

Benny Shanon, *The Representational and the Presentational: An Essay on Cognition and the Study of the Mind*, Hemel Hempstead, Hertfordshire, U.K.: Harvester Wheatsheaf, 1993, ISBN 0-7450-1095-4; Paramus, NJ: Prentice-Hall, 1994, vi + 409 pp., \$66.00 (paper), ISBN 0-13-302225-0.

This is an important book. Shanon has amassed and organized a vast array of criticisms of what he calls the representational-computational view of mind, or *representationalism* for short. Collectively, these criticisms envelop representationalism. Some of the criticisms are profound and address the deepest assumptions of

the field, while others are much more detailed and narrow in scope – or at least might appear to be narrow in scope. Even the narrow problems, however, have collective impact. The fudges and epicycles that would be required to respond to all of them would, collectively, bury representationalism. The foundational criticisms, on the other hand, show that representationalism is hollow from the beginning: it doesn't even begin to address the most relevant issues. It is difficult to see how representationalism could emerge from these discussions intact.

Fans of representational approaches, as well as those who simply cannot imagine any alternative, may find themselves impatient at times with Shanon's methodical laying out of issue after issue that not only is not, but arguably cannot, be handled within the representationalist framework. Responses such as "That will have to be dealt with later – you can't do everything immediately." or "That's an implementation issue." or "That's XYZ's problem, not mine." come readily, even to a reader who is sympathetic to Shanon's basic message. But Shanon anticipates arrays of such counterarguments as well, and shows that they too ultimately don't work. The book is a massive and impressive achievement.

One of the major contributions of Shanon's book is as much implicit as it is explicit. That is the organization that Shanon brings to the various kinds of critiques of representationalism and, thus, to the various facets of cognition. It is in these various kinds of failures and incompletenesses of representationalism that the outlines emerge of an alternative approach to cognition. This book does not focus on an alternative in the sense of developing explicit details, but it does definitely point the way forward.

The book is much too rich to successfully summarize, but I would like to illustrate some of its organization of critiques, counterarguments, and rejoinders to the counterarguments. The first line of critique argues that fixed, abstract, semantic representations cannot adequately characterize the *knowledge* that people have of the world. The second line argues that such representations cannot account for the *relationship* between the cognizing organism and the external world. The third line argues that representationalism cannot account for the *temporal* aspects of knowledge, such as its development and progression in time. The fourth line addresses some fundamental *philosophical* problems from within the core psychological perspective of the book.

An example of the first line is an extended consideration of context effects. Shanon's conclusion is that context sensitivity is unbounded in its potential effects on meaning, and that this unboundedness is of a sort that cannot be captured within the resources of representationalism. This is a nicely ironic argument in that it captures the structure of Chomsky's argument against associationism – associationism cannot capture the kinds of unboundedness found in language – but with decidedly non-Chomskyan conclusions.

An example of the second line is that representationalism cannot account for reference or semantics. There is an unbridgeable gap between the abstract representation and the world. This too involves an irony in that the basic naive appeal

of representationalism was, in its early years, and still is, the promise to be able to account for meaning, for semantics. Put another way, nothing that does not have genuine semantics or meaning can be a genuine representation or symbol, yet terms such as “the empty-symbol problem” are recognitions that semantics and meaning have not been captured by representationalism. Shanon argues that they cannot be. Another “gap” that Shanon analyzes in this second line of critique is that representationalism is incapable of modeling the relationship between cognition and action; a related “gap” is that between cognition and motivation.

The third line of critique turns on the fact that representationalism is inherently atemporal, at least with regard to representations themselves. There is temporality, or at least sequence, in computational operations upon representations in this view, but the purported representations themselves are so by virtue of, for example, atemporal informational relationships with what they are purported to represent. Shanon argues that cognition is inherently temporal, and that representationalism cannot capture that temporality.

