

The Effects of Warm Colour on Memorization of Arabic Words Among Private Religious Secondary School Students in Perak

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Abstract

This study was conducted to examine whether warm colour had effects on memorization of Arabic words. Participants involved were 90 students from a private Religious Secondary School in Perak. They were each given a set of paper consisting of one Surah; with six words been highlighted with warm colour (red and yellow), cool colour (green and blue) or white colour background. The paper also contained the meaning of each word in Arabic, which were extracted from exegesis book *Tafsir al-Jalalain*. The participants were given fifteen minutes to memorize the list of words and their meaning in Arabic language. The percentage of words recalled correctly were the dependent variable. It was hypothesized that participants who received warm-coloured set could recall more Arabic words than participants who received either the cool-coloured set or the white set. A paired sample t-test and Wilcoxon test were conducted and the results indicated that there was not a statistically significant difference in percentage of words recalled based on paper set. Possible explanations were examined.

Keywords: Warm Colour, Arabic Words, Colour, Memorization

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1. INTRODUCTION

The Ministry of Education Malaysia has started to promote the use of Information and Communication Technology (ICT) as a tool to increase effectiveness, productivity and proficiency in the educational system (Chan, 2002). Students in educational institutions especially in Religious schools, need attractive tools that could help them memorize efficiently especially for Arabic words. However, the main question to be answered here is whether background colour make teaching and learning process more efficient by enhancing memory performance. Therefore, the aim of this study is to understand the relationship between warm colour background and memory performance among Religious school students.

2. LITERATURE REVIEW

Previous research shows that there is a connection between memory, arousal, attention and colour. Among the factors that helps to transfer information between human memory structure, and keep the information in both short term memory and long term memory, is that it needs outside factors which could activate the memory, namely; attention and arousal.

2.1 Attention and memory

Attention is really important in memory. According to Atkinson and Shiffrin, attention is important in the process of information transfer from sensory store to short term store (1968). James (1901), described attention as "the taking possession by the mind, in clear and vivid form, of one out of what may seem several simultaneously possible objects or trains of thought. It implies withdrawal from some things in order to deal effectively with others."

2.2 Arousal and memory

Colour has been found to increase a person's arousal. Faber Birren (1950) proposed that warm colour, such as red and yellow can increase arousal more than cool colours like green and blue. Greene et al. (1983) found that warm colours increase arousal compared to cool colours. Participants were issued three different scales measuring emotional response, personal feelings, and quality of place. They were then seated in a small room with one of ten different colours mounted on the walls. The participants then filled out the scales again and were given a task to measure boredom. It was found that yellow and orange (warm colours) elicited more arousal than other colours like brown and grey.

Kaya and Epps (2004) in their study on 98 college student volunteers of public institutions, used ten saturated colours from the Munsell-Colour System for the study. It was found that 22 emotions were associated with those colours. For instance, it was recorded that the majority of participants associated green colour with the feeling of calmness, happiness, comfort, peace, hope and excitement. Meanwhile, black colour was associated with the feeling of sadness, depression, fear and anger. This means, colours have the emotional arousing effect. However, the degree of arousal level may differ depending on the type of emotion or feeling being attached with it (Jackson, et. al., 2009).

According to Jackson, Wu, Linden and Raymond (2009), some types of emotion may have a greater effect on arousal than the others. For instance, anger was found to have greater arousal effect than happy or neutral emotion. Based on the studies mentioned, it shows that colour can produce emotional arousing effect but the range of arousal vary; depending on the emotional element that is being attached with specific type of colour. Red colour for instance, is being attached with stronger emotion or feeling compared to the other colours.

2.3 Colour and Memory

Colour has the ability to attract attention and raise emotional excitement. Therefore, each of these elements helps in the transmission of information, memory structures in a better way and have the ability to store information for a long time. A number of studies have been conducted on the relationship between colours and memory performance. Pan in his previous study had indicated that colour is the most important element that helps in increasing memory performance, as he concluded that recognition and reactions with colour are faster when the subjects are examined instead of shape (Pan, 2009).

