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Patron Expectations about Collocation: Measuring the Difference between the Psychologically Real and the Really Real

Patron Expectations About Collocation: Measuring the Difference Between the Psychologically Real and the Really Real

James M. Donovan

ABSTRACT. Library patrons have innate expectations about how documents should be arranged. Useful classification schemes are those which conform to these expectations and are thereby psychologically comfortable. All schemes necessarily deviate from these expectations, but not to the same degree. The greater the divergence from this mental standard with a scheme, the greater the psychological discomfort the patron will experience and the less useful the patron will find it. Using as an example the discipline of anthropology, this article develops a measure of the deviation of library classifications from collocation in mental space.

INTRODUCTION

The decision to employ a classification scheme is influenced by many variables. Common considerations include the amount of external support the candidate schemes have acquired, and the cost-per-item of each. Information bearing on patron reaction is equally important. While all schemes are equally able item locators, they

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vary in the ease with which a patron will find useful materials for which he or she was not specifically looking (i.e., by serendipity). All things being equal, a scheme optimizing serendipity by bringing together all items of interest to the patron would be expected to generate greater patron satisfaction, and hence be the better choice for implementation.

The ideal, of course, is not easy to realize if for no other reason than because a single item cannot be physically located simultaneously within all categories in which it claims membership. The technical aspects of theatre or television, for instance, may be either separated or collocated with the artistic. Both placements are defensible, but with only a single copy of the item to be placed on the shelf, one possibility must be preferred, and complete collocation rendered impossible.

Schemes reflect these preferences, and as a result collocate differently. Given a range of options, patrons can be expected to prefer some to others, and it then becomes a research task to measure these varying levels of responses. Patron satisfaction can be gauged roughly by user surveys,¹ thereby permitting the librarian to include this variable in the selection process. But although this method might be sufficient at the *practical* level of a particular case, it raises several objections at the *theoretical*.

First, the survey can discriminate only between "good" and "bad" relative to an ideal standard. But if all surveys showed users to be satisfied with their schemes, the data cannot further discriminate "more" or "less" satisfaction between the schemes unless one is in the rare circumstance of having a large population of frequent users of multiple classification schemes. This is because different populations evaluating different objects cannot be directly compared. Consequently, results can seldom be rank-ordered (e.g., "Patrons prefer Dewey to LC"). Surveys must limit their conclusions to nominal groupings of "satisfactory" and "unsatisfactory" from the patron's perspective ("Dewey users report being satisfied with their scheme"). But members of each of these nominal groupings are of equal status, statistically if not intuitively. In other words, schemes classed as "satisfactory" by this method cannot further sort themselves out into those *more* satisfactory than others.²

Second, the survey approach cannot *predict* the patron response

to an entirely new scheme for which there are no prior users. Yet prediction of the compatibility of patron to scheme might simplify the selection process.

This essay seeks to explore one factor which affects patron satisfaction with classification schemes. The theoretical discussion is brought into the "real world" by an attempt to quantify these factors. Possible benefits of this exercise include a uniform criterion by which existing schemes can be rank-ordered, and a method for predicting patron reactions to the proposed introduction of a new scheme.

This discussion treats the greatest imaginable displacement of a classification scheme, creation in one cultural context followed by its introduction into a second. The expectation is that by examining the difficulties on this scale, we might discern principles which are valid in less traumatic displacements, be it from one library to another, or from an innovator's mind to its first collection.

I. THE PURPOSE OF CLASSIFICATION

Psychological processes are a major factor in the present essay. If other workers such as Ranganathan try to build schemes based upon dissection of what a work is objectively "about," this paper begins by considering what patrons subjectively *think* it is "about."

Eichman reviews the common complaint among librarians about the "lack of specificity in the opening reference questions." Besides their obvious intent to state an information need, initial requests acquire this general form, he suggests, because they also serve phatic (channel-opening) functions. It is this second which prevents the reference query from being as exact as the patron later proves capable of framing it.

He is probably correct as far as he goes, but reasons for the appropriation of these surface linguistic features to serve this function are not explained. A later section argues that humans enter classification schemes at what is known as the "basic level," and expand or contract from this reference point. Basic level terminology (e.g., bird, house) shares with initial queries the trait of being too general to identify specific items within the library. Combining these observations ultimately depicts the general reference query as the pa-

tron's verbalizing the steps of his or her own thought processes as he or she begins at the basic level and progressively "zeroes in on" the desired materials.⁴

This observation is critical. It implies the psychological reality within a patron's mind of the structure of topical categories. A too-general reference query may be inadequate to identify an item on the shelf, but the mere fact that the patron has started there is reason to assert that the patron expects the desired material to be contained within the requested category.

