

Visual change blindness and memory



**ASSIGN
BUSTER**

Abstract

Visual Change Blindness and the types of conditions related to this will be assessed and experimented on during this Ia report. The participants were 339 under-graduate students. A Change Blindness test of naturalistic images was used for this report, to test different conditions for change blindness. Subtraction of the image, (as well as no change) was seen to be more easily recognised than other changes and addition changes. Therefore, subtraction changes are more easily identifiable than other conditions to Visual Change Blindness.

Visual Change Blindness and Memory

This paper will be going into the topic that is something a person could come across everyday, or even when doing puzzles in the newspaper such as a spot the difference. Therefore, this report will be analysing and discussing the experiment – Visual Change Blindness. Understanding Visual Change Blindness is a very important topic for researchers, therefore this experiment is looking into, understanding memory, as well as why and how people can either see or miss large visual changes that are noticeable. Topics like this also play a role in the criminal justice system in regards to eye witness testimonies. In this experiment it will be delving relevant conditions, such as; change condition which was the control condition of this experiment, addition changes (something was added), subtraction changes (something was taken away), and other (colour change or an object moved) as well as which ones are seen more clearly and easily than others.

Mondy and Colthart (2000), has been researching into the topic of change blindness, more specifically finding and identifying change in naturalistic scenes. Previous research into this topic has shown that there have been higher rates of identification of deletion in scenes rather than additions (Mondy, Colthart, 2000). Also a prediction was made that changes in scenes will be easier to label and detect, rather than other types of changes such as moving one object to a different spot or changing the colour of something in the naturalistic image (Mondy, Colthart, 2000). Therefore, changes such as subtraction or addition, or even no change are more recognisable than changes of the other variety. However, subtraction changes are also more clearly recognisable than addition changes. Iconic memory plays a large role in change blindness and the detection and non detection of changes (Simons, Rensik, 2006). Labels play a large role in the understanding and uncovering changes. Most changes have a 'label' attached to them, and as changes get shown they are then encoded into the short-term memory, only to be replaced as new changes are labelled and found (Simons, Rensik, 2006). Therefore, experiments on iconic memory have shown that changes can be found, however, only last a short time before they are replaced (Simons, Rensik, 2006). Through research it can be understood that evidence from a variety of change detection examples that the eye cannot process all of the changes because of eye movements across the saccades (Henderson, Hollingworth, 2003). Also, due to a gap in the presentation of naturalistic images, it causes the visual system to sometimes fail as there are then too many new visual onsets (Simmons, Ambinder, 2005). There are also too many things in the world for a person's eyes to take in and encode into their memory, therefore, visual changes in an eyes centre of interest are

more likely to be detected (Becker, Pashler, Antis, 1999). Therefore, only objects and changes that move into the short-term memory will be detected (Simmons, Ambinder, 2005).

The aims of this experiment were similar to the Mondy and Colhart (2000) paper that examined what types of changes are most likely to be missed in a change blindness experiment. However, in this paper we will be examining which types of changes are most likely to be found against other types of changes in a change blindness experiment. This topic is of large importance, as change blindness is the the inability and failure to be able to find and see large changes that would normally be noticed more easily.

The hypotheses for this research experiment are as follows. Hypothesis one is whether it is thought that the subtraction condition will be more correctly identifiable than the addition condition. Hypothesis two is whether the subtraction condition will be more easily identifiable than the no change condition. And lastly, hypothesis three, is that the subtraction condition is also more easily identifiable than the other condition. These three hypotheses will be examined throughout the course of this experiment.

Method

Participants

339 participants (248 females, 90 males, 1 other) participated in this experiment. Participants were undergraduate students enrolled in 2007PSY at Griffith University, Mt Gravatt and Gold Coast campuses. The mean age was 23.82 ($SD = 7.23$), with the range being 18 to 57 years old. The basis

for this participation was volunteered – no compensation in anyway and was integrated as a part of the course curriculum.

Design

The experiment conducted was a within-subjects design. There were several variables studied in this analysis. They were: whether or not there was a change in naturalistic photos and if there was, was there a change in addition of a change, subtraction of a change, no change or other. The independent variable was whether there was a change – yes or no – and whether the change was addition, subtraction, no change or other. And the dependant variable was whether the change/no change was correctly identified. A two-tailed t-test was also used to determine if there was and what type of effect has occurred. Eleven data sets were removed due to incomplete or abnormal data entries.

Materials

The materials consisted of a PowerPoint slide show that had a pre-set timer of 32 pairs of photos. A projector was used so that the whole tutorial class could complete this experiment at the same time. As well as a results sheet of paper that was given to the whole cohort. Also another PowerPoint slide show that held the results of the paired photos, as well as explaining if there were differences and what they happened to be.

Procedure

The experiment began as the tutor went through four practices of the change-blindness test examples with the entire class, therefore, the concept <https://assignbuster.com/visual-change-blindness-and-memory/>

of the experiment was understood. There were 32 pairs of slides and from each of the four categories (addition, subtraction, no change, other) were presented in a randomised order. The paired pictures were then projected onto the screen individually. Each slide with the first of the paired pictures were shown for five seconds, each containing a blue blanking screen that was shown for one second after the first picture of the pair was viewed. Then the response slide was shown afterwards for another seven seconds after the second picture of the pair was shown. The response screen was the same for each pair, with “ Change or no change? Type of change?” written onto the image. Therefore, in this seven second period, the participants then had to record their answers onto the results sheet. After the experiment concluded, the results slideshow was then viewed, showing and explain the answers, all the while the participants self-marked their own results. After the results slide show was completed, the participants tallied their results for each separate category and either gave the paper to their tutors or uploaded it onto a google document along with their age and gender as the experiment was completed.

