

The Zeigarnik Effect and Memory  
An Experimental Investigation of the Correlation Between Interruption and Memory  
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## Introduction

Memory is an extremely prominent facet within the field of psychology and is most closely related to the cognitive aspects behind human behavior. Due to the distinct role that memory has in understanding human functions, the aim of our investigation was to test the effectiveness of the the Zeigarnik Effect, which is a psychological phenomenon describing a tendency to remember interrupted or incomplete tasks or events more easily than tasks that have been completed, by recreating a study that had previously been shown to support the idea of the Zeigarnik Effect. This psychological concept was founded by Bulma Zeigarnik, a Russian psychologist, in the early 1900s. After observing waiters and their memorization of orders before and after payment was completed, she noticed that waiters had less success when recalling orders after they were paid for than when the meals were still unpaid. Therefore, Zeigarnik then associated the payment of a meal with the completion of a task and theorized that uncompleted tasks were more successfully recalled than completed tasks. She then decided to further study this new theory through continued experimentation, where she would give subjects tasks and only interrupt the subjects for half of the tasks in order to see the effect of interruption of the memory of specific tasks. In support of her theory, she found that the tasks that involved interruption were also the tasks that were most successfully recalled (Zeigarnik 1927). The replication of Zeigarnik's original study with sufficient statistical evidence to support the idea of the Zeigarnik Effect could not only further strengthen the existence of this psychological concept, but real life applications of the Zeigarnik Effect could allow for more success in memorization tasks within many fields.

The study that we decided to replicate was Zeigarnik's original study, *On Finished and Unfinished Tasks* (Zeigarnik 1927). The aim of this study was to investigate the effect of interruption on the memory recall of tasks. We wanted to test the relevance of the Zeigarnik Effect to see if our experiment would or would not support Zeigarnik's findings from her original study. The reason that studying this concept is significant is because it can tell us more about different methods to learn effectively. It is important to note that the time allotted for the tasks to be completed stayed constant whether or not the interruption occurred during a specific task. In this experiment, 164 subjects were given anywhere from 18 to 22 tasks to complete as quickly and correctly as possible. Half of these tasks were interrupted before completion of the task and once all tasks were finished, the experimenter asked the subject which tasks they had worked on during the experiment and other personal questions regarding their opinions of the tasks. The results of the study indicated a 90% memory advantage during interrupted tasks, and also indicated the relevance of the Zeigarnik Effect.

Null Hypothesis: If the interruption of taking a short survey (independent variable) occurs within a given amount of time during the completion of a short story memory task, there will be no correlation between the subject's ability to recall details during the questionnaire (dependent variables) from the task whether or not they were interrupted.

Research Hypothesis: If interruption of taking a short survey occurs within a given amount of time during the completion of a memory task, participants will be more successful in recalling

details during the questionnaire about the task during which they were interrupted compared to a control group that was not interrupted.

### **Exploration**

Due to the limitation of our study involving a memory task, it was necessary that the structure of our replication included independent measures, because having prior knowledge of the story would affect their success in answering the following questions correctly. The type of sampling that we used was convenience sampling due to the fact that we could only use a relatively small group of high school volunteers, making our target population 14-18 year-old male and female students that were willing to volunteer. 13 teenage boys and 13 teenage girls participated in our study and were spread out among the control and experimental groups randomly and as evenly as possible. All of the participants are able to speak English fluently so comprehension was not a problem within our study.

Some of the extraneous variables that we had to control for were the time allotted per each part of the experiment, differences in characteristics between the control and experimental groups, and prior schema of memory tests. To control, we had a strict limit for each part of the task as well as for each group in the experiment. Because more time on a specific task would allow subjects to memorize or recall more of the story, it was extremely necessary that we controlled for this by keeping a strict time limit of 2 minutes and 30 seconds throughout each part of the task. By handing out the exact same stories and questions to each subject in each group, we tried our best to control the differences in characteristics between the experimental and control group. Lastly, by creating our own original story to use for the memory task, we controlled for prior knowledge about memory tasks. There are many stories that are consistently used when running an experiment on memory within psychology, so we wanted to make sure that this would have no effect on the memorization and success of recall for our experiment by making our own story.

