sense of how orderly the LCSH are if we set them within their context of variation. So, for example, if we compare them to the AAT or MeSH, again, we see that the LCSH are relatively “flat”, while the latter two vocabularies are much more “hierarchical”. Viewing these simply as perceptual properties and not, for the moment, relating them back to the vocabularies’ historical context or functional requirements, we can observe that this variation affects how we view the different vocabularies. (We discuss the historical transformation of the LCSH from a stricter subject-headings form (using associative relationships only) to a more thesaurus-like form (using hierarchical relationships also) immediately below (2.1.3). For the purposes of this comparison, we consider that the LCSH are now viewed and taught as having a hierarchical structure; cf. Chan (2007).) For example, the LCSH’s vast expanse of entries at very similar levels of specificity reinforces our sense of its breadth of coverage, and its relatively lower level of

orderliness increases our sense of its universality. The relatively high degree of hierarchy and orderliness of the AAT and MeSH, on the other hand give a sense of “rigidity” or “precision” that is lacking in the LCSH. This is hardly an exhaustive discussion of direct perceptual properties of the LCSH, but demonstrates that examining the structure of an IOF, both directly and in terms of its context of variation, is a fruitful way to identify its aesthetic properties.

2.1.2 Guiding question 2: does the IOF meet its standard (or theory, or discourse)? In this guiding question we are looking to see how closely the IOF meets its declared (or manifest) standard. Specifically we need to identify the appropriate standard and to measure the performance of the IOF in meeting that standard. It is not self-evident how this should be applied to the LCSH, since they are a historical conglomeration of practices and (therefore) *sui generis*. We therefore appeal to the discourse of the IOF (i.e. its documentation and scholarly discussion) to determine whether it presents itself as following a coherent standard.

Following this procedure we find that the LCSH does not display a high degree of coherence. For example, the LCSH describe their policy regarding regularization of headings as:

Since the inception of the list, headings have been created as needed when works were cataloged for the collections of the Library of Congress. Because the list has expanded over time, it reflects the varied philosophies of the hundreds of catalogers who have contributed headings. Inconsistencies in formulation of headings can usually be explained by the policies in force at the varying dates of their creation (Library of Congress, 2011, Library of Congress Subject Headings – Introduction – History).

This tells us that the policy is not to periodically regularize headings for consistency, but to allow historical variation. We may presume that this policy is a result of practical and economic realities, rather than a desire to limit the aesthetic sense of coherence, though we will want to revisit that when we consider the cultural context of the LCSH in a later guiding question. So, simply in terms of setting itself a standard and adhering to it, we see that the LCSH have the property of “imperfect coherence”.

Various other details taken from the discourse reinforce this sense that holding itself to a standard in the interest of producing an aesthetic sense of coherence is not a high priority. For example, the introduction of free-floating subdivisions and pattern headings are discussed as a practical measure to avoid unnecessary repetition in the printed LCSH (Library of Congress, 2011). Again, this is presented as a practical measure, not necessarily intended to take advantage of the potentials in free-floating subdivisions or pattern headings to standardize the LCSH or to give a greater sense of coherence. The haphazard practice of creating authority records for subject-heading/subdivision constructs and reluctance to excise already-established constructs which could be constructed from the free-floating subdivisions or pattern headings (Library of Congress, 2011) reinforces the sense that these were purely practical decisions.

Therefore, from our examination of the discourse of the LCSH, we can see that adherence to a hypothetical standard has not been a guiding principle. Some attempts have been made to standardize the subject headings, but these are prompted by practical considerations of usability rather than desire to order the LCSH according to abstract rules. Together these produce a sense of the LCSH as “historically contingent” rather than “timeless”. Again, this is not a comprehensive discussion of the relationship of the

LCSH to its (hypothesized) standard, but is sufficient to show that examining this aspect does give a principled way to assess aesthetic standards, and gives us results that generally correspond to an intuitive aesthetic assessment of the IOF.

2.1.3 Guiding question 3: is the invoked standard manifest? Here we are asking how readily the user who interacts with the IOF can identify its standard; a readily identifiable standard may produce aesthetic properties such as clarity, transparency, or realism, while a less readily identifiable standard may produce properties such as confusion, searching, or impressionism. Again, it may seem that application of this guiding question is not intuitive for the LCSH, since it does not have a standard *per se*, but is its own sort. However, determination of that sort of relationship (or, in this case, non-relationship) to a standard is precisely the point of this guiding question.