In addition, there are other studies conducted on the relationship between colour and memory performance. Spence Wong, Rusan, and Rustegar (2006) studied the ability of 120 participants to recognize colour and grey images as opposed to natural scenes. They concluded that participants were able to recognize coloured scenes and neutrals 5% higher as compared to grey ones (Spence et.al, 2006).

Smilek, Dixon, Cudahy, and Merikle (2002) studied the effect of colour on memory performance. They used numbers in four different cases: Black, white, congruent and incongruent colour. Undergraduate participants were given three minutes to study the stimuli displayed on a computer screen, and another three minutes to recall them. The result showed that there are statistically significant differences between the recall cases. It shows that memory performance in the case of congruent colours is better compared to the other cases.

There is another study by McConnohie (1999) on the effect of colours on memory by using soft colours; Blue and green. He had used an alphabet and presented it to the participants through a computer screen on three different coloured backgrounds; White, blue and green. Twenty-eight students from a public school participated in this experiment, and the participants were asked to remember the alphanumeric characters shown to them. Then he asked them to remember those letters

immediately after the show, and the other one hour later. The result of this experiment showed that there is a significant difference between the white and green background slides, and between the blue and white background slides. It indicated that recall rates are higher in the slides that were presented with a white background in all cases. Therefore, background slides coloured in cool colours (blue and green) resulted in lower recall rates compared to white.

Previous studies show that colour affect memory performance, and warm colour increase more arousal and attention on memory. But most of these studies use alphabetical words and pictures as instrument. This study aims to observe the effects of colour on memorization of Arabic words, which is not easy for a non-native speaker such as Malaysian students.

3. THEORETICAL FRAMEWORK

The theoretical framework for this study is based on Atkinson and Shiffrin's "Modal Model" of memory which is portrayed in Figure 1. This model explains that human memory system consists of sensory store, short-term store and long-term store (Sternberg, 2009). It explains that the information that we receive from our senses; either visual or auditory, flow to the sensory store, but it only keeps the huge amount of information for a short period of time (Faiz, 2013).

The external information received by the senses is important in determining whether it could be further transferred to short-term store or long-term store. The information that can capture attention will have higher chances to be transferred from sensory store to short-term store. Otherwise, there is high probability that the information would be lost (Faiz, 2013).

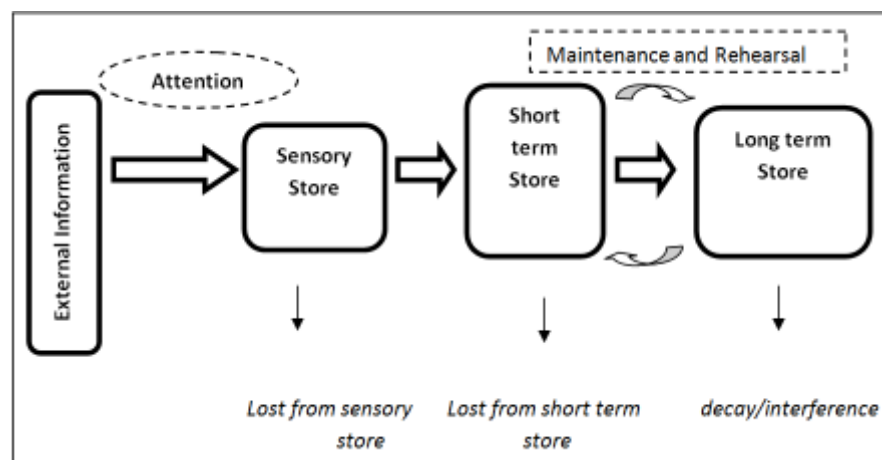


Figure 1: The Theoretical Framework based on the Atkinson and Shiffrin Modal Model of Memory 1968 (as cited in Sternberg, 2009)

Several techniques or control processes are needed to transfer and maintain the information in the short-term store or in the long-term store (deepest level of memory system), such as maintenance rehearsal and elaborative rehearsal (Faiz, 2013). It all depends on the level or depth of processing of a stimulus used. Craik (1973) refers to this depth as extraction of meaning from the stimulus rather than the quantity of analyses performed upon it. Thus, the deeper the level of analyses produced, the longer the memory will be stored.

