Faculty of Cognitive Sciences and Human Development

THE EFFECTS OF WRITING ON MEMORY RETRIEVAL

PERFORMANCE

Iffah Syazwani binti Shamsul Arif

Bachelor of Psychology (Honours)

2022

UNIVERSITI MALAYSIA SAWARAK

Grade: _A_____

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Masters ☐
PhD ☐

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THE EFFECTS OF WRITING ON MEMORY RETRIEVAL PERFORMANCE

IFFAH SYAZWANI BINTI SHAMSUL ARIF

This project is submitted
in partial fulfilment of the requirements for a
Bachelor of Psychology with Honours

Faculty of Cognitive Sciences and Human Development
UNIVERSITI MALAYSIA SARAWAK
(2022)

The project entitled **'The effects of Writing on Memory Retrieval Performance'** was prepared by **Iffah Syazwani binti Shamsul Arif** and submitted to the Faculty of Cognitive Sciences and Human Development in partial fulfillment of the requirements for a Bachelor of Psychology with Honours

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ABSTRACT

Writing during reading activity had often proved with comprehension, rather than memorization. This research aimed to investigate whether writing during a reading activity can affect memory retrieval performance using 3 different groups of modes of encoding; Reading-Only group, Reading-and-Rewriting group, Reading-and-Random-Writing group. Fourty-five dean lists undergraduates from University Malaysia Sarawak was randomly chosen and divided into the 3 groups of encoding (N=15 each group) to take part in the research where the mean scores of the test given to each of the 3 groups of encoding were compared using One Way ANOVA. Findings revealed that writing act as the enhancer when students read, showing bigger mean scores in rewriting group and random writing group than reading only group, proving this research as significant in the education settings.

Keywords: Writing, Working Memory, Undergraduates, Encoding and Retrieval of Memory.

ABSTRAK

Menulis semasa aktiviti membaca selalunya terbukti dengan pemahaman daripada hafalan. Kajian ini bertujuan untuk menyiasat sama ada menulis semasa membaca boleh menjejaskan prestasi perolehan ingatan menggunakan 3 kumpulan mod pengekodan yang berbeza; Kumpulan Membaca Sahaja, kumpulan Membaca-dan-Menulis Semula, kumpulan Membaca-dan-Menulis-Rawak. Empat puluh lima senarai dekan mahasiswa dari Universiti Malaysia Sarawak telah dipilih secara rawak dan dibahagikan kepada 3 kumpulan pengekodan (N=15 setiap kumpulan) untuk mengambil bahagian dalam suatu ujian di mana skor min ujian diambil dari setiap satu 3 kumpulan pengekodan lalu dibandingkan menggunakan One Way ANOVA. Dapatan kajian menunjukkan bahawa menulis bertindak sebagai penambahbaikan apabila pelajar membaca, menunjukkan skor min yang lebih besar dalam kumpulan menulis semula dan kumpulan menulis rawak daripada kumpulan membaca sahaja, membuktikan kajian ini penting dalam pendidikan.

Kata kunci: Menulis, Memori Kerja, Mahasiswa universiti, Pengekodan dan Penyimpanan Memori.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Writing was no stranger when one was a student. Either it was just a mere writing in a class or revising for an upcoming test, it had been a method used by people inherently when they started their education process. To remember the knowledge given by the educators, students produced various kind of methods to study like using repeated vocal techniques, reading, and rehearsing in their head and writing especially during examinations and tests. Revision or study styles have known to be categorized, usually with visual, auditory and kinaesthetic. Now, kinaesthetic learning style was when you learn by manipulating or touching a material (Laskey & Gibson, 1997). A study done to investigate learning styles and attitudes among Malaysia tertiary students found that many of the tertiary students prefer to learn using kinaesthetic modality (Yong, 2010). It can be said that writing was one of the kinaesthetic learning styles as writing involve finger and hand movement. In addition, another study done in Malaysia found that plenty of students remember information orally and in writing (Kob, Kannapiran & Abdullah, 2018).

