

To what extent is decline in cognitive functioning

Psychology



**ASSIGN
BUSTER**

The scientific study of old age is also known as gerontology. For many years old age was viewed exclusively in terms of loss, it was believed that as people age, their cognitive processes gradually start to decline. There are different cognitive processes, these include paying attention to particular stimuli, recalling previous experiences from memory and solving problems. The information-processing perspective on ageing reflects an understanding of human cognition that uses the operation of computers as an analogy to the way the mind works. Two aspects of information processing are related to age.

The first is the slowing in response time, this is the time it takes for new information to be processed and the second is research that deals with the various changes in memory, namely, learning, storage and retrieval of information. The most widespread change in the information processing ability is that an older person is slower when compared to a younger person in processing new information. The relationship between response time and speed was recognised in a classic study by Birren, Butler, Greenhouse, and Yarrow (63). They used a total of 47 men between the ages of 65 and 91 who were healthy, according to a clinical examination.

They were then split into two groups, group 1, were in good health and group 2, and were without obvious symptoms of disease. This small difference turned out to be very important in understanding the real connection between age and information processing. It was found that intelligence measures that demanded fast responses were flawed for both groups and old adults were significantly slower in psychomotor speed than young adults.

This data insinuates that age slows down the reaction time regardless of the health, muscle used and sensory modality of an individual.

Therefore, because this change occurred in both groups, it can be assumed that it is related to age rather than disease. Many researchers have tried to explain why this happens. Some believe that the problem originates from the central processing functions of the brain, therefore the more complex the problem the slower a person gets. Others believe in the speed-accuracy trade-off, which involves participants selecting a strategy where the emphasis is on responding quickly or waiting a short time before they make the final decision in order to ensure it is correct.

Effectively they 'trade off' speed for accuracy. Furthermore, some have used measures of brain waves to argue that particular electrical impulses measured in the brain during problem solving do not show any age difference therefore the slowing must be caused by something outside the brain. In hypothetical circumstances an individual can compensate for the slower processing speed and perform equally as well as the younger person, particularly if the person is an expert in a specific skill.

As illustrated by Salthouse (84) who found that older typists did not show any differences in their rate of typing, regardless of slower responses on other dimensions. This is because the older participants compensated for slowing by looking further ahead at the material to be typed, by doing this they had a little more time to process the information leading to their typing speed remaining consistent. However, when we are faced with everyday

complex and unexpected situations we do not have time to compensate, which is where the older adults may sometimes lose out.

For instance when faced with an awkward situation whilst driving, crossing a street or even incidents around the house. The information processing approach is adopted in order to explain the decline in memory efficiency; here the emphasis is on encoding, storage, and retrieval. Morris et al (90) tested older and younger participants, they had to do a conventional memory task in which they had to memorise a short list of words whilst deciding if a simple sentence was true or false. The recall of the older participants was worse than the younger ones.

Morris argued that this age difference occurs because younger participants not only encode information but also send a copy of it to the long-term memory store, so they can retrieve it if they lose the original trace. However, older people are unable to make a copy and if they lose the trace then they forget. Memory decline becomes much more visible in the short-term memory; this was investigated by Strayer et al (87). They used the process called event related potentials (ERP) which measures electrical responses of the brain to stimuli.

According to earlier research, an element of the ERP called the P300 is related to cognitive processing and states that it slows with age but it is not influenced by the individual's response to the event. Consequently reaction time, which includes memory, searching, encoding and responding can be associated with the P300. They found that each of the above were equal

contributors in the slowing of reaction time. Another aspect in memory is how accurately people can remember events from the past.

Salthouse (82) stated that people are more inclined to remember events if they were highly speculated at the time, even if the individual was not born then, such as, the death of Princess Diana. Nevertheless, Rybash (86) discovered that people remember events associated with their present state. For instance, depressed people may only remember the downfall of their life, whereas an optimistic person may recall events in which they achieved success. Hence we are left with the image that old memories are not reliable when investigating memory changes.

Mead (70) stated that psychology needs to focus on everyday memory performance and not just on experiments in the laboratory. Sinnott (89) agreed with Mead and stated that by using prospective memory, memory loss maybe compensated for. He told participants of different ages to remember to mail back postcards on a given day, they found that the elderly were better than younger people at remembering future events. This could be because older people are more motivated and trustworthy. Another dimension that could be effected by ageing is an individual's intelligence.

