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Understanding *hifdh* and its effect on short-term memory recall performance: An experimental study on high school students in Saudi Arabia

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Abstract – Past literature suggests memorizing the Quran enhances one's learning and overall memory performance. This study investigates the effect of *hifdh* on high school students' short-term memory recall performance in Saudi Arabia. The research specifically aims to explore whether the ability to memorize Quran will affect the short-term memory of the individuals. One hundred high school students residing in Saudi Arabia, aged between 13-20 years, were divided into two groups of 50 students each. The first group consisted of *huffadh* students with 28 males and 21 females, while the non-*huffadh* group had 13 males and 36 females. All were given a word list recall task consisting of both English and Arabic word lists. They were asked to immediately recall words to the best they can at the end of every list. The analysis shows that the memory performance differed between the two groups. This finding suggests that *hifdh* has a significant effect on individuals' short-term memory performance.

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INTRODUCTION

The most complex structure discovered by man in the universe is found within himself; the brain. Every thought, feeling, emotion, action, and even experience first originate from the brain. 86 billion neurons are found within the brain that form millions of neural connections, all of which are used to carry out sensory, motor, and cognitive skills (BrainFacts.org, 2020). More and more of these connections are formed as we learn new information, form new memories, and gain new experiences (Cherry, 2020). One of the core cognitive processes carried out by the brain is memory. The study of human memory is among the major topics of interest extensively studied in cognitive psychology, a sub-discipline of psychology focusing on the scientific study of the mind.

Memory is understood as the faculty of the brain responsible for encoding, storing, and retrieving information and past experiences (Rodriguez, 2020). The brain has an incredible tendency to increase its cognitive abilities, including strengthening memory. Much like building muscular strength, the cognitive skills in the brain can be enhanced by engaging in intellectually challenging mental exercises. According to Smith, Segal, and Robinson (2020), the best brain-boosting exercises include those unfamiliar yet challenging that require mental effort, demanding full attention, and allowing one to build on their skills as they move a level further while maintaining their interest and keeping them engaged. One such activity that boosts brain health is memorization which mainly enhances memory-related brain functions.

There has been a rapid decline in the practice of memorization in schools in the past 50 years, giving preference to teaching "higher-cognitive skills" like critical thinking and problem-solving (Garlock, 2020). However, memorization has shown proven benefits, including strengthening the ability of learning and remembering new information, improving neurological flexibility of the brain, enhancing creativity and the ability to stay focused for longer durations, delaying cognitive decline in the elderly, and improving the performance of working memory (Garlock, 2020; Dajani, 2018).

It is said that an average human being can only memorize up to seven items from a list of 20 (Dajani, 2018). However, memorization of the Quran has revealed extraordinary abilities of the brain. It is suggested that the Quran enhances memory-related brain functions and mental well-being. Every day, thousands of Muslims worldwide, including children as young as seven, are committing up to 2 pages of the Quran in memory (Dajani, 2018). Quranic memorization is believed to enhance IQ levels and strengthen brain health (Dajani, 2018). Memorization of the Quran has also been linked to better mental health than those who have not memorized the Quran (Lakzaei et al., 2019). Ghiasi and Keramat (2018) concluded that only listening to the recitation of the Quran significantly reduced anxiety among individuals. Hojjati et al. (2014) investigated the effect of listening to the Quran on their participants by giving them memory tasks and found significant differences in the Quran group performance than that of the control group. This suggests that the Quran significantly improves performances on memory-based tasks. However, does memorization of the Quran have any effect specifically on the short-term memory of the *huffadh*?

Huffadh (sing. *Hafidh*) is an Arabic terminology derived from the root words *ha-fa-dha,* which literally means "to protect/ safeguard." It is generally used to refer to Muslims who devote most of their time memorizing the Quran to 'safeguard' it in their memories by paying close attention

to the words and their correct pronunciations. The Quran is divided into 30 parts, or *Ajzaa'* (sing. *Juzz'*). *Hifdh* is the strenuous activity of memorizing the Quran from cover to cover, including all 30 Ajzaa' of the Quran.

More research is needed to investigate whether memorization of the Quran directly influences an individual's short-term memory. Therefore, this research aims to investigate the effect of *hifdh*, especially on one's short-term memory recall performance.

The act of memorizing the Quran is like 'mental gymnastics' that nurtures brain health. It trains the brain to retain large chunks of information, builds its capacity to remain focused on monotonous tasks for more extended periods and expands the capacity of the brain to learn new information. It is believed that memorization of the Quran sharpens the brain with the skills necessary for learning and memory-based tasks. This was investigated by Nawaz and Jahangir (2015), who concluded that *hifdh* influences the academic achievement of the *huffadh* positively. The effect of *hifdh* was also proven among stroke patients with aphasia who showed a considerable improvement in language communication after memorizing the Quran (Ma'ruf, Hartanto, Suminah & Sulaeman, 2019). Memorizing the Quran has also been linked to improving cognitive intelligence among children (Slamet, 2019). A study was conducted to measure the effect of the Quran on short-term memory (STM), but this focused on participants listening to the recitation of the Quran and found significant improvement in their STM performance (Putra et al., 2018). Past literature shows a link between improvement in cognitive processes and memorization of the Quran. However, to date, no research has been conducted on high school students in Saudi Arabia on the effect of *hifdh* on memory. There is also a lack of empirical data on the memorizing the Qur'an effectiveness, specifically on the short-term memory of the individuals. Thus, this study focuses on measuring whether memorizing the Quran has any effect on the short-term memory performance of high school students in Saudi Arabia.