In addition, we also kept ethical considerations in mind by making sure to receive parental consent for participation within our study (Appendix 1), as we were using minors as subjects for our experiment. After splitting up the subjects evenly into our two groups, we seated the subjects apart from each other and then handed out Informed Consent Forms (Appendix 2) for the subjects to read and sign before beginning our experiment, which detailed the different aspects of our study and also the subjects' rights within the context of participation in our study. They knew that their identities would remain confidential, they had the right to withdraw from the study at any point, and that no harm would be done to them during the completion of our experiment. Once these had been read and signed, the forms were collected and we began handing out the Short Story Memory Task (Appendix 5) face-down on the tables. We then read the directions from our Script (Appendix 3) and gave them 2 minutes and 30 seconds to read. The papers were then collected and the Recall Questions (Appendix 6) were handed out face-down as well. Once again, we read the Script (Appendix 3) and gave the subjects 2 minutes and 30 seconds to complete the questions. We then collected the papers and then continued with the experimental group. The procedure was exactly the same, except that during the Short Story Memory Task (Appendix 5), we handed out the Interruption Survey (Appendix 7) then collected it and gave the subjects the rest of their 2 minutes and 30 seconds to read the story. Lastly, we then gave all of the subjects a debrief of

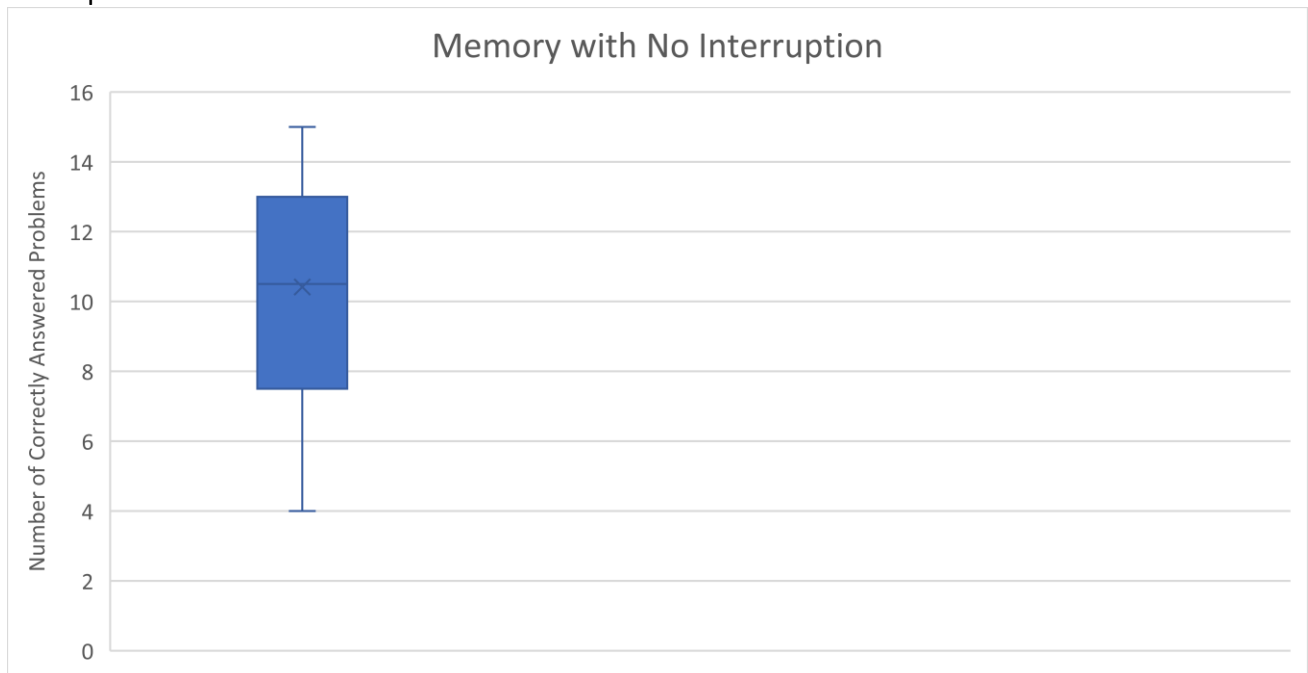
the experiment and once again reminded them of their rights and ethical considerations of the study.