That subjects have a psychological reality for users is not a new idea. Farradane, a prominent classification theorist, asserts much the same point. Classification, he says, "is not some part of an external 'reality,' waiting to be discovered; it is an intellectual operation upon mental entities and concepts."⁵

Granted that patrons seem to have broad but firm ideas regarding the "aboutness" of intellectual materials — a concept to be explored in section IIB — and their arrangement, the categories of initial requests should ideally correlate with those of the classification system. If, in other words, the patron asks for a book on birds, he expects that a section in the library contains all bird books. Otherwise, the initial query would not be merely too general, but rather meaningless. To the extent that they do not (e.g., bird books are spread out into many different places), the system is awkward and irrational from the patron's perspective, regardless of its logical consistency from the librarian's.

It is not irrelevant to consider which perspective should be given priority. On this matter there is no clear consensus. While Dewey claims that "the only real test of any skeme [sic] is its helpfulness to its uzers [sic],"⁶ Farradane argues that "the system of order required must be not just helpful but an accurate, even though necessarily simplified, representation of the state of knowledge."⁷

These goals are not mutually exclusive, of course, as suggested by Farradane's later conclusion that "the closer a classification approaches to the true structure of knowledge, the more useful it will be."⁸ Still, conflicts between the two can arise, and how these are resolved depends on which is given higher priority. There is no objective justification for favoring one over the other in all circumstances. The value premise informing this essay, therefore, is that a

classification scheme's most worthwhile goal in ordering books on library shelves is maximum usefulness to its patrons.

"Useful," of course, is a difficult term to unpack. At least two separate dimensions are included in the concept. First, there is the intersection of patron needs with library resources. Since needs vary from one patron to the next, and from one moment to another even for a single patron, what is useful to one person at one time may not be so later. This dimension of usefulness is highly erratic, and will not be explored here.

The second aspect of usefulness may be termed "psychological comfort." Most human social life is organized by a priori expectations about how people will behave. Serious deviation from these expectations can cause a person to "be considered not only a fool or a knave, but a madman."⁹ Failed expectations complicate relations between parties; that which does the unexpected is unpredictable, and humans have a low tolerance for the ambiguous.

As discussed above, patrons have expectations about the organization of materials. By extension, failure of the shelving scheme to fulfill these expectations creates a sense of frustration. In the extreme, an unpredictable arrangement may be judged to be "crazy" or "stupid."

When the scheme performs as the patron expects that it should, by bringing together all materials which are "about" the same thing into the same area, he or she may be said to be psychologically comfortable with it. Disappointments and unpleasant surprises are kept to a tolerable minimum. This is the dimension of usefulness with which this essay concerns itself.

In sum, the field of library science has already been introduced to the ideas that humans have innate algorithms for categorizing, that classification schemes should reflect this mental reality, and that one which does so maximally will also be maximally useful. This article adds the minor claims that patrons expect correspondence to hold; schemes which deviate significantly from these expectations generate frustration and are less useful to patrons; and the source of these unexpected groupings is the application of idiosyncratic and self-conscious intellectual premises.

II. SUBJECT CLASS AND ACADEMIC DISCIPLINE

A. Equating Subjects and Disciplines

Having stated the primary goal for a classification system, we can evaluate schemes for their success by comparing patrons' expected broad groupings with the schemes' major divisions. The comparison enables a determination if these divisions further the desired goal (i.e., if they match the expectations, the scheme has passed the first test of usefulness, which we have termed "psychological comfort"). The worst case scenario of cross-cultural transference, however, shows that patron expectations and classification categories can be at odds, although misleading effects of identical labeling can mask these differences.

As readings on the history of classification theory illustrate, groupings of materials build complex intellectual categories called "subjects," which bear strong resemblance to the disciplinary divisions within the university. Although subjects have a tendency to be treated in classification theory as though they were natural, objective (i.e., "real") categories, in fact they are arbitrary assemblages dependent upon time and place: one culture's religion (Dewey 200s) can easily be another's folklore (Dewey 390s). The categorization which necessarily precedes classification is therefore the product of a specific cultural and intellectual milieu.

