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## HYPERMNESIA IN EPISODIC AND SEMANTIC MEMORY: Response to Bahrck and Hall

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In a previous issue, we (Wheeler & Roediger, *PS* 3(4), 1992, pp. 240–245) reported experiments showing that for recently learned material, repeated testing revealed overall improvements in recall when short intervals occurred between the tests but forgetting occurred when the intervals between tests were lengthened to a week. This outcome solves the puzzle posed by the conflicting results of Ballard (1913) and Bartlett (1932), among many other investigators, who had reported differing effects of repeated testing.

Bahrck and Hall (this issue) argue that our conclusion is likely correct for recently learned material (episodic memory situations, in Tulving's, 1972, terms), but that for "a stable knowledge system acquired much earlier" (semantic memory), hypermnnesia can be found with long intervals between tests. They argue that in semantic memory situations, little intertest forgetting occurs, so any recoveries of knowledge between tests will lead to overall (net) improvement. They cite data from Bahrck and Hall (1991) and Herrmann, Buschke, and Gall (1987) in support of their argument.

Bahrck and Hall's observations (this issue) are interesting ones and should lead to further research on these matters. Previous research (Roediger, Payne, Gillespie, & Lean, 1982, Experiment 3) had shown hypermnnesia for general knowledge material (repeated retrieval of category instances) with short intervals (several minutes) between tests, but the intervals used by Bahrck and Hall (1991) were a month. Squire, Haist, and Shimamura (1989) have also reported hypermnnesia, with both amnesic patients and control subjects, in repeated cued-recall tests of public events with long delays between tests. They gave subjects the same test up to six times; a year elapsed between the first and second tests and the second and third. Percentages correct on the three tests were 21,

28, and 30 for the amnesic patients and 42, 48, and 56 for the control patients. (Three more tests were given to the amnesic patients after the third test to see if these patients would continue to improve. The tests were given a few weeks apart and led to fairly stable performance—30%, 34%, and 31% total recall, respectively.) These results are especially interesting in complementing those reported by Bahrck and Hall (1991), because they show that the improvements are not critically dependent on explicit or declarative memory capabilities, which are gravely impaired in amnesics.

One complication of the report by Squire et al. (1989) is that, after each recall test, subjects were given a multiple-choice recognition test. Therefore, some improvement between tests might be credited to subjects who failed to recall the correct answer but then recognized it and learned it to some degree on the succeeding recognition test. If opportunities for new learning via some sort of study occur between tests, then the hypermnnesia obtained would be suspect by the usual criteria. In laboratory experiments, researchers can ensure that no exposure to material occurs between tests, but this feature cannot be guaranteed in experiments testing general knowledge with long intervals between tests. Indeed, the interpretive problem in the experiments by Squire et al. (1989) potentially exists to some degree in all experiments in which general knowledge is tested with long intervals between tests. The problem is that subjects may pick up an item or two between tests from books, magazines, newspapers, or television. The first test may sensitize people to the missed facts and lead them to learn these facts if exposed to them in the interval between tests. Bahrck and Hall (1991) assumed this factor is not a problem in interpreting their hypermnnesia with a month between tests, and they may well be right, but the issue is difficult to decide because adequate controls are impossible to arrange.

Let us assume that the foregoing concern of learning between tests is not a problem. Then the issue remains as

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## The Transmitter-Persistence Effect

to why subjects recall more facts from semantic memory on a second test than on a first test when the tests are 30 to 40 days (or even a year) apart. Bahrck and Hall (this issue) point to the low intertest forgetting as a critical ingredient, and it is—but only in allowing gains in correctly answering previously missed items to be seen as overall improvement, or hypermnnesia. The critical issue is why such reminiscence—correct recall on a later test of facts that were failed on an earlier test—occurs. We do know that taking one test improves recall on the information successfully retrieved (e.g., Thompson, Wenger, & Bartling, 1978), but why should a test improve recall on items that are failed (unless, as in the experiments by Squire et al., a recognition test or other study opportunity occurs)? Psychologists interested in memory have been unable to answer this question, and neither our own research (Wheeler & Roediger, 1992) nor Bahrck and Hall's (1991) research provides an answer. The idea of recursively sampling a pool of responses provides a general account of recoveries over time (Estes, 1955), but we can still provide little specification beyond this almost 40 years after the idea was first proposed.

A general implication of the research by Bahrck and Hall (1991), Herrmann et al. (1987), Roediger et al. (1982), and perhaps Squire et al. (1989) is that retrieval from allegedly "stable knowledge systems," or semantic memory, is not so very stable: Test people again either soon after a first test or with a month's delay, and some previously known facts will be forgotten and some previously inaccessible facts will be recovered. Psycholo-

gists interested in memory have been puzzling over such observations since early in this century (Ballard, 1913; Brown, 1923), and have not made much progress in understanding these facts.

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## THE TRANSMITTER-PERSISTENCE EFFECT: A Confounded Discovery?

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**Abstract**—In four studies, Boninger, Brock, Cook, Gruder, and Romer (1990) found that attitude change following exposure to a persuasive message persisted longer if recipients were expecting to have to transmit the message to someone else. The present experiment demonstrated that this effect obtains only if the people preparing to transmit, as was the case in the studies of Boninger et al., are denied the opportunity to do so. It is argued, then, that the findings of Boninger et al. may be attributable to a tendency toward thought perseverance triggered by the failure to complete the transmission task, rather than being a consequence of the preparation to transmit per se.

Recently, Boninger, Brock, Cook, Gruder, and Romer reported in this journal (*PS* 1(4), 1990, pp. 268-271) the discovery of a simple technique that appears to promote long-term attitude change following exposure to a persuasive message. In four experiments, subjects who were given the expectation that they would have to transmit the contents of a to-be-read communication to another person exhibited less decay in attitude change over time periods ranging from 8 to 20 weeks than subjects who were given the expectation that they would receive more information about the topic of the communication (Studies 1-3) or than subjects who were given no particular expectation (Study 4). Drawing on the work of Zajonc (1960) and other investigators, Boninger et al. explained

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