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BOOK REVIEW

Memory Observed: Remembering in Natural Contexts by U. Neisser.

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Cognitive psychologists who support the approach to perception taken by direct realists [1] face a formidable question. If perceiving is unmediated by mental representations, are cognitive abilities also to be explained without reference to such representations?

At first glance, this question seems preposterous. According to the prevailing information-processing perspective, cognition is by definition a collection of higher *mental* processes [2] that internally represent and access information. On this view, the separation of knowledge from memorial storage cannot be seriously contemplated.

Nevertheless, significant progress has been made toward an alternate understanding of cognition (termed here cognitive realism) that is not rooted in internal representations [3]. One tenet of this approach is that knowledge is more like a public transaction than a private possession used to construct meaning from impoverished or ambiguous sensory input. That is, knowing is the temporally extended activity of detecting useful information about the surrounding environment.

It is important to note, however, that the emphasis which cognitive realists place on the environment is increasingly shared by other cognitive psychologists who are in no way motivated to dispense with the concept of representation. Thus, cognitive realism should be distinguished from what might be termed "cognitive naturalism". Within this latter perspective, more room is made in representations for active, exploratory perceptual processes in naturally occurring contexts. Ulric Neisser is a leading figure in this endeavor.

In *Cognition and Reality*, Neisser [4] boldly faulted twenty years of cognitive psychology generated by the information-processing framework that Neisser [5] himself had helped to develop. The central criticism was that cognitive research generally lacked ecological validity, that is, it failed to connect with everyday acts of perceiving and remembering. Whereas experiments often employed behaviorally sedentary subjects given a brief glance at an arbitrary, temporally abrupt, and spatially isolated stimulus, everyday perceiving was viewed as a behaviorally active, temporally and spatially extended process occurring in a meaningful context. Neisser attributed this gap, in part, to the computer metaphor underlying the information-processing view of human cognition. The likening of cognizer to computer fostered research programs more concerned with internal processes (the *how* of perceiving) than external reality (the *what* of perceiving) [6].

Neisser challenged researchers "to pay more attention to the details of the world in which perceivers and thinkers live, and the fine structure of information which that world makes available to them" (ref. [4], pp. 7-8). In

order to promote these goals, he introduced the idea of the perceptual cycle. Essentially, the cycle is the means by which the perceiver/knower maintains epistemic contact with the world. A particular anticipatory schema (Neisser's representational construct) guides the active perceiver's attention to task-relevant properties of the environment. The schema is, in turn, modified by this episode, which influences the course of succeeding cycles.

In *Memory Observed*, Neisser continues to prod cognitive psychologists to investigate naturally occurring phenomena. Unlike most collections of readings in cognitive psychology, the book's goal is to reform, rather than simply survey, the field: "If X is an interesting or socially significant aspect of memory, then psychologists have hardly ever studied X" (p. 4). Simply put, *Memory Observed* offers 43 examples of X plus a preface and introduction that elaborate on the motivation for the volume and the selection criteria [7].

Neisser's disappointment with much of memory theory and research stems from his view of the *ceteris paribus* clause in cognitive psychology. Researchers sensibly select artificial stimuli and tasks in order to eliminate extraneous and confounding variables. But the price exacted is substantial. The field is now full of competing theories of generic memory; they examine how undistinguished, but well controlled, material is remembered by college students to little practical purpose. Neisser suggests that sound generalizations about remembering can be revealed only when researchers attend to the diversity of contexts in everyday life that people use and know [8].

Whether *Memory Observed* wins converts to cognitive naturalism hinges, of course, on the clarity and coherence of the concept of a natural context [9]. As Neisser describes it, every place we live, work, or play qualifies. Phenomena that arise from activities in such situations are therefore appropriate to investigate. They are neither contrived by experimenters nor dependent on the laboratory for their existence. However, the call to natural cognition neither reduces to an appeal for more field research nor does it constitute a departure from principles uncovered by laboratory investigations. On the first point, nearly half of the selections in *Memory Observed* are themselves laboratory studies. On the second point, readings in the volume address such "traditional" topics as the serial position effect, gist memory and Ebbinghaus's forgetting function.

