

Change in the structure of reverse memory development in senile age

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Abstract. Aging is a universal and inevitable process. It is natural to all organs and systems of the body, even under optimal genetic and environmental conditions. Not all organs and systems age simultaneously or at the same rate. However, for most of them aging processes begin long before the onset of old age — in the period of early and middle adulthood. Many of the aging effects are undetectable until late adulthood as aging processes are gradual and most of the body's systems have significant reserves. Memory is the most important characteristic of all mental processes, it ensures the unity and integrity of a human personality, in which the processes of aging are vividly manifested.

1 Introduction

The study of psychological features of memory has a history of its own. In the early 20th century, T. Ribot formulated the law of reverse memory development, which is formulated in the following - reverse memory development is done in a certain order, it goes 1) from newer to more old, 2) from more complex to simpler, 3) from arbitrary to automatic, 4) from less organized to more organized. T. Ribot noted that there is a relationship between the law and physiological principles: degeneration first gives rise to what developed later, and complex is lost before simple. [1, 2, 3]

The law provision by T. Ribot is shared by domestic psychologists as well. So, S.L. Rubinstein quite clearly says that memory changes in old and senile age are made according to T. Ribot.

Scientific research proves that in older people with auditory perception the material is better remembered using logical memory and hearing memorization above the visual. Research confirms that visual memorization weakens over the years. In the elderly age, short-term memory weakens the most. The problem of memory impairment is closely related to the special treatment of the past, the role of memories in the life of the elderly and senile person. The stimulation of memories helps older people accept their lives, understand that it “was not lived for nothing” [4, 5, 6].

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In other words, older people tend to remember what matters to them or might come in handy in life. This demonstrates that development always takes place in a certain context and that even when one gets older, the demands and opportunities of the environment support his skills and abilities in good shape. Finally, older people are usually better off performing tasks if they have received detailed instructions on how to classify and organize memorized material. Training significantly improves older people's performance of memory tasks. [7, 8]

The objective is to study the change in the structure of reverse memory development in senile age.

2 Materials and methods

The study involved 20 people: 10 men and 10 women between the ages of 62 and 70.

Methods used for the study of memory indicators: "10 words" and "Pictogram" technique by A.R. Luria. The following was assessed using these methods - the overall state of memory of the subjects, features of memorization, preservation, reproduction, and mediated memorization.

During this method's application, the age of the subjects had a great role. It was easier to interact with subjects of 60 - 65 years old; they understood the purpose of the task faster and passed the survey faster as well. The subjects of 65 years old and up had a harder time with the survey; they thought that at their age it was too much of a load and argued that because of the survey they had to think a lot, which was a hardship for their age. Such people had to be persuaded to assure that there was nothing difficult, that the survey took only a little time.

3 Results and discussion

Let us consider the results of the "10 words" technique. During this technique application, 20 people were interviewed - 10 women and 10 men of senile age. Age of male subjects: 62 years, 63 years, 65 years, 66 years, 67 years, 68 years, 69 years old - two people, 70 years old - two. Age of female subjects: 61 years, 62 years old - two, 64 years old - two, 66 years, 67 years, 68 years, 69 years, 70 years old. A common feature of all subjects was that they all memorized the first two words and the last two words (out of 10) without exception. It should also be noted that two men aged 62 memorized 5 words on the first attempt, on the second - 3, on the third - 2 words. Our attention was caught by a woman in the age of 70 who named 7 words from the third time. No one was able to remember more than 7 words apart from this woman.

Table 1. Memory capacity of women, (men).

| Rating in % | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Number of female/(male) subjects | | | | | 5 | 4 | 1 | | | |
| | | 2 | | 1 | 4 | 3 | | | | |
| Number of correctly written | | | | | 5 | 6 | 7 | | | |

| | | | | | | | | | | |
|--|--|---|--|---|---|---|--|--|--|--|
| words (out of 20) (women)/ (men) | | 2 | | 4 | 5 | 6 | | | | |
|--|--|---|--|---|---|---|--|--|--|--|

Thus, we see that women's memory capacity was significantly higher than men. Women: 5 persons — 50% of memory capacity, 4 persons — 60%, 1 person — 70%. Men: 3 persons — 60% of memory capacity, 4 persons — 50%, 1 person — 40%, 2 persons — 20%. In this regard, we also portray the overall memory capacity of men and women.