Hence, the big question was, did writing had an impact to students' memory? Was it only the presence of writing or a collection of different cognitive processes during the writing action, helped students to memorize and passing their exams? Working memory had been proved to be the most critical component amidst the time of test/examinations. To investigate if there was any difference between modes of encoding i.e., reading-only task, reading-and-rewriting task, reading-and-random-writing task precisely when students write, have an influence on retrieval performance or not, will be the main goal of this study.

1.1 Background of Study

Revision was a change made to something, or the process of adapting and modifying information (Cambridge Dictionary, n.d.-a 1.). It was also a process on manipulating information we gathered beforehand and are later used in examinations or tests. This process can consist of many components which by reading, writing, rehearsing by vocals, and using flashcards. Beginning with reading, it had known to be the method of 2 critical revision. It taught students to revise the information they gather in their own conceptual understanding (Reading Rockets, n.d.-b 1). This was one of the examples of visual learning styles. Next, some students also revised by rehearsing the information they learn using verbal vocals. Rehearsing was what was called when student said the same thing repeatedly. Taking this into the revision methods, students usually did verbal rehearsing when they wanted to convey or talk in front of many people in order to not feel nervous (Seahorses Consulting, 2012). Though it was not used for revision, rehearsing can also be used as a memory enhancer as saying repeatedly could help someone to remember. This was an example of an auditory learning styles. Furthermore, using flashcards. Now this method was more modern compared to the other methods of revision mentioned. The way flashcards work was by having the cue on the front of the paper and the answer at the back of the paper.

According to Pradana and Gerhani (as cited in University of Nebraska, 2020), using flashcards could produce students with excellent verbal communication and memory skills. Lastly, writing as a revision process specifically had been proved to be one of the effective methods when revising. Studies have shown that when writing, the central executive part in working memory component control and switch attention when writing (Vanderberg & Swanson, 2006), give thorough processing of information (Frisch, 2016) and increase deeper understanding

(Umejima, Ibaraki, Yamazaki & Sakai). Furthermore, memory retrieval, or memory recall was defined by the cognitive process in which the information stored are brought to consciousness (Lumen Learning, n.d.-c 1).

Working memory was a memory system where the information was temporarily stored in a limited capacity system and further used for manipulation for complex tasks like learning, reasoning or comprehension. People retrieved or recalled information that they have manipulated into due to many reasons. According to Lumen Learning (n.d.-c 2), there were two types of memory retrieval: recall and recognition. The first type, recall was more to the concept of bringing the information from long term memory to short term memory and later be used. The second type, recognition was more to the experience of familiarity when a cue of an information is being presented. Thus, the background of this study concluded that the present study aimed to use writing method as the independent variable and memory retrieval as the dependent variable.

1.2 Problem Statement

Vanderberg and Swanson's (2006) study investigated the main objective of their study is to investigate the relationship between components of working memory and the macro and microstructure of the writing task (i.e., planning, revision, grammar, and punctuation). The result of the study compromised of many components of writing task only concluded central executive of the working memory component to be working when writing. There was no direct and clear relationship of writing with memory retrieval in the study done. Even though revision was one of the components, the study failed to point out how writing alone can be used for memorisation. The researchers only pointed out comprehension rather than memorization.

Other very close example would be a study was conducted by Naka and Naoi (1995) where the researchers' study about repeated writing and memory using foreign characters, not by using characters of words that the participants are well familiar with. None of these studies proved specifically about the existence of writing itself as the enhancer for memory retrieval performance. Thus, it was the main objective of the study to prove that the existence of the writing task in the language that the participants were very well familiar with, could act as the enhancer for memory retrieval. In addition, while most of this kind of study was usually done in western countries, to the best of researcher's knowledge, the study on mode on encoding and memory retrieval were still so scarce in Malaysia, especially in East Malaysia. Hence, the present study will investigate on writing and its relationship with memory retrieval among university undergraduate students in Malaysia.

1.3 Research Objectives

1.3.1 General Objective

This study attempted to investigate whether writing on reading task can help enhance memory performance when encoding information.