So, on an intuitive assessment, we can see that the LCSH cobble together elements that belong to many different standards. Again, the use of free-floating subdivisions could point to a faceted standard, but they are not in fact used this way in the LCSH. Similarly, we can assess the decision in 1986 to include hierarchical (i.e. broader term (BT) and narrower term (NT)) relationships in the LCSH. First, the inclusion of both associative and hierarchical relationships reimagines the LCSH in terms of a standard thesaurus (Aitchison *et al.*, 1997). This muddies the aesthetic analysis of the LCSH: are we to perceive them as “subject headings” (i.e. with associative relationships only), or are we to perceive them as a “thesaurus” (i.e. both associative and hierarchical relationships)? If we perceive them as “subject headings”, then their lack of conformity to the appropriate standard gives us the aesthetic sense of “imperfect coherence, disorder, struggle”. If we perceive them as a “thesaurus”, then their context of variation displays them as being particularly “flat, undeveloped”. The difficulty in selecting the appropriate standard additionally gives a sense of “friction, unsettledness”. As we expect, this analysis reinforces that developed under guiding question 2.

Second, the implementation of the conversion of the LCSH to a thesaural structure was, presumably for reasons of economic necessity, performed in a somewhat mechanical fashion. Spero describes the process:

[...] an attempt was made to automatically convert these “See Also” links into the standardized thesaural relations. Unfortunately, the rule used to determine the type of reference to generate relied on the presence of symmetric links to detect associatively related terms; “See Also” references that were only present in one of the related terms were assumed to be hierarchical. This left the process vulnerable to inconsistent use of references in the pre-conversion data, with a marked bias towards promoting relationships to hierarchical status (Spero, 2008, p. 203).

Here we arrive at a similar aesthetic effect by a different analysis; if we perceive the LCSH as a thesaurus, we see it as a rather imperfect one (e.g. “marked bias [...] to hierarchical status”), so our aesthetic perception of it is not “well-ordered, neat, balanced”, but “irregular, messy, imbalanced”, or at least leaning to that end of the continuum. There are other considerations to make when we look at this transformation in its historical context, but in terms of manifesting a given standard, we can see that our rubric gives consistent and coherent results.

2.1.4 Guiding question 4: does the manifest standard fit its historical context? Here we consider whether the standard invoked is the historically appropriate standard and whether other historical conditions necessitate deviation from the standard. In a

simple case the use of an up-to-date standard can convey properties such as “modernity, diligence, professionalism”, and the use of an out-of-date standard can convey properties such as “old-fashioned-ness, sloppiness, amateurishness”. Though, of course, more complex properties are conceivable, such as “self-conscious archaizing”. Concerning deviations from the standard here, we compare the work to its practice community; if a given problem has previously been solved by deviation from the standard, then the work will be expected to make use of that solution. The effects of following current best practices are similar to following the historically appropriate standard: close attention to the innovations of others will give the sense of “modernity, professionalism, flexibility”; adherence to the literal standard despite solutions current in best practices conversely will give the sense of “stiffness, amateurishness, rigidity”.

Again, given the historical complexity of the LCSH, it is not simple or obvious how to apply this guiding question. That is, this calls for a serious work of criticism, which it is not our intention here to develop; rather we give a quick sketch of the potential of this line of inquiry. We may focus again for a moment on the decision to introduce hierarchy into the LCSH. At an earlier time, hierarchy was studiously avoided in the LCSH for practical reasons: in a print catalog, an alphabetic (sufficiently cross-referenced) dictionary style catalog was far more usable by non-specialists than a classed (i.e. hierarchical) style catalog (Haykin, 1951). The standard adopted represents an elegant solution to the technological limitations of the first half of the twentieth century. In 1986, of course, those limitations no longer existed, since, in a searchable environment strict alphabetic listing of subject headings offered no additional benefits and the inclusion of hierarchical relationships introduced potential benefits (e.g. through automatic query expansion) at little or no reduction in usability (i.e. the thesaurus structure had by then been long established and was familiar to many users). Therefore, we can see that even though the standards for subject headings in 1985 did not call for hierarchical relationships, the fact that thesaurus structure was in fact often used to organize subject headings brought the dynamics discussed previously into play: strict adherence to Haykin’s alphabetic dictionary catalog of subject headings would have been perceived as rigid and old-fashioned, and it is an open question of whether this problem of perception (i.e. aesthetics) had as much to do with the decision to introduce hierarchical relationships as any gain in terms of usability or functional requirements.

2.1.5 Guiding question 5: does the IOF innovate away from its manifest or nominal standard in order to address an emergent technique or problem? Here we address the related issue of creativity. In guiding question 4, allowances were made for deviating from a standard in light of current best practices; here the expectation is that we can evaluate the aesthetic value of IOF’s in terms of how they advance the state of practice within their category. For example, a work that slavishly embodies the most current standards and best practices may still appear “derivative, uninspired, mechanical”, but one that displays itself as searching for new solutions, even if the final form of those new solutions has not been reached may rather appear as “exploratory, creative, original”.