Horn (70) introduced the two-factor theory of intelligence; this consists of two basic types of intelligence. Firstly, fluid intelligence, this reflects the central nervous system at its physiological peak. It is mainly measured by the performance tests, which reflect the ability to reason quickly when presented with novel tasks. Secondly, crystallised intelligence portrays the extent to which we have absorbed the knowledge base of our culture as well

as the amount of information we have accumulated. Horn believed that fluid intelligence reaches its climax in early adulthood and then steadily declines.

Conversely, as crystallised intelligence is involves experience and learning, it stays stable and increases as the years pass, this is because we maintain a balance between forgetting or storing old information and processing new information. Nevertheless, this is not to say that crystallised intelligence will not decline, it will but it depends on the amount of losses a person receives during the course of life. In addition to this, Baltes (93) expanded on the two-factor theory in order to explain why performance in different activities remains stable or improves albeit physiological declines.

Consequently, according to Baltes, as we grow older, our mechanics of intelligence 'fall off', however, this loss can be compensated for by an increase in the pragmatics of intelligence, which is the knowledge that we have accumulated. This makes up for fluid losses and determines performance. Baltes concluded that if their crystallised intelligence is extensive then older people could outperform the young. Wechsler was particularly interested in at the age in which intelligence starts to decline.

He gave participants, who ranged in age from 16 to over 75, the Wechsler adult intelligence scale (WAIS) in order to test intelligence. It was found that intelligence seems to increase until about the age of 22, then stays the same from 22 to about 30 and then declines gradually from 30 years onwards. The decline became rapid after the late 60's. Therefore, the older one becomes the less intelligent they become. The Seattle longitudinal study tested the

age changes in intelligence and is the central defining study of intelligence and age.

The study used five scales from the primary mental abilities (PMA) test, which was originally developed by Thurstone (1938). The five dimensions used were verbal meaning, space, reasoning, number, and word fluency. Schaie conducted a series of comparisons between different age groups. He believed that he could measure the contrasting biases of each type of research method and isolate the true impact of age on intelligence. The researchers first selected groups of volunteers seven years apart in age and compared their scores. They then followed each group testing them at 7-year intervals.

Schaie's findings refuted the belief of 1970's psychologists that intelligence declines in the early 20's and introduced controversial results. On average the gain in intelligence lasts up until the early 40's and are stable until mid 50's or 60's. However, after the age of 60, seven-year losses are statistically significant for all five PMA scale dimensions. Theorists who study cognition in older adults have recently begun to speculate whether elders might have some advantages over the young because of their collection of worldly knowledge and skills.

Current thinkers suggest that wisdom may play a role in later adulthood similar to that played by fluid intelligence in earlier life. Baltes introduced a criterion called the wisdom-related expertise, which they used to test wisdom in old and young adults, by devising situations in which participants could give their opinion, which in turn, would test their wisdom. They found

that very few people produced responses at the wise end of the scale, people scored higher if the scenario related to them personally, they concluded that wisdom was equal between the two groups.

However, Baltes was not satisfied with this explanation and investigated further, he compared clinical psychologists with people in comparable professions. Results indicated that clinical psychologists scored higher than people whose work did not involve human expertise. Therefore Baltes concluded that wisdom does advance with age but a very knowledgeable young adult could also possess wisdom. Critics suggest that Baltes is simply measuring general cognitive ability rather than what is usually thought of as wisdom and old age.

It is argued that the speed of accessing wisdom-related knowledge remains constant across adulthood. Perlmutter (90) found that those older adults isolated by their peers as wise are more likely to be concerned for humanity as a whole. Enhanced creativity may also be a positive element of cognition in older adults. Highly creative individuals such as writers; composers or artists reach their peak in late adulthood. Cohen (00) has developed a four-stage theory of mid-to-life creativity in order to describe the potential for work in the later years.

She found that at the age of 50 individuals enter a re-evaluation phase, in which they reflect in past experiences and devise new goals, this leads to a desire to do something and be someone. The liberation phase involves individuals in their 60's doing more creative work because they have retired. In the summing up phase during their 70's, people have a motive to pull

together their achievements and reminisce. In the final phase, the encore phase during their 80's and onwards, adults have an increased aspiration to complete any unfulfilled work or desire that have been neglected in the past.

In conclusion, it is still impossible to say how much change occurs in the quality of an individuals cognitive functioning after 65. There are still enormous differences amongst adults who are relatively a similar age. On one hand, there are clear and important declines in cognition but on the other, these declines can be compensated for. There is also the fact that every longitudinal study has found at least two participants who show no decline in their cognitive abilities at all. Consequently, this presumes that decline maybe a characteristic, but not a consistent accompaniment of ageing.