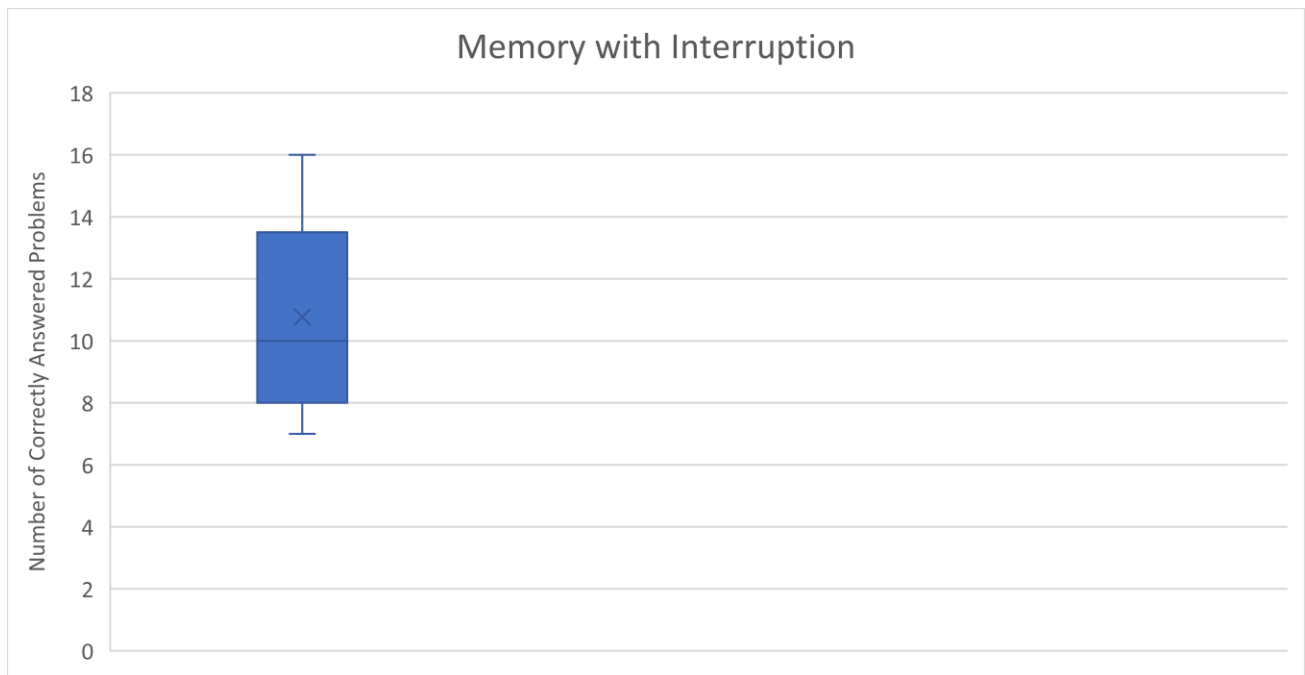
### **Analysis**

We scored the recall questions by assessing how many questions the participant got right out of the 17 problems (Appendix 6). It is important to note that while there were only 10 questions on the paper, certain problems contained more than just one question within it, therefore making there be 17 possible correct answers. We found that the median score of the control group was 10 with an interquartile range of 5 questions. As for the experimental group, the median number was 10 as well with an interquartile range of 5.5 questions. We used median and interquartile range to describe the statistics from the results of this study because there are outliers present within the tendency to recall information, and therefore the median as well as the interquartile range provide a representation of the data that is not skewed by outliers.

Also, because there are 2 sets of ordinal data due to the usage of independent measures in the structure, Mann-Whitney U was used to find a U-Score of 81.5 and a critical value of 51. The results that we found do not support our research hypothesis because the medians were the same between both of groups and IQRs of both groups were very similar, showing virtually no difference between the results of the two groups. These scores show that the findings of our replication were not statistically significant because the variance between the two numbers is much greater than the alpha-level of .05. Therefore, we fail to reject the null hypothesis

Descriptive Statistics:





### **Evaluation**

Although our results were unsuccessful in supporting the Zeigarnik Effect, we followed very similar steps as the original study did that was shown to be statistically significant enough to support this psychological concept. Our U-Score, 81.5, and our Critical Value of 51 were not nearly close to being within the .05 alpha-level of each other to even be considered significant. This shows that we cannot say that there is a correlation between interruption and ability to recall due to the results of our replication, though plenty of other studies have been shown to support this correlation prior to ours.

A few reasons as to why our study was not able to provide evidence in support of the Zeigarnik Effect may be that we did not allow enough time or that we allowed too much time for the story to be memorized. In the original version of the study, there was no time limit for completing the tasks, however the subjects were asked to complete the tasks as quickly as they could possibly do it while still completing them correctly (Zeigarnik 1927). The lack of time and subjects we were able to use for our experiment. While other researchers could run multiple tasks, we had to come up with a memory task with enough different aspects going on in it to challenge the subjects' knowledge of the task. We would not have been able to do multiple tasks in the given time, which was around 10 to 15 minutes per group, especially not enough to challenge the subjects' memories of each task. To combat this contingency, we decided to use a short story as the task, making sure to include many irrelevant details to challenge the subjects' memory, and we had a strict time limit to control for the amount of time spent reading. Although we thought that this was a good way to replicate the study while accounting for the outside variables we faced, this task could have not been a close enough replication to the original in order for the Zeigarnik Effect to occur. A limitation with our sampling method was that convenience sampling does not allow for different characteristics to be matched between the groups.