1.3.2 Specific Objectives

To investigate if there are any significant differences between modes of encoding i.e., reading-only task, reading-and-rewriting task, and reading-and-random-writing task on memory retrieval performance?

1. To investigate if there is any significant difference between reading-only task and reading-and-rewriting task on memory retrieval performance.

2. To investigate if there is any significant difference between reading-and-rewriting task and reading-and-random-writing task on memory retrieval performance.

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3. To investigate if there is any significant difference between reading-only task and reading-and-random-writing task on memory retrieval performance.

1.4 Research Questions

1. Is there any significant difference between reading-only task and reading-and-rewriting task on memory retrieval performance?

2. Is there any significant difference between reading-and-rewriting task and reading-and-random-writing task on memory retrieval performance?

3. Is there any significant difference between reading-only task and reading-and-random-writing task on memory retrieval performance?

1.5 Research Hypotheses

1. There is a significant difference between reading-only task and reading-and-rewriting task on memory retrieval performance

2. There is a significant difference between reading-and-rewriting task and reading-and-random-writing task on memory retrieval performance

3. There is a significant difference between reading-only task and reading-and-random-writing task on memory retrieval performance
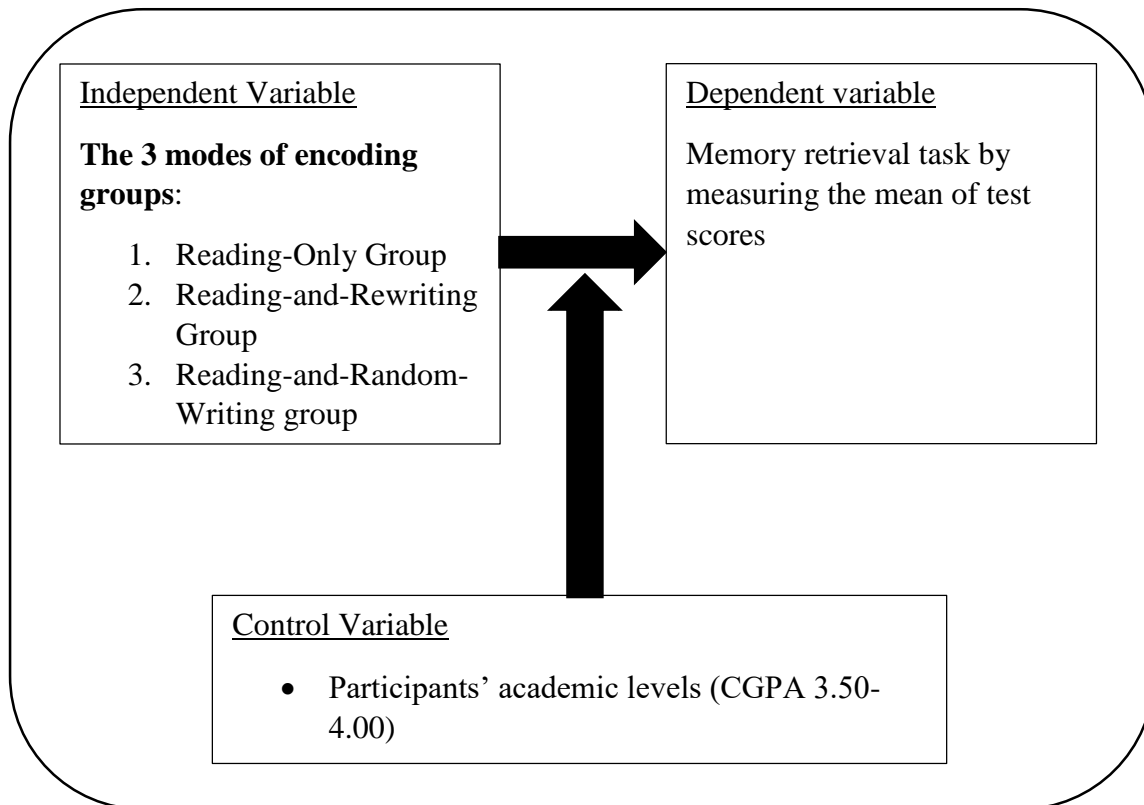
1.6 Conceptual Framework