Table 2. General table of memory capacity for men and women.

| | | | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Rating in % | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |
| Number of subjects of women and men | | 2 | | 1 | 9 | 7 | 1 | | | |
| Number of correctly written words (out of 20). | | 2 | | 4 | 10 | 11 | 7 | | | |

It should also be noted that memory capacity at senile age can be divided not only by gender, but also by number of years.

Table 3. Age table of memory capacity of women, (men).

| Number of test subjects women (men) | Age of test subjects (years) | | Number of given words | Number of memorized words by test subjects | | Memory capacity | |
|-------------------------------------|------------------------------|----|-----------------------|--|---|-----------------|-----|
| | | | | | | | |
| 1 | 61 | 62 | 10 | 6 | 6 | 60% | 60% |
| 2 | 62 | 63 | 10 | 6 | 6 | 60% | 60% |
| 3 | 62 | 65 | 10 | 6 | 6 | 60% | 60% |
| 4 | 64 | 66 | 10 | 6 | 5 | 60% | 50% |
| 5 | 64 | 67 | 10 | 5 | 5 | 50% | 50% |
| 6 | 66 | 68 | 10 | 5 | 5 | 50% | 50% |
| 7 | 67 | 69 | 10 | 5 | 5 | 50% | 50% |
| 8 | 68 | 69 | 10 | 5 | 4 | 50% | 40% |
| 9 | 69 | 70 | 10 | 5 | 2 | 50% | 20% |
| 10 | 70 | 70 | 10 | 7 | 2 | 70% | 20% |

3.1. Results of age memory capacity of men and women

From the above shown memory capacity tables by age differences, we see that women's memory capacity was higher than men's. The following distinguishing points should be noted: one female subject of 70 years of age had a memory capacity of 70% (it should be noted that she had the highest result among all subjects), and 2 men of the same age had 20% memory capacity. Another distinguishing feature is that a 69-year-old woman test subject had 50% memory capacity and two men of the same age had 40%. But despite these differences, there were common points such as: at age 62, men and women had the same memory capacity — 60%, men and women at age 66 and age 67 had the same percentage of memory capacity — 50%.

That is, we see that in women from age 61 to 64, the memorization process went steadily (60%), then memory capacity decreased dramatically from age 64 to 69 (50%) and

from age 70 had a sharp jump in memory capacity. In men from age 62 to 65, memory capacity was unchanged (60%), then there was a sharp decline in memory capacity to age 69 (50%), from age 69 and until age 70 memory capacity was reduced to 20%. In this way, it can be concluded that in both gender differences and age differences women had a higher memory than men.

To study the amount of memory in senile people, we used another method — “Pictogram”. In the course of the method, 20 (10 men and 10 women) people of senile age were interviewed. Age of male subjects: 60 years, 2 persons - 62 years old, 63 years, 66 years, 2 persons - 67 years old, 3 persons - 68 years old. Age of the female subjects: 61 years, 2 persons — 64 years old, 2 persons — 65 years, 3 persons — 69 years, 2 persons — 70 years old. The results are presented in the table.

Table 4. Age table of women (men) memory capacity.

| Number of test subjects women (men) | Age of test subjects (years) | | Number of words and collocations presented | Number of words and collocations written correctly by test subjects | | Memory capacity | |
|-------------------------------------|------------------------------|-----|--|---|-----|-----------------|-----|
| | Women | Men | | Women | Men | Women | Men |
| 1 | 61 | 60 | 15 | 5 | 5 | 35% | 35% |
| 2 | 64 | 62 | 15 | 6 | 5 | 42% | 35% |
| 3 | 64 | 62 | 15 | 6 | 5 | 42% | 35% |
| 4 | 65 | 63 | 15 | 5 | 5 | 35% | 35% |
| 5 | 65 | 66 | 15 | 5 | 4 | 35% | 28% |
| 6 | 69 | 67 | 15 | 4 | 4 | 28% | 28% |
| 7 | 69 | 67 | 15 | 4 | 4 | 28% | 28% |
| 8 | 69 | 68 | 15 | 4 | 4 | 28% | 28% |
| 9 | 70 | 68 | 15 | 3 | 4 | 21% | 28% |
| 10 | 70 | 68 | 15 | 3 | 4 | 21% | 28% |

From these age tables we can see that memory capacity in women was higher. Thus, there is the following pattern of memory capacity of women and men. The memory capacity of women was higher on the following traits: the memory capacity in two women aged 64 years was 42%; in men there was a decline in memory capacity to 35% starting from 63 years old and up. Women (3 persons) 69 years of age — 28% memory capacity, and men had 28% memory capacity already in 68 years. So, women at the age of 69 already had a better memory than men at 68.

