Memory Across the Lifespan: Is Aging the Reversal of Development?

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The functioning of episodic memory (i.e., memory that is situated in time and place) undergoes profound and continuous changes across the human lifespan. In general, memory performance has been shown to increase sharply during childhood, and to decrease during adulthood, with accelerated decline in very old age (see review in Shing et al., 2010). The surface similarity in memory performance between children and older adults does not imply that the underlying cognitive and neural mechanisms of episodic memory are the same across different life periods. In this talk I will present three lines of evidence that demonstrate subtle but important differences in memory processes comparing childhood to old adulthood. First, the plasticity of episodic memory is greater in children than in older adults. With training, children show greater improvements and higher levels of asymptotic performance than older adults, even when the different age groups initially perform at the same levels. Second, compared to children, older adults have considerably greater difficulties in rejecting rearranged associative information. Third, older adults and children differ in the nature and access of their memory representation. At the theoretical level, I will present the two-component framework of episodic memory, one of the few lifespan theories available for memory development. In this framework, my colleagues and I proposed that (a) children's difficulties in episodic memory primarily originate from low levels of strategic operations, and reflect the protracted development of the prefrontal cortex in the brain; (b) deficits in older adults' memory originate from impairments in both strategic and associative components (for example, binding together information for face and name), reflecting senescent changes in the prefrontal cortex and medio-temporal lobes. By taking a lifespan approach (Baltes, Lindenberger, & Staudinger, 2006), we postulate that sets of mechanisms related to maturation, senescence, and learning mutually enrich and constrain each other throughout the lifespan, and that it is best to understand and study them together as interacting forces driving the development of brain and behavior.