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┌─────────────────────────────────────────────────────────────────┐
│  ┌──────────────────────────┐        ┌──────────────────────┐    │
│  │ Independent Variable     │        │ Dependent variable   │    │
│  │                          │        │                      │    │
│  │ The 3 modes of encoding  │        │ Memory retrieval task│    │
│  │ groups:                  │───────▶│ by measuring the mean│    │
│  │   1. Reading-Only Group  │        │ of test scores       │    │
│  │   2. Reading-and-Rewriting│       │                      │    │
│  │      Group               │        │                      │    │
│  │   3. Reading-and-Random- │        │                      │    │
│  │      Writing group       │        │                      │    │
│  └──────────────────────────┘        └──────────────────────┘    │
│              ┌──────────────────────────────────┐                │
│              │ Control Variable                 │                │
│              │   • Participants' academic levels│                │
│              │     (CGPA 3.50-4.00)             │                │
│              └──────────────────────────────────┘                │
└─────────────────────────────────────────────────────────────────┘
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Figure 1 Conceptual framework of the research

1.7 Significance of Study

By exploring writing as a revision style, this study enhanced understanding of its phenomenon in Malaysia, specifically in Sarawak. The data gathered from undergraduates' dean lists students from UNIMAS in Sarawak will add to the new knowledge of current state of the study of writing and working memory. With the research information, writing as an affective revision style can be developed and implemented to increase awareness. Findings in this study should serve as the foundation for future development of not just for university students, but lower-level institutions like primary school and high school and more broadly, assisted in the success of a strategic plan addressing various styles of methods during revision process. It also can be used by educators to help students in general on how to use writing to create more solid information when revising.

1.8 Definition of Terms

1.8.1 Modes of Encoding

Conceptual Definition: Encoding can be defined as the conversion of sensory input into a form capable of being processed and brought into memory. Encoding is the first stage of memory processing (American Psychological Association, n.d.-d 1). In much simpler terms, encoding is basically the process of putting information into memory.

Operational Definition: The mode of encoding in this study will be measured using 3 different modes which by reading-only task, reading-and-rewriting task and readingand-random-writing task. All the mode will be presented by a text of paragraph from the TOEIC listening and reading test. TOEIC, or Test of English for International Communication is an international standardized test of English language proficiency for non-native speakers (Educational Testing Service, 2015). It is important to note that the TOEIC is considered reliable and valid to be used in this study. According to Powers, Kim and Weng (2008), the Cronbach alpha reliability for TOEIC reading estimate .95 and .94.

Another crucial note for this study is the study will only use the TOEIC reading part of the test since the present study only uses reading as one of the independent variables. The original reading section of TOEIC includes three parts, testing how well participants understand written English. However, only one part of three parts will only be used in this study because the remaining two parts are considered not suitable for measuring memory retrieval. Participants will then be given a paragraph to read and respond at their own pace within the time provided.

1.8.2 Memory Retrieval Performance

Conceptual Definition: Memory retrieval is a cognitive process in which information stored is brought to consciousness. It can also be defined as a process where long-term memory is

brought to short-term memory for multiple reasons like comprehension and learning (Lumen Learning, n.d.-c 3).

Operational Definition: The memory retrieval performance in this study will be measured by observing the test scores after the TOEIC reading test has been distributed and collected. The mean scores will be observed and compared between the three modes of encoding: reading-only, reading-and-rewriting and reading-random-writing. The mode with the highest mean scores will determine which mode is the best for memory retrieval performance.

1.9 Summary

This chapter had elaborated the research background, problem statements, research objectives, questions and hypotheses, conceptual framework, significance of study, and the definition of terms regarding writing and memory retrieval performance.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The literature review of this study will discuss about theories, models, past findings and improvement in present study of writing and memory retrieval performance. Most components of working memory will be mentioned as both writing (the independent variable) and memory retrieval performance (the dependent variable) relate to working memory. It is important to state that the purpose of the literature review in this study is to give insights about how the writing task and memory retrieval performance can work in various kinds of studies.