4. CONCEPTUAL FRAMEWORK

One of stimuli which has a capacity of triggering attention and arousal is colour. Thus, it has a potential to cause stronger retention in both short-term store and long-term store (Faiz, 2013). An external information that goes through the sensory store like colour, also has the potential to trigger the emotional arousal and attention (Farley & Grant, 1976; Green et al., 1983; Kaya & Epps, 2004); which later increase the chances of the information to be stored in the memory (Pan, 2010; Smilek et al., 2001; Spancer et al., 2006) including in short-term memory (immediate recall) (Faiz, 2013).

It is believed that the arousal effect which can be produced will enhance the recall especially in delayed condition. The same effects are also predicted from the scripts or stimuli with coloured background. In contrast, the non-coloured background scripts or stimuli are unable to capture attention which causes the information to decay and not transferred to short-term memory. This will be seen in the low rate of memory test (Faiz, 2013).

The current study as displayed in figure 2 intends to look at the effects of the background colour of Arabic words towards memory performance in three conditions; warm coloured background, cool coloured background and non-coloured background. Since most of the previous studies focused on manipulating the object or the alphabetical words, this study focused to evaluate whether there are any differences in memory performance with the background colour of Arabic words. Therefore, it is hypothesized that immediate recall of Arabic words with warm coloured background condition will be better than Arabic words with cool coloured background condition. The conceptual framework is displayed in Figure 2.

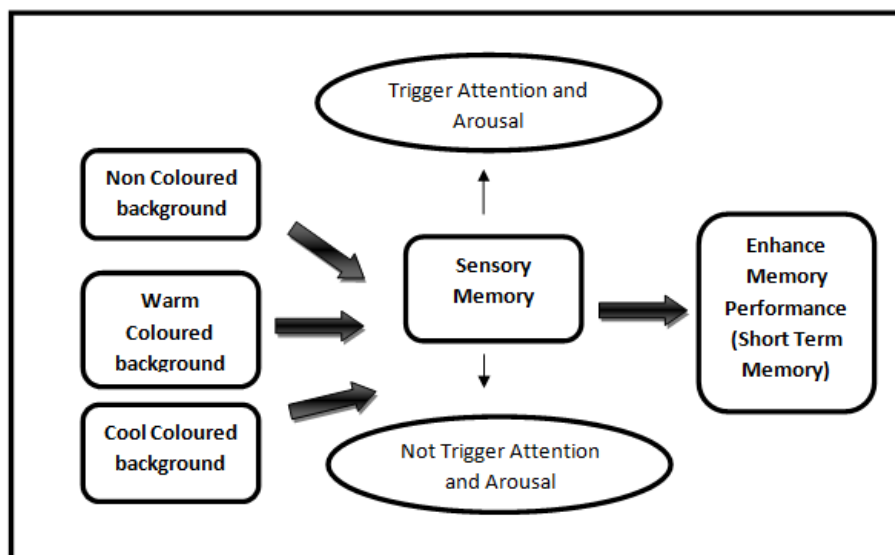


Figure 2 : The Conceptual Framework

5. OBJECTIVE

The objective of this study is to examine the effect of warm colours on memorization of Arabic words, which has been used among religious schools. As we know, students in religious schools in Malaysia are non-native Arabic speakers, so it could be difficult for them to memorize learning materials in Arabic Language. Thus, the study aims to see the effect of warm colours towards student performance in memorizing the Arabic words.

6. RESEARCH METHODOLOGY

6.1 Design

The research will be using experimental group design. The independent variable for this research is the script's background colour and the dependent variable is the recalling percentage of Arabic words by the participants. There will be three groups of participants; with each group being given different background coloured scripts. The first group were given the control script or stimuli (white background), while the second and third group were given the experimental script or stimuli; warm coloured background (red and yellow) and cool coloured background (blue and green).

