

Schank R C & Abelson R P. *Scripts, plans, goals and understanding: an inquiry into human knowledge structures*. Hillsdale, NJ: Erlbaum, 1977. 248 p.  
[Yale University, New Haven, CT]

We investigate the knowledge structures necessary to understand stories involving social interactions. Structures called scripts are proposed for processing stereotypical situations. Also proposed are structures used to understand behavior with respect to the goals individuals pursue and the plans employed in the pursuit of goals. [The *SCI*® and *SSCI*® indicate that this book has been cited in over 670 publications.]

## An Early Work in Cognitive Science

Roger C. Schank  
Department of Computer Science  
Yale University  
New Haven, CT 06520-2158

March 23, 1989

Cognitive science is often described as the area of mutual interest to both cognitive psychologists and researchers in artificial intelligence (AI). *Scripts, Plans, Goals and Understanding (SPGU)* was an early work in cognitive science. Because *SPGU* was a collaboration between an AI researcher, me, and a psychologist, R.P. Abelson, it was shaped by questions we brought from our experiences in our own disciplines. Two questions from AI were (1) how to progress from understanding sentences in isolation to understanding paragraphs and stories involving the complex behavior of people and (2) how to capitalize on the similarities among situations in order to avoid much of the inference that is necessary to understand novel situations. A question from psychology was how to refine the notion of "schematic" knowledge structures. We realized it was not sufficient to describe what schemas contained; it was also necessary to explain how they could be both organized and employed to enable people to understand specific situations. Fortunately, our experiences in our respective fields helped us to answer each other's questions. The content theory of schemas suggested solutions to the AI problems, and the computational models of AI pre-

sented an approach to the problems with schemas. Thus, *SPGU* was a product of the movement of psychology toward an information processing approach and the movement of AI toward making machines better emulate human behavior.

During the writing of the book, I was eager to move fast in order to get the general ideas into the public domain, while Abelson wanted to go slowly and work out more of the details. Thus, we recognized that *SPGU* was not a fully developed theory, and we anticipated strong debate. In that respect we were pleased with the widespread response to the book. However, we never anticipated one aspect of the book's success, the loss of control over our own terminology and theories. For example, we used the word *script* to describe frequently recurring social situations involving strongly stereotyped conduct, such as a visit to a restaurant. (In fact, restaurants became a favorite example, and we regretted not posing at a table in a restaurant for the dust-jacket photo.) However, in the subsequent literature we have seen others use *script* to describe virtually any situation. We've seen references to such general situations as the "car crash" script and the "borrow" script. In the end, though, this phenomenon led us to consider where such mislabeled "scripts" would fit in our theory.

Another response we had hoped for was research in experimental psychology that would test our ideas. In part this was satisfied by work in the Yale Cognitive Science Program<sup>1</sup> and in part by influential research elsewhere.<sup>2</sup> Some of the research results provoked revisions in our thinking. For example, we were intrigued by the finding of confusions between events occurring in related scripts, such as doctor and dentist visits.

In the successor to *SPGU*, *Dynamic Memory*,<sup>3</sup> our theory is extended to cover the questions raised in response to *SPGU*. In *Dynamic Memory* I expand the theory to include new representations (called MOPs and scenes) that encompass scripts as others interpreted them, in addition to revising our original concept of scripts.

It is always tempting to speculate on the reasons for the success of a book. One reason *SPGU* may have been so popular is that the ideas are both simple and easy to apply, but the very fact that it is so popular probably means that the ideas are too simple. A second reason for its popularity may be its concern with the issues of both psychology and artificial intelligence at a time when the fields increasingly overlapped. Able to take advantage of the insights of each discipline, it cast light on both.

1. Galambos J A, Abelson R P & Black J B, eds. *Knowledge structures*. Hillsdale, NJ: Erlbaum, 1986. 275 p.

2. Bower G H, Black J B & Turner T J. Scripts in memory for text. *Cog. Psychol.* 11:177-220, 1979. (Cited 205 times.)

3. Schank R C. *Dynamic memory: a theory of reminding and learning in computers and people*. Cambridge, England: Cambridge University Press, 1982. 234 p. (Cited 110 times.)

1A-14