Chewing gum and Memory

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Chapter One

1. Aim: To find out if chewing gum helps improve memory.
2. Hypothesis: By chewing gums participants can reach the maximum chunks of numbers in Miller's Magic Number
3. Rationale: To find out ways to improve our short-term memory

Chapter Two: Literature Review

1. Literature Review

   a. http://www.psych.utoronto.ca/users/peterson/psy430s2001/Miller%20GA%20Magical%20Seven%20Psych%20Review%201955.pdf

      This is George A Miller's Seven Magic number (short-term memory) study. It stated that human can memorize 7 plus and minus numbers in short amount of time. This is the reason why we set our experiment number 7(7 chunks and 7 numbers).

   b. http://www.tandfonline.com/doi/abs/10.1179/147683009X423247

      This is the study about the effect of chewing gum. The result showed that chewing gum did not improve memory task but it did improve intellectual performance. It relates to our study since the research is about the relationship between chewing gum and memory performance.

   c. http://www.sciencedirect.com/science/article/pii/S0195666304000066

      This research made chewing gum into four parts, no chewing, mimicking chewing movements, chewing a piece of tasteless chewing gum and chewing a piece of spearmint flavored chewing gum. The result showed that chewing gum did not improve memory but it does affect specific aspects of attention. It related to our study by using the same material, gum, and the effects on memory.

   d. http://www.sciencedirect.com/science/article/pii/S0195666304000911

      The research exanimated whether chewing spearmint gum could affect the initial learning or subsequent recall of a word list. The results showed that chewing gum at initial condition was associated with superior recall. It related to our study by if chewing gum associated with superior recall, it affects the performance of memory.

Chapter Three: Methodology

1. Methods
    a. Experiment
2. Sample
    a. 40 Males and 40 Females
    b. Age 14 to Age 18 (Grade 9 to Grade 12)
    c. HAS students
3. Setting
    a. Quiet and isolated setting (most ideally the library)
    b. Before lunch (around 11:00)
4. Procedure
    a. Split the samples up into 2 groups (1 control and 1 experimental) each containing 20 males and 20 females (5 males and 5 females from each grade)
    b. The control group will be give sets of numbers in chunks of 3 (see appendix 1)
    c. Results of how many chunks of numbers the participants are able to memorize will be recorded and graphed
    d. The experimental group will be give pieces of gums and step b. will be repeated for this group while they chew the gums
    e. Repeat step c. for the experimental group
    f. Compare the results of the 2 sample groups
5. Materials
    a. Gum
    b. Sets of numbers
    c. Notebook & pen
    d. Laptop

6. The reason why each was chose
    a. Sample: Recruited volunteers from HAS (10 males and 10 females from each grade)
    b. Procedure: We chose the experiment method because we are looking at the effects of chewing gum on memory, so we are comparing the memory of 2 groups, 1 group that did no chew gum and the other that chewed gum

Chapter 4: Data

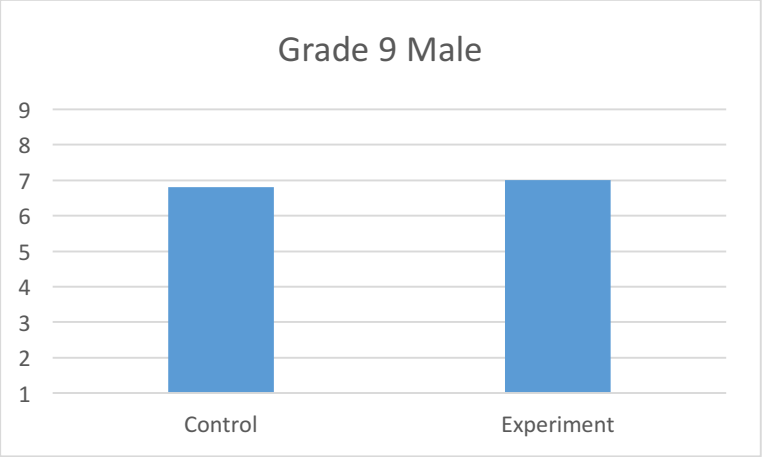
1. Data

    a. Male

        i. Grade 9

Control	Results	Experimental	Results
1	6	1	7
2	7	2	8
3	6	3	6
4	7	4	7
5	8	5	7
Total	34	Total	35
Average	6.8	Average	7
Mode	6	Mode	7
Median	7	Median	7

