CONCRETE VS ABSTRACT WORDS – WHAT DO YOU RECALL BETTER?

A STUDY ON DUAL CODING THEORY

Lin Yui¹*, Roslin J. Ng¹, Hiran Perera-W.A².

¹Department of Psychology – HELP College of Arts and Technology
²Department of Psychology – Durham University

*Corresponding Author:
Email: linyui@uymail.com

Abstract

This study was conducted to investigate the theory of dual coding on remembering words, by testing whether concrete words are better recalled than abstract words. A total of 298 (from Asian ethnicity) participants took part in this study. The participants were divided into two groups, where each group was given a list of abstract or concrete words. Then, they were asked to write down as many words as they recall within two minute. The results demonstrated that the participants recalled concrete words better than the abstract words, supporting previous studies.

Keywords: Dual Coding Theory, Concrete words, Abstract words, Asian Participants
Dual Coding Theory and Memory

The Dual Coding Theory (DCT), which was proposed by Allan Paivio in 1971, presumes that there are two separate cognitive subsystems. One is specialized for dealing with language, and the other deals with representation and processing of non-verbal objects (imagery). DCT is a general theory of cognition that accounts for both verbal and nonverbal cognition (Paivio, 1971). The non-verbal imagery deals with non-linguistic understanding of the world. It is generally referred to as imagery because its main function is the generation of mental images (Sadoski, 2003). The verbal code specifically deals with language. This provides the means for communication, encoding, and decoding of messages. Paivio has proposed that there are two types of representational units known as imagens and logogens. Imagens represent mental images, while logogens represent verbal entities. Logogens are said to operate sequentially as words come one at a time in a form of sentence. Imagens are said to operate synchronously or in parallel as all parts of the image are accessible at once (Paivio, 1986).

An important feature of the DCT is the notable difference between abstract and concrete language. Concrete language has more access to non-verbal imagery compared to abstract language. For example, the word flower may evoke both verbal and nonverbal imagery processors compared to the word shame, which is more likely to evoke verbal processors than imagery. The abstract words in this theory tend to depend on a network of verbal associations for its meaning. For example, the word shame can be defined as disgrace, humiliation, infamy, and indignity. Although concrete words also depend on verbal associations, it can also evoke nonverbal imagery as a form of meaning. For instance, if one thinks of the word flower, he/she has the ability to picture it clearly (color, shape, texture, and various experiences linked to it) thereby making the meaning clearer. The verbal code is able to encode both abstract and concrete words, whereas the imagery code is said to be able to easily encode concrete words. Therefore, concrete language has an obvious advantage over abstract language as it can be easily shown and processed in two codes i.e. dual coding. (Sadoski, 2005).

Many experiments have been conducted to support the DCT. In a study done by Paivio and Yuille (1969), 96 participants were given two learning and recall trials with a list of 79 words. Half of the participants were given the words in a random order, while the other half was given in a syntactic order. After viewing each word, the participants were given four minutes to write down as many words as they remembered. The study found that the recall of concrete words was more
than the abstract words supporting the dual coding theory. In a study done by Hargis and Gickling (1978) on vocabulary learning in kindergarteners, the children were shown a set of concrete words and abstract words equal in length and frequency. Each of these words were presented on flash cards and each pronounced and used in a sentence. Two days after training, the children were able to identify the concrete words more than the abstract words. Ten days after the training more than four times as many concrete words were identified compared to abstract words.

Similarly, Paivio, Walsh, and Bons (1994) in their study on the effects of concreteness and relatedness of noun pairs and free call, experimented on 76 participants. They were each given one of two lists of words depending on the time of arrival. The lists consisted of 12 abstract, and 12 concrete words. After reading the list of words, the participants were asked to write down as many words as they could recall. The results of this experiment showed that concrete words were better recalled than abstract words. There were two parts to this experiment the second experiment was similar to the first that was conducted. The participants in the second experiment were 120 undergraduate introductory to psychology students. During the experiment, 24 words (12 abstract and 12 concrete) were presented through a projector to the participants. At the end of the presentation, the students were asked to write down as many words as they can recall. The results of this experiment too shows that concrete words were better recalled than abstract words. This experiment explains the necessity of strong verbal associations for recall of abstract words, and the necessity of high imagery for the recall of concrete words. The results of this experiment have been consistent with the dual coding theory.

