

Visual Imagery and Reading Books

Buvana Ramesh^{1*}, K. T. Shwetha²

¹Research Scholar, Department of Humanities and Social Sciences, Srinivas University, Mangalore, India

²Assistant Professor, Department of Humanities and Social Sciences, Srinivas University, Mangalore, India

Abstract: Reading helps in mentally visualizing the story. The aim of this study is to understand if there is a relevance and correlation between reading a book and how vividly youngsters have a mental imagery. A wide range of readers exist among us. The illustrations in books form various images in each of our minds. The image is subjective from person to person. When does the actual picture form in our mind? Is it a slow and steady process? Is the visual effect the same with open and closed eyes? This interesting study is beneficial in finding the relevance of these factors which can encourage children to begin reading at an early age. Book reading at any age can be helpful in forming images which in turn can be helpful to take active interest in the activities of daily life. It can have a positive effect by planning ahead duly affecting time management, scheduling, coordination, focus, etc. Therefore, cultivating the habit of book reading and developing the art of visual imagery can have a positive effect on life.

Keywords: Aphantasia, Book Reading, Mental Imagery, Visual Imagery, Vividness, VIVID.

1. Introduction

The study aims at understanding the fact that reading helps in mental visualization and vice versa. The words weave vivid, various illustrations in the minds of the wide range of readers, and each image is different for different people. With the scientific advancement in the past few years, our understanding and knowledge on the functional organization of the brain has increased. Functional Magnetic Resonance Imaging (fMRI) [1] has been incredibly useful for breakthroughs in the field of neuroscience which has critically studied about the visual cortex. The visual cortex located in the occipital lobe interprets and processes information based on the information received from the eyes. This outermost layer in the cerebral region in the brain is responsible for visual information processing. The study has given rise to useful facts and further studies are carried out for future discovery. The dynamic network of neurons has revealed pertinent information about the structure and the functional properties of the visual cortex region [2]. Studies have found mental imagery having direct influence on memory and perception which resulted in developing theories based on principles rather than models. Experimental studies have led to breakthroughs in mental or visual imagery [3]. The nature of these images formed in our brain provides scope for interest and debate in world of cognitive science [4]. This book talks about the symbolic representation by one group of

theorists while the other group argues that they are mere pictures in our mind. This seems to be a fascinating subject to be studied in depth in fields of philosophy, psychology, neuroscience, etc. The book also describes the phenomena of mental imagery, several articles from scientists and psychologists.

The ability of visualization of each person is unique and research in this field has not been impactful. Newer tests and tools have been recommended for such studies [5]. Experiments were conducted to compare vividness and non-vividness in memory and social memory which was significant with sight and mental recognition of face. [6] The musical connection based research has found association between vivid imagery and auditory sense forming images [7]. Reading creates pictures in our mind which is unique to each of us. This region is critical in forming various still pictures or dynamic moving shots like films. The comprehension strategies varies to each individual weaving a web of detailed schema in their memory. Parts of it could be continued from their previously formed schema while the rest could be a newly formed schema. Other perspectives of the interpretation can be seen. Several tactics were used to explore the variations in the neural framework [8] Minority of people claim that they have the inability to form mental images. This impairment may be a result of heterogeneous factors However, is it their inability or do they refuse to form an image? This neurological area could be analyzed psychologically with proper assessments for better comprehension of the concept [9] which could serve as a potential research topic. The teachings in any form from childhood forms an internal representation in our mind. In Neuro linguistic programming, this is called as map of the world [10]. Researchers have found the link to the relationship of internal to external representations. Empirical and theoretical implications to perception and memory suggest the link to learning. This could shed more light to the concept of visualization. The complexity of such knowledge is made simpler with the techniques of visualization. Knowledge visualization and information visualization are two distinct areas thriving independently. The culmination between the two can bring about newer strategies to facilitate reading and learning skills [11]. Pictures are formed in our mind when we read a book. We begin to visualize parts of the story which makes comprehension easier. The images can be a combination

*Corresponding author: buvanar@hotmail.com

of any of the five senses. The illustrations in the books guide us in the way the author wants us to imagine. It is later helpful to fill the gaps when there are no more illustrations. There are emotions and smells associated with the mental imagery. The images can be formed as and when the sentence is read or when the entire sentence is completed. The images could be of characters, the nature scenes of daily lives or the actions they perform. They form as moving scenes like a film or as static pictures.