Despite these limitations, a strength of our experiment was that created our own story in order to control for any previous background knowledge or schema of the memory task. There are a few commonly used stories when trying to investigate memory within the field of psychology. We wanted to make sure that we could control for as much as we could, and we did this by creating our own story and making sure to include enough details to challenge the subjects when they were recalling the story during the question portion of the experiment. Due to this, there was no possibility for prior knowledge affecting the results of the recall task, making our original story a strength of our design.

Another strength of our experiment was that the design of our experiment only focused on a single variable, because we controlled for time and did not focus on the completion of a task, as the other versions of this replication had done prior. Because we were only focused on interruption, this allowed us to specify the correlation, if the results were statistically significant, to be surely between interruption and recall success. Also, a strength of our sampling method was that it allowed our results to be comparable since all of the participants were all around the same age and have similar leaning abilities. Including subjects with a wide range in age could cause problems when comparing results of the questionnaires as adults learning strategies could be more developed.

In summation, the results of our replication experiment were not statistically significant, meaning that we conclusively failed to reject our null hypothesis that if interruption occurs within a given amount of time during the completion of a memory task, there will be no correlation between the subject's ability to recall details from the task whether or not they were interrupted. We were unsuccessful in replicating the Zeigarnik Effect, but we still initially aimed to investigate the correlation between interruption and memory. Further exploration could be attempted in order to assess the evidence of this effect, with consideration to the strength and limitations of our experimentation process previously mentioned.

### **References:**

Zeigarnik, B. (1927). On finished and unfinished tasks. *A Source Book of Gestalt Psychology.*, 300–314. doi: 10.1037/11496-025

Zeigarnik Effect. (2016, February 1). Retrieved September 27, 2019, from <https://www.goodtherapy.org/blog/psychpedia/zeigarnik-effect>.

**Appendices:**

Appendix 1: Parent Consent Form

September 2, 2019

Dear Parents,

I am writing this letter to inform you directly about the nature of the Psych IA Experiment Day that will be taking place on Tuesday, October 1<sup>st</sup>, 2019. All Psychology students need to be there to participate as subjects (Psych I) or as experimenters & subjects (Psych II) from approximately 2:30-4:00pm. This is an IB Psychology requirement. I am asking for volunteers from NHS and Key Club to act as participants (for service hours) in the experiments as well. Ethical guidelines require that parents give consent for their minor children in order to participate in a Psychology IA. If you agree to let your child(ren) participate in Psych IA Day, please write their name(s) below and sign and date on the line. If you have any questions or would like to review the procedural or ethical guidelines, I would be happy to email them to you. Please rest assured that IB Psychology standards are even more stringent than standard ethical requirements and your student will not be in any physical or emotional distress. Thank you for your cooperation and support for this required, albeit inconvenient, IB activity.  
Sincerely,

Please Print Name(s) of Minor Child(ren) Who Will Participate in the Psychology IA Day below:

Student Name(s):

\_\_\_\_\_

Parent Signature: \_\_\_\_\_ Date:

\_\_\_\_\_



## Consent Form

- I have been informed about the nature of the research.
- I understand that I have the right to withdrawal from the research at any time, and that any information/data about me will remain confidential.
- My anonymity will be protected as my name will not be identifiable.
- The research will be conducted so that I will not be demeaned in any way.
- I will be debriefed at the end of the research and will have the opportunity to find out the results at a later date.

I give my informed consent to participating in this research.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Email: \_\_\_\_\_

### Appendix 3: Control/Experimental/Debrief Script

**Standard Script:**

Hey! Thank you for being participants in our study. What we are going to have you do is read this short story, and make sure to pay close attention. You will have two and a half minutes to read it. Time starts now.

Now that you have finished reading the story, we have a short questionnaire that we'd like you guys to read. Please do not write your name on it as it is being kept anonymous. You will have two and a half minutes to answer all the questions. Try to answer the questions to the best of your ability. Time starts now.

