Pictionary!

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Abstract

Memory retention plays a huge part in learning. Theories, concepts, and formulas have all been part of our K-12, and now tertiary education. Many students struggle with memorization, especially with huge chunks of text from dry, bland textbooks filled with lines and lines of words. Studies have shown, however, that students learn better by drawing thoughts and concepts out instead of memorizing verbatim off notes and slides, especially if they are abstract concepts instead of concrete ones. This study aims to find out how college students perform when tasked with memory recall after drawing out thirty different abstract and concrete nouns in randomized order. Students were able to recall, on average, at least half of the nouns they previously drew, although the comparison between number of abstract and concrete nouns each recalled was statistically insignificant.

Pictionary!

It has been well documented that people naturally have a better memory recall of concrete words as compared to abstract words. There even is a term for it: concreteness effect, which refers to the observation that concrete nouns are able to be processed faster and more accurately than abstract nouns in cognitive tasks. (Jessen et al., 2000) Event related fMRIs found greater activation in regions of the brain during encoding of concrete nouns when compared to abstract nouns, which points to the superior encoding of concrete words. (Jessen et al., 2000) These findings were replicated in a study by Fliessbach et al., who found a correlation between subjects tested between brain activity in the lower fusiform gyrus and hippocampus during recognition of learned words, and the strength of the concreteness effect. (Fliessbach et al., 2006) However, these tests only determine the encoding of these words when written, not drawn out as a pictorial representation. It was found that drawing concepts out instead of writing them led to observed gains in memory performance. No more than four seconds of drawing was required to provide a benefit. (Fernandes et al., 2018) This increased benefit of drawing could be due to the fact that it required creativity in order to come up with these pictorial representations of nouns given, especially abstract nouns. By using fMRIs on healthy adults partaking in a game of 'Pictionary', where they are required to draw out given words, there was increased engagement of multiple parts of the brain such as the cerebellum, thalamus, left parietal cortex, right superior frontal, left prefrontal and paracingulate and cingulate regions. When compared to a noncreative task of simply drawing out zigzag lines, this increased brain engagement was thus observed. (Saggar et al., 2015) There are a few obvious differences between drawing and writing that can lead to its increased benefits in memory retention. Drawing a representation of a concept means rehearsing it, and if it incorporates elaboration of the concept, that would be an additional level of processing depth. It can even be drawn as a short story during the process. If the drawing is unusual in nature, the more likely it will stand out among a sea of information. Last, it is a relatively pleasant way to increase effort when engaging with a concept, as opposed to just writing a definition down as-is. (Banning, 2019) With this information in mind, the experiment in this research study combines the two aforementioned theories and aims to compare the retention rates of concrete

versus abstract nouns when drawn out in a 'Pictionary' style task. The researcher hypothesizes that there will be a greater retention of concrete nouns when compared to abstract nouns because, even though these words are drawn out, the theory still stands that concrete nouns are easier to recall than abstract nouns.

Method

Participants

Participants of this study were students enrolled in an undergraduate psychology research methods course at the University of Oklahoma (N=22). The demographics of the participants were not relevant in this study, and therefore no groups were excluded. Informed consent was inferred based on willing participation in the study. There were no anticipated risks or benefits to participants in this study.

Procedure

Participants were given one minute to draw out their interpretations of words read to them one at a time. Thirty words were read out to participants consecutively and were in randomized order of whether they were concrete (tree, kite) or abstract (electricity, gust). Concrete nouns, in this case, are defined as nouns that can be identified through one of the five senses, namely, sight, smell, touch, taste, or hearing. Abstract nouns are defined as a quality, concept, or idea, or in other words nouns that cannot be identified via the five senses. The complete list of words can be found in appendix A. After participants had completed this main task, there was a five-minute filler task, following which, participants were instructed to write down as many words as they remembered being given from the main task and given two minutes to do so. Memory retention was thus measured by how many of each type of noun was recalled by participants.