Here we may consider the publication of the *Subject Cataloging Manual: Subject Headings* (SCH:SH) in 1984. Arguably, this is a substantial innovation that changed

how users, or catalogers at any rate, saw and understood the LCSH. Stone describes the impact of the publication:

It was necessary, it may be argued, to publish such a manual in order to promulgate the rules for assigning the numerous and complicated free-floating subdivisions to be used under various categories or pattern headings. But the manual provided much more information, including LC policies and procedures, scope notes, and detailed guidance on applying subject headings for particular disciplines or forms of material [. . .] From this point forward, the LCSH ceased being simply a list and became the LCSH system (Stone, 2000, p. 6).

Whatever the practical implications for catalogers, we are interested in the innovation involved here of presenting the LCSH as a system rather than a list. This exemplifies the idea of origination targeted by this guiding question. The jury may still be out as to whether delivering the rules for forming subject headings according to the free-floating subject headings and pattern headings is “better” or “more efficient” than simply forming all the potential headings ahead of time and releasing them as a list, but that is not what is at issue here. Rather we see here the publication of the SCH:SH as a creative attempt to make the mass of subject headings in the LCSH more manageable, even though, or, rather precisely because it is not a method prescribed by the standards for subject headings or established in best practices (of the time).

2.1.6 Guiding question 6: are the IOF and its manifest standard culturally accessible? Here we consider whether the linguistic usage of the IOF is appropriate to its user group, whether its epistemological paradigm is appropriate to its subject matter and/or user group, whether its user group responds appropriately to the IOF, and related issues of cultural context. The model here is that a given structure can inspire different aesthetic responses depending on what cultural context it appears in. Again, these are not simply yes-or-no questions, but different kinds of relationships between the cultural milieu presented by the IOF and its cultural context will have different aesthetic effects.

We find that applying this guiding question to the LCSH is a particularly fruitful way to assess its aesthetic axis. In linguistic terms, we could consider how the long-standing principle of avoiding overly specialized language (Haykin, 1951) is, on the one hand a practical matter of meeting functional requirements of usability for a wide audience, but, on the other hand is an aesthetic stance where the particular choice of the vocabulary of the LCSH instantiates its democratic principles. Again, in linguistic terms, we could focus on the revision of the vocabulary in the 1960s and 1970s to remove “offensive terms or subtly-discriminatory wordings of headings related to racial, ethnic, religious, or gender groups” (Stone, 2000, pp. 5-6). In terms of its epistemological paradigm, we might examine whether the LCSH’s long-standing insistence on elaborate pre-coordination is simply a practical matter (“But ultimately it was generally concluded that none of these means for subject access could fully match the effectiveness of a precoordinated, controlled vocabulary such as the LCSH system” (Stone, 2000, p. 5)), or whether the aesthetic effect of that system (along the lines of “monumental, eternal, objective”) is also an important consideration. (Consider, for example, Thomas Mann’s (1997) impassioned defense of the system). A post-coordinate system, whatever the practicalities, surely has a different effect, suggesting conditionality, transitoriness, and/or subjectivity.

2.2 Rubric applied to Sexual Nomenclature: A Thesaurus

For the second thought experiment with our rubric, we apply it to a domain-specific controlled vocabulary designed to adhere to a specific standard. Unlike the LCSH which has evolved for over a century, the SNT was created in a narrow historical context. The SNT therefore complements the LCSH in our assessment of the rubric and suggests the applicability of the rubric over a broader range of IOFs.

2.2.1 Guiding question 1: what aesthetic properties does the structure of the IOF have? Here, again, we consider the perceptual properties of the SNT directly. Directly, we can observe an allowance for variation. Descriptors include abstract nouns (e.g. “Child parent relationships”, “Childlessness”) concrete nouns (e.g. “Child victims”, “Children in photographs”), and gerunds (e.g. “Cloning”). Cross-referencing is uneven (e.g. on p. 14 related terms number from 0 to 3). To consider the position of this variation in the context of variation, we can compare the SNT to other subject thesauri. For example, the *Alcohol and Other Drug (AOD) Thesaurus* has relatively little variation, with virtually all descriptors being abstract nouns, though cross-referencing also varies from entry to entry (National Institute on Alcohol Abuse and Alcoholism (US), 2000). For another example, the *Astronomy Thesaurus* (Shobbrook and Shobbrook, 1990) uses abstract and concrete nouns almost exclusively, and has a similarly wide range of cross-referencing. Therefore, viewed from the perspective of the context of variation within the category “thesaurus” the use of gerunds and abstract and concrete nouns, the variation in level of cross-referencing are unexceptional. The aesthetic properties dependent on the structure of the SNT, set in its context of variation are “ordinariness”, “typicality”, even “transparency”, in that the standard features of the category do not obtrude, once we see this as a thesaurus.