**Experimental Group:**

Hey guys! We're so sorry, we forgot to have you guys answer this quick survey. Please don't write your names on it. Fill it out really quick, and this time won't be included in your two and half minutes to read the story. Thank you in advance!

**Debrief:**

Thank you for participating in our experiment! Before we let you go, we have to go over a few things. First, you have the right to withdraw your results from our study at any point if you contact us, meaning that your results will be excluded from our IA, no questions asked. Second, your identities will remain confidential in the results of this experiment.

#### Appendix 4: Official Procedure

1. Split subjects up into two even groups with the first group being the control group and the second being the experimental.
2. Take control group into the classroom, leaving the experimental group outside of the room waiting.
3. Sit everyone down, making sure to separate people at tables and leave enough room between people to make sure results are accurate.
4. Hand out Informed Consent Forms, wait for everyone to sign and then collect the forms.
5. Hand out short story face-down. Once everyone has a copy, read directions from script and start timer. Subjects start reading.
6. Call time at exactly 2 minutes and 30 seconds. Collect all stories and then pass out the recall questions face-down.
7. Once everyone has a copy, read script and start timer for 2 minutes and 30 seconds. Subjects may begin answering.
8. Call time at exactly 2 minutes and 30 seconds, collect papers, and walk subjects out of the room.
9. Experimental group may now enter. Repeat steps 3-5.
10. At 1 minute into subjects' reading time, stop the clock, read the script and hand out Interruption Survey. Once everyone finishes, collect the surveys.
11. Allow subjects to begin reading again. Then repeat steps 6-8.
12. Read Debrief Script to all subjects.

## Appendix 5: Short Story Memory Task

One day, a boy named Billie woke up from a nap in his backyard. He walked to his fridge to get a snack; he was craving peanut butter and celery. He looked in his fridge and was sad to find that he only had rotten milk. So, he went to the pantry instead to grab some granola. He debated whether to choose the mixed nuts or not. Billie's little brother, Jimmy, came and brought him his own snack which was a bowl of oats and banana. After that he decided to get ready for his party that he had later that night. Billie was planning to go with his friends, Matthew, Marc, and James. He marched upstairs, and saw a blue, white, and red sock on the stairs, stared at it, and continued walking up stairs. He decided to grab his tuxedo, which was a bold, dark, navy color, and grabbed a pink bow tie to match it. He then went to the bathroom to style his hair. He grabbed his new gel and ran it through his hair, parting it to the right side. He was then ready to go meet his friends at the end of the world.

Billie walked into the spacious garage and got into his electric blue mustang, then drove out to pick up his friends. Since all his friends lived close to him, he only had to drive down Woodward Drive to pick up Matthew and Marc. After that he turned on to Nickleby Court to pick up James. After, they drove down Starlit Street to get to Jasmine's house, which is where the party was located; they walked in the door right at seven forty-five, which was when the party started. They started eating dinner at eight thirty and there was a buffet of pizza, mozzarella sticks, salad, fruit platter, noodles and cream puffs. Everyone started dancing at nine fifteen. During the dance, there was a raffle. Billie won a stuffed rat, James won a Hydroflask, and Marc and Matthew didn't win anything.

After the party was over, they decided to drive home as they were tired. On their way to the car, they saw some ravenous coyotes in the woods. At the same time Matthew tripped over a tortoise and fell into a bush of thorns. All the boys laughed when they saw that Matthew had fallen on a bunny. They finally reached their car and on the way home they hit a deer, and all died. The End.

## Appendix 6: Recall Questions

1. How is the main character's name spelt?
2. What snack did the main character grab and where did they grab it from?
3. What were the 3 friends that were mentioned named?
4. What was the color of the sock?
5. What item was colored pink?
6. To what side did the main character part his hair?
7. What color was the color and type of the car?
8. What street did the main character drive on where the two of his friends were located?
9. What time did the party start at?
10. Which character tripped and what did they trip over?

## Appendix 7: Interruption Survey

Female or Male

Eye Color: \_\_\_\_\_

Height: \_\_\_\_\_

Write down one word that best describes you: \_\_\_\_\_

Appendix 8: Mann-Whitney Raw Data

Control Group	Experimental
10	13
15	14
12	10
13	10
10	7
9	8
4	14
10	7
7	9
13	12
14	8
11	12
7	16

T1=172.5

T2=178.5

n1=13

n2=13

nx=13

$$U = n1*n2 + nx * \frac{nx+1}{2} - Tx$$

$$U = 13*13 + 13 * \frac{13+1}{2} - 178.5$$

$$U = 81.5$$