Perhaps what makes cognitive studies natural is not the research site or theoretical issue selected but rather the stimuli, tasks and subjects chosen. In this regard, Neisser's examples of remembering in natural contexts all share at least one of the following properties: meaningful and/or familiar stimulus material (e.g. U.S. presidents, pennies, childhood events); tasks that when completed yield a useful accomplishment (e.g. relating tribal history, giving court testimony, baking bread); unusual, but naturally occurring, memory skills (e.g. mnemonists, calendar calculators). Future discussions should consider whether any of these conditions are necessary for "interesting or socially significant" research.

The continued growth of natural cognitive psychology depends on several factors. First, a wider awareness is needed that Neisser's "reforms" do not argue for a switch to doing "mere" applied research. As Loftus points out [9], there is

no cause for this derogation. Applied cognitive psychology need not be anti- or a-theoretical. What, after all, are more basic issues than the natural problems that confront us daily? Second, a clearer specification is needed of the defining qualities of the natural contexts approach. What, for example, are the implications of Neisser's view for the selection of dependent variables? Consider reaction time. Clearly, memory research asks subjects to respond as quickly and accurately as possible far more often than is required in daily living. When is this kind of responding normally appropriate? Does more deliberate action engage qualitatively different cognitive processes than arise from speeded responding? Cognitive psychology would benefit from a catalogue of intrinsic dependent variables — ways that knowledge is ordinarily expressed in specific domains — to contrast with all-purpose measures such as reaction time and old/new judgments [10].

Finally, cognitive naturalists must face the arguments made in favor of ecological *invalidity* and tests of the limits of human abilities. If out-of-the-ordinary settings, conditions and tasks were shunned by researchers, discoveries such as biofeedback, the characteristics of dark adaptation, and, in physics, the monopole, would not have been made [9, 11, 12]. No one would contest the significance of these contributions to science. However, since *Memory Observed* contains a section of mnemonists, there seems to be some confusion about what constitutes ecological invalidity. For Mook [11], memory experts are unrepresentative of the population of rememberers. As specialists, they illustrate what people can do as opposed to what is usually done. This is certainly true, yet, as a criticism, it slides past the perspective that informs *Memory Observed*. For memory experts, the extraordinary *is* ordinary. A study of the cognitive demands on space shuttle astronauts would be perfectly at home in a future edition of the collection, although few of us will ever become astronauts. Cognitive naturalism does not look for the typical; it seeks to understand the full range of memorial abilities people bring to bear to serve their purposes. *Memory Observed* skilfully samples this range.

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7. The introduction is reprinted from *Practical Aspects of Memory* (1978) M. M. Gruneberg, P. E. Morris & R. N. Sykes (Eds.). New York: Academic Press, a valuable companion volume to Neisser's.
8. Recent memory research does not lack for studies of significant contexts such as mood and environmental settings. See, respectively, Bower G. H., Monteiro K. P. & Gilligan S. G. (1978) Emotional mood as a context for learning and recall. *Journal of Verbal Learning and Verbal Behavior* **17**, 573–585; Smith S. M. (1979) Remembering in and out of context. *Journal of Experimental Psychology: Human Learning and Memory* **5**, 460–471; Godden D. R. & Baddeley A. D. (1975) Context-dependent memory in two natural environments: On land and underwater. *British Journal of Psychology* **66**, 325–332. The omission of these studies from *Memory Observed* is more likely to reflect space limitations in the volume than Neisser's dividing line between what is and is not naturalistic research.
9. Loftus E. F. (1981) Natural and unnatural cognition. *Cognition* **10**, 193–196.
10. A related point regarding psychophysical measures is made by Warren W. H. & Shaw R. E. (1981) Psychophysics and eometrics. *The Behavioral and Brain Sciences* **4**, 209–210.
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