

Final Research Paper

Investigating the Quantitative and Qualitative Abilities of Visual Long Term Memory

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Abstract

The focus of this research is primarily on the ability of a person's long term memory (LTM) to encode, store, and recognize discrete characteristics of inanimate objects. This research challenges common understandings of LTM, as it supports the notion that LTM is able to store seemingly unimportant attributes of stimuli. 79 Students were asked to identify repeated images, decipher between old and new images, and also remember specific physical qualities of the items in the images. This experiment indicated that students were able to carry out these tasks with an adequate amount of accuracy.

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The current study places an emphasis on the idea that an individual's long term memory (LTM) is able to maintain small detail in images and objects, which is contrary to popular belief. There is an assumption that LTM does not scrutinize specific detail of visual experiences, however, previous research as well as the current study have indicated findings that say otherwise.

Research conducted by Brady et al., (2008) utilized a design similar to that of the current study and provided for similar results. The researchers were interested in determining how much information LTM can store about ambiguous objects, and so they organized a design that presented participants 2,500 stimuli for 3 seconds each. The investigators provided the participants with time to study the stimuli; there were 10 twenty minute pairs with five minute breaks between each one.

For the first memory test, the researchers issued a repeat detection task. The participants in this study were presented one image at a time and told to press a space bar when they were presented with an image they had already seen. The first memory test was to determine how accurate the participant was when selecting familiar objects. For the second part of the memory test, the participants were presented 2 images at a time, being categorized as either novel, exemplar, or state. Novel pairs were presented in order to determine the participants memory of the gist of the item, for example, an old item (one they had seen already) being paired with a new item. Exemplar pairs tested the participants ability to identify more specific qualities of the object, for example, recognizing the old item when it is paired with a physically similar item. State pairs were utilized to measure the participants ability to detect the familiar object, when it is

paired with the same object but presented in different orientations or with very subtle changes made. The participants in this research indicated the familiar items through a two-alternative forced-choice selection task (Brady et al., 2008). The results indicated that the performance of participants was reasonably high, meaning that subjects were able to identify which object they had seen before, and also identify specific details about the object, supporting the idea that a person's LTM is able to maintain illustrative representations of visual stimuli (Brady et al., 2008).

In another study, the researchers Urgolites and Wood (2013) investigated the capabilities of visual long term memory, and instead of conducting their research with images, they used computer generated actions (CGA). The experiment used the same idea and method as the current study—they presented CGA to the participants and then after, assessed their ability to remember what they saw. Urgolites and Wood (2013) had similar intentions to that of the researchers of the current study because the central focus of both experiments is on visual LTM and how it is able to interpret and remember fine detail that separates old visual stimuli from new. They presented original actions to participants and then later presented the original actions and new actions mixed together and asked them to determine which one they had seen before. The participants in this study were adequately able to decipher what actions were old and what ones were new (Urgolites&Wood, 2013). This study assists in providing support for the idea that visual LTM processes and is aware of more detail than many believe.

In addition, Castelhana and Henderson (2005) investigated representations in visual LTM and utilized essentially same methods as Brady et al., (2008) and Urgolites&Wood (2013). They presented images of scenes instead of inanimate objects, and then later tested the extent of the participants visual memory. What they observed was that participants were able to recall scene

details not as a result of studying the material, but from prior exposure to the images. This study also supports the notion that visual LTM is very perceptive and vigilant.

The main goal of this research is to investigate the capacity of visual LTM and to assist in the continuing investigation of this cognitive function. The current study intends to replicate the findings of Brady et al., (2008) and determine the amount that an individual's visual LTM can process and attend to. This study predicts that with previous exposure to the images, participants will be able to recall the gist of the image, the object identity, and even subtle details of the object.

Method

Participants

The study focused on the information provided by 79 Guelph University students from a cognitive psychology class. The sample was diverse in race and ethnicity, and was also largely female.

Materials

The students were presented 144 pictures of objects on a projection screen. The 12 repeats from the repeat detection task were not used any further. The remaining 120 images were used for the second part of the study. Participants were asked to record their answers on a recording sheet using a pen or pencil.

Design

This experiment uses a within-subject design. The independent variable of this research is the object pairings that were presented on the screen, either novel, exemplar, or state. The dependent variable of this study is the amount of correct answers the students recorded for each category.

Procedure

The experiment was conducted on two different days. On the first day, students were asked to analyze 144 images on a screen and identify how many repeats they saw. On the second day, the researchers presented the 120 images —not including 12 repeats from first part— and

asked students to indicate which image in each pair they had encountered during the first part of the experiment. The pairs were presented for 6 seconds each. The students were presented 40 novel pairs, 40 exemplar pairs, and 40 state pairs and asked to make a choice for each. Participants were told to indicate whether the old image appeared on the left or right side by marking “L” or “R” on their recording sheets in the corresponding rows.

Discussion

The findings of the current study closely resembles the findings of Brady et al., (2008), Urgolites&Wood (2013), and Castelhana&Henderson (2005). This experiment succeeded in supporting the hypotheses that were proposed. The results indicate that previous exposure to visual stimuli called for a stronger ability to recognize the objects when paired with brand new object. They also indicated that participants were able to identify the old object when it was presented with a very similar looking object. Also, students had the ability to recognize the old object even when it was presented with an image of the same object, but appearing in a different state. It is evident that the exposure to the objects on day one of the experiment provided participants with the ability to identify the same objects weeks later when they were paired with new stimuli.

Through this investigation, it becomes apparent that the ability to recognize familiar objects or situations is an innate psychological experience, due to the fact that the participants did not need to rehearse or study the stimuli in order to recognize them.

An implication that can be drawn from this research is that there is a need for more investigation on this subject. It appears that very few people have explored this phenomena, and so it is important for these findings to be replicated in order to generalize the findings. This experiment notes that the population sampled was largely female and racially diverse. This sample is very small and in order to avoid biases, it would be beneficial to continue this investigation and use a larger, more representative sample so that the findings can be applied to more people.

References

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