Once such critiques are understood in their full power, other related issues that seem unimportant in the representationalist view become “obviously” highly relevant and important in the view that Shanon outlines. Such shifts are characteristic of shifts in basic frameworks: The details of atomic spectra were curiosities until they became centrally relevant to the development of the quantum mechanical understanding of the atom. Shanon explores such shifts in relevance as well. An example in the third line of critique, the one that addresses time, is the temporality of action and performance. Shanon is developing characteristics of an action-based conception of representation in these critiques, and action and performance are “obviously” relevant and important in that perspective – cognition *is* a kind of performance in Shanon’s perspective – even though peripheral or utterly irrelevant from the representationalist perspective.

Following the four lines of critique, Shanon devotes a chapter to the question “Why Representationalism?”. He first looks at a number of metaphysical and methodological assumptions that bias toward representationalism, showing that they too are seriously questionable on their own more abstract levels, and then turning to a few historical reasons why representationalism has become so currently dominant.

The last hundred pages are devoted to anticipating and blocking possible counterarguments, and to outlining what an acceptable model of cognition would have to look like – including a survey of current non-representationalist alternatives. Connectionism is one of the alternatives considered; the book predates the recent surge in autonomous-agent approaches, but the action framework that Shanon advocates is highly compatible with, and anticipatory of, some of the themes of that work.

It is important to get at least a flavor of Shanon’s consideration of counterarguments and of his own counters to those. These complete the logical devastation wrought by his critique by blocking the exits. One such response to the sorts of inadequacies that Shanon discusses is to patch things up, perhaps, for example, by adding additional tags and features to handle the new problem. Shanon gives

in-principle reasons why such patching will never be complete. With regard to strategies of compartmentalization and division of labor, he argues that there are no clear lines of demarcation between the issues that a representationalist might wish to address and those that the representationalist would like to disregard or postpone, and, indeed, that the disregarded and postponed may be the most interesting and important issues. Furthermore, once the postponed issues *are* addressed, the problematics of the earlier work may simply disappear: They receive more elegant accounts from within the broader perspective, or else simply dissolve.

These are serious concerns. The history of science provides multiple examples, and Shanon argues that similar points hold for representationalism. One historical example is associationism. One of the major psychological journals was once *The Journal of Verbal Learning and Verbal Behavior*. The journal no longer exists – its field no longer exists. The assumptions were false; the postponed problems were vastly more important than the addressed problems; the patches didn't work; many of the problematics simply disappeared once the restrictions of associationism were abandoned. If Shanon is correct, much the same fate awaits the cognitive representationalism that replaced associationism.

There are a few typesetting errors in the book, but not many, and none that seemed to make interpretation impossible. I found reading the book to be a combination of being fascinated with the arguments, their structures, their implications, the shifts in relevance that they induce, and so on, on the one hand, and an occasional sense of surfeit with the vastness of it all on the other. But that vastness is an essential part of the power of Shanon's book. Representationalism fails in so many ways and directions that it is a vast enterprise to survey them. I suggest simply reading in segments, when your attention is clear.

I have written a book that examines a few of the most fundamental criticisms that Shanon considers, outlines an alternative, and shows how the problems that those criticisms expose are manifest in, and damaging to, *many* projects and approaches in cognitive science and artificial intelligence (Bickhard and Terveen, 1995) – showing that, and how, those errors permeate the fields. Shanon has adopted a different strategy of encircling representationalism with its *many* criticisms and incompletenesses and failures. He surveys and organizes the many errors that permeate representationalism, with relatively less attention to specific projects. The approaches are quite different, but highly complementary.

The audience for this book ought to be both representationalists and anti-representationalists. It provides a massive challenge to any who would defend representationalism. The approach is bankrupt if Shanon is correct, and the array of arguments and domains of deficiency and fundamental failures that he provides cannot be simply dismissed. To the anti-representationalist, it provides a deeper understanding of where and in what ways representationalism goes wrong, a rich diagnosis with rich implications for the direction in which to move next. It *should* have a large readership.

References

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