Commentary on Ruchkin

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Models vs. Descriptions: Real differences and language differences

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Abstract

We argue that an approach treating short-term memory as activated long-term memory is not inherently in conflict with information recycling in a limited-capacity or working memory store and with long-term storage based on the processing in such a store. Language differences aside, real model differences can only be assessed when the contrasting models are formulated precisely.

The authors of the present target article introduce their proposal with an attempt to draw a distinction between idea of short-term or working memory as a separate store and the idea of short-term or working memory as activated representations in long-term memory. We note that these views are not inherently opposed to one another. In particular, it makes a great deal of sense to assume that short-term memory corresponds to activated representations in long-term memory, but that does not mean that a model for short-term memory that is based on the notion of stores or buffers is useless or even incorrect.

In this respect it is of some interest to note that the STS system in the modal model of memory proposed by Atkinson and Shiffrin (1968) has long been formulated as the temporarily activated portion of LTS (e.g. Atkinson & Shiffrin, 1971). This reformulation was based on theoretical grounds, in particular the idea that it made more sense to assume that perceptual stimuli contact information in long-term memory rather than assuming a sequence from sensory registers to short-term store to long-term store. This idea was further elaborated in Shiffrin (1975, 1976). Of course, the idea of short-term memory as activated representations in long-term memory considerably predates Atkinson and Shiffrin, going back at least to James (e.g. 1890).

More importantly, this idea is easily reconciled with a model that assumes that STS or working memory may be viewed as a store that temporarily holds a small amount of information for further (more elaborate) processing. As argued by Shiffrin (1975, 1976), perceptual information activates a large amount of long-term memory information. However, the information is rapidly lost from STS (i.e., become inactive) unless it is maintained in STS through rehearsal and other coding processes. As a result, only a few items may be maintained simultaneously in a highly active state in STS. A STS buffer such as proposed by Atkinson and Shiffrin (1968) is a simple model to describe this process of maintenance of information in STS.

The history of the psychology of memory has shown a number of examples where ideas that are not necessarily mutually exclusive lead to unfruitful debates. Perhaps the clearest example is the way in which the Atkinson-Shiffrin modal model of memory is usually discussed in textbooks and put into opposition to the levels-of-processing framework (Craik & Lockhart, 1972) or the working memory model of Baddeley and Hitch (1974, 1977). The present article echoes these textbook accounts where it mentions that "it does not provide an accurate account of how short-term and long-term memories

interact, nor does it correctly predict performance for certain dual-task experiments …". However, Raaijmakers (1993) and others (Bjork, 1975; Glanzer, 1977; Shiffrin, 1977) have argued that the conflict between the levels-of-processing approach and the Atkinson-Shiffrin model is artificial and not based on a detailed analysis of the Atkinson-Shiffrin model. In particular it does not take into account the role assigned to the control processes of rehearsal and coding (or maintenance and elaborative rehearsal). In a similar vein, it has been argued that the evidence that was put forward by Baddeley and Hitch (1974) does not really contradict the modal model (see Raaijmakers, 1993).

We are afraid that the present article might similarly promulgate a false dichotomy and help initiate a flood of papers showing either the fruitfulness of the "store"-approach or arguing for the temporary activation approach. Although some might see such as state of affairs as a sign of healthy progress, active debate is not always a good thing when the debaters are talking 'past one another'. We believe that such theoretical controversies are best resolved by careful and precise formulation of the different approaches, so that the fundamental and underlying similarities and differences can be assessed. Our personal approach has been to produce such specification by formulating mathematical and computer simulation models. We predict that such formulations would show that the two model types are not in conflict, but rather that each type has many differing variants that would be amenable to experimental testing. In addition, the choice of model representation may be more a matter of style than substance. The preferred choice of 'stores' or 'activated subset' will probably depend most on the nature of the data that one tries to accommodate, and an assessment of which approach proves more fruitful, parsimonious, or productive. As such the situation is reminiscent to the wave versus particle viewpoints in contemporary physics.

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