6.2 Participants

There were 90 students from two private Religious Secondary School in Hilir Perak; Sekolah Menengah Agama Irshadiah in Bagan Datoh and Maahad al-Islah Sungai Lampam, in Teluk Intan, with age ranges from 14 to 17 years old, who were recruited to participate in the research. The reason of choosing participants from private Religious Secondary Schools because of the diversity of thinking level among students in these schools rather than student in Government Religious Secondary School which most of them from selected student and have a high level of thinking.

Participants were randomly assigned into one of five colour settings: two were warm colours, two were cool colours, and one was the control colour setting (white). There were 15 students given red coloured scripts, another 15 students given yellow coloured scripts, another 15 students given blue coloured scripts, another 15 students given green coloured scripts, and the other 30 students were given white coloured scripts. The students selected as participants were not colour-blind to make sure the results were reliable.

6.3 Materials

The materials of the research were five sets of scripts. Each set contained one Surah with selected words been highlighted with various background colours (green, blue, red, yellow or white). The various colours were chosen to differentiate three types of settings or stimuli (warm, cool or neutral). Each set also contains the meaning of words in Arabic language (*tafsir*) which were taken out from the book of *tafsir (Tafsir Jalalain)*. All of the Arabic words were printed in black ink.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿إِذَا وَقَعَتِ الْوَاقِعَةُ ﴿١﴾ لَنَسْفَعْنَا كَادِبَةً ﴿٢﴾ خَائِبَةً زَاهِقَةً ﴿٣﴾ إِذَا رُجَّتِ الْأَرْضُ رَجًا ﴿٤﴾ وَنُسِفَتِ الْجِبَالُ نَسًا ﴿٥﴾ فَكَانَتْ هَبَاءً مُنْبَثًا ﴿٦﴾ وَكُنُفًا أَوْجًا ثُلَاثًا ﴿٧﴾ فَأَصْحَابُ الْمُنَافِقَةِ ﴿٨﴾ مَا أَصْحَابُ الْمُنَافِقَةِ ﴿٩﴾ وَأَصْحَابُ الْمَشْأَمَةِ ﴿١٠﴾ وَالصَّالِفُونَ ﴿١١﴾ وَالشَّالِقُونَ ﴿١٢﴾ أُولَئِكَ الْفَرُوقُونَ ﴿١٣﴾ فِي حُجَّتِ الْكَلْبِ ﴿١٤﴾﴾

﴿سورة الواقعة: الآية ١-١٤﴾

معاني الكلمات:

الكلمات	معاني الكلمات
١. الْوَاقِعَةُ	القيامة
٢. إِذَا رُجَّتِ الْأَرْضُ	عُرِثَتْ عَرَثَةً شَدِيدَةً
٣. وَنُسِفَتِ	نُفِثَتْ
٤. هَبَاءً	غبارًا
٥. أَوْجًا	أصدافًا
٦. فَأَصْحَابُ الْمُنَافِقَةِ	الَّذِينَ يُؤْتُونَ مَالَهُمْ بِمَا لَهُمْ
٧. مَا أَصْحَابُ الْمُنَافِقَةِ	لنُعْطِيهم إِنشَاءهم بِدَعْوَتِهِمُ اجْتِهَادًا
٨. مَا أَصْحَابُ الْمَشْأَمَةِ	تَحْقِيرِ إِنشَاءهم بِدَعْوَتِهِمُ الْهَرَبِ

Figure 3 : Non-coloured background script

الكلمات	معاني الكلمات
١. الْوَاقِعَةُ	القيامة
٢. إِذَا رُجَّتِ الْأَرْضُ	عُرِثَتْ عَرَثَةً شَدِيدَةً
٣. وَنُسِفَتِ	نُفِثَتْ
٤. هَبَاءً	غبارًا
٥. أَوْجًا	أصدافًا
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٨. مَا أَصْحَابُ الْمَشْأَمَةِ	تَحْقِيرِ إِنشَاءهم بِدَعْوَتِهِمُ الْهَرَبِ

Figure 4 : Warm coloured background script



Figure 5 : Cool coloured background script

6.4 Procedure

A consent form was given to each participant as evidence of their agreement to participate in the research. General information regarding the nature of the study were given to all the participants. An instruction were given to the participants regarding the task that they were required to do in the research.