How many of us can form pictures in our mind when words are read or spoken aloud? The process of visualization has been studied by researchers for decades. They are based on our previous experiences in life. Images are formed in our brain based on experiences. There are impressions stored in our memory based on our past experiences and the pictures are recalled to the relevant present. Triggers or stimuli could just be anything. Language is so powerful that the words can quickly bring up images in our mind. Is it imagination? Have we experienced it before? Many of us can bring the exact picture to our mind when we recall and some of us can even bring in the associated sounds, smells with it. It is found that some of us cannot bring the pictures to our mind. This is termed as aphantasia. However, this study was to find the co-relation between reading books to visual imagery. Language provides an entry point for learning about the process. A way to thought process is through. Researchers have asserted that a picture in the mind is a representation of language. Language plays a key role in schema formation in neural network processing. In contrast, the older people were able to form shapes and scan visual mental images as good as young adults. These studies conclude age contributes to slowing down, however, individual imaging processes are affected selectively by aging. Cognitive behavioral researches based on the questionnaire of this study have led to having control and experimental groups for vivid imagers and non-imagers. Reward based study measuring the creative performance manipulated by instructions given verbally. The events happened in the past have already imprinted certain images in our mind which helps us in becoming creative. Reward and creativity goes hand in hand and a bond develops between them. This internal representation ensures that the relationship between reward and creativity stayed strong. It is proven from past many researches that anticipatory reward increases imagery and creativity [12] Mental imagery has been utilized in the field of sports. By using the non-dominant hand for throwing a ball using imagery was found to be the same during the actual physical sport. However, it was significantly beneficial as strategy of retention for transfer of visual and kinesthetic motor skill. Performance was enhanced in the neural and cognitive functional areas. The vividness questionnaire which also tests for mobility in all forms was effective in this study and a positive relationship to the mental imagery was established [13] The power of mental imagery have been experimented in areas of arts, performance, decision making, sports, memory, behavior, retention and recall, motivation, attention, comprehension, reading, understanding, etc. This experiment was conducted with randomly picked students from high school and college to

participate in this VVID study.

2. Methodology

1) Aim

1. To study if a correlation exists between Visual Imagery and book reading
2. To check if the paired population means are equal.

2) Hypothesis

H0: There is NO significant relationship between Closed Eyed and Open eyed Visual Vividness to Book reading

3) Variables: Independent Variable

Book reading-Y/N-Categorical variable

4) Dependent Variable:

Open Eyed Scoring (the sum of four blocks of open eyed setting)

Close Eyed Scoring (the sum of four blocks of closed eyed setting)

5) Ethical Acknowledgement

The VVIQ scale that was developed by Dr. Marks who has given full permission to use the scale for research purpose.

3. Tables

Table1
Mean Statistics

		Mean Statistics	
Book reading		Open-eye	Close eye
Yes	Mean	58.80	58.41
	N	51	51
	Std. Deviation	11.293	10.863
No	Mean	49.11	50.00
	N	9	9
	Std. Deviation	8.007	7.778
Total	Mean	57.35	57.15
	N	60	60
	Std. Deviation	11.355	10.834

Table 2
Correlations

		Open_eye	Close_eye	Book_reading
Open_eye	Pearson Correlation	1	.948**	-.307*
	Sig. (2-tailed)		<.001	.017
	N	60	60	60
Close_eye	Pearson Correlation	.948**	1	-.280*
	Sig. (2-tailed)	<.001		.031
	N	60	60	60
Book_reading	Pearson Correlation	-.307*	-.280*	1
	Sig. (2-tailed)	.017	.031	
	N	60	60	60

Table 3
T-Test-Paired Samples Statistics

		Mean	N	Std Deviation	Std, Error Mean
Pair 1	OPEN_EYE	57.35	60	11.355	1.466
	CLOSE_EYE	57.15	60	10.834	1.399

Table 4
Paired Samples Correlations

		N	Correlation	(Sig)One-Sided p	(Sig)Two-Sided p
Pair 1	Open_eye & close_eye	60	.948	<.001	<.001

Table 5
Paired Samples Test

		Mean	Std Deviation	Std Error Mean	Lower(95%Conf)	
Pair 1	Open_eye-close_eye	.200	3.616	.467	-.734	
		Upper(95%Conf)	t	df	One Sided p	Two-Sided p
Pair 1	Open_eye-close_eye	1.134	.428	59	.335	.670

