



The Impact of Smartphone Notifications on Memory Recall

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Abstract

In the era of technology, smartphones are a crucial part of everyday life. In fact, more than 86% of the population owns a smartphone. Despite these smartphones being so valuable to the world population, there are cons that come with such devices. This experiment evaluates the impact of smartphone notifications (specifically social media) on memory recall and whether these notifications can cause distractions when focusing on a specific task. The hypothesis was that there will be a significant decrease in average number of words recalled when participants are introduced to a memory test with 10 second intervals consisting of 13 words when smartphone distractions are present. This was determined through opportunity sampling and the experiment confirmed this hypothesis. However, more research can be done in different settings to generalize these results.

Introduction

This investigation will examine the effect of smartphone notifications on the ability to recall a list of twelve words within a thirty second time frame. There will then be another thirty seconds for writing the words down in any order on a laptop. These tests consisted of different types of distractions, participants, and types of memory recall but the main findings show display smartphone distractions decreasing the amount of information retained in the brain when compared to that of the control group. This study is unique due to its experiment having a direct effect on memory from the technological platform of Instagram. The aim of the study is to determine if a diverse sample of students, from the same school, aged 16-18 based on opportunistic sampling will be affected by smartphone notifications when attempting to recall a series of words. This study could be useful to students who are looking to determine the best learning environments when learning and processing memory, especially because phones are so prevalent in today's society. It can also be used by schools and teachers who are determining whether to enforce harsher policies on keeping phones away from students during lectures or allow them. The independent variable in this study is the notifications which are played in 10 second intervals until the 2 thirty second timers are up; this is during the memory portion and the seconds while writing the words down. The dependent variable will be the number of words written down in any order on the iPad, based on recall. There will be a list of 13 words with 8 characters, each of which were chosen randomly.

Methodology

The conducted experiment used an independent samples design. The participants were randomly assigned to either the control or experimental group. The treatment group received a list of words to memorize while smartphone notifications were being played. The control group, on the other hand, received the same list of words with no distractions present. This particular design was used because it is important to have each participant perform the task once to

reduce the confounding variables. The participant doing the same task twice would lead to discrepancies in the data as he/she may try to remember the words during the second experiment due to the practice effect. Additionally, doing the task twice would lead to demand characteristics as participants may try and guess the aim of the experiment and change their behavior accordingly.

Opportunity sampling of students aged 16-18 was used for data collection. 14 people were chosen based on availability in the school's main hallway and were chosen as part of the treatment or control group based on a coin flip. There were 10 males and 10 females. Opportunity sampling was used because it was efficient and allowed for a diverse range of people with similar levels of education. It was important that the participants were fluent in English so that they could fully comprehend the task.

The participants signed a consent form before participating in the experiment. Once the experiment was over, participants were debriefed as one of the experimenters was reading off a script, explaining the process of the experiment.

For the controls, participants were given a laptop to read the standardized instructions to ensure every participant followed the same instructions. Participants were also given the same twelve words to ensure that the difference in words wouldn't create discrepancies in the data. Additionally, the amount of time for memorization and writing down the words was the same for all participants, in this case thirty seconds for each. This allowed for nobody to have an unfair advantage, which in turn limited the confounding variables.