It should come as no surprise that the correlation between academic disciplines and the broad divisions of classification schemes is practically perfect.¹⁰ As an extreme case, Bliss' Bibliographic Classification, at least in the second revised version, is reported to have gone out of its way to guarantee that each group would be a discipline explicitly corresponding to a university department.¹¹

The equation between the major subject classes and the academic disciplines would present fewer difficulties if disciplinary rubrics were similarly defined in all societies. Equivalency holds for some fields, particularly those of the natural sciences, but not all. As an example, we can compare the intellectual contents of the disciplinary rubric "anthropology" cross-culturally. The United States is unique in its practice of defining anthropology by a "four field" theory, comprised of sociocultural, linguistic, and physical anthro-

pologies, as well as archaeology.¹² The British, on the other hand, are notable for their explicit exclusion of linguistics for theoretical reasons, while German schools of anthropology restrict themselves almost exclusively to ethnography.¹³ In both British and German traditions, archaeology is coordinate with, and not subordinated by, anthropology.

Use of an American scheme in Germany may therefore be dismissed by Germans as being too broad due to the inclusion of topics which belong elsewhere. On the other hand, a German or British schedule in the United States would appear to Americans to be too restrictive, dismembering and scattering the body of anthropology. Were one culture to adopt the scheme of some other, the collection could fail to meet the primary goal of patron usefulness.

This cross-cultural Charybdis and Scylla traps librarians. They must navigate between the mutually exclusive goals of making their collections maximally useful to their own patrons or designing their systems to be uniform and interchangeable from one setting to another. In the effected compromise, culturally idiosyncratic renderings of disciplines, which are needed to maximize the psychological comfort of local patrons, are valid only if they remain within their original environments.

Yet even if there existed a cross-cultural identity regarding the contents of disciplinary rubrics, at least one other problem with the subject/discipline equation presents itself. Because all works can be accommodated somewhere, even if only in a trashcan miscellaneous category, classification schemes effect a complete ordering of human knowledge. Comprehensive systems are not by this fact alone also maximally useful systems. At issue is the relevance of these disciplinary categories for the needs of the typically "naive," as opposed to the academically specialized patron. Although some patrons may in fact ask for books on anthropology or physics, requests such as "I'm going on a trip to Pago-Pago, and want a book that will tell me something about the place," or "I am interested in finding out about the relationship between quantum mechanics and Taoism," are more likely. Division by academic disciplines offers little aid in these situations.

Shelving materials so that they collocate the needed books for these examples would breach the integrity of disciplinary bounda-

ries. Materials on Pago-Pago would come from disparate areas, while the second request requires the intersection of two disciplines which are far afield. The point here is that, granting that the equation of basic classification categories with academic disciplines yields a logical system in the strict sense, this arrangement is only one from among many possible, equally logical systems. And even were this not the case, it bears repeating that the goal of classification is not to construct a logical system, but a useful one.

Arrangement by discipline, therefore, is a dubious practice on at least two counts. First, it introduces intellectual assumptions which are often not valid outside their original contexts. Second, it creates confusion because most works are not pure in their disciplinary contents, instead mixing or contrasting disparate fields of study. Systems based on academic disciplines cannot easily and neatly accommodate such heterogeneous materials in a way that is maximally useful to the patron. Current library classification schemes, then, must *inevitably* generate some psychological discomfort for their users. We will want to know how much.¹⁴

B. Aboutness

There are difficulties of another sort from centering library classification around the university disciplines. Patrons want books "about" sundry things, but disciplines, and hence schemes, are not sensitive to this concept.

Academic disciplines may be viewed as the nonexhaustive combinations of intellectually broad questions or problems and the methodologies deemed appropriate to explore them. They can apply the same methodology to different questions, or different methodologies to address the same question. Thus, physics and chemistry both use the hypothetico-deductive, positivistic method to investigate material reality, but for chemistry the questions are one integrative level above, hence qualitatively different from those of physics. On the other hand, sociology, having perfected the survey method and the techniques of statistical analysis, and anthropology, employing participant-observation and interviews, use different strategies to study the same topic, Man-in-Groups.

Patron interests are most frequently phrased in terms of what

something is "about." "Aboutness" is a concept which has been used without discussion in earlier sections, but here our train of thought forces us to consider more explicitly the meaning of the term. Judgments about what a work is "about" are largely intuitive, depending very much upon what the reader has, for his or her own reasons, chosen to focus upon. At one extreme, poetry and art are given different interpretations as to what they are "about" depending upon the sensibilities of the consumer. This is the sticking point in many obscenity debates, for a work that is "about" sex and pornography for one can be "about" more sublime matters for another. A single item, therefore, can be "about" many things, some of which are mutually exclusive.

There is a sense, though, that a work is *really* "about" only one thing, with other readings being judged either misinterpretations at worst, or at best relatively minor themes when compared to this major one. Noncontroversial judgments of this type depend upon authoritative statements either by the producers of the work or by other specialists to whom we as a society have delegated responsibility for knowledge of this sort. If, for instance, the poet tells you what the poem is "about," then that usually settles that argument, although it may well open others about how well he or she succeeded in his or her intent.

