HUMAN NATURE REVIEW
ISSN 1476-1084
http://human-nature.com/

Book Review

The Big Book of Concepts by Gregory L. Murphy. The MIT Press, 2002; ISBN: 0262134098.

Reviewed by

William L. Benzon

I am ambivalent about this book. Thus I would like to take the somewhat unusual step of quoting from someone else's review of it. Paul Bloom is a Yale developmental psycholinguist most likely known to evolutionary psychologists as Steven Pinker's co-author for "Natural Language and Natural Selection," the article that put language origins back on the intellectual map. Writing in *Nature* Bloom (2003) says that

> Murphy . . . reviews a complicated literature with honesty, clarity and wit. This is going to be the classic text in the field for a very long time. It is one of those rare cases in which the standard back-of-the-book blurb is actually true. Anyone seriously interested in concepts and categorization — seasoned researchers, graduates and advanced undergraduates, or scholars who simply want to get a sense of the field — must read this book.

I have no reason to contest that judgment; this is a clear and thoroughgoing review of a large literature. Bloom then goes on to say:

> If you skip to the end of the book looking for a clear resolution, you will be disappointed. Concepts, Murphy cheerfully concludes, are a mess. With the exception of the classical view ("a total flop"), each of the existing theories is the best explanation of a particular set of empirical findings.

I have no reason to contest this, either. Most investigators in this field, so Murphy

asserts, focus only on a limited set of issues and propose models that account for those, and only those, issues. None of those models work when one attempts to account for a wide variety of phenomena.

The "classical view" that Bloom mentions is the starting point for Murphy's discussion. This view dates back to Aristotle and holds that concepts are given meaning by necessary and sufficient conditions. One problem with this view is that it has proven very difficult to specify those conditions for both real and artificial concepts—a discussion in which Wittgenstein has been very influential. Another problem is that the view doesn't admit of gradations. Something either is, or is not, an example of a particular concept. This is difficult to square with the line of experimental investigation initiated by Eleanor Rosch and her colleagues in the mid-70s. They have found that, for example, a robin is more birdlike than a chicken and that a chair is more furniturelike than a piano. The classical view has no way of accounting for this well-replicated empirical result.

For these and other reasons the classical view has fallen out of favor with experimentalists. It has been replaced by accounts that fall in one of three broad categories: 1) exemplars, 2) prototypes, and 3) theories. On the first view, conceptual categories are built up by remembering examples as we encounter objects. New objects are categorized in accordance with the examples they most resemble. Prototype views posit a summary account for each category, often in the form of a weighted feature list. When a new object is encounted, its features are noted and compared with the feature lists for each category. It is classified in the category with which it shares most features.

The theory view is a bit different. It holds that concepts exist in rich and structured relationships with other concepts and these relationships affect concept use. These conceptual complexs are sometimes thought to constitute intuitive theories. In the domain of folk biology, for example, Murphy describes (p. 165) how Rips

> created a scenario in which an object or animal went thorugh a transformation. In particular, he described to subjects something that was much like a bird. This animal, however, had the misfortune to live next to a toxic waste dump, where chemicals caused it to lose its feathers and develop transparent, thin wings. It also grew an outer shell and more legs. At the end of this metaphorphosis, the creature appeared rather reminiscent of an insect. Rips asked subjects whether the animal was a bird or an insect and whether it was more similar to birds or insects. Subjects claimed that this stimulus was more similar to an insect but that it was still a more likely to *be* a bird. That is, subjects felt that the

> change in outer appearance and even body parts did not constitute identity, but that the animal's inherent biological properties determined what it was.

The question of just how such folk biology originates, however, is beyond the scope of this literature.

Murphy reviews a great deal of empirical work on these three types of theory, including experiments designed to distinguish between one type of theory and another. Murphy also has chapters on taxonomy, induction, the development of concepts in infants and children, word meaning, and conceptual combination. When all is discussed and reviewed Murphy concludes, as Bloom has noted, that none of the three main approaches—exemplars, prototypes, theory—can be ruled out on empirical grounds, nor can any of them account for all the evidence.

In fact, he goes beyond that, to suggest that we will probably end up with a "mixed" account of concepts that embraces models of each type:

> On the proposal I am making, people attempt to form prototypes as part of a larger knowledge structure when they learn concepts. But at the same time, they remember exemplars and these memories may influence them in a variety of ways. In short, concepts are a mess. (p. 492)

From there Murphy works his way to the comforting observation that "the diverse nature of conceptual behavior is itself an empirical discovery" (p. 494).

I am willing to accept this. If then, I have no reason to dispute this, why am I a bit uneasy about this book?

Actually, it is not so much the book I'm uneasy about, as the field it reviews. It's not clear that you can get *there* from *here*. What do I mean?

During the 1970s, when cognitive science was beginning to crystallize as a recognizeable interchange of work in linguistics, philosophy, psychology, and computer science, a great deal of work was done in the computer-modelling of human knowledge. This work, in fact, was one impetus for some of the theory-oriented reseach Murphy has reviewed. But the question of whether or not concepts were embedded in a rich structure, such as intuitive theories or a highly structured associated network, was not itself in question. The need for rich conceptual structures was taken as a starting point. But a major point of contention concerned just what kinds of concepts (e.g. properties, entities, events, plans, scripts, frames, etc.) and relations (e.g. is-a, agent, patient, cause, purpose, before, etc.) were needed to model various domains. Those issues are still very much alive, but they are not addressed by the research Murphy reviews, nor is it obvious to me how those techniques could address such issues.

Much of the work on these issues is being done in the name of knowledge representation (cf. Sowa 2001). But knowledge representation is most often treated as a matter of logic or of software engineering without any empirical component beyond the question of whether or not a computer program runs successfully. Of course, getting empirical evidence on how brains organize these conceptual structures is not easy; it is one of the most difficult issues facing the human sciences. What makes me uneasy about Murphy's book is not so much that it does not have much to say about these difficult matters. From an empirical point of view—and Murphy is certainly an empiricist—there isn't much to say.

What bothers me, then, is that he has not adequately acknowledged these issues, that the range of "concepts" under investigation in this particular literature does not come close to the range of "concepts" that furnish the human mind. Thus *The Big Book of Concepts* appears to be but a prolegomena to something else: the integration of these models and empirical techniques into a richer intellectual undertaking. If you are interested in that richer undertaking you probably need to know what is in this book, but mostly as background. To actually navigate in those other territories you will need to consult other literatures.

William L. Benzon, 708 Jersey Avenue, 2A, Jersey City, NJ 07302, USA. Email: bbenzon@mindspring.com

References

Bloom, P. (2003). Glue for the mental world. *Nature* **421**(6920): 212-213.

Sowa, J. (2000). *Knowledge Representation: Logical, Philosophical, and Computational Foundations*. Pacific Grove, CA, Brooks/Cole.