Chart 1-1



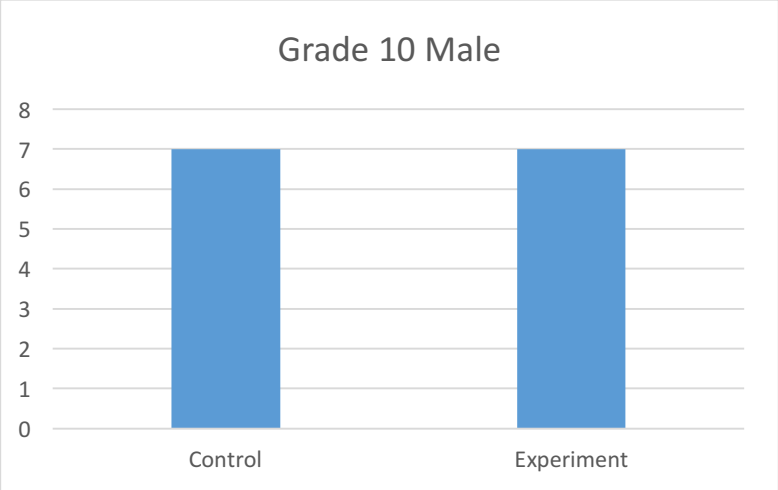
Graph 1-1

        ii. Grade 10

Control	Results	Experimental	Results
1	7	1	9
2	7	2	6
3	6	3	6
4	7	4	7
5	8	5	7

Total	35	Total	35
Average	7	Average	7
Mode	7	Mode	6
Median	7	Median	7

Chart 1-2

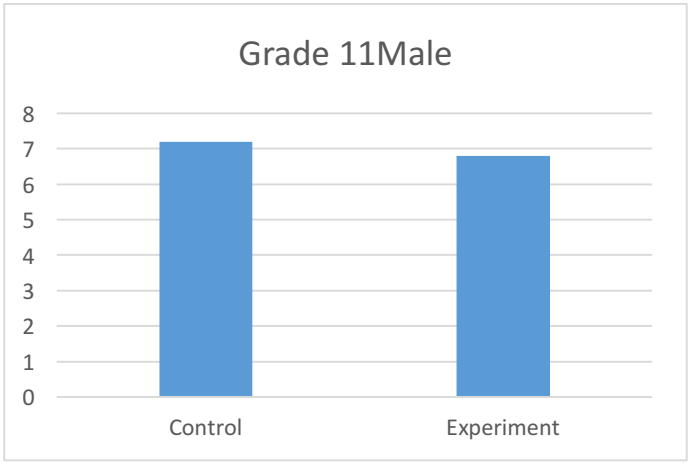


Graph 1-2

iii. Grade 11

Control	Results	Experimental	Results
1	7	1	6
2	6	2	7
3	7	3	6
4	7	4	7
5	9	5	8
Total	36	Total	34
Average	7.2	Average	6.8
Mode	7	Mode	6
Median	7	Median	7

Chart 1-3

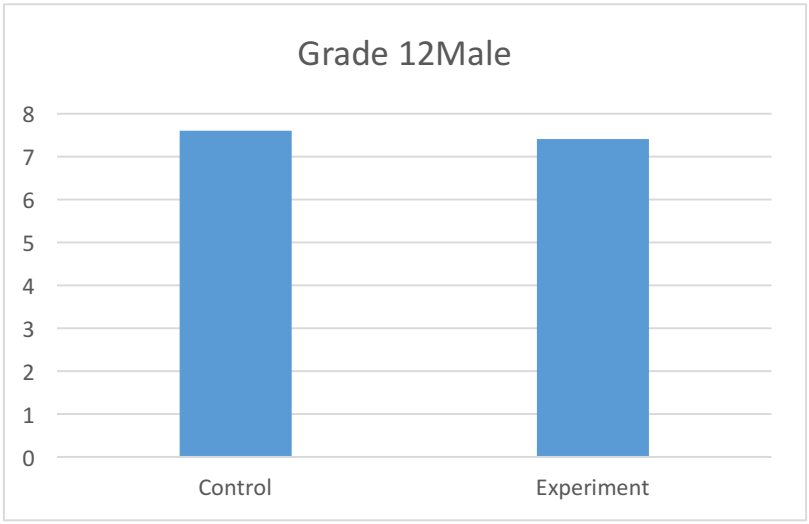


Graph 1-3

iv. Grade 12

Control	Results	Experimental	Results
1	7	1	6
2	9	2	6
3	9	3	7
4	6	4	9
5	7	5	9
Total	38	Total	37
Average	7.6	Average	7.4
Mode	7	Mode	6
Median	7	Median	7