Previous research has focused mainly on the effect of *hifdh* on mental well-being or specific cognitive processes like communication skills, cognitive intelligence, and academic performance (Lakzaei et al., 2019; Ma'ruf et al., 2019; Al Hafiz et al., 2016). The research which measured short-term memory involved listening to the recitation of the Quran alone (Ahmad & Ahmed, 2017). This study is theoretically significant because it bridges the gap in the existing knowledge on the effect of *hifdh* on an individual's short-term memory. Additionally, this research will also provide a considerable contribution to the field of Islamic Cognitive Psychology by investigating the effectiveness of *hifdh* on an individual's memory performance.

The results from this study are of practical significance because they can give insight into what can be adopted by teachers in the education sector to enhance pupil's learning and memory task performances. Additionally, the *hifdh* method adopted by the *hifdh* teachers in Saudi Arabia can be re-visited and re-designed, weighing the effectiveness it has on influencing one's short-term memory. Therefore, this research aims to investigate the effect of *hifdh* on short-term memory recall performance. It is hypothesized that there will be a statistically significant difference between the short-term memory performance among high school students who are *huffadh* than those who are not.

RESEARCH METHOD

The purpose of this study is to explore a cause-and-effect relationship between two variables of interest. The research design adopted is an independent group experimental design. The independent variable is hifdh, while the dependent variable is the short-term memory recall. Hifdh is conceptualized as the act of paying attention to encode the Qur'anic text, storing it by maintaining the encoded information, and then retrieving it from memory (Nawaz & Jahangir, 2015). It is operationalized by dividing participants into two groups: the group who memorized the Quran *(huffadh)* and those who did not (non-*huffadh*). Short-Term Memory Recall is identified as the dependent variable in this study. It is conceptualized as the temporary recall of information being processed at any time (The Human Memory, 2019). This is operationalized based on the total number of words accurately recalled from each series of slides that displayed the English and Arabic words, respectively.

One hundred participants who were students of Year 8 to Year 12 were recruited using convenience sampling. Forty-one males and 59 females aged between 13 to 20 years (Mean= 16 years) participated in the experiment. 75% of the participants were residents of Jeddah, while the other 25% belonged from cities including Riyadh, Dammam, Makkah, and Khobar. The participants were divided into two groups of 50 students each; the first group (28 males and 21 females) consisted of students who memorized the Quran *(huffadh)*, while the other group (13 males and 36 females) consisted of students who did not memorize the Quran (non-*huffadh*). Both groups of students belonged from a similar socioeconomic background because all participants studied in schools with the same tuition fee range. All participants were well-versed in the English language and understood essential Arabic words. For verification purposes, the group of students who memorized the Quran must show their *Shahadah* (certificate of Hifdh Completion awarded to the *huffadh* in Saudi Arabia after their final assessment) to prove they have completed hifdh.

1. Due to pandemic COVID-19, an online experiment has been conducted. All experimental materials were distributed via Google Forms and included the following: Informed Consent: This form introduced the potential participants to the critical elements of the research study, clarifying what is expected of the participants during the task performance
2. Demographics Information: This section included questions on the participant's gender, age, whether they have memorized the Quran, their year of study, and their contact number.
3. Word List for Recall: two lists of 15 English and Arabic words in each were selected from high-frequency words used in everyday vocabulary so that the participants can read and understand the words off the screen. Each word list consisted of 15 words to suit the capacity of the short-term memory. Thus, being able to recall all words would be a rare circumstance. Selecting difficult words with ambiguous meanings was avoided in order to reduce the possibility of word knowledge bias. The Arabic letter words are included to have a fair comparison and eliminate differences in language familiarity. The word list was adapted from past literature, mainly from Khosravizadeh & Gerami's (2011) study, which studied word list recall among younger and older adults.

The students studying the same school board in the same school were approached, and a link to the Google Form was shared. This form included the informed consent and demographic information. The students who signed up were randomly selected; 50 of those who memorized the Quran and 50 did not memorize the Quran and were divided into two groups, in their respective *huffadh* and non-*huffadh*. Each participant was connected personally via WhatsApp. A day and time were allotted to each participant. Then, the online video call sessions were held individually with every participant. All sessions were recorded for reference purposes for later use. The participants were first briefed about the research objective, the word-recall experiment, and what they were expected to do in the task. Thereafter, the screen was shared, and a series of slides were displayed as a slideshow. The participants were requested to strictly observe the experiment's rules, including that the participants must have their video switched on throughout the experiment. They must ensure that there will be no distractions or disturbances for the next 10 minutes, they must not mute their microphones at any point during the experiment, the camera must be positioned at an angle where the researcher can have a full view of their hands to ensure complete honesty. Before the commencement of the experiment, a trial word list consisting of 5 English words was prepared for the participants to practice the task.

The word lists were prepared as a slideshow, with one word on each slide and a pause of 3 seconds on each word. Participants carefully paid attention to the words displaying on the screen. The last slide was a blank slide to mark the end of the word list. Soon after the blank slide, without any delay, a one-minute timer was set to begin immediately, and the participants were asked to recall words from the slides. This "immediate recall" after the slideshow eliminated the possibility of interference of any active mental processes like a rehearsal to retain the words in memory. Once the trial was over, the first-word list consisting of 15 English words began as a slideshow, following the same pattern as the trial-word list. Once this was completed, the second list of 15 English words was displayed, followed by the