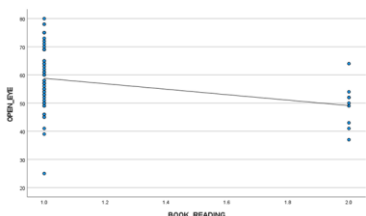


Fig. 1. Open eye

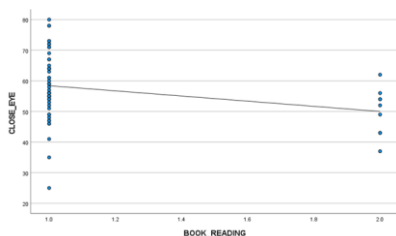


Fig. 2. Close eye

4. Findings and Discussion

The data was analyzed and found to be normally distributed. The Skewness and kurtosis values for open eyes and closed eyes vivid imagery seemed within range of ∓ 1.96 . The Shapiro Wilk test significance ‘p’ values are > 0.05 which show that the data is normal. Q plots display the normalcy of data. Table 1 show additional values with the means report. This contains the mean, sample size and the standard deviation. This shows that the total mean for the open eye group is slightly more than the closed eyes. Table 2 is the correlation table. Here Point Biserial correlation has been used since the data is a combination of a numerical and categorical value. This is calculated through Person’s Coefficient Correlation. The Correlation is significant at both 0.01 and 0.05 level for 2-tailed distribution values. Figures 1&2 display the plots and the correlation line connecting the X axis and Y axis. This shows in both the closed eyes and open eyed scenarios, the book reading value of 1 which has a corresponding category of ‘Yes’ and value of 2 carrying a value of ‘No’. show a downward slope from 1 to 2. This means that the book reading has a significant effect of

vivid imagery with both open and closed eyes. This rejects the null hypothesis proving that there is significant effect of visual Vivid Imagery.

Table 3.1-3.3 give the results of Paired ‘t’ test. The Paired ‘t’ test was performed on the normally distributed values of the dataset. Level of Significance (two tail test)

df =59 (n-1 ie 60-1)

Critical Value (CV) = 2.00 (from the t distribution table)

‘t’ = .428

Critical Value (CV): 2.00 (df of 59) for a 0.05 level of significance.

Hence $t < CV$

$P = .05$

P value = 0.670 > 0.05

Confidence Interval CI lies between 0.734 and 1.134 and it does not include the ‘0’

5. Conclusion

Based on the above data analysis and discussion, with the normally distributed parametric data, it has been found that the t test has rejected the Null hypothesis. This means that there IS a significant relationship between Closed Eyed and Open Eyed Visual Vividness to book reading. The mean difference is 0.20 between open and closed eyes, Open eyes is 0.20 points more than closed eyes. There is significant correlation between open eyed visual imagery to book reading which is graphically plotted on Figure 2 giving a downward slope from Open eyed to close eyed.

References

- [1] Grill-Spector, K., & Malach, R. The human visual cortex. *Annu. Rev. Neurosci.*, vol. 27, pp. 649-677, 2004.
- [2] Gilbert, C. D. Microcircuitry of the visual cortex. *Annual review of neuroscience*, vol. 6, no. 1, pp. 217-247, 1983.
- [3] Finke, R. A. (1989). Principles of mental imagery. (Book)The MIT Press.
- [4] Book Tye, M. (2000). The imagery debate. (Book)Mit Press.
- [5] Hall, C., Pongrac, J., & Buckholz, E. The measurement of imagery ability. *Human movement science*, vol. 4, no. 2, pp. 107-118, 1985.
- [6] Swann, W. B., & Miller, L. C. Why never forgetting a face matters: Visual imagery and social memory. *Journal of Personality and Social Psychology*, vol. 43, no. 3, 475, 1982
- [7] Küssner, M. B., & Eerola, T. The content and functions of vivid and soothing visual imagery during music listening: Findings from a survey study. *Psychomusicology: Music, Mind, and Brain*, vol. 29, no. 2-3, pp. 90, 2019.
- [8] Mackey, M. Visualization and the Vivid Reading Experience. *Jeunesse: Young People, Texts, Cultures*, vol. 11, no. 1, pp. 38-58, 2019.
- [9] De Vito, S., & Bartolomeo, P. (2016). Refusing to imagine? On the possibility of psychogenic aphantasia. A commentary on Zeman et al. *Cortex*, vol. 74, pp. 334-335, 2015.
- [10] Rapp, D. N., & Kurby, C. A. (2008). The ‘ins’ and ‘outs’ of learning: Internal representations and external visualizations. In *Visualization: Theory and practice in science education* (pp. 29-52). Springer, Dordrecht.
- [11] Keller, T., & Tergan, S. O. (2005). Visualizing knowledge and information: An introduction. In *Knowledge and information visualization* (pp. 1-23). Springer, Berlin, Heidelberg.
- [12] IKwuagwu, U. R. (2010). Effects of mental imagery, reward and gender on creativity. Unpublished M. Sc. Thesis, University of Nigeria, Nsukka. (1-121)
- [13] Taktek, K., Zinsser, N., & St-John, B. (2008). Visual versus kinesthetic mental imagery: Efficacy for the retention and transfer of a closed motor skill in young children. *Canadian Journal of Experimental Psychology/Revue canadienne de psychologie expérimentale*, 62(3), 174.