



## Immediate Memory Span

### KEYWORDS

Nauma Hafeez

Dr Karpagam

### ABSTRACT

*AIM: The aim of this study is to assess the span of immediate memory in an individual.*

*OBJECTIVE: The aim of this study is to assess the span of immediate memory in an individual using digit span method.*

*BACKGROUND: Memory is key to everyday activities of life. Without memory learning is impossible. Therefore retention and memory together play an important role in an individual's mental behavior. Since memory and learning go hand in hand in the span of memory in an individual can be used to evaluate his learning ability.*

*REASON: To evaluate the longest span of memory in individuals and relate this to his mental health.*

### INTRODUCTION

The modern era is continually changing. With people making new discoveries and innovative ideas popping every other second the world is advancing at an incredible pace. To keep up with all this "change" we have forced our brains to expand and develop from a mere primitive brain to a very complex mind which can store up to a million GB while some go to the extent of saying it is even more than a million.

To put it in our perspective a brain can store enough CDs to stack up to the moon and 15 libraries for every person on this planet. The data is huge to even imagine.

We as individuals are continuously learning for the aim of progress. Every experience makes us learn something valuable and therefore learning is key to survival.

But have you ever wondered how learning actually begins???

It all starts with memory. Memory is key to learning .without the ability to memorize learning is not possible and progress is difficult.

Memory is the process in which any kind of information is encoded ,stored and retrieved for later use.

In the first stage the information must be changed from the source to chemical signals so that it may be put into the encoding process. Storage is the second memory stage or process. This entails that information is maintained over periods of time. Finally the third process is the retrieval of information that has been stored. Such information must be located and returned to the consciousness.

Broadly, Memory can be classified into three types: sensory memory, short-term memory and long-term memory, this is known as the Atkinson-Shiffrin model, after Richard Atkinson and Richard Shiffrin who developed it in 1968, and it remains to this day the most popular model for studying memory.

Adding the aspect of cognition to short term memory we get what is called working memory. Working memory is a short-term memory buffer that allows for the manipulation of stored information, while short-term memory is only in-

involved in the short-term storage of information. It is known that a working memory can store only up to 7 items at a time.

Our lifestyle implores us to retrieve information for longer durations of time or sometimes even forever since memory is merely a neuronal connection or a synapse in the brain ,that is any information from the outside will cause synaptic formation in the brain , the ability to memorize will increase in either increased synaptic junction or stronger synaptic junctions .This can be achieved by repeated use of short term data which will gradually strengthen into long term data in the brains memory system.

In this study we aim at finding the immediate memory span of an individual .In psychology and neuroscience, memory span is the longest list of items that a person can repeat back to back in correct order immediately after presentation on 50% of all trials. Items may include words, numbers, or letters. The task is known as digit span when numbers are used. Memory span makes use of working memory as we have not only to store but also to manipulate it in the same order.

### METHODS AND MATERIALS:

Materials: a list of numbers ranging from one digit to five digits with three numbers in each digit. The list of numbers can either be read out or a recording of this can be played to the individuals.

List of numbers used in this study to assess span of immediate memory :	
One digit	8
	2
	7
Two digit	19
	78
	49
Three digit	200
	303
	789
Four digit	2090
	6024
	1000

List of numbers used in this study to assess span of immediate memory :

Five digit	26789
	10008
	45890

**Participants:**

53 saveetha dental college undergraduate precisely 23 males and 30 females served as participants for this study. All the participants of this study were mentally fit , studying the same course (dental) and therefore no bias based on mental strength was made.

For this study participants were chosen between the ages 17 to 22 so as to compare the memory span between them.

**Method:**

Individuals were given the following instructions:Carefully listen to the list of numbers being played and write them down in the same order as soon as I finish playing it.Stop the experiment if the individual makes any mistake in the sequence of the list of numbers or in the individual numbers.The span of memory is the number previous to the number written wrongly.

The list of numbers that had been previously recorded was played to the participant one time. The participant after listening to the recording should list out the numbers in the same order to the best of their memory. The trial ended when the participant indicated that he or she could not remember any more numbers. The participants were graded based on number of items they could remember in the same order.