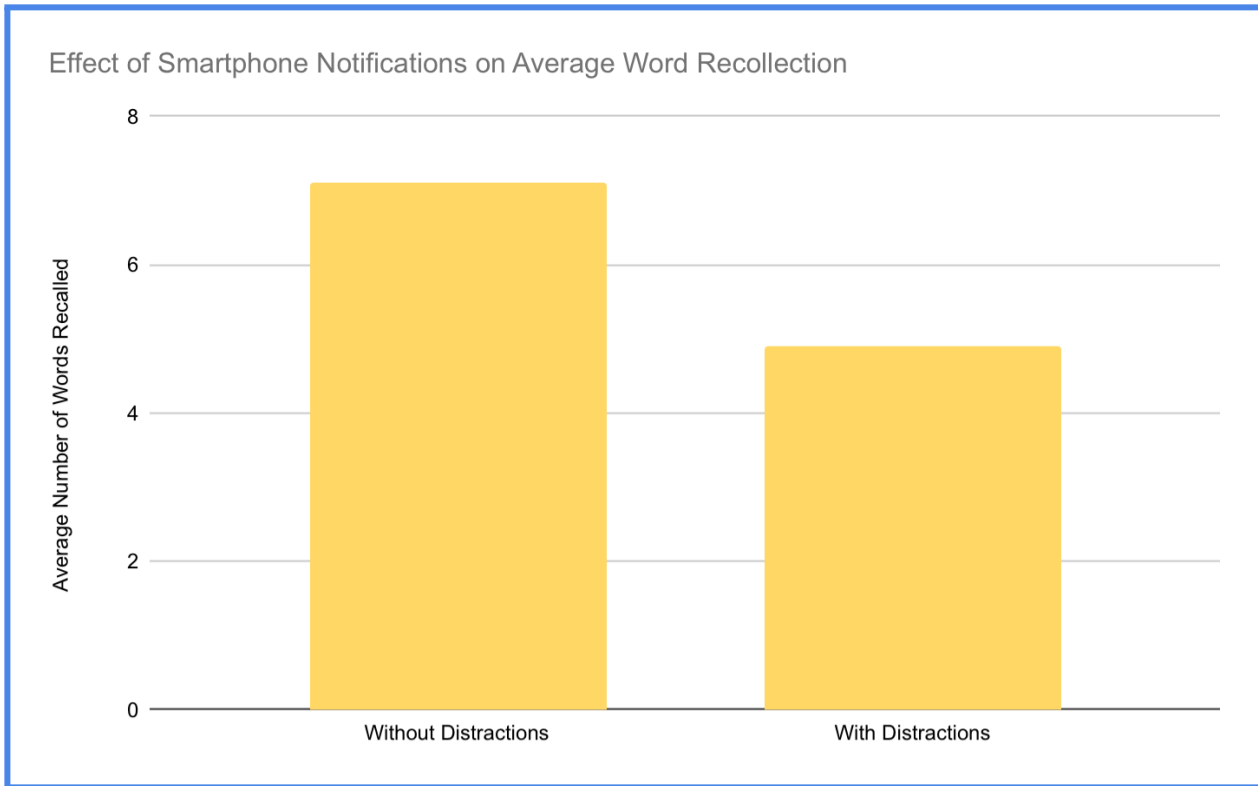
The materials used in the experiment were a Laptop, 30 second timer, and a smartphone. These materials were used to create a simple and efficient way of collecting data. The same was done with the treatment group instead with smartphone notifications going off in 10 second intervals. The same Instagram notification was used for fairness and went off for about 2 seconds each time. Lastly, 13 words with 8 characters were chosen by an experimenter at random from a word generator to eliminate possible patterns in the words that could skew the validity of the data.

Raw Data

Participant	Without Distractions	Participant	With Distractions
1	8	11	5
2	5	12	5
3	8	13	4



4	9	14	5
5	6	15	5
6	7	16	6
7	6	17	4
8	7	18	4
9	8	19	5
10	7	20	6



Descriptive Statistics

	Without Distractions	With Distractions
Mean	7.1	4.9
Mode	7	5

Standard Deviation	1.3	0.82
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On average, the participants without distractions remembered 2.2 more words than the participants with the smartphone distractions. The mode was greater for the participants with no distractions as well by 2 words. This correlates with the mean, as the participants who performed without distractions performed better in general. The standard deviations for both experiments were relatively low, meaning that the amount of words remembered by participants' was close to the mean.

Results and Discussion

From this study, it can be concluded that in a sample of high school students, smartphone notifications significantly affect memory recall of a list of words, confirming the hypothesis. This is why when someone wants to concentrate upon a task, he/she should keep their phone away from them and turn their notifications off.

One strength of using an independent sample design was that the same list of 13 words could be used for the control and experimental group because there were different people participating in each. This helped minimize demand characteristics and the creation of 2 different lists, which would be a confounding variable since the lists could be different levels of difficulty. A limitation of this design is participant variability because one group may have had better memory recollection than the other, which would negatively alter the results of the experiment.

One modification that could have improved the experiment was for the participants to take an English proficiency test before participating so that outliers in English proficiency levels could be eliminated and therefore reduce confounding variables. Another modification would be to have a quiet designated room where each participant could perform the experiment. This could reduce any distractions in the surrounding area, such as noise, which would further reduce any possible confounding variables in the experiment when trying to memorize the words.

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