Scientific materials are usually clearer than the artistic in what they at least intend to be about. By definition each discipline has a circumscribed intellectual domain. A work generated within the field can be assumed to be "about" issues within that limited area, though not necessarily restricted to these. This last sentence, if accepted, has major ramification for our study. For if we define academic disciplines as the conjunction of problem with method, "aboutness" judgments appear to take cognizance only of the problem, while ignoring how the information pertaining to the problem was gathered. Ultimately, the problem addressed is what the item is "about," and the two may be used interchangeably. Thus both physical documents and abstract subjects can be meaningfully compared in terms of this concept.

The implication is that while a book within the biology section would be "about" the problems addressed by biology, not all books "about" these problems are necessarily within this section if

nonbiological methodology has been used.¹⁵ In other words, being "about" biological problems are necessary but not sufficient grounds for inclusion within the class "biology."

As another example, O'Neill, Dillon, and Vizine-Goetz point out that "DDC locates bookbinding in two widely separated sections of its schedule (025.7 and 686.3). Which is chosen for a specific item depends on its topical emphasis and the *judgment of the cataloguer*."¹⁶ This dispersion of materials "about" the same topic contravenes the expectation that the natural, basic categories will correspond to those of the library.

The discrepancy occurs because the initial facet of problem/aboutness is conjoined with another of method. Consequently, the location of a book within a library depends at least as much on the perspective and training of the author as it does on its topic.

III. PSYCHOLOGY OF CATEGORIZATION

The previous section outlined several problems inherent within classification schemes which cause them to disperse items expected to be collocated. Principles which motivate these psychological expectations of patrons follow.

The way we categorize components of our experience is explicable in terms of general human psychology. This means that while categories themselves are culturally variable, the types of categories created, and the way in which this is accomplished, are not. According to Lakoff, the current theory of categorization can make "predictions about what human category systems can and cannot be like. It does not predict exactly what will be in a given category in a given culture or language."¹⁷ In spite of these limitations, several aspects of this theory are essential to our examination.

Subjects are not classical categories as described by Aristotle, where membership is determined by necessary and sufficient properties. Instead, they are radial categories, which Lakoff defines as categories where "the center, or prototype, of the category is predictable. And while the noncentral members are not predictable from the central member, they are 'motivated' by it."¹⁸

Members of such a category are joined by a series of associational links of various kinds to the prototype. The presence of these

links serve to justify treatment of the category as one conceptual unit. Each member can serve as a subprototype within the category, forming links with members which otherwise would not be associated with the original center. For these reasons, the two ends of a chain of such links can appear to bear no obvious or even logical relationship to one another. Nevertheless they are part of the same category by virtue of what we might call their genealogical ties with the prototype.

Significant distance from the center of a subject can make a given item a less good representative of that subject. If a textbook or journal of physics serves as the prototype of "physics," then Capra's *The Tao of Physics*, a popular book intended to show the fundamental equivalency between tenets of Taoism and conclusions of theoretical physics, can be included within the category by chaining principles even though it is not as purely physics as is the textbook. But, since *The Tao of Physics* is interdisciplinary in nature, links also exist with the subject of religion. How classifiers determine which is to be the preferred chain determining the book's physical location is indicative of hidden organizational premises. Such premises, if they are culture-bound, can complicate the cross-cultural transfer of classification schemes.

So long as academic disciplines constitute the divisioning of the universe of information, materials on the periphery of the pure disciplines constitute a significant problem. Linear shelving exacerbates the difficulties because any given subject has only two sides. Consequently, while physics and chemistry hybrids can be accommodated by Dewey (530s being next to 540s), physics and religion (200s) mixtures cannot. Linear shelving does not allow them a place on the shelf corresponding to their location within mental space. This fact results in dispersion of materials perceived as similar by the patrons. Given the physical constraints, however, there is no escaping the need to make the choices which lead inevitably to this dispersion. The question is not whether to disperse or to collocate, but rather which principles of dispersion are to be preferred.

Links can be made between any prototype and practically any other member of the intellectual universe. Selection principles are established by classifiers to specify which links are most important. Seeking to respect disciplinary boundaries, at least some schemes

prefer that the general take precedence over the specific. This is in practice achieved by classing first by noun, and then by adjective.

The contrary trend, and one which may be more natural, is what Lakoff calls "Wilensky's Law": More specific knowledge takes precedence over more general knowledge.¹⁹ Here, "psychological anthropology" and "cross-cultural psychology" are specifications via adjectives of two general nouns (specialty and discipline, respectively), resulting in semantic convergence between the two pre-coordinated terms. Collocation of these materials is initially expected based on similarity at the specific level.