If there was any discontinuation in the list of numbers or a number in the middle of the list is mistake or been missed out by the participant subsequent numbers will not be taken into consideration for grading. There are 15 numbers in the list. Each number of the list correctly listed out is graded one For example a participant giving 5 correct numbers in the list in the correct order is graded 5 out of 15.

Since it assesses the span of memory based on auditory stimulus only, it limits the study .

**Results and discussion**

The table gives the results of the memory test.

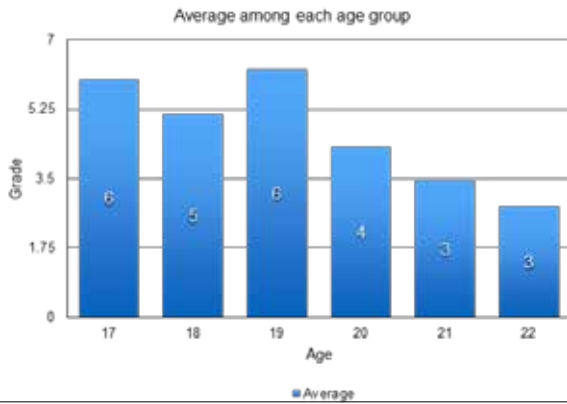
Sno	Age	Grade	Sex
1	21	4	F
2	17	4	F
3	17	7	F
4	22	1	F
5	20	2	F
6	18	7	F
7	20	2	F
8	21	2	F
9	18	8	F
10	18	1	F
11	17	6	F
12	20	4	F
13	21	2	F
14	19	5	F
15	21	5	F
16	19	7	F
17	21	5	F

Sno	Age	Grade	Sex
18	19	4	F
19	18	4	F
20	18	6	F
21	20	6	F
22	22	2	F
23	17	5	F
24	21	1	F
25	18	4	F
26	18	4	F
27	22	4	F
28	22	3	F

29	19	8	F
30	18	7	F
31	20	4	M
32	18	7	M
33	22	4	M
34	21	4	M
35	17	8	M
36	18	4	M
37	18	9	M
38	19	1	M
39	18	1	M
40	20	6	M
41	18	3	M
42	21	4	M
43	21	4	M
44	18	4	M
45	19	7	M
46	20	7	M
47	20	1	M
48	21	4	M
49	20	7	M
50	18	8	M
51	19	8	M
52	19	10	M
53	21	3	M
Average		4.660	

Sno	17	18	19	20	21	22
1	4	1	1	1	1	1
2	5	1	4	2	2	2
3	6	3	5	2	2	3
4	7	4	7	4	3	4
5	8	4	7	4	4	4
6		4	8	6	4	
7		4	8	6	4	
8		4	10	7	4	
9		6		7	4	
10		7			5	
11		7			5	
12		7				
13		8				
14		8				
15		9				
16						

Sno	17	18	19	20	21	22
17						
18						
19						
Average	6	5.13	6.25	4.3	3.45	2.8



males and females Occurrence of individual grades in the memory test.

The table compares grades obtained by males to that of females. The table shows that females have grades centre around 4, 5 and 6 this shows that females are able to store in average close to the 7 items benchmark. The average score of a female individual is 4.43.

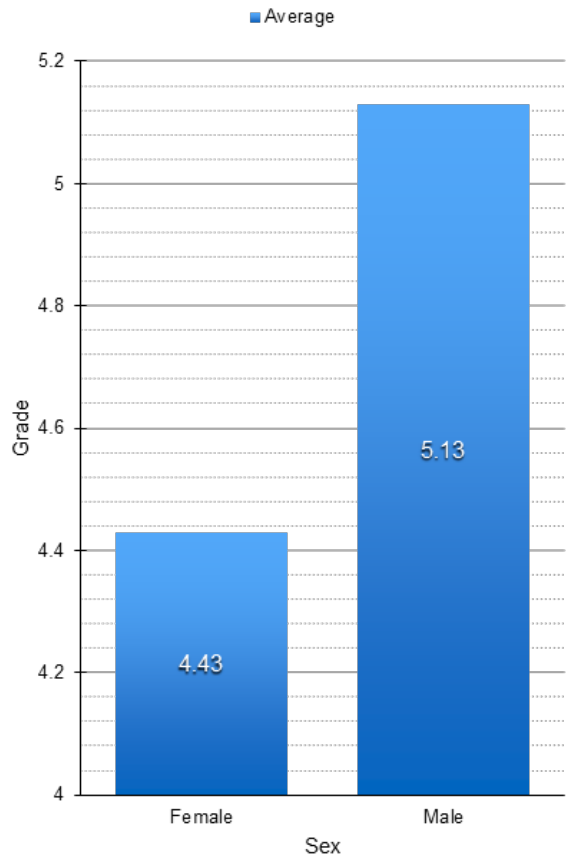
The male individuals on the other hand tend to show two extremities, one that is above the 7 item benchmark and the other that is 4 or below.

This shows that the ability to store more than 7 items is not a generalized male ability rather it is a talent shown in some males only. The average score here is 5.13.

The graph clearly shows that men have greater short term memory in terms of the number of items that can be remembered when compared to women.

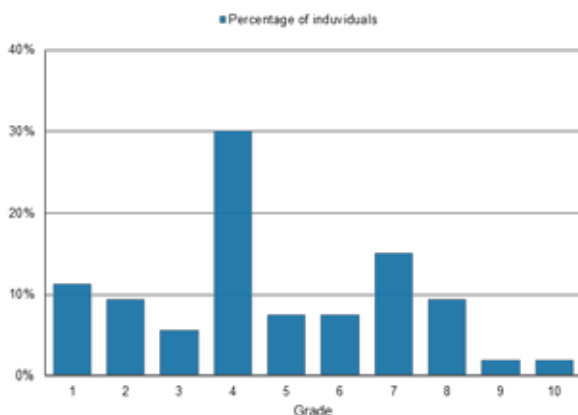
Female	Male
4	4
4	7
7	4
1	4
2	8
7	4
2	9
2	1
8	1
1	6
6	3
4	4
2	4
5	4
5	7
7	7
5	1
4	4
4	7
6	8
6	8
2	10
5	3
1	
4	
4	
4	
3	
8	
7	
4.43	5.13

The table shows comparison of average grades between



Grade	Percentage of individuals
1	11.3%
2	9.4%
3	5.6%
4	30.1%
5	7.5%
6	7.5%
7	15.09%

Grade	Percentage of individuals
8	9.4%
9	1.88%
10	1.88%



#### Discussion:

The table 1.1 gives grades of Individuals based on the number of items they were able to recall.

From the table it can be seen that the average value among the 53 individuals comes to 4.66 .

Rounding this off to 5 we can say that an average individual has the ability to hold in his working memory up to 5 items at a time .

It can also be noted that none of the individuals have scored zero indicating that all of them are able to store at least one item in their working memory without much difficulty.

The percentage of occurrence of each grade is given in table 4

From the graph we can note that grade 4 has the highest occurrence of 30.1%. The next highest occurrence is grade 7 with 15.09%. Occurrence of one comes next in line with 11.3%. The other grades fall in the intermediate values

The least occurrence is for grades 9 and 10 with only 1.88% each suggesting that very few individuals are able to retain up to 9 or 10 items in the working memory.

This is in favor of the idea that it is difficult to remember more than 7 items at a time

table 2 gives us an idea of the average grade of each age group. The graph clearly indicates that with increase in age the average grade comes down. In this case age group 22 has only 2.8 as its average grade.

Whereas age groups 17, 18 and 19 have a grade of around 6. This shows that with increase in age it is difficult for the retention of new knowledge.

For example it's easier to learn a new language as a kid but learning a new language becomes difficult as we cross 20 years of age.

This could be due to the decreased generation of synaptic points in the brain.

This also shows that brain development gradually decreases with ageing.

#### Conclusion.

This study shows the range of memory span among teens and young adults. The teens were seen to have better short term memory when compared to the young adults showing and yet again proving that memory is hard to build as we get older.

This study shows that males falling in the age group 18 to 19 are better able to retain items in their short term memory.

The average number of items that can be stored in the working memory is found to be 4.66 approximately that is 5. This shows that an average person is able to hold not more than 5 items in his brain at a time.

This piece of information is particularly helpful, when trying to learn a new phone number or a new lesson at school or college or learning anything new in general, we should try and chunk the piece of information close to our personnel test score. This way we can better retain the information.

This study also shows us that though our brain can store huge amounts of data it does have its own restrictions and limitations as we get older.

#### References

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