2.2.2 Guiding question 2: does the IOF meet its standard (or theory, or discourse)? The SNT explicitly references its standard as the 1974 ANSI Z39.19 standard for thesaurus structure, construction and use (American National Standards Institute, 1974). We will not exhaustively compare the SNT to the standard, but here we will examine the establishment of term definitions for purpose of illustration. The checklist of properties of term definitions appears in Table II.

Standard property of ANSI Z39.19-1974	SNT practice
4.3.1 BT/NT relationships restricted to genus/species relationship	Not strictly followed; also uses for whole/part relationships and other less well-defined relationships; see discussion
4.3.1 USED FOR relationships indicates subsets of the preferred term	As standard, with a few exceptions, see below
4.3.1 RT indicates that the meanings of the two terms are to be differentiated	As standard
4.3.2 Adjectival modifiers are allowed	As standard
4.3.3 Distinguish homographs with parenthetical qualifiers	As standard (no examples)
4.3.4 Identify trademarks as such	As standard (no examples)
4.3.5 Use scope notes to further restrict the use of a term	Used more widely than examples given in standard, but within literal bounds; see discussion

Table II.
Term definition
standards and SNT
practice

Many of the BT/NT relationships in the SNT are formed according to the strict genus/species model prescribed by the standard, for example CHILDBIRTH has the narrower terms CAESAREAN SECTION and NATURAL CHILDBIRTH each of which “is a kind of” childbirth. In other headings, though, we can see clear examples of the whole/part relationship, which is not countenanced by the standard. For example, VULVA has the NT CLITORIS, which has the “is a part of” relationship. Some other relationships notated as BT/NT are less clearly principled. For example, ANNULMENT is defined as “the legal voiding or abolishing of a marriage”, that is, as a process; it is notated, however as a NT of DOMESTIC RELATIONS LAWS (as if the descriptor could be understood as “annulment law”, but it is not so defined), which fits neither the genus/species model (a process is not a kind of law) nor the whole/part model. As defined ANNULMENT does fit under its other BT, FAMILY DISORGANIZATION (annulment is a kind of family disorganization).

The SNT almost invariably uses USE/USE FOR (UF) relationships to indicate equivalence relationships. For example: CHILD PARENT RELATIONSHIPS has the UF PARENT CHILD RELATIONSHIPS, CLIMECTERIC has the UF MENOPAUSE. This may represent the emergent best practice of the time, as equivalence relationships replaced subset relationships in later versions of the standard (National Information Standards Organization, 1993). A few exceptions do not follow this pattern, for example CHILD REARING ADVICE has the UF POPULAR ADVICE; here we must understand that the concept “popular advice” cannot simply be indexed as CHILD REARING ADVICE, but tested to see if it fits this term (is really “popular advice about rearing children”), and, if not, another term must be sought. That is, POPULAR ADVICE has neither a subset relation nor an equivalence relation to CHILD REARING ADVICE. This was the exception, though, and most USE/USE FOR instances were equivalence relations.

The use of scope notes is somewhat atypical in that *every* entry includes a scope note that is most often in the form of a definition, and sometimes more narrowly, direction on when to use the current term as opposed to one of its RT. Although this was not the most common practice, it does fit the letter of the standard which allows for scope notes for clarification and advice on indexing, and does not explicitly prescribe their form or extent of use.

The aesthetic properties dependent on how closely the SNT meets its standard, based on the examination of descriptor definitions, are somewhat conflicted. On the one hand, the SNT adheres closely to the standard on most of the guidelines surveyed; it is clear from this that the creators were striving for the effects of “professionalism, modernity, clarity” that a strict adherence to the published standard could provide. On the other hand, the deviation from the standard that BT/NT relationships often are not genus/species relationships, and in a noticeable number of instances not even whole/part relationships is perceived as significant. The exact aesthetic properties that depend on this deviation also depend on the historical context of the SNT, for example, how strictly was the “is-a” rule applied in thesaurus construction in the early 1970s, or, is there another principle at work here that we might see this deviation as an innovation. On its own, though, this aspect of the thesaurus has the property of “jarring, unsettling”, as if an otherwise realistic painting broke the rules for perspective.

