

## Psychomotor speed in old age

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Psychomotor ability is defined in terms of the relationship between cognitive functions and motor activities. It plays an important role in acquiring and carrying out a broad range of physical skills and coordinated behaviors, such as playing a sport, or in everyday activities like pouring a glass of milk or applying makeup. Psychomotor speed therefore is the rate at which a certain psychomotor behavior can be carried out. Because of the relevance of psychomotor speed to many areas of personal functioning, it has been extensively studied in a wide variety of applied contexts including sports performance, personnel selection within the military, symptoms of mental health problems such as depression and schizophrenia, and recovery following brain injury.

Perhaps the area in which psychomotor speed has been most extensively studied is adult aging. Normal trajectories of aging generally include increases in cognitive ability until some peak age, followed by steady age-related declines. Whereas some narrow abilities, such as verbal comprehension, peak quite late in life, psychomotor speed appears to peak relatively early in adulthood, and steadily declines throughout most of the adult developmental period. Consequently, comparisons of reaction time between young and older adults on tasks ranging from simple visuomotor activities (such as rapidly crossing out all instances of a particular

symbol from among an array of symbols) to more complex tasks like driving, generally find that young adults react more quickly to stimuli than do older adults.

Various reasons have been proposed to explain differences in psychomotor speed due to aging. For instance, older adults are more likely to be vulnerable to medical conditions or take prescription medications that may indirectly affect psychomotor speed. Declines in auditory and visual acuity may also affect the time it takes for individuals to react to stimuli. Changes in neuronal structure have also been noted in the elderly, with overall decline in both grey matter and white matter brain volume after the age of 65. Environmental influences such as increased stressors may also impact the speed at which older adults react to situations.

Psychomotor speed is thought to be especially important among older adults due to its role in activities of daily living. Reduced psychomotor functioning can affect gait, balance, and fine motor skills, which in turn can have an impact on activities from buttoning a shirt to walking down the stairs. Older adults may also take longer to decide how to respond to situations involving ambiguous information. For these reasons, reduced psychomotor speed has been associated with an increased risk of falling within elderly populations, and in some studies, has been linked with mortality.

Many older adults continue to function as well as they ever did despite signs of cognitive decline.

Although research documents age decline in laboratory tasks such as rapid finger tapping, tests of simple reaction time, digit symbol substitution tests, or crossing out symbols, activities of daily life normally involve more complex cognitive processes. Adults who have developed

expertise in a given area often continue to perform well into older ages because practice, maintenance, and compensation play a role in countering age related decline. For instance, a classic study by Salthouse compared the performance of older and younger typists on a simple finger tapping task and on their typing speed. While psychomotor speed on the finger tapping task greatly favored the younger typists, actual typing speed did not differ noticeably between the two groups. Salthouse proposed that older typists had a better developed skill of anticipating words in the document they were typing, thereby reducing the time spent switching between the document and their typing. The older adults could use their experience to compensate for slower psychomotor speed. In sum, although psychomotor speed does appear to decline as one ages, other cognitive abilities do not decline as quickly and can be used by older adults to compensate for slower psychomotor speed.

### **Further Reading:**

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