2.1 Modes of Encoding

2.1.1 Reading

Reading is a process that occurs in the mind that is layered with comprehension, word recognition, fluency, and motivation (Leipzig, 2001) while writing is composed texts that can consists of graphic symbols to convey meaning (Nordquist, 2019). Though most people wrote without reading anything beforehand like an inspired poems or song writing, the kind of writing in which people read first beforehand was usually done in academic setting, at workplace, etc. According to Perfetti, Landi and Oakhill (2005), the entire process of reading comprehension is divided by three main levels: Word, Sentence and Text. With these three levels, connecting with any reader's knowledge will then produce reading comprehension. They added that there are two main components of the processing events of reading comprehension which is (1) the recognition of words and (2) the arrangement of language mechanisms. With these two components and the three levels, it can be concluded that the completed process of reading comprehension was a complex structure that happened in the mind.

2.1.2 Writing

Writing on the other hand, can be said to have complex process as well. In the early theory of writing, Flowers and Hayes (1981), stated that the key model of writing is planning, translating, and reviewing. They also included cognitive process and long-term memory as the basic components when people write. Hence, it can be analysed here that it is important to acknowledge how reading and writing comprehension in an academic setting works as it could be understood that, that would be one of the underlying processes of encoding information in the present study.

2.1.3 Studies/Literature on Reading and Writing

Next, studies or literature on reading and writing will be discussed. This was to understand the mechanism, ways, strategies, and methods on how students in research field can comprehend when reading and/or writing. A study done to investigate the relationship of critical thinking and critical writing discourse on 1st year students in a Turkish university found that there is a positive relationship of advanced reading with critical thinking skills and critical writing skills (Ataç, 2015). This study supports the present study decision to have the participants to only dean list students (CGPA (Cumulative Grade Point Average) 3.50 - 4.00) as having the same academic performance level can be assumed for students to be having critical thinking and writing skills.

Another perspective of reading and writing can be understood by a book written by Duke and Pearson (2002) describing the effective practices for development of reading comprehension. Three of the many strategies of reading comprehension are (1) Prediction to read. This is to give before-hand preparation for students to use their knowledge to relate to the context that they will read. (2) Think-aloud, a way of students to verbalize what they are thinking. Think-aloud activity is a good strategy for reading as recent evidence suggested that students who

possess positive attitude towards think aloud, is more eager to use this strategy (Chin & Ghani, 2021). (3) Text structure, where students that are more well-informed about good text structure recalls more information those who are not. Thus, this studies/literature can be said to be important to the independent variable as the present study used all the strategy for the mental processes when reading and/or writing.

2.2 Memory Retrieval Performance

2.2.1 Working Memory

To justify working memory in the literature review, the researcher's intention to point out the connection of mechanism of working memory with encoding and retrieving because both variables go under the category of working memory which can be found in Baddeley's model of Working Memory. Baddeley's model of working memory dates back from 1974 where the representation of working memory is the 9 central executive system that consists of the two subcomponents: the visuo-spatial scratchpad and articulary loop (Baddeley, & Hitch, 1974). With the central executive system being as the core system that coordinates between the two subcomponents, one of the visuo-spatial scratchpad's function is to maintain and manipulate any kind of information in visuo-spatial images while the articulary loop that composed with 2 components are to process articulatory rehearsal information and phonological inputs (Baddeley & Hitch, 1974).

These two terms then later changed into Visuo-spatial sketchpad and Phonological loop where numerous studies done to understand them better (Baddeley, 1992). Specifically, the part of the Baddeley's model that connects with memory encoding and retrieval is focused on the phonological loop. The working memory researchers discovered that encoding, especially semantic encoding is a part of verbal short-term memory task that happens in the phonological loop (Campoy, Castellà, Provencio, Hitch, & Baddeley, 2015) and it is known that the