2.2.3 Guiding question 3: is the invoked standard manifest? In the most direct sense, the invoked standard of the SNT, namely ANSI Z39.19-1974, is manifest, since it is

explicitly referenced on p. viii. More broadly, a casual inspection of the SNT reveals that the standards for thesaurus construction are the appropriate category within which to view the SNT. Descriptors indicate use-for terms (UF) broader terms (BT), narrower terms (NT), related terms (RT), and scope notes (*SCOPE). Non-preferred or “lead-in” terms are also included (USE). For our purposes of illustration we will focus on term formation. A checklist based on ANSI Z39.19-1974 for what we identify as standard properties of this category appears in Table III.

Deviations from the standard concerning term-formation are minimal and do not cause any ambiguity in perceiving the SNT as belonging to the category described by ANSI Z39.19-1974. The prescriptions of the standard for use of singular or plural nouns are not exhaustive; the SNT evidences some deviations from the standard, but these are easily understood as preferring prevalent usage in the literature indexed. For example, the standard indicates that the plural should be used for all classes of things, including parts of the body, giving the example of “teeth”. The SNT however uses the singular (e.g. clitoris, vulva, prepuce). This apparently reflects usage in the literature, and later versions of the standard came to reflect this usage (3.5.1.1) (National Information Standards Organization, 1993). Similarly, the standard does not give clear guidelines for abstractions when they are not obviously processes or properties. This ambiguity is reflected in the usage of the SNT, which uses singular for “law, animal behavior, sociology, victimology, pedophilia, etc.” and plural for “child parent relationships”. A few other term forms do not follow the standard here without a clear overriding principle: “clitoral ritual mutilations, genital ritual mutilations” (should be singular as a process). Similarly, there are a few apparent deviations from the rule of direct entry: “child parent relationships” (normal usage is “parent child relationships”) “women medical advice” (normal usage is “medical advice for women”; see the scope note for WOMEN MEDICAL ADVICE: “popular press works for women . . .” (Brooks and Hofer, 1976, p. 303)). Use of punctuation is according to standard (i.e. minimal), with the exception that the (contra-standard) subdivisions would appear with dashes; for the subdivisions generally see the following.

Standard property of ANSI Z39.19-1974	SNT practice
4.2.1 Terms should be in noun form	As standard
4.2.2 Single-word and multiword terms allowed	As standard
4.2.3 Adjectives allowed when coordinated with noun terms	As standard
4.2.4 Use singular for processes, properties, and unique things; use plural for classes of things	Unclear, see discussion
4.2.5 Direct entry	As standard with few exceptions; see discussion
4.2.6 Punctuation, use only: parentheses for ambiguity control, hyphens in proper and trademarked names only	As standard
4.2.7 Use abbreviations only when well-established	As standard

Table III.
Term form standards and
SNT practice

2.2.3. *Guiding question 4: does the manifest standard fit its historical context?* Here we examine the historical background of the selection of the standard. According to its self-description, the SNT was developed using a draft of the ANSI 39.19-1974 even before it was finally approved (Brooks and Hofer, 1976). Descriptor terms were taken from the LCSH where available. Additional descriptors were added, explicitly using literary warrant (Brooks and Hofer, 1976), as one of the methods prescribed by ANSI 39.19-1974 (section 1). The syndetic structure of the descriptors was also established primarily using literary warrant and secondarily using scholarly warrant in the form of standard reference works (Brooks and Hofer, 1976). Based on its self-described historical context then, we see that the SNT appealed to current standards and best practices at the time of its construction. In terms of its historical context, then the SNT appears “modern, professional”. It seems likely that special care was taken to foster this aesthetic response, beyond what was needed to satisfy functional requirements, in an effort to engender or maintain a sense of professionalism in a field that at the time continued to struggle for a sense of legitimacy.

2.2.5 *Guiding question 5: does the IOF innovate away from its manifest or nominal standard in order to address an emergent technique or problem?* Here we examine any innovations or deviations from the standard to see to what extent they merit special admiration for being creative solutions to problems or uses of emergent techniques. The most salient divergence from the standard in the SNT is its use of LCSH-style subdivisions with many subject headings. Four subdivisions are indicated: (AGE), (M/F), (GEOG), (HIST); that is age groupings, male/female, geographical location, and historical period. These are, of course, not mandated (or even described) by the standard, and are presumably modeled on the geographical and historical period subdivisions then used by the LCSH. The introduction to the thesaurus notes that many of the subject headings were taken or based on LCSH, and the selection of highly pre-coordinated subject headings reflects the language of the contemporary debate on pre-coordination with regard to the LCSH (“multiword concepts and extensive precoordination of terms were chosen because of our manual retrieval system” (Brooks and Hofer, 1976, p. viii); see (Stone, 2000)).