A third contribution from the theory of categorization is the concept of basic level categories which were briefly introduced in section I. Lakoff defines these as "the level at which most of our knowledge is organized," as well as being "our earliest and most natural form of categorization."²⁰ Reviewing the research literature, he concludes that basic level concepts "are in the middle of the taxonomic hierarchies and have a great deal of internal structure. But they have the kind of structure that human beings find easy to process—that is, easy to learn, remember, and use."²¹

Section I offered the conclusion that library patrons use basic level concepts to frame initial requests. This seems especially reasonable in light of the finding that "the ways we understand experience structure the kinds of questions we ask about it."²² The general categories requested are therefore expected to contain the specific items needed; it can be an unpleasant surprise if refining a basic level category like "birds" into "birds in the Bible" in fact throws one out of the class of "birds" altogether and into that of "religion." To the extent which the requested items are significantly dispersed outside expected groupings, or even to the extent which these groupings do not match any existing within the scheme, to that same extent the classification scheme is contrary to the psychologically real expectations of the patron, which, as Farradane suggests, inherently and adversely affects the usefulness of the system.

These are all important points, and bear repeating. First, subjects are necessarily radial categories, and therefore have difficulties incorporating accurately the less good representatives of the prototypes. Due to the dimensional constraints of physical shelving, classifiers must legislate priorities for placement decisions. One

example is the "general first, specific second" hierarchy principle. This principle conflicts with the "specific over general" expectations of patrons.

Since real space cannot faithfully mimic mental space, *post facto* intellectualization is unavoidable. The only question remaining regards how much is applied. Decisions at this point bring libraries into conflict with patrons, who, heedless of librarians' dilemmas, operate only under the dictates of mental space. This mental space is most powerfully characterized by the manipulation of basic level concepts. Whatever else, the patrons expect boundaries between these concepts to be inviolable, being in their eyes self-evident.

These three aspects of categorization—radial categories, Wiensky's law, and especially basic level concepts—are universal in that their use by human beings is not the result of learned behaviors. We use them instinctively by consequence of our psychological hardwiring. Thus, they are capable of generating the ideal, culturally unbiased standard we need to quantify and compare the intellectual idiosyncracies of real classification schemes.

IV. AN INDEX OF POST FACTO INTELLECTUALIZATION

Universal principles of categorization lead us to expect that all items encompassed by the same lexical term will be grouped together. Since constituents of such lexical groups are also "about" the same thing, then by analogy we expect all items which are "about" the same thing, regardless of their lexical marking, also to be collocated.

"Psychological anthropology" and "cross-cultural psychology" are together an instance of just such semantic convergence, and are "about" the same thing. Indeed, cross-cultural psychology is explicitly distinguished from the other not in terms of what it is "about" (its "theory" or problem) but "by its methodology."²³ While these two academic disciplines differ in terms of treatment, the two are synonymous at the level of "aboutness," and it is the latter which is expected to take precedence. Patrons needing the one probably will find the other useful as well. Optimal shelving supported by useful classification should bring the two fields into close

proximity. Yet, for reasons already discussed, the *Journal of Cross-Cultural Psychology* and the *Journal of Psychological Anthropology*, although illuminating similar problems, are not shelved together in LCC (BF 728.J65 and GN 502.J68, respectively).²⁴

The easiest way to quantify the impact of these premises is to measure directly the magnitude of this unexpected dispersion, an enterprise which receives valuable direction in the work of O'Neill, Dillon, and Vizine-Goetz. They examine two measures of dispersion in the context of reclassifying from DDC to LCC and vice-versa: (1) *distance*, which refers to physical dispersion; and (2) *scatter*, a conceptual dispersion which refers to the number of classes which "would have to be searched to find a given item from the original group."²⁵ These are not mutually exclusive measures. For instance, a single class, when reclassified, can be broken into several classes in the new scheme without necessarily affecting the physical shelving of any items if reclassification introduces no new items into the area, and the new classes are contiguous.²⁶

The measure I describe below emphasizes scatter. This use is perhaps oversimplified by assuming that scatter is significantly correlated with distance despite their nonequivalence. Most cases seem to conform to this assumption.²⁷ Thus, high scatter of items relative to psychological collocation expectations is read to imply that these items are also physically distant from one another.

The measure of dispersion I propose is quite simple. First, compile a list of paired titles for which collocation is psychologically expected.²⁸ Then apply classification schemes to see how they treat these items. Those which, overall, disperse these items the least are closer to psychologically real collocation, incorporating less *post facto* intellectualization, thereby maximizing patron comfort and usefulness.