Results

A dependent samples T-test was run to compare the retention rates between concrete and abstract nouns among participants. It was found that, on average, participants were able to identify approximately 8.05 concrete nouns and 7.91 abstract nouns within the two minutes given (Figure 1). The standard deviation for concrete noun recall was approximately 2.48. The standard deviation for abstract noun

recall, on the other hand, was approximately 2.27. The degrees of freedom obtained was 21. The results obtained were not statistically significant, with a p value of more than 0.05. Because of that and a small t value (0.166), the researcher was unable to reject the null hypothesis.

Discussion

It was concluded that, because of the non-statistically significant results obtained, that there is not a determinable relationship between concrete and abstract noun memory retention when the nouns are drawn out in a visual representation as opposed to being written out. However, there is still a slight increased retention rate of concrete nouns as compared to abstract nouns, by comparing the means. However, this is not a large enough difference to be statistically significant and could be due to chance. This could be attributed to the fact that the sample size was relatively small (N=22), and testing was done only once, due to time constraints. Future studies should be repeated with a significantly larger sample size, with testing done multiple times in order to obtain more reliable data. In addition, to obtain more complete data on the effects that drawing concepts out have as compared to just writing them out, the experiment should be done in both drawing and writing condition. That is, participants should be tasked to write and then recall the thirty words in addition to drawing. This way, more representative data can be obtained comparing drawing and writing and how it affects memory retention. In addition, confounding variables could be due to participants being distracted on their cellular device or by each other. In future studies, participants should be tested one at a time with little to no distractions in order for them to focus on the task at hand.

References

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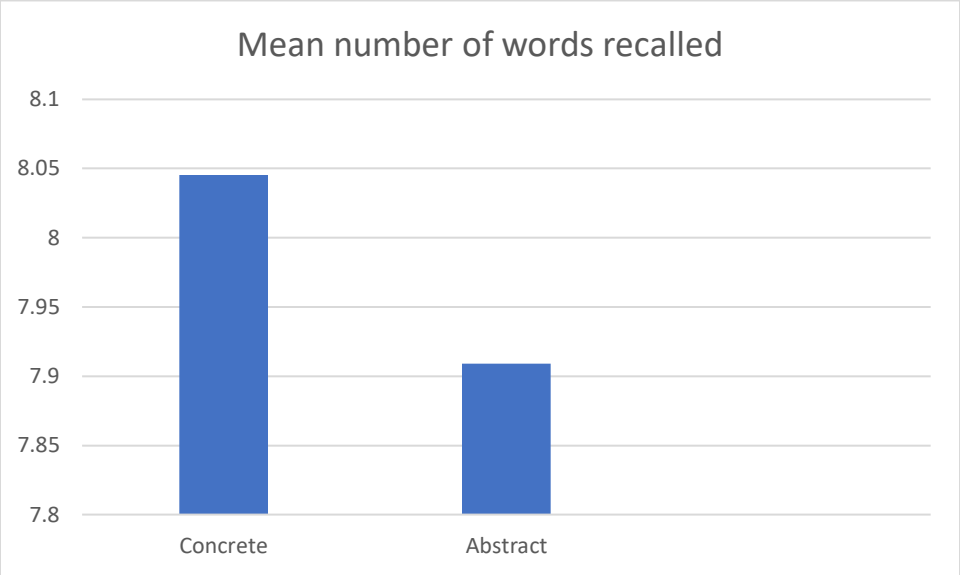
Figure 1. Bar graph comparing the mean number of each type of noun recalled



Appendix A: List of Concrete and Abstract words given to participants, in randomized order

Concrete words:	Abstract words:
Mountain	Password
Lighthouse	Fabric
Pants	Address
Ice cream cone	Electricity
Sun	Gold
Socks	Sunburn
Kite	Quicksand
Flower	Cardboard
Slide	Dustbunny
Cookie	Runt
Banana	Gust
Cheese	Nightmare
Mouse	Glitter
Book	Thief
Tree	Coach