It is difficult to make an exact assessment of the aesthetic effects of this deviation. On the one hand, a certain amount of creativity is involved here in adapting the subdivisions from the LCSH to fit the specific subject matter, that is, introducing the (AGE) and (M/F) subdivisions. On that basis we can consider them “innovative”, if in a somewhat limited way, since the LCSH subdivisions were not then an emergent technique. On the other hand, the (GEOG) and (HIST) subdivisions seem to have been more mechanically adopted from the LCSH without particular consideration for their new context; it is not clear that subdivision by geographical location and historical period are useful in a collection of less than 100,000 items (Brooks and Hofer, 1976). That is perhaps left as a question of functional requirements: whether the descriptive function of subject cataloging or its collocating function had greater priority. On the aesthetic level, though, the subdivisions give a sense of elaboration, complexity, or fine granularity. That sense may reinforce the sense of diligence, but given the potential misfit with the scale of the collection the SNT is meant to describe it may instead appear “rococo”, elaborated for its own sake, which would be in contrast to the sense of “professionalism” elsewhere sought by the thesaurus.

2.2.6 *Guiding question 6: are the IOF and its manifest standard culturally accessible?* In considering cultural accessibility, we assess linguistic usage and epistemological paradigm in relation to the intended user-group, along with user response and other

cultural issues. In the case of the SNT, we observe several tendencies that do not seem perfectly reconciled. First, there is a tendency to select “scientific” forms of terms, or at least ones that produce a similar sense of impersonality or distance. A brief selection of preferred terms (USE) compared to non-preferred terms (UF) shows this tendency; see Table IV.

This tendency is not absolute, as in the case where the preferred term “Child victims” has the non-preferred equivalent “Pedophilia victimology” (in this case, the less technical term seems to have been chosen to make the syndetic structure with other terms in the form “Child . . .” clearer in the alphabetic listing). As a general tendency, though, we also see this reinforced in the decision to rely on scholarly warrant where literary warrant was insufficient to determine the definition of the term (Brooks and Hofer, 1976). The aesthetic property that depends on this set of decisions is a certain coolness or distance that fits well with the sense of professionalism we see as the goal of the thesaurus elsewhere.

Second, there is a tendency to use LCSH-like terms in general usage, which is not always reconciled with the tendency to prefer scientific forms. For example, the NT under ANIMAL SEX BEHAVIOR includes more technical forms (AMPHIBIAN SEX BEHAVIOR, INVERTEBRATE SEX BEHAVIOR, MAMMAL SEX BEHAVIOR, REPTILE SEX BEHAVIOR) and parallel but non-technical forms (BIRD SEX BEHAVIOR, FISH SEX BEHAVIOR). The NT under PSYCHOLOGY display similar variation, with technical terms (COGNITION, IMPRINTING, PHRENOLOGY, etc.) next to terms taken from natural language (DREAMS, VIOLENCE, SLEEP); in this case the variation may be explained as being simply copied from the LCSH, but the effect of the failure to reconcile the two principles remains.

This is an example of linguistic usage reflecting cultural accessibility. The unresolved tension between preferences for scientific or technical terminology and popular usage (presumably under influence from the LCSH) produce an aesthetic effect of unevenness, uncertainty, or tentativeness. This could reflect a more complex sense of flexibility or of not wanting to impose a rigid vocabulary on an evolving research area. On the other hand, a stricter adherence to technical vocabulary would fit more coherently with the general sense of the thesaurus to aim at professionalism. Arguably either linguistic usage could be judged appropriate to the context of the user group as professional researchers.

We very briefly suggest some further approaches in this area. The very extensive cross-referencing of related terms in the SNT seems fitting for the general area of the social sciences, where a more hierarchically-oriented thesaurus would be expected in the natural sciences, and an apparatus for assigning proper names as subject headings would be appropriate in the humanities (Tibbo, 1994). The fitness on the level of epistemological paradigm lends a sense of “transparency” or “realism” to the thesaurus. The introduction to the SNT indicates that its initial period of use showed that its user-group suggested a number of additions and corrections (Brooks and Hofer, 1976). A close inspection of these additions and corrections (and the work-process for

Preferred term	Non-preferred term
Child parent relationships	Momism, parent child relationships
Child rearing advice	Popular advice
Climacteric	Menopause
Orgasm	Climax

Table IV.
Preferred and
non-preferred terms in
SNT

maintaining the thesaurus) would provide further insight on its cultural appropriateness and aesthetic effects that depend on it.

