

The Positivity Effect: Why Older Minds Prioritize Joy

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Several studies have shown a positivity effect for autobiographical memories in older adults. One study found a positivity bias for involuntary memories where younger adults did not rate their involuntary memories as positively as did older adults. Voluntary memories did not show this difference. Another study found a reminiscence bump for adults in their 20s for happy involuntary memories but not for unhappy involuntary memories. Happy involuntary memories were also more than twice as frequent as unhappy involuntary memories. In older participants, a bump for memories reported as most important and happy was found. The saddest and most traumatic memories showed a declining retention function. The positivity bias could reflect an emphasis on emotional-regulation goals in older adults.

Accuracy

Judging the veracity of autobiographical memories can be a source of difficulty; however, it is important to be able to verify the accurateness of autobiographical memories in order to study them.

Vividness

The vividness of the memory can increase one's belief in the veracity of the memory, though not as strongly as spatial context. Some memories are extremely vivid. Memories of personal significance would appear to be very accurate. These memories have been termed flashbulb memories. Flashbulb memories may not be any more accurate than everyday memories. In one study, both flash bulb memories of 9/11 and everyday memories deteriorated over time; however, reported vividness, recollection and belief in accuracy of flashbulb memories remained high.

False memories

False memories have features that differentiate them from true memories. False memories often do not have as much visual imagery as true memories. In one study comparing the characteristics of true and false autobiographical memories, true memories were reported to be wealthier in "recollective experience", or providing many details of the originally encoded event, by participants and observers. The participants engaging in recall reported true memories as being more important, emotionally intense, less typical, and having clearer imagery. True memories were generally reported to have a field perspective versus an observer perspective. An observer perspective was more prominent in false memories. True memories provided more information including details about the consequences following the recalled event. However, with repeated recollection, false memories may become more like true memories, having greater detail.

False memory syndrome is a controversial condition where people demonstrate conviction for vivid

personal memories that are false. False memories and confabulation, reporting events that did not occur, may reflect errors in source-monitoring. Confabulation can be a result of brain damage, but it can also be provoked by methods employed in memory exploration. Professionals such as therapists, police and lawyers must be aware of the malleability of memory and be wary of techniques that might promote false memory generation.

Neuroanatomy

Neural networks

The autobiographical memory knowledge base is distributed through neural networks in the frontal, temporal and occipital lobes. The most abstract or conceptual knowledge is represented in frontal and anterior temporal networks, possibly bilaterally. Sensory and perceptual details of specific events are represented in posterior temporal and occipital networks, predominantly in the right cortex.

A "core" neural network composed of the left medial and ventrolateral prefrontal cortices, medial and lateral temporal cortices, temporoparietal junction, posterior cingulate cortex, and cerebellum are consistently identified as activated regions in at least half of the current imaging studies on autobiographical memory. A "secondary" neural network composed of the dorsolateral prefrontal cortex, superior medial cortex, superior lateral cortex, anterior cingulate, medial orbitofrontal, temporopolar and occipital cortices, thalamus and amygdala can be identified as active regions in a quarter to a third of imaging studies on autobiographical memory. Regions of the brain that are reported infrequently, in less than a quarter of autobiographical memory imaging studies, include the frontal eye fields, motor cortex, medial and lateral parietal cortices, fusiform gyrus, superior and inferior lateral temporal cortices, insula, basal ganglia and brain stem.

These widespread activation patterns suggest that a number of varying domain-specific processes unique to re-experiencing phenomena, such as emotional and perceptual processes, and domain-general processes, such as attention and memory, are necessary for successful autobiographical memory retrieval.

Construction and retrieval

Autobiographical memories are initially constructed in left prefrontal neural networks. As a memory forms over time, activation then transitions to right posterior networks where it remains at a high level while the memory is held in the mind.

Networks in the left frontal lobe in the dorsolateral cortex and bilaterally in the prefrontal cortex become active during autobiographical memory retrieval. These regions are involved with

reconstructive mnemonic processes and self-referential processes, both integral to autobiographical memory retrieval. It should be noted that there is a complex pattern of activation over time of retrieval of detailed autobiographical memories that stimulates brain regions used not only in autobiographical memory, but feature in other memory tasks and other forms of cognition as well. It is the specific pattern in its totality that distinguishes autobiographical cognition from other forms of cognition.

Maintenance of a detailed memory

Autobiographical memory maintenance is predominantly observed as changing patterns of activity within posterior sensory regions; more specifically, occipitotemporal regions of the right hemisphere.

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