We are now ready to turn to an example. Due to semantic convergence, collocation is psychologically expected for the *Journal of Cross-Cultural Psychology* and *Journal of Psychological Anthropology*. DDC, in fact, reflects this equivalency, and classes both journals in 155.805. LCC separates the two, and we must now assign a numerical value to this scatter.

According to the *LC Classification Outline* (Fifth Edition), LCC has 21 major classes divided into more refined subcategories. Be-

ginning with AC and assigning it rank 1, we add 1 every time thereafter that a letter *not* in the first position changes, and 6 every time the first letter changes. The actual numerical values were arbitrarily chosen, but served the need to account for qualitatively different transitions. For example, the gap between NK and NX is smaller than that between NX and P, even though both pairs are contiguous in the scheme. Following this process, the last class, Z, has an assigned rank of 423.

Referring back to the LCC treatment of the journals, the class stems are GN and BF, which in our numbered outline have the ranks 93 and 19, respectively. Subtraction yields 74, and these may be termed the dispersion points which LCC accrues from this one pair. DDC earns no points since there the journals are assigned the same number.

Because of the traditional library preference for general-over-specific classification, further examples such as this are not difficult to identify. For instance, molecular biology is defined by *Webster's* as "a branch of biology dealing with the ultimate physiochemical organization of living matter." Bio-chemistry, on the other hand, is "the chemistry of plant and animal life: biological chemistry or physiological chemistry."²⁹ At the level of "aboutness," these fields are equivalent, despite their disparate methodologies.³⁰ Thus, a patron interested in the topic of the chemistry of living matter should find them both helpful, and this fact generates the psychological expectation that they will be physically close.

The spread here is not nearly so drastic as with the first example: the *Journal of Molecular Biology* (LCC: QH 301.J73; DDC: 574.8805) is fairly close in both schemes to the *Biochemical Journal* (LCC: QP 501.B47; DDC: 612.015). Repeating the process described above for LCC, we have $332(QP) - 328(QH) = 4$ dispersion points.

To measure scatter in DDC, the numbers to the left of the decimal are scored in a similar manner as was LCC. A sequential change in the ones column added 1 to the rank, in the tens, 3, and in the hundreds, 6. The outline's highest class, 999, therefore has a rank of 1224.³¹ Translating DDC's 574 and 612, we obtain 703 and 752, for 49 dispersion points. This result cannot be directly compared with that from LCC because the units are uneven. The uni-

verse of knowledge is divided into 423 units in LCC as we counted them, as compared to DDC's 1224. Z-scores should be used to translate points into standard deviation units.

A representative set of instances such as these, by arithmetic addition of the standardized dispersion points separating each pair which would be collocated in mental space, produces a single number for each scheme. This figure is the index of *post facto* intellectualization, and is immediately comparable between systems.

Interpretation of this index would be as follows: Assume that LCC and DDC continue to follow the patterns indicated by these two examples. LCC's index would be large, and DDC's significantly smaller. DDC, then, would be closer to the fundamental psychological categories of everyday human existence than is LCC, which is more rarified and deliberate.

At the most conservative, the index sets an upper limit to the amount of cultural signature elements contained within a classification scheme. A low index could then be reasonably interpreted as indicating few cultural influences; as a first guess, these would be the schemes we expect to be successful cross-culturally. Schemes with a high index might contain a large number of cultural assumptions which could compromise its ready acceptance in a novel setting.

V. SUMMARY AND CONCLUSIONS

This paper set the aim of describing a first measure of possible cultural relativity of classification schemes. Discussion began with the observation that patrons have a very real sense of how materials should be arranged, and with the judgement that the first goal of any classification exercise should be maximizing of access and usefulness to the patron. Farradane provides the link between the two by specifying that the scheme which is most faithful to our innate psychological concepts is also the most useful.

Existing schemes were shown to be based upon ethnocentric assumptions which preclude ready cross-cultural application. One instance of these is the overlap between perceived subject of intellectual materials and traditional disciplines within academia. Problems

resulting from such assumptions were highlighted, including the resulting dispersion of documents "about" the same thing.

Lakoff's exhaustive presentation of the literature on categorization theory yielded three particularly valuable concepts: radial structures, Wilensky's law, and basic levels. The first two were used to illustrate further difficulties which arise within current schemes, and how they can conflict with psychological expectations. The first follows from the discrepancy between real and mental spaces, the second from arbitrary choices made to prioritize links within the subject categories. Patrons were next suggested to use basic level categories during initial approach to the collection, and from this comes the conclusion that patrons expect materials encompassed by basic level categories to be collocated.