An experiment conducted by Sadoski, Goetz and Fritz (1993) on comprehensibility, familiarity, memorability, and interestingness of concrete and abstract text was investigated in four experiments. The first experiment explored the comprehensibility, interestingness, memorability and familiarity in concrete and abstract sentences regarding historical figures. The second experiment investigated the immediate and delayed recall of the sentences, while the third and fourth experiments replicated features of experiments one and two. The results of these experiments show that concreteness was the variable most related to comprehensibility and recall of words and sentences. Concrete text was rated as more concrete, more interesting, and more comprehensible than ecologically valid abstract text (Sadoski, Goetz and Fritz, 1993), supporting the dual coding theory.
In Paivio (1970) on the functional significance of imagery showed a comparison of effects of the abstractness and concreteness of nouns in paired associative learning between children (from grades four to eight), and adults. The results showed that concrete language has a natural advantage over abstract language.

Many research had been conducted on the concreteness of abstract and concrete words. One such study is one done by Corkill, Bruning and Glover (1988) on the effects of abstract and concrete organizers on students’ memory for prose. There were two experiments conducted, the first experiment compared three conditions; a) students were required to paraphrase an abstract organizer before reading a passage, b) a concrete organizer before reading a passage, and 3) a control condition which did not require the students either before reading. The second experiment was replicated on the first experiment except, a text book chapter was used as the material to be used. The students were tested on free recall of the material. The results in this experiment showed that students who paraphrased the concrete organizer recalled considerably more of the content given, compared to others.

An experiment carried out by Schultz and Woodall (1980) on 126 third and fourth grade students on pictorial and narrative learning mediators, the children were randomly assigned into three presentation conditions: control group, narrative mediator, and pictorial mediator. They were presented with ten words to study in four minutes. The control group was shown the first poster containing words and was asked to look at the words while the narrative mediator group was asked to write down a story using (if possible) all the words in the poster. The pictorial mediator group was given a second poster containing both pictures and words, where they were told to look at all the pictures. At the end of four minutes the posters in each condition was removed and the stories of the narrative mediator group was collected. One minute after, the children were asked to write down as many words as they remember. The results of this experiment showed that there was a higher recall of words in the pictorial mediator group, which recalled an average of 8.93 words compared to the narrative mediator group and control group which recalled an average of 6.05 and 6.58 words respectively supporting the dual coding theory.

It is evident that the dual coding theory has been a popular area of research for many decades. Although there were many contradictions over the past years, majority of research supports the theory of dual coding. This theory is applicable in daily activities mainly in the education sector where it has proven to improve skills such as reading and writing. It is also
applicable in remedial literacy education, where these principles were used to help those with learning disabilities (Paivio, 2006). The present study on DCT was conducted using participants from Asian ethnicity. 298 subjects were given a set of 30 words (either concrete or abstract) to memorize in 60 seconds, and the total number of words recalled were recorded according to the number of words given to the participants. We hypothesized that the participants were able to recall concrete words better than the abstract words supporting the previous studies.

Method

Participants

298 Students enrolled in the bachelor of psychology undergraduate program took part in this study. All participants (127 male, 171 female) were from Chinese ethnicity between 18 to 25 of age. The Participants were randomly assigned into one of two groups: group-1, and group-2, which was made up of 149 in each equally. Participants did not receive any incentives for taking part in this study.

Materials

30 concrete words, and 30 abstract words printed on an A4 paper used in this study. Each participant received a sheet depending on the group they were assigned to. A stop watch was used to calculate the time. A filler task (simple algebra) was given in between the study after the memorization. All participants were given a written consent form prior to the experiment; thus, participating in this study was completely voluntary. This study was approved by the HELP University College ethics committee.

