

Memory Development

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Human memory shows amazing changes across infancy, childhood, and even through adulthood. But there are many different kinds of memory—each performing a specific function—and these different types show different patterns of change across the lifespan. Both age of onset and improvement rate can differ across memory systems. However, most types of memory show an “inverted U” pattern of development, with individuals showing low performance levels in the early years, increasing levels through young adulthood, and then lower levels again in middle age and old age.

Short-term memory is very limited in duration and capacity. It is used to store information for about 20-30 seconds, for example the time it takes to store a phone number so you can order a pizza. Research suggests that the maximum capacity is only about four items. How do people remember a phone number, then? They tend to chunk information together, for example turning a phone number into three chunks. When scientists talk about how people actively use information in this short-term storage, they label it working memory, and working memory is one type of memory that shows the classic inverted U pattern in development. Specifically, working memory capacity increases through childhood, reaching near-adult levels in the preteen years, and then declines steadily just after the early twenties.

Memories that are stored for more than 30 seconds, including memories that last a lifetime, are all types of long-term memory. One important type of long-term memory is semantic memory, which can be thought of as a person's knowledge base. It contains a person's vocabulary as well as other forms of fact-based knowledge, including information acquired through formal schooling. This type of memory often shows remarkable advances very early in life. For example, by the time they are four months old, babies have categories in memory that group similar objects together (e.g., they can distinguish cats from dogs). In contrast, vocabulary growth starts slow, with the first words appearing around age one, but then accelerates remarkably, with vocabulary size averaging about 6,000 by age six, and about 60,000 by the early twenties. As with many aspects of semantic memory, vocabulary stays steady or increases across adulthood.

Another type of long-term memory is episodic memory. This is the type of memory that stores events from a person's life, such as remembering what you ate for breakfast or remembering the day you got your driver's license. Development of episodic memory across the lifespan shows the common inverted U pattern—that is, increasing abilities through childhood but then declines in old age. Babies do not show true episodic memory until after their first birthday. At around 16 to 18 months of age, children begin to talk about the past, but these utterances usually refer to simple, recent things, such as a duck they saw the day before. By age two, toddlers can describe events that happened several months before. However, adults lose the ability to recall memories from the first three years, recalling little to nothing from these years. This phenomenon is called childhood amnesia. Episodic memory abilities continue to improve through the teen years, reaching their peak in young adulthood. In fact, memories formed

between age 15 and 25 are particularly strong and are over-represented in the pool of memories recalled by middle aged and older adults (an effect known as “the reminiscence bump”).

Lastly, prospective memory refers to the ability to remember to do tasks, such as remembering to complete an online math assignment or take a medication. Lifespan development shows the common inverted U pattern. That is, successful remembering improves from preschool through young adulthood, but forgetting increases in middle age and old age. However, motivation is important. For example, seven-year-olds can remember to do everyday tasks as well as ten-year-olds, as long as the tasks are important to them.

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