Chart 1-4



Graph 1-4

v. All the males (From Grade 9 ~ Grade 11)

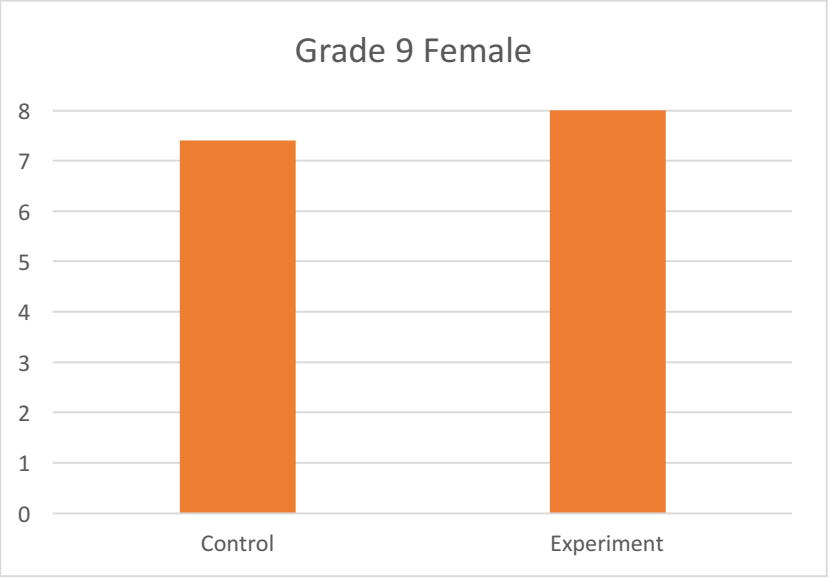
Control		Experiment	
total	136	Total	141
average(mean)	6.8	Average	7.05
Mode	7	Mode	7
Median	7	Median	7

b. Female

i. Grade 9

Control	Results	Experimental	Results
1	6	1	7
2	6	2	9
3	9	3	8
4	7	4	7
5	9	5	9
Total	37	Total	40
Average	7.4	Average	8
Mode	6	Mode	7
Median	7	Median	8