Using these psychological expectations as a nonarbitrary standard, an index of intellectualization can be calculated measuring the amount of unexpected dispersion within a classification scheme. This index captures all deviation from the pan-human assumptions used when working with categories.

The index is not capable of discerning among the possible sources of this divergence. It can come from either the culture in which the scheme was devised, or it can be the product of the creator's personal inspiration. Culture, incidentally, is used here in the broad sense of not only nations, but also to refer to subcultures such as academia. In any case, divergence shows up in the index as being an addendum, alteration, or other refinement to natural categories.

Much work remains to be done before the index can be applied, not the least being the compilation of a list of representative paired titles "about" the same topic. In its final form, however, the index would rank-order existing schemes in terms of their deviation from the standard of the psychologically real expectations of library users. Those schemes which stay close to the basic levels of innate classification are satisfying, useful and comfortable to users; those which deviate significantly from such a baseline require more conscious and deliberate work on the part of the patron. In the examples used here, LCC requires quite a bit of work, while DDC much less. The path of least resistance suggests that Dewey would be the more popular system of the two, especially for use with the general population.

The finding that LCC is more "difficult" than DDC will surprise few librarians. The contribution intended here is not a new conclusion about the relative merits of the two schemes, but rather a new way to talk about the intuitions which most practitioners already have. And while the relative position of LCC to DDC may be common knowledge, the index of *post facto* intellectualization permits placement on a single continuum of other classification schemes (e.g., Bliss, Colon) with which most professionals have no immediate experience. Schemes which once were viewed as being qualitatively different can now be compared on at least this single quantitative measure. Further, the index provides one, and perhaps the only way to anticipate the reaction of patrons to a completely new scheme which has never been applied.

ENDNOTES

1. For a general discussion about the use of surveys in the library environment, see Charles L. Busha, "Survey Research in Librarianship," in *Research Method in Librarianship*, (Orlando, FL: Academic Press, 1980), 35-51, and Helen M. Gothberg, "The Library Survey: A Research Methodology Reconsidered," *College & Research Libraries* 51(November 1990): 553-559. Abraham Bookstein ("Questionnaire Research in a Library Setting," *Journal of Academic Librarianship* 11[March 1985]: 24-28) issues some caveats, while John Budd and Mike DiCarlo ("Measures of User Evaluation at Two Academic Libraries: Prolegomena," *Library Research* 4[Summer 1982]: 71-84) present a case study. Although designed for use in computer departments, D.N.J. Mostert, J.H.P. Eloff, and S.H. von Solms' "A Methodology for Measuring User Satisfaction" (*Information Processing & Management* 25[1989]: 545-556) would be a sophisticated advance if adapted to libraries.

2. The reason for this, to reiterate, is that while one group liking Dewey very much, and another hating LCC, might lead one to conclude that Dewey is more favored by patrons, this conclusion is unsupported by the data. The group that hated LCC might hate *all* classification schemes, and the fans of Dewey might give rave reviews to any system they dealt with. Without this information we cannot meaningfully compare our two groups. The fact that most patrons often restrict their exposure to only one system makes this information in fact nonexistent, and the goal of comparison thus unobtainable in most settings.

3. T.L. Eichman, "The Complex Nature of Opening Reference Questions," *RQ* 17(Spring 1978): 212; cf. Marilyn Domas White, "Evaluation of the Reference Interview," *RQ* 25(Fall 1985): 76-83.

4. A working assumption here is that reference queries which are "too general" would, upon examination, prove to use relatively more basic level terminol-

ogy than do queries deemed sufficiently specific to identify particular items. While I do defend this assumption, the necessary discourse analyses do not exist to raise it to higher epistemological status.

5. J.E.L. Farradane, "Fundamental Fallacies and New Needs in Classification," in *Theory of Subject Analysis: A Sourcebook*, ed. Lois Mai Chan et al. (Littleton, CO: Libraries Unlimited, 1985), 199.

6. Melvil Dewey, "Introduction to *Dewey Decimal Classification and Relative Index*," (1926, reprint New York: Forest Press, 1965), 69; cf. S.R. Ranganathan, *Prolegomena to Library Classification* (New York: Asia Publishing House, 1967), 154.

7. J.E.L. Farradane, "The Psychology of Classification," *Journal of Documentation* 11(December 1955): 187.

8. Farradane, "Fundamental Fallacies," 200.

9. Peter L. Berger, *The Sacred Canopy: Elements of a Sociological Theory of Religion* (New York: Anchor Press, 1967), 24.

10. Cf. Classification Research Group, "Bulletin No. 10," *Journal of Documentation* 29(March 1973): 53; and "Bulletin No. 12," *Journal of Documentation* 41(June 1985): 77.