This research has pre-test and post-test for every session. For the first session, all participants were given one set of script or stimuli with non coloured background. The participants had to go through two phases: (1) study phase, and (2) test phase. In the study phase, all participants were given the meaning of each Arabic words in Malay language in order to make them understand. They were then given fifteen minutes to memorize the words. After that, they were given one paper containing questions where they had to write down the meaning of certain Arabic words. Marks were given based on total of words able to be recalled by the participants.

Experimental Group	STUDY PHASE **memorize Arabic words	TEST PHASE
Group 1 (White)	White Background	Write down the answers
Group 2 (Warm)	Colour	
Group 3 (Cool)		

Figure 6 : Pre-test – Post-test

The procedure for post-test and retention-test is quite similar with the pre-test post-test, except the participants were given different sets of background coloured scripts or stimuli (warm, cool and white) from the ones they received in the previous procedure. The total correct words able to be recalled by participants in post-test were also counted.

Experimental Group	Study Phase	Test Phase
	*Memorize Arabic Words	
Group 1(White)	White Background Colour	Write down the answers
Group 2 (Warm)	Warm Background Colour	
Group 3 (Cool)	Cool Background Colour	

Figure 7 : Post-Test - Retention-Test

7. FINDING AND DISCUSSION

The data from the tests were analyzed using a paired sample t-test and Wilcoxon test. The independent variable was the scripts' background colour condition (warm, cool and white). Meanwhile, the dependent variable was the percentage of words recalled correctly by the participants.

The analysis was done with an alpha level of .850. The results were analyzed based on background colour condition with pre-test–post-test conducted separately from pre-test-retention-test. The results for pre-test and post-test showed that there were statistically significant difference of recalling percentage for coloured background, non-coloured background (white); $F(31) = -4.12$, $P = .00$, warm colour background; $F(31) = -3.39$, $P = .002$, and cool colour background; $P = .002$. It concludes that the recalling percentage for post-test is higher than pre-test.

However, analysis for pre-test and retention-test gave contrary result from the hypothesis. There were no statistically significant difference for recalling percentage of non-coloured background; $F(31) = -1.47$, $P = .15$, and warm coloured background; $F(31) = -1.68$, $P = .10$. But, there were statistically significance difference for recalling percentage recall of cool coloured background; $F(31) = -2.49$, $P = .02$. Hence, it shows that the recalling percentage among participants having cool background colour is higher in retention-test than pre-test.

Contrary to what was expected, there were no significant difference for recalling percentage of warm colour background. These results are also inconsistent with previous researches (Spence et al., 2006; McConnohie, 1999).

One possibility is that the selected colour when printed on paper was darker than visualized on computer. Hence, the warm colour (red) was not capable to activate the memory arousal, thus not affecting the memory performance. Other than that, the brightness of the hue could have had an arousing effect, rather than a calming effect (L. Huchendorf, 2007).

Second possibility, the participants were not exposed to colours long enough. As we know, colours have the ability to enhance emotional arousal. Thus, the warm background colours were not able to enhance the memory performance most probably because the duration of participants in study phase and test phase environment were not sufficient to enhance emotional arousal. In Jackson et al. (2009) for instance, the emotions and feelings had the ability to enhance arousal like anger which is more easily aroused rather than positive feelings such as happiness. In the Wolters and Goudsmit (2005) study, they were testing recalling percentage based on very arousing and traumatic events. Therefore, exposure to warm colours would not have such an impact and not arouse or trigger the corresponding increase in memory.

8. CONCLUSION

In conclusion, a repetition of this experiment with slight different methods might give other useful results. First improvement which could be implemented in future, is the duration of time participants are exposed to the colour could be increased and also a different hue of colour to be printed is selected. This research shows more benefit to the education field, where students could choose coloured notes or highlighted texts to aid in their study; especially in Arabic subject. Overall, this

study needs to be continued in other fields such as enhancing Quran reading with *tajwid*, which could help weak students to become a good Quran reader.

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