Chart 2-1

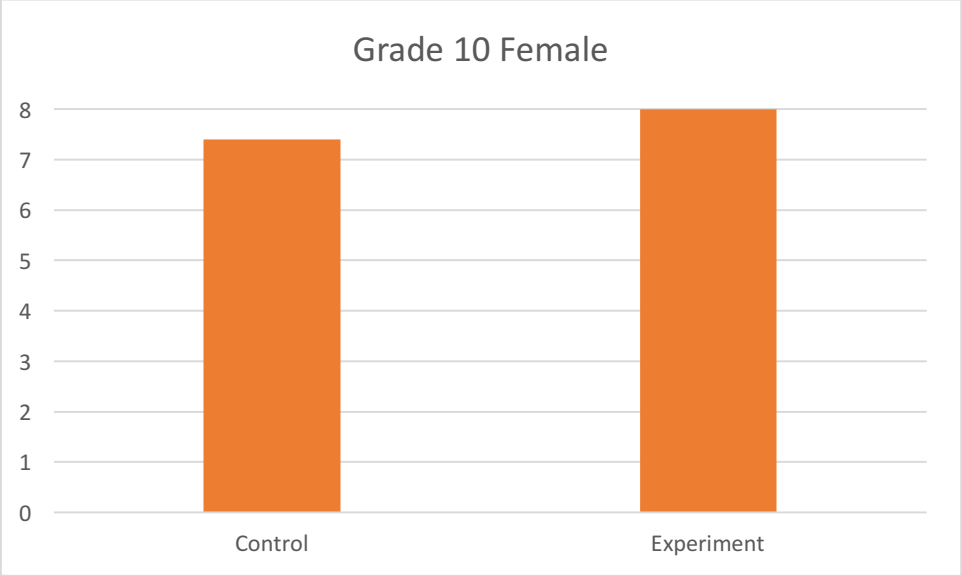


Graph 2-1

ii. Grade 10

Control	Results	Experimental	Results
1	8	1	9
2	8	2	9
3	7	3	8
4	9	4	7
5	6	5	6
Total	38	Total	39
Average	7.6	Average	7.8
Mode	8	Mode	9
Median	8	Median	8

Chart 2-2



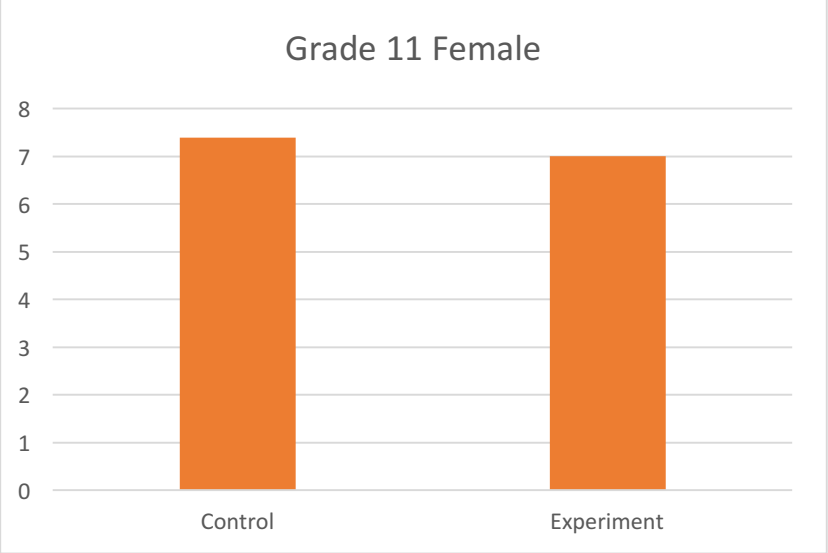
Graph 2-2

iii. Grade 11

Control	Results	Experimental	Results
1	8	1	6
2	6	2	7
3	7	3	9
4	7	4	7
5	9	5	6
Total	37	Total	35
Average	7.4	Average	7
Mode	7	Mode	6

Median	7	Median	7

Chart 2-3

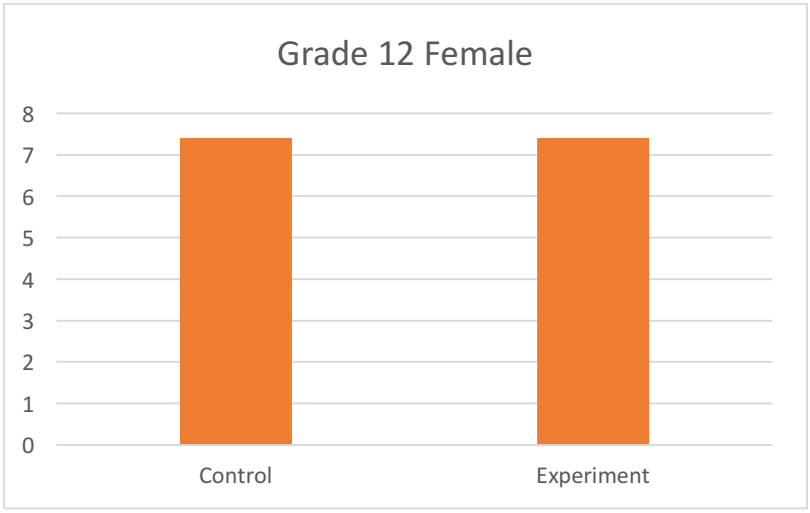


Graph 2-3

iv. Grade 12

Control	Results	Experimental	Results
1	7	1	6
2	8	2	8
3	9	3	7
4	6	4	7
5	7	5	9
Total	37	Total	37
Average	7.4	Average	7.4
Mode	7	Mode	7
Median	7	Median	7

