

Cognitive Skills: What are the 8 Core Cognitive Capacities

What is cognitive impairment?

Cognitive impairment is when a person has trouble remembering, learning new things, concentrating, or making decisions that affect their everyday life. Cognitive impairment ranges from mild to severe. With mild impairment, people may begin to notice changes in cognitive functions, but still be able to do their everyday activities. Severe levels of impairment can lead to losing the ability to understand the meaning or importance of something and the ability to talk or write, resulting in the inability to live independently.

The imminent growth in the number of people living with cognitive impairment will place significantly greater demands on our systems of care. There are millions of family members providing unpaid care to a person with a cognitive impairment, a memory problem or a disorder.

The 8 Core Cognitive Capacities

- Sustained Attention
- Response Inhibition
- Speed of Information Processing
- Cognitive Flexibility
- Multiple Simultaneous Attention
- Working Memory
- Category Formation
- Pattern Recognition

Attention is the ability to focus on an activity or stimulus over a long period of time.. It is what makes it possible to concentrate on an activity for as long as it takes to finish, even if there are other distracting stimuli present.

There are 5 different attention processes:

- **Sustained Attention:** the ability to continuously maintain focus on a task or event over a long period of time. This type of attention is also called vigilance.
- **Selective Attention:** The ability to direct attention and focus on a task without interruption or interference from either external or internal factors or stimuli.
- **Alternating Attention:** The ability to rapidly shift focus from one task to another.
- **Processing Speed:** The rate at which the brain performs a task. It will evidently vary according to the task and depending on other cognitive functions involved. It is measured by the elapsed time between the onset of a stimulus and the individual's response.
- **Hemineglect:** Great difficulty or inability to direct attention to one side, (usually the left) of external space or one's own body.

<https://www.neuronup.com/en/areas/functions/attention>

Response Inhibition: Also known as response inhibition, is a cognitive process and more specifically, an executive function – that permits an individual to inhibit their impulses and natural, habitual, or dominant behavioral responses to stimuli (a.k.a. prepotent responses) in order to select a more appropriate behavior that is consistent with completing their goals. It is an important aspect of inhibitory control. Eg; successfully suppressing the natural behavioral response to eat cake when one is craving it while dieting requires the use of inhibitory control.
https://en.wikipedia.org/wiki/Inhibitory_control

Speed of Information Processing: refers to how quickly a learner can process incoming information. ... Sustained attention and response inhibition contribute to speed of information processing by increasing activation of the brain processing systems appropriate for the task to which the person is attending. Speed of information processing as measured by various reaction time and inspection tasks has been shown to correlate with psychometric intelligence, and it has been suggested that general intelligence is determined to some degree by the speed that information is processed. If this is so, then various measures of speed of information processing should correlate substantially with each other, and each should also correlate with a wide range of psychometric tests that load on.
<https://www.sciencedirect.com/science/article/abs/pii/0191886996000220>

Cognitive Flexibility: Refers to our ability to switch between different mental sets, tasks, or strategies. To measure cognitive flexibility, local switch costs are currently preferred above global switch costs because the global switch cost is also influenced by a difference in working memory load between both blocks (i.e., block including the repetition of one single task; AAAA or BBBB) and mixed blocks (i.e., block including the alternation between two tasks; ABABAB).
<https://www.sciencedirect.com/topics/neuroscience/cognitive-flexibility>

Multiple Simultaneous Attention: is the ability to multitask with success. It is the ability to move attention and effort back and forth between two. Research also shows that working memory is very fragile, he says. "Over the course of seconds, one interruption erases memory quality."
<https://www.aarp.org/health/brain-health/info-05-2011/multitasking-switch-in-older-brains.html>

Working Memory: Working memory is a system for temporarily storing and managing the information required to carry out complex cognitive tasks such as learning, reasoning, and comprehension. ... One test of working memory is memory span, the number of items, usually words or numbers that a person can hold onto and recall.

Category Formation: This is the ability to organize information, concepts and skills into categories, and forms the cognitive basis for higher-level abilities like applying, analyzing, and evaluating those concepts and skills. Categories are the basis of language and organization of the world.

Pattern Recognition: Without the mathematical rigor provided by a computational approach, naturally the dependency upon numerous assumptions in any given experimental design, let alone interpretations of results, presents additional problems.