3. Conclusions

In conclusion, we have identified the problem that implicit aesthetic judgments of IOFs lack an aesthetic framework from which to draw their principles; as such they remain implicit and pre-reflective, a state which tends to result in unpredictable interference with other axes of assessment of IOFs. We therefore propose such an aesthetic framework appropriate to IOFs. To that end we surveyed the current literature in philosophical aesthetics and identified a core set of theorists who discuss the problems of representation and the ontology of art. From the work of these theorists we identified seven key principles that appear particularly apt to the assessment of aesthetic properties of IOFs. We then operationalized these principles in an evaluative rubric. Finally we applied the rubric to two widely disparate IOFs, the LCSH and SNT.

3.1 Discussion of results

The LCSH is a highly complex IOF that has evolved over time; it was not reasonable to exhaustively examine even the subject headings, much less its work processes and discourse. Rather, we examined a few aspects of the LCSH that allowed us to test the various fields of our rubric. Given its discrete nature, we were able to examine the SNT more thoroughly, but the goal was the same, to see if the rubric was useful in making implicit aesthetic judgments explicit (i.e. identify them as aesthetic judgments and frame them in aesthetic terms) and in making pre-reflective aesthetic judgments post-reflective (i.e. from “this seems fitting” to “this seems fitting because of x, y, and z”; space is created for the judgments to become principled). We see three main trends in the results: intuitive assessments of the IOFs are often confirmed, the rubric aided in the discovery of further areas of aesthetic judgment, and the rubric provided direction for reflecting on the nature of the aesthetic judgments.

3.1.1 Confirmation of intuitive aesthetic assessments. Perhaps it is not surprising that many of the aesthetic properties our rubric led us to identify are ones that anyone familiar with the IOF would also make. We do not need a philosophical framework to get the impression that the LCSH are “monumental” or “imperfectly coherent”, or that the SNT is “distanced, scientific” or “flawed”. Rather, what we see here is that the rubric does what we intended in making implicit judgments explicit. We do not suddenly become aware that there are very many subject headings in the LCSH. Rather, the gain here is that we can reassess arguments about the extension of the LCSH with the knowledge that they may be preferred or dis-preferred on the aesthetic grounds of their monumentality. We may see that the Library of Congress has aesthetic grounds for preferring extension on the basis that a monumental controlled vocabulary is fitting for a national library; we can then reflect on that preference: how does it weigh against concerns for usability, economic considerations, and the like. In the case of the SNT, we can justify our impression that it is “flawed” by pointing to the lack of strictness in using BT/NT relationships to reflect genre/species relationships, or applying LCSH-like subdivisions within the context of appealing to ANSI Z39.19-1974. That is, neither practice is a flaw *per se*; the MeSH similarly use BT/NT to reflect part/whole relationships, and subdivisions are fitting within the LCSH. They appear as flaws in the SNT because they are contra-standard properties of its category, and their

inclusion does not appear as an innovation to overcome a particular problem of representation.

3.1.2 Discovery of further areas of aesthetic judgment. In partial contrast to our first theme, we also found that the rubric led us to consider aspects of the IOFs as subject to aesthetic judgment that were not easily identified by an intuitive or naïve approach. For example, it did not appear to us intuitively obvious that the *Subject Cataloging Manual: Subject Headings* was a locus of aesthetic properties, but once we were guided by the rubric to identify novel or creative approaches to representation, it became clear that the SCM:SH is admirable as a creative attempt to represent the relationships between the subject headings, whether or not it is particularly effective at meeting the functional requirements of the LCSH. Similarly with the SNT, it is not necessarily apparent on a superficial inspection that the thesaurus aims for a sense of professionalism, but our rubric led us to examine the implicit principles of its construction, such as explicit adherence to a published standard, term selection, and attention to historical context that clearly point to fostering an aesthetic response of detachment, scientific-ness, or transparency (even though, in our judgment, other factors impeded the actual creation of such a response).

3.1.3 Direction for reflection on nature of aesthetic judgments. Here we move from confirmation or identification of areas for aesthetic judgment to the assessment of those judgments. That is, from the motion from implicit to explicit judgments to the motion from pre-reflective to post-reflective judgments. We found that the rubric gave some direction for this kind of reflection. For example cell 1.5 directs evaluation of perceptual properties within the context of variation of the category of the IOF. Thus when we examine the perceptual properties of the LCSH, it was not enough to say that it is “monumental” or has “relatively little hierarchy” simpliciter, but we substantiate that it has these properties in comparison to other large systems like the AAT or MeSH. Similarly with the SNT, we found that the rubric led us to reflect on our aesthetic impressions, in the first place by comparing the SNT with thesauri of similar scope. Moreover, the process of applying the rubric led us to look at an anomaly or feature of the thesaurus and try to imaginatively reconstruct what the authors were trying to do. For example, the rationale for the inclusion of geographical and time period subdivisions in the SNT is not self-evident in terms of the functional requirements of the system, given that the collection contained only 36,000 text-documents and that they are in usage only sparingly (Brooks and Hofer, 1976). When we combine this with other observations prompted by the rubric, that the subdivisions were added over and against the explicit standard and that the forms of subject headings were taken over from the LCSH were possible, a narrative begins to emerge that the authors of the SNT wanted to give the impression of similarity to the LCSH. This similarity is a matter of aesthetics; the structural reference allows the SNT to reference further properties of the LCSH, for example, of being mainstream, authoritative, and the like.