11. Classification Research Group, "Bulletin No. 11," *Journal of Documentation* 34(March 1978): 43.

12. Annemarie de Waal Malefijt, *Images of Man: A History of Anthropological Thought* (New York: Alfred A. Knopf, 1974), 254.

13. Cf. Robert Heine-Geldern, "One Hundred Years of Ethnological Theory in the German-Speaking Countries: Some Milestones," *Current Anthropology* 5(1964): 407-418.

14. There may be ways to minimize this discontinuity between expected and actual collocations. These would include supplemental tools such as the classified and online catalogs. But these only help to make the best of a bad if unavoidable situation. The focus of our attention, however, is on seeing how well the problem has been solved by various schemes *without* recourse to these supplemental tools.

The situation might be likened to that of Ptolemaic earth-centered astronomy. Epicycles and other ingenious addenda were needed to reconcile the theory with reality, until one day the whole scheme collapsed under its own weight and was replaced by the more elegant Copernican, heliocentric model. Ours seems to be a situation where entire professional careers can be spent solving problems arising from discipline-centered classification schemes. What may be needed is a shift of the center to some organizing principle other than the university which would generate fewer problems in the first place.

15. Cf. Bohdan S. Wynar, *Introduction to Cataloging and Classification*, 6th ed. (Littleton, CO: Libraries Unlimited, 1980), 412.

16. Edward T. O'Neill, Martin Dillon, and Diane Vizin-Goetz, "Class Dispersion between the Library of Congress Classification and the Dewey Decimal Classification," *Journal of the American Society for Information Science* 38(May 1987): 204; emphasis added.

17. George Lakoff, *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind* (Chicago: University of Chicago Press, 1987), 96.

18. *Ibid.*, 65.

19. *Ibid.*, 147.

20. *Ibid.*, 46, 49.

21. *Ibid.*, 199.

22. Richard L. Derr, "A Classification of Questions in Information Retrieval by Conceptual Presupposition," *Proceedings of the ASIS Annual Meeting 19* (October 1982): 70.

23. Harry C. Triandis, "Introduction," in *Handbook of Cross-Cultural Psychology, Volume 1: Perspectives*, ed. Harry C. Triandis and William Wilson Lambert (Boston: Allyn and Bacon, 1980), 6.

24. LCC and DDC numbers for these two journals, and for the *Journal of Molecular Biology* and the *Biochemical Journal* discussed later, were obtained from Library of Congress MARC records pulled from OCLC (Nos. 1587107, 3895116, 1782923, and 1532962, respectively). Although this source was consulted principally for reasons of convenience, its use can be justified on theoretical grounds as well.

This paper depicts situations high in ecological relevance, which is to say, less what *should* be the case, and more what in fact *actually* is the case. The classification schedules, in the hands of a virtuoso classifier (which I am not), may yield numbers other than those I provide. But the ones cited, given their source, are probably the ones most likely to be encountered in a real-life library.

25. O'Neill, Dillon, and Vizine-Goetz, "Class Dispersion," 199.

26. Readers of the referenced article will note that the authors offer formulae for the quantification of these dispersions which I do not use for two reasons. First, both measures they propose require knowledge of the total number of items in the original class. This variable precludes their application in some of the contexts with which I am concerned, such as where the classification scheme has not yet been applied to any collection. Second, the formulae are designed to quantify dispersion when a collection is reclassified from one scheme to another, while my interest is to measure the dispersion which results from classing into any scheme, relative to universal psychological expectations.

27. *Ibid.*, 203, Tables 6 and 7.

28. Principles to identify these pairs have already been discussed by elaborating the concept of "aboutness." Another tack, however, entails the use of semantic differentials to identify subject labels which *mean* the same thing (cf. Charles E. Osgood, George J. Suci, and Percy H. Tannenbaum, *The Measurement of Meaning* [Chicago: University of Chicago Press, 1957]). This approach would require a further step to ascertain if a label's meaning is equivalent to what the works referenced by that label are "about." This discussion is not developed in this essay.

29. *Webster's Third New International Dictionary, Unabridged*, (Springfield, MA: Merriam-Webster).

30. Giving credit where it is due, this example was recommended to me by Kevin Coppola, a chemist.

31. This paper has devoted itself largely to the theoretical development of the type of measure needed, but can at this time offer only general directions as to the precise form it would take. Ranking was done from left to right in both schemes until a major disjunction was reached; numbers in LCC, and the decimal in DDC. The actual numerical increments for class changes were arbitrarily assigned, but with the stipulation that more severe transitions should be assigned higher scores. Future research may well change the details of my suggestions. For the time being, the examples here should be read as suggestive and not prescriptive.

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