Results

All analyses were run using SPSS version 24. A test was run to check for any outliers in the category of subtraction. There was one substantial univariate outlier that was found, therefore was then removed. However, this outlier did not change the results of the data, therefore, the participant was left in the analysis and results.

A test for skewness for the four conditions were also run. Once analyses these results showed that subtraction was moderately positively skewed, addition was moderately positively skewed, as well as, other was significantly positively skewed. However, no change showed that it was moderately negatively skewed.

Variable	N	M	SD
Gender	33	. .	
	9	2 45	7 2
Age	33	3. 7.	2
	9	8 72	2
No Change	33	5. 1.	
	9	0 74	3
Addition	33	2. 1.	
	9	3 34	1
Subtracti on	33	3. 1.	
	9	4 33	

		8	
		1.	
Other	33	4	1.
	9	41	
		8	

A paired-samples t-test was conducted to compare the amount of correctly identified changes in subtraction and addition, in regards to hypothesis one. There was a moderate difference in the scores for subtraction ($M = 3.48$, $SD = 1.33$) and addition ($M = 2.31$, $SD = 1.35$) conditions; $t(338) = 11.66$, $p = .001$. It can be seen from the results collected that there is a change in the scores between the conditions of subtraction and addition. Therefore, the hypothesis is supported in the fact that there are more correctly identified changes in subtraction than there is in addition.

A second paired-samples t-test was conducted to compare the amount of correctly identified changes in subtraction and no change, in regards to hypothesis two. There was a moderate difference in the scores for subtraction ($M = 3.48$, $SD = 1.33$) and no change ($M = 2.03$, $SD = 1.74$) conditions; $t(338) = -13.17$, $p = .001$. From the results collected, it can be seen that there is a change in scores, however, the hypothesis is not supported as no change scores are more correctly identified than subtraction scores. Therefore, the hypothesis is rejected.

And lastly, a paired-samples t-test was conducted to compare the amount of correctly identified changes in subtraction and other, in regards to hypothesis three. There was a moderate to non-significant difference in the scores for subtraction ($M = 3.48$, $SD = 1.33$) and other ($M = 1.48$, $SD = 1.$

<https://assignbuster.com/visual-change-blindness-and-memory/>

41) conditions; $t(338) = 19.89, p = .001$. From the results analysed above, it can be seen that there is a difference between the conditions of subtraction and other. Therefore, the hypothesis is supported as it shows that subtraction had a higher record of correctly identified changes than other did.

Discussion

It can be seen from the results that hypothesis one is supported, that the change of subtraction is recognised and identified at a higher rate than the change of addition. From the results it can be seen that the hypothesis is supported, and that the rate of correctly identified addition changes are in fact lower than subtraction changes. Studies have shown that subtraction changes are easier identified than addition changes, that the eye and brain are able to store this information easier, supporting this (Mondy, Colthart, 2000). Therefore, this finding supports the theory that subtraction changes in naturalistic images are more distinguishable in regards to Visual Change Blindness than addition changes. This replicates and supports previous research regarding this topic and hypothesis.

Visual Change Blindness was seen to be more identifiable and recognised in the no change condition than subtraction. Therefore, the results were not consistent with hypothesis two, that subtraction would be easier detectable than the no change condition. From this results, it's easy to see that in matter of fact, participants find it easier to see no change than subtraction changes. Our results, and other sources have suggested and supported the same idea that corroborates this finding.

Hypothesis three was supported in that subtraction changes in naturalistic images are more recognisable than changes in the other condition.

Therefore, overall from the findings of the results analysed as well as outside, respectable sources, the findings support the theory that subtraction changes in these types of images are seen easier than other types of changes, such as changes of colour or placement of objects. This then decidedly replicates and supports previous research that is in regards of this topic and hypothesis.

The sample size of this experiment was not seen as a limitation to the data. However, it could be argued that the generalizability of results were also psychology studies may not have been seen as a very accurate data representation of the population as a whole, therefore, this might have had an impact on results. Also, the experiment that was conducted included self-marking, therefore, it might not have been made clear as to what counts as right or wrong (no being specific about what changed vs. just knowing that something in the image changed, but unsure of what it was). Therefore, this also could have impacted the results. Also participants could lie in their self-marking, however, due to the sample size this should even out in regards to the results of the experiment. A potential way to fix incorrect marking and other issues, would be to increase the writing time of the response section of the experiment, and have participants write down key aspects about the change they have viewed. Therefore, implications of this analysis suggest that people see subtraction and no changes best when it comes to Visual Change Blindness, that is why I believe further research should be conducted

into why participants of these experiments find other and addition changes as difficult as they do.

References

- Becker, M. W., Pashler, H., & Anstis, S. M. (2000). The role of iconic memory in change-detection tasks. *Perception* , 29 (3), 273-286.
- Henderson, J. M., & Hollingworth, A. (1999). The role of fixation position in detecting scene changes across saccades. *Psychological Science* , 10 (5), 438-443.
- Mondy, S. & Coltheart, V. (2000). Detection and identification of change in naturalistic scenes. *Visual Cognition* , 7 , 281 - 296.
- Simons, D. J. & Ambinder, M. S. (2005). Change blindness: Theory and Consequences. *Current Directions in Psychological Science* , 14 , 44 - 48.
- Simons, D. J. & Rensink, R. A. (2006). Change blindness: Past, present and future. *Trends in Cognitive Sciences* , 9 , 16 - 20.

Appendix