3.2 Directions for further research

In pursuit of this project it has repeatedly been necessary to maintain a narrow scope, so that we could make the necessary first steps of identifying an appropriate theoretical framework from which to make principled aesthetic judgments of IOFs and of operationalizing that framework in a rubric with which we could engage in

meaningful criticism of the aesthetic properties of specific IOFs. At many points, then, engaging or problematic issues have been deferred as sites of future research.

3.2.1 Conceptual issues. We encountered several large-scale conceptual issues in the course of this project that it was not practical or within scope to address, but which remain important concerns for future research. First among these is the need for a program to develop a context of criticism based on the principles developed here, if they are accepted. In our examination of the LCSH and SNT we assigned aesthetic properties as dependent on the structure or heuristic of the IOFs on a more-or-less intuitive basis, since our goal was to demonstrate that the rubric identifies the aspects of the IOFs that are relevant for such judgment, not that it performs the judgments automatically. In any critical context, judgment is based on previous judgments (precedent) and dialogue between qualified judges. One person's perception may be idiosyncratic but critical consensus approaches identification of objective properties.

A related area for further research is identification of appropriate aesthetic properties that may be held by IOFs. There is a substantial body of literature within the field of aesthetics on the topic of aesthetic properties (summary in Levinson (2003)). We have withheld addressing this topic here, since the aim of this paper is to establish a framework within which identification of such properties as belonging to IOFs is sensible. Therefore considerable work remains to be done in addressing how specific aesthetic properties can be identified in IOFs. In identifying the properties of the LCSH and SNT, we again proceeded on an intuitive basis, identifying properties that seem noncontroversial for IOFs, such as elegance, harmony, balance, unity, coolness, distance, and the like. In regard to other properties commonly assigned to artworks, such as beauty, sublimity, power, depth, sadness, cheerfulness, and the like, it is less clear whether they can apply to IOFs and how they might be identified. Such work on identifying appropriate aesthetic properties could also be useful for their use as indexing terms, as suggested by Huvila (2010).

Third, the question of whether the specific framework we rely on here is culturally limited, specifically, whether the conception of aesthetics as revelation of various properties, as opposed to a more kinetic conception, as discussed in section 2.3 (part 1) in the companion paper, requires investigation. There is some evidence that non-Western aesthetics can call for interactive, rather than distanced responses (Feagin, 2007). This is more properly an issue of philosophic aesthetics rather than information science, but further work on this topic should be noted.

3.2.2 Application. This project has been carried out as a sort of thought experiment to explore the possibilities of assessing the aesthetic axis of IOFs, and how such a project might be carried out. In the tradition of thought experiments we have relied on our sense of what is reasonable, what is intuitive, and what is counter-intuitive. On the one hand, it is necessary to recognize the limitations of this approach, that, though we have attempted to guide our intuition by the principles we derive from philosophic aesthetics, ultimately this kind of criticism is a humanistic endeavor and relies on individual experience, insight, and intuition. The results of this kind of theory-building are something about which reasonable people may disagree. On the other hand, despite these limitations, we find that the thought-experiment is the appropriate method for this stage of the project, since it allows us room to expand the field of inquiry concerning IOFs, to ask questions that have not been asked before, and to suggest how they might be answered. In this sense, reasonable disagreement need not show that the approach is

mistaken, but points the way forward. In any humanistic endeavor such dialectic points out what must be clarified, revised, or rethought, and that is the creation of knowledge. Therefore it is our hope and expectation that our readers will apply this approach for themselves and decide what is useful and what requires further work.

In a similar way, assessing IOFs as subjects of aesthetic properties revises our view of what an IOF is. We began this study by justifying such assessment in terms of the role of human creativity in such frameworks, and we find that such an assumption is repeatedly justified when we look at IOFs not as abstract structures, but as human creations in specific historical and cultural contexts. When we adjust our view in this way, we can see that, like artworks, IOFs are ways of saying something new about the world, of giving a voice to groups of people, and of solving human problems. And that is why we organize information in the first place.

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