Procedure

The participants were divided into two groups: group-1 and group-2. Participants in group-1 were each given a sheet of concrete words, and participants in group-2 were given the abstract words. Participants were given 60 seconds to go through the list of words given to them. At the end of their time limit, participants completed a filler task (a simple mathematical task) for approximately 45 seconds. Then, they were asked to write down as many words from the list they memorized as they recalled in any order. The participants were given 120 seconds to write down the words.
Results

Table 1

Recall of words

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>149</td>
<td>10.213</td>
<td>3.142</td>
</tr>
<tr>
<td>Abstract</td>
<td>149</td>
<td>8.898</td>
<td>3.198</td>
</tr>
</tbody>
</table>

The results were calculated based on the number of words written. The mean number of concrete words recalled was 10.213, and the mean number of abstract words recalled was 8.898. The standard deviation for concrete and abstract was 3.142 and 3.198 respectively (table 1). The mean difference was 2.011 equal variances assumed. Levene’s test for equality of variances: .089, \( p = .69 \). The independent samples t-test showed a statistically significant difference in recall for concrete and abstract words; \( t (301) = 5.12, p < .001 \) (table 2).

Table 2

Independent samples t-test

<table>
<thead>
<tr>
<th>( t )</th>
<th>df</th>
<th>Sig.</th>
<th>( M )</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.12</td>
<td>301</td>
<td>( p &lt; .001 )</td>
<td>2.011</td>
</tr>
</tbody>
</table>
Discussion

The results of this experiment showed that the participants were more able to recall concrete words better than the abstract words. The findings support the hypothesis that concrete words are better recalled than abstract words. Thus, showing that concrete words are superior (memorable) to abstract words in free recall and memory tasks.

The findings also consistent with past research. The experiment of Paivio and Yuille (1969) where the participants were presented with 79 words in both syntactic and random order to learn and recall showed similar results. The results showed that participants were able to recall more concrete words compared to abstract words. In the study conducted by Hargis and Gickling (1978) on kindergarteners showed similar results where the children were able to identify concrete words compared to abstract words, regardless of the age difference and time interval. An extended study of the same research on middle class children with learning difficulties, have shown similar results to both the Hargis and Gickling(1978) and the present study. The results of the study have shown that children were able to learn concrete words almost 12% faster than abstract words. It was concluded that concrete and high imagery words can be learned more easily compared to low imagery and abstract words, which would need more exposure and use in context (Sadoski, 2005).

The same concept is applicable to the results of the current study.

Sadoski, Goetz, and Fritz (1993) experiment on comprehensibility, familiarity, memorability and interestingness of concrete and abstract text was yet another interesting study which showed similar results to the current study. This experiment illustrated how concrete words are more comprehensible and easier to recall compared to abstract words. Similarly, the experiment by Paivio (1970) supported the dual coding theory, and the current hypothesis as concrete words were better recalled than abstract words regardless of age limit as it compares the results of adults and children. Although the recall of words in children were much lower than the recall of words of adults, both adults and children were able to recall concrete words than abstract words. Similar results are seen in the experiment carried out by Corkill, Bruning and Glover (1988) on the effects of abstract and concrete organizers on students’ memory for prose. It explained how students who paraphrased the concrete organizer was able to recall more words compared to the students who paraphrased the abstract and the rest who were simply asked to read. The experiment conducted by Schultz and Woodall (1980) showed how words assisted with pictures are more helpful in learning as it has a higher recall rate than words. Concrete words are said to evoke verbal
processors and imagery which helps one to understand and picture the word and thus retains in memory longer than abstract words.

Many researches on the DCT has been tested on all age groups. The current study was tested on participants above the age of 18 with Asian ethnicities. We found similar results as previous studies supporting the DCT. As an application, it is worth mentioning that the future research on DCT can be used to test eyewitness memory (Loftus, 1979; Perera-W.A., 2014; Marsh, 2007). Many studies have found inconsistencies with eyewitness testimonies and the cross-race effects (Platz & Hosch, 2006; Pezdek, O’Brien, & Wasson, 2012; Perera-W.A., 2014). As stated earlier (Paivio, 1986) the involvement of logogens and imagens with DCT in eye-witness testimony is yet to be explored. Given the consistent results, future studies can be focused on further identifying the importance of DCT in the area of memory retrieval process.
References


