

## Does the use of a distracter affect short-term memory?

### Abstract

After reading over the studies of Peterson and Peterson, and Glanzer and Cunitz, this investigation has been based around the subject of distracters and interferences with short term memory. The aim of determining whether the use of a distracter affects short-term memory was investigated by asking participants - students - to memorise a list of words. After the first list they were simply asked to write down as many of the words as they could remember, however after they had looked at the second list they were presented with a distracter and then asked to write down all memorised words. The results and statistical test - Sign test (calculated value: 0, critical value: 3) - indicate that the use of a distracter does actually disrupt short-term memory as less words were recalled in the distracter condition. The theory is that the distracter inhibits any short-term memory being converted into long-term memory.

### Background

The Atkinson-Shiffrin model of memory (1968, 1971) describes memory as a sequence composed of three stages. Sensory-memory is the initial stage and comes about from stimulation of the sensory organs, such as noticing a bright colour. The next stage, short-term memory, is memory that has passed from sensory memory, into short-term memory and can be retained long enough for it to be used, such as remembering a telephone number long enough to dial it or write it down. The third and final stage is long term memory. This provides lasting retention of memories and is generally brought about due to repetition of short-term memories.

Glanzer and Cunitz (1966) investigated how a distracter affected the recency effect. They asked participants to count backwards for ten seconds between the end of list presentation and start of recall. This virtually eliminated the recency effect and words at the beginning of the list were remembered well whereas words at the end of the list were not well encoded and were displaced easily.

Peterson and Peterson (1959) studied how the use of a distracter would affect short-term memory. They presented trigrams of consonants to participants and asked them to recall after 3 seconds, 6 seconds, 9 seconds, 12 seconds, 15 seconds or 18 seconds. The distracter was applied between the initial presentation of the trigram and the recall time to prevent rehearsing. It was found that participants were quite able to recall trigrams after 3 seconds; however recall deteriorated from there after. This study has been conducted to further investigate the affect of a distracter on short-term memory.

### Aim

The aim of the study is to investigate whether the use of a distracter will affect short-term memory. Memory in this study is defined as the number of four letter words recalled from a list of twenty-four words [see the appendix for the complete lists of words used].

### Hypotheses

**Experimental Hypothesis:** The use of a distracter will disrupt short-term memory and fewer words will be recalled. The distracter in this study will be four basic mathematical calculations [see the appendix for the calculations].

**Null Hypothesis:** The use of a distracter will have no effect on short-term memory and there will be no difference in word recall. Any difference in word recall is down to chance where  $p \leq 0.05$ .

### Methodology

The experiment is a laboratory experiment, which will give full control throughout the investigation with a repeated measures system in place.

The target population for the study is students that attend Brighthouse Sixth Form College, aged between 16 and 18. An opportunity sample method has been selected as opportunity sampling is very economical and is quick and simple to do.

The experiment has been split into two tasks: task A and task B. Task A is the experiment with no distracter and task B is the experiment with the distracter. With a total of sixteen participants, a counterbalancing system will be exercised with eight participants doing task A, and the second eight doing task B first, with the selection of students to each task being random; picking names out of a hat. Then these two sets of eight will switch over and complete the remaining task. This will help reduce demand characteristics and therefore make the results more viable.

**Task A:** Each participant will be given a sheet of paper containing twenty-four, four letter words. They will be given ninety seconds to attempt to memorise these words. Once the memorisation time is up, they will be asked to write down all the words they remember and will be given a further ninety seconds for this.

**Task B:** Each participant will be given a sheet of paper containing twenty-four, four letter words. They will be given ninety seconds to attempt to memorise these words. After the memorisation time is up, they shall be asked to complete four basic mathematical calculations. When the participant has completed these sums they will be given ninety seconds to write down as many words as they can remember from the list.

All participants will be asked the same questions at the same point of the test as to keep a standardised investigation. A flow chart with a series of instructions was produced, enabling this to occur efficiently [see appendix for copy of flow-chart].

The number of words that are recalled will be noted for each participant in each test, with the distracter and without the distracter. These results will then undergo the Sign test where they will be deemed significant or insignificant and one of the hypotheses will be accepted, the other being rejected depending on the Sign test value.

Each participant will be debriefed using the standardised technique from the flow chart, meaning participants will have the same things said to them.

Confidentiality was the main ethical issue to consider, and participants all remained anonymous and were given the right to withdraw from the study at any point, and all were debriefed following the experiment.

## Results

Table to show the key data gained from the results:

	<u>No distracter</u>	<u>Distracter</u>
<u>Mean</u>	14.50	7.81
<u>Median</u>	14	8
<u>Mode</u>	14	7
<u>Range</u>	9	6
<u>Standard Deviation</u>	2.50	1.56

The mean value for the test without a distracter was 14.50 and that of the test with a distracter was 7.81. Therefore more words were remembered without a distracter and the interpretation of this would be that a distracter disrupts short-term memory.

The statistical test of choice was the Sign test as the data collected was nominal and the study was a repeated measures investigation. The Sign test gave a result of 0 and the critical value was 3. To be significant the Sign value had to be equal to, or below this critical value and as the Sign value was 0, the experimental hypothesis was accepted and the null hypothesis rejected, suggesting the results were not down to chance and there was cause and effect as to why these results were gained.

## Discussion

The aim of the experiment was to determine whether a distracter would affect short-term memory. The experimental hypothesis - use of a distracter will disrupt short-term memory - was accepted, and the null hypothesis - use of a distracter will have no effect on short-term memory - was rejected.

The results showed that a distracter significantly affects short-term memory and because of this, the experimental hypothesis has been accepted. The research by the Petersons, and by Glanzer and Cunitz both showed that distracters disrupted short-term memory. The results in this experiment are consistent with that; therefore agree with the results gained by the aforementioned research.

A major strength of the methodology of the study was the counterbalancing system implemented. Having half the participants doing the task with the distracter while the others do the task without the distracter, and vice versa, made sure there were no demand characteristics as, the participants had no chance to communicate between tasks.

Another strength of the study was the standardised method used for all participants. Each participant was asked the same things at the same point in the experiment.

One of the weaknesses was the sample. The results are not particularly generalisable because there were so few people being tested and all the participants were students aged between sixteen and eighteen, therefore not generalisable to the rest of the population. Students tend to be different from other people as they are generally used to remembering information and many have developed a good ability to do so, whereas much of the rest of the population are not used to doing such things and therefore may not be quite as adept at memorising.

A second weakness is that the study is low in ecological validity. People do not often find themselves in situations where they have a set time to attempt to memorise words and then a set time to recall the remembered words.

A further area of research could be to see if the amount of time given to memorise something affects how the efficiency recall. It is possible that having more time to memorise something would improve recall, and ultimately convert short-term memory into long-term memory.