

The Functionalist Agenda in Memory Research

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One of the benefits of working in applied settings is that problems tend to be well defined. It is relatively easy to measure progress, and analytical techniques can be objectively evaluated. If the charge is to help a banker remember the vault code, it is not difficult to tell whether the intervention is working—the vault either opens or remains closed. For the laboratory researcher, however, problems are often ill defined. There can be no clear starting point, well-stated goal, or simple way of evaluating or marking progress.

Consider the study of pure memory, an enterprise widely pursued by researchers in cognitive psychology. Most memory researchers focus on a particular memory system or process, such as episodic, semantic, or implicit memory, and they conduct experiments to (a) isolate its underlying mechanisms and (b) determine its parameters of operation. The goal is to analyze the system's structure and its component parts in much the same way that a chemist might analyze a chemical compound by breaking it down into simpler elements. Attention is rarely given to the system's function at this point, largely because understanding function is presumed to depend on understanding structure. After all, how can we determine the function of a system unless we first understand the system itself? It is necessary to isolate the critical components, along with some rules for their interaction, and then—perhaps—the adaptive role that the system plays in cognition can be specified.

In this chapter, I discuss some of the implications of this widely practiced structuralist, or nonfunctional, approach to the analysis of memory. To begin, as noted above, problems crafted within a structuralist framework tend to be ill defined. When we set out to study *implicit memory*, it is difficult to gauge progress, or measure success, because the objective is unclear. The components of an implicit memory system are unknown; consequently, there is no way of determining when, or if, the system has been fully described. Researchers often end up studying tasks as a result, such as paired-associate learning or word-fragment completion, because task performance is easy to evaluate objectively. The trouble with this focus, however, is that the link between the studied tasks and the true memory system of interest can be tenuous or, more likely, inadequately specified.

Second, there are compelling reasons to believe that our memory systems are functionally designed. Our capacity to access and use the past did not develop in a vacuum; instead, our memory systems evolved to help us solve particular problems, adaptive problems that arose in our ancestral past. Without a functional perspective, as a result, it will be extremely difficult to determine how any mnemonic system works (or we can easily be led astray). As a starting point, we should assume that the structural components of the system exist, and work the way they do, because they are design features—that is, they contribute to solving a problem that is regularly faced by the organism (Klein, Cosmides, Tooby, & Chance, 2002; Tooby & Cosmides, 1992). Note that structure from this perspective is a by-product of function rather than the other way around: Nature designs, or selects, particular structural features because they aid in solving a problem faced by the species (Dennett, 1995).¹

Finally, as I discuss in the main body of the chapter, ignoring the primacy of function in our analyses can lead to principles, or theoretical positions, that are misleading or wrong. Two such widely held principles are considered here: (a) Memory, especially short-term memory, depends directly on the activation of a trace, which, in turn, decays over time; and (b) memory, especially long-term memory, depends directly on the similarity or match between retrieval cues and traces, as encoded. Note that neither of these principles is placed in any kind of functional context; there is no consideration given to a central problem that the memory system might be attempting to solve, other than a vague reference to “memory.” As a consequence, we are left with principles that generate equivocal predictions and, in fact, violate general dictums of memory theory in some cases (see Nairne, 2001, 2002a, 2002b). Before developing these points in detail, I begin by addressing the question that sits at the heart of any functional analysis: What is memory for?

What Is Memory For?

Everyone agrees that the ability to store, recover, and use the past serves an adaptive role. But did our memory systems evolve primarily to solve the problem of reproducing the past or to solve other problems? Some have argued that memory’s primary function is to help us use the past, in combination with the present, to decide on an appropriate plan of action (e.g., N. H. Anderson, 1996; Glenberg, 1997). In some respects, designing a system literally to reproduce the past makes little adaptive sense. A past event can never occur in exactly the same way again, nor can it be perceived in a like manner. In the words of

¹Not all structural components are necessarily adaptations, that is, components that have been sculpted by the mechanisms of natural selection. It is still reasonable to assume, however, that their role in remembering is functionally designed, regardless of whether they are adaptations, exaptations (i.e., co-opted components that evolved for different reasons), or even spandrels (i.e., components that by themselves are not adaptations but are linked in some way to other evolved traits; e.g., Gould & Vrba, 1982). Moreover, my use of the term *designed* is not meant to imply the existence of a preexisting plan but rather refers to the process through which components conform to prevailing environmental demands.