The results of the study showed that no man had more than 35% of memory capacity, while two 64 years old women had a 42% memory capacity. It should also be noted that men had a decline in memory capacity since the age of 63, and women - later (at the age of 65), which is also important for memory capacity.

In general, it should be noted that the “10 words” method application for remembering and reproducing words was more difficult with those who were over 68 years old; and the “Pictogram” method conducted on the study of mediated memorization by the free graphical association method was more difficult for those who were 65 years old and up.

During the course of the methods application, the following age features of memory for historical events were revealed. The results of the study are that those subjects who answered better and showed a high amount of short-term memory had lower memory rates and vice versa - low short-term memory metrics correlate with high historical memory rates. From the results we can see that the subjects (men and women) aged 60 to 65 years

had about the same percentage of memory capacity, but they had poor long-term or tertiary memory. In subjects aged 66 to 70, we saw a respectively lower percentage of short-term memory and a high percentage of long-term memory.

Let us give some examples.

The subject woman of 70 years old recalled the events of 60 years ago in detail. For example, in the first place she remembered her childhood, such moments as: games she liked to play when she was a 10 years old girl, a favorite dress - down to the fact that she even called it color and pattern. She remembered her toys and their names, and most importantly, she remembered the year, day, month when the favorite toy was bought. But her memory capacity for historical events was not limited on this as she remembered not only childhood periods of life, but also later ones. For example, her student years: she gave six surnames, patronymics and names of university faculty members who were her professors. This test subject was unique also because she showed the highest results during the course of the methods application, i.e. excellent short-term memory for her age, as well as very good memory in historical events.

Another example of long-term memory was a male test subject at the age of 68. His very first memory was army service, he recalled interesting moments in the course of it. Then his memories touched on several years, where he told how he and a friend joked about the teacher, how he quarreled (and why) fought with a friend, what words his mother said in the course of the conflict.

Thus, from these examples we can see that tertiary or long-term memory for distant events appears to persist almost entirely in the elderly people.

The following pattern should be noted: in subjects aged 60 to 65 years, the percentage of short-term memory was higher than in 70 years old subjects, and long-term memory was much worse. For example, a 62 years old man could not say anything from his early life periods, although the short-term memory rate averaged 60%.

It is interesting to note that the woman subject of the same age (62 years) could remember one period of her life, such as: gifts she got for her birthday as a teenager, but she recalled it in general terms, not in detail. In general, when researching historical events memory in people aged 60 to 65, we saw the examples of how low the percentage of their long-term memory was, how episodic their memories were or whether they couldn't remember anything at all.

Thus, the older the age of the subjects, the higher the amount of memory that contains the most distant events, but the smaller the short-term memory. Thereafter, the lower the age of the subjects, the lower the percentage of long-term memory and higher the percentage of short-term memory.

4 Conclusions

Thus, the following psychological features of reverse memory development in senile age have been identified.

- 1) The problem of memory impairments is closely related to the special attitude to the past, speech and memories in the life of an elderly person. This attitude to the past makes up a significant part of the elderly person's mental life while drawing attention to the phenomenon of special and emotionally colored reverence of old people to past.

- 2) Remembrance for distant events is preserved almost entirely in older people. According to the research, older people better recall details of historical events in which they were directly involved.

- 3) The most characteristic memory changes in persons over 60 years old are as follows:

(a) There is an uneven deterioration of memory in persons over 60 years of age. Mechanical imprinting is particularly afflicted. Motor memory does not suffer as much; b) the semantic component of logical memory is preserved most well over the age of 60; c) figuratively — sensual memory decreases more than semantic memory component or than mechanical capture; d) the basis of memory strength over the age of 60 is internal semantic connections; e) fixing current actions in persons over 60, even having a good memory is rarely satisfied. It is significantly weakened in the vast majority; f) memory functions emerged later are not preserved; g) internal semantic connections are significantly weaker at a certain age. Memory of any kind becomes precarious and everything new is perceived poorly. The structure of the perceived material is corrupted. Such people use only long-established concepts and perceptions with a sharp narrowing of interests in life; h) when dealing with the issue of working capacity of persons over 60 years old, preservation of the semantic component of logical memory should be especially taken into account; i) extremely sharp weakening of short-term memory. In deep old age, the semantic component is significantly weaker, which leads to further deterioration of memorization.

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