

## **Attention in Old Age**

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Attention is the first step our brains take to actively process information from the environment. Our attentional capacity is limited, such that we cannot process all the sights, sounds, smells and feelings surrounding us all at once. Attention (along with memory) is one of the basic cognitive processes most impacted by growing older. In addition, attention is not a unitary process and different types of attention require more cognitive resources than others. Thus, not all attentional systems are subject to declines with age to the same degree.

Sustained attention refers to the ability to keep our focus and concentration on a task for an extended period of time. This type of attention is necessary when learning new things such as reading a book, listening to a lecture, taking an exam or when beginning to drive a car. Sustained attention is effortful and for some and it can be difficult to achieve or to maintain for long periods. This type of attention is typically measured using vigilance tasks, whereby people are asked to monitor their surroundings and respond to an infrequent occurrence. In general, sustained attention is not impaired with age.

Selective attention refers to selectively concentrating on one aspect of the environment while ignoring other things. Think about the items in your environment competing for your attention while you are at home, at school or at work. In addition, there will be thoughts and memories that creep into your consciousness, attempting to distract your attention away. We use our selective attention all day long as our brain focuses on the most important aspects of our environment, while disregarding everything else. One well-used measure of selective attention is visual search tasks. This method involves people searching through a visual array for a target item (e.g. the letter P in an array of letter As). Note the task can be made more difficult by making the distractor items more similar to the target item (e.g. the letter P in an array of letter Bs). Findings are somewhat mixed regarding the impact of age on selective attention. However, a consensus is that older adults are slower at

identifying the target, but do not appear to be disproportionately impacted by distractor difficulty. This suggests that age affects underlying processing speed, but not selective attention per se.

Alternating attention refers to the ability to switch attention from one task to another, or to transfer your concentration from one activity to another (e.g. reading a recipe and preparing a meal). Like selective attention, we use this type of attention all day long as we are constantly making sudden changes in our actions that require attentional shifts. In addition, this is a more effortful type of attention because it requires a constant change of mental set (i.e. mental flexibility). Alternating attention is measured by requiring people to do two separate tasks back and forth continuously (e.g. monitor and respond to stimuli in two different visual arrays, or take part in a visual and auditory task one after the other). Although older adults may perform one of these tasks at the same level as young adults, performance on alternating attention tasks slows down in older adulthood.

Finally, divided attention is the ability to pay attention to, and / or respond to more than one task simultaneously. Thus, unlike alternating attention, when you are switching attentional focus back and forth between tasks, using your divided attention means you attempt to do both tasks at once. An example could be talking on the phone while shopping online (often referred to as multi-tasking). Measuring this type of attention is similar to measuring alternating attention, except that people are required to do both tasks at once. With this type of 'dual task', there are significant declines with age, especially when the attentional demands of both tasks are high. This slowing in performance in old age cannot be accounted for by underlying processing speed, and is believed to reflect a decline in processing resources with aging.

Further reading:

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