

Quintilian's discussion of the relationship between memory and writing helpfully illustrates the social dynamics of ancient composition in performance and the relationship between written texts and prepared speech. Unlike some ancient theorists, Quintilian places a high value on rote memorization – composing speeches, or at least key movements, in advance, orally or in writing, and then reciting them verbatim before the audience (see *Institutes* 11.2.45). This approach, he observes, is superior to the memory theatre model in that it assists the oral performer in the recall of language elements that are not easily assigned to visual images (conjunctions, transitions, critical strings of words, etc.; 11.2.24–25). At the same time, rote memory is impractical and, in some settings, may even be counterproductive. Most obviously, writing out a composition and then memorizing it for recitation can take a great deal of time; in most cases, the speaker is better served to invest preparation time in developing a solid grasp of the facts and the line of argument (11.2.48). Further, public presentation and debate require continuous real-time adjustment: the speaker must continually adapt the discourse to audience response and counterargument, an impossibility with a memorized discourse (11.2.2, 11). Finally, and somewhat the reverse of modern expectations, the memory theatre model, which creates a spontaneous composition on the basis of a general framework, is more persuasive than verbatim recitation: 'The judge admires more, and fears less, things which he does not suspect of having been prepared in advance to outwit him' (11.2.47; LCL translation).

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Further Reading

- Cicero. *On the Orator*. 1959. Translated by E. W. Sutton and H. Rackham. LCL. Cambridge, MA: Harvard University Press.
- Quintilian. 2001. *Institutes of Rhetoric*. Translated by Donald A. Russell. LCL. Cambridge, MA: Harvard University Press.
- Sorabji, Richard. 1972. *Aristotle on Memory*. Providence, RI: Brown University Press.
- Yates, Francis. 1966. *The Art of Memory*. Chicago: University of Chicago Press.

Memory, Persistence and Decay of Impressions of events, things, and people persist in human memory for variable periods of time (see COGNITIVE MEMORY). Some persist (remain memorable) for a very long time, while others decay (fade from memory) almost immediately. Which memories persist the longest is determined by unconscious processes, although it is possible for individuals to ensure that specific memories are more likely to endure by giving close attention to the events which formed the memory and to the frequent rehearsal of those events.

Modern psychological research has determined that memories decay according to predictable patterns, a phenomenon first investigated systematically by Hermann Ebbinghaus. Published in 1885, Ebbinghaus' study of the rate at which he himself forgot memorized lists of nonsense syllables is credited as the first experimental investigation into the performance of human memory. Ebbinghaus reported that his memories of the lists initially decayed at a very fast rate, but that this rate slowed over time – in other words, memories that passed the initial phases of sudden decay tended to become gradually more stable. Subsequent investigation has shown that many types of memories, not only lists of items, follow a decay pattern similar to that discovered by Ebbinghaus. Wixted and Ebbesen (1991; 1997), for example, have shown that Ebbinghaus's data yielded a *forgetting curve* very similar to those they obtained for human memories of lists of high-frequency nouns, visual memory, and the length of time that a pigeon remembered a learning task. They found that forgetting curves are approximated more closely by the power curve, $b = 184/((\log t)1.25 + 184)$ (where b is the saving of work evident in relearning, and t is the time in minutes counting from one minute before the end of the learning period), rather than by the logarithmic curve suggested by Ebbinghaus.

A large volume of publications describing the results of experiments investigating human memory appears every year, but almost all of these report experiments that produce results show memory decay over very short periods of time (seconds, minutes, or sometimes days at most). Controlled experiments that trace memories over periods of time as long as months or years are difficult to conduct and consequently are infrequent, but some experiments have covered periods as long as five years, and a few have explored the quality of memories that have persisted for as long as thirty to fifty years.

Willem A. Wagenaar, for example, devoted six years to an experiment to determine how well he remembered events in his own life. At the end of each day, Wagenaar wrote down one event that was in some way distinguishable from all other memories he had accumulated over his lifetime. He noted details of who, what, where, and when each day's recorded event occurred, and a critical detail in the form of a cue question. At intervals, sometimes as long as five years, he tried to remember these memories after being given one of the cues, 'who, what, where and when' (in random order), followed by a second cue, then a third. He then used the cue question to determine whether he was really remembering a specific event, or only one like it. Wagenaar discovered that his memories over a period of five years followed the general decay curve that has been found to be typical of shorter-term memories: much was lost initially, but the rate of decay slowed, and some memories persisted over the longest periods he tested.

Harry P. Bahrick investigated very long-term persistence of Spanish language skills among English-speaking individuals in the United States who had studied Spanish in high school or college. His results showed that the decay of individuals' memories of the Spanish language followed closely a logarithmic decline for the first three to five years. This decline is enough to extinguish the knowledge of Spanish in those who studied Spanish for only a short time period, or who had not performed well from an academic standpoint. But those who had studied Spanish for a longer period and to a certain level of proficiency were able to retain a substantial residual of knowledge of Spanish over the first three to five years, despite the decay of their memory of the language. Language skills that had persisted for three to five years remained relatively constant from that time until twenty-five years had elapsed, after which time proficiency declined further. Similarly, Harry P. Bahrick, P. O. Bahrick, and R. P. Wittlinger studied very long-term memories of faces and names by using photos in high school yearbooks. They discovered that students were able to distinguish with great reliability photographs of their high school peers from photos of other students who were from classes that they had not attended even after periods as long as fifty years. Teachers, however, were not very proficient at the task of identifying students in classes they had taught after periods of this length.

Robert K. McIver has argued that these experimental results can be used to provide an assessment of the persistence of memories of Jesus' teaching and other activities for the thirty to sixty years that elapsed between the events of his ministry and the composition of the Gospels. While many memories of Jesus would have decayed by the time the Gospels were written, experimental and other evidences suggest that a significant proportion of memories about Jesus would have persisted over the time that had elapsed by the time the Gospels were written. McIver further argues that memories that persisted over the first five years after the crucifixion would likely persist in human memories for the next thirty or forty years. This would be particularly true if these memories were repeated and rehearsed, as memories of Jesus almost certainly were in conversations between Christians and in preaching and teaching activities in the early church.

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Further Reading

Bahrick, Harry P. 2000. 'Long Term Maintenance of Knowledge.' In *The Oxford Handbook of Memory*. Edited by Endel Tulving and Fergus I. M. Craik. Oxford: University Press, pp. 247–362.