

Attention

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Attention is a particularly tricky concept to study because it encompasses many different aspects. For example, attention can refer to general arousal, such as when someone is experiencing a scary event. Attention also can refer to prioritizing one event over another event, such as paying attention to your friend talking to you, and ignoring a stranger in the background. This type of attention is studied extensively in cognitive psychology. Attention also can refer to multi-tasking, when the focus of your attention is split among different events, such as when you are driving and fiddling with the radio. This entry provides a brief discussion of these three types of attention: arousal (general heightened physiological state), selective attention (prioritizing some information over other information), and divided attention (multi-tasking).

Arousal, in the context of attention, refers to a heightened physiological state ranging from excitement to panic. What is unique about arousal is that it indiscriminately increases attention paid to all events. For example, when you are watching a scary movie, you may find that you can hear water dripping from your faucet, which you may have not noticed otherwise. By contrast, when you first wake up in the morning with lower arousal levels (especially before having coffee), it may be difficult to focus on anything. Research with infants has used arousal, as measured by heartrate, to indicate when they are engaged in periods of sustained attention and ready for learning. Such research has inspired decades of studies investigating optimal periods for teaching and learning.

Selective attention refers to the process of prioritizing some event over others. This process, especially when goal-directed, is fundamental to our ability to function in our daily lives. Goal-directed (or top-down) selective attention refers to prioritizing information that you want, such as searching for mustard in the fridge when making a sandwich. By contrast, bottom-up selective attention refers to being attracted to aspects of the environment involuntarily. For example, you may pay attention to a loud bang or bright flashing lights even if you do not know why those events occurred. Over five decades of research has investigated top-down and bottom-up selective attention using visual search paradigms. In particular, top-down visual search paradigms investigate how we find what we are looking for. It turns out that adults can search for specific objects, or even categories of objects, by 200 milliseconds, which is approximately as fast as it takes for you to make one eye-movement. The ability to engage in top-down search develops from infancy throughout older childhood. Although adults are very good at top-down search, many studies also have demonstrated the limits to selective attention, such as limited search capacity. This phenomenon refers to not being able to search for many things at the same time. In general, there is a limited "load" on our attentional system that, if exceeded, would reduce the quality and quantity of the information that we can pay attention to. This "load" may differ between individuals, and recent research has been investigating the causes and consequences of these individual differences.

Divided attention (multi-tasking) refers to the ability to focus on more than one object or event at a time. Parents and caregivers often demonstrate excellent multi-tasking abilities, such as monitoring their children, while making dinner and calling a friend. Although multi-tasking may be necessary at times, research has shown that divided attention typically results in worse attention (and outcomes) to each event, compared to if you were to devote all of your attentional

resources to each event sequentially. We may become less accurate or slower at responding to events as a result of divided attention. Moreover, multi-tasking for extended periods may "wear down" mental capacities. One example of how multi-tasking can have severe consequences is driving while texting, and more effort is required to reduce this issue as much as possible.

In summary, attention is a multi-faceted cognitive process with at least three types: arousal, selective attention, and divided attention. It is a fundamental ability that underlies, and interacts with, many other cognitive processes, including memory and learning. In particular, important research has shown how deficits in attentional abilities, such as in attention deficit hyperactivity disorder and anxiety, may have cascading effects on other cognitive abilities, especially learning. New exciting research uncovering how attentional abilities across the lifespan interact with other cognitive abilities will help us better understand issues related to cognitive development and cognitive decline.

Further Reading

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Nobre, K. (2014). *The Oxford handbook of attention*. Oxford University Press.