Chart 2-4



Graph 2-4

2. Male vs. Female

Male

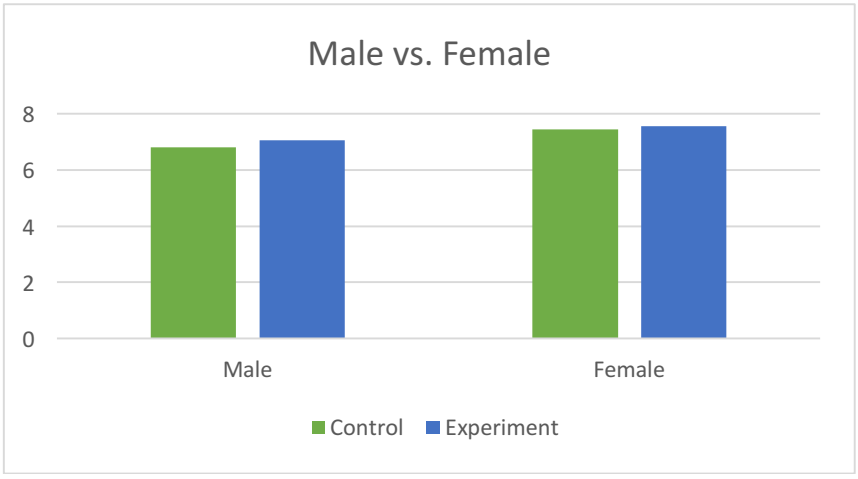
Control		Experiment	
average(mean)	6.8	Average	7.05
Mode	7	Mode	7
Median	7	Median	7

Chart 3-1

Female

Control		Experiment	
average(mean)	7.4375	average(mean)	7.55
Mode	7	Mode	7
Median	7	Median	7

Chart 3-2



Graph 3-1

3. Analysis

The female control and experimental results were even closer. The female control group performance had an average of 7.4, whereas the experimental group had an average of 7.5. The groups by grade also showed no rigid patterns. Some age groups had higher results in the experimental groups, for example the 9th and 10th grade females (refer to graphs 2-1 & 2-2), while others had higher results in the control groups, for example the 11th grade male and female (refer to 1-3 & 2-3). Still other groups had the exact same average results, for example 10th grade male and 12th grade female (refer to 1-2 & 2-4). The mode and median of the overall performance were both 7, which once again supports Miller's magic number. The overall results of the chunks of numbers the participants were able to memorize is generally around 6 to 9, which suits Miller's theory of the 7+/-2 magic number. However, the general results did not have such a great difference. The male control group performance had an average of 6.8 chunks of 3, while the male experimental group scored an average of 7.05 chunks of 3.

Chapter 5: Conclusion

1. Conclusion

The results of our study disprove our hypothesis. Based on the results, there are no observable effects of chewing gums and memory. The results had no specific pattern; it is reasonable to conclude that there is no correlation between memory and chewing gums. The range of chunks of numbers an individual could memorize is around 6 to 9, which still follows Miller's magical number despite whether they are chewing gums or not (Miller, 1956). This also matches the results of Oliver Tucha's research on chewing gums (Tucha, 2004).

A possible source of error could be that the experiment took place before lunch. The feeling of hunger may affect the individual's performances, while chewing gums could slightly relief the feeling of hunger (Hetherington, 2007). With that been said, a possible way to improve this experiment is to do this experiment again at different times, or specifically both before and after the participant eats. This would most favorably reduce the possible effects of hunger on memorization.

Chapter 6: Reference

Miller, G. A. (1956). "The magical number seven, plus or minus two: Some limits on our capacity for processing information". Psychological Review 63 (2): 81–97.

Smith, Andrew. "Effects of Chewing Gum on Mood, Learning, Memory and Performance of an Intelligence Test." Taylor & Francis. N.p., 2009. Web. 02 June 2016.

Tucha, Oliver. "Chewing Gum Differentially Affects Aspects of Attention in Healthy Subjects." *Science Direct*. N.p., June 2004. Web. 02 June 2016.

Baker, Jess R. "Chewing Gum Can Produce Context-dependent Effects upon Memory." Science Direct. N.p., Oct. 2004. Web. 02 June 2016.

Appendix 1

Numbers in Chunk of three:

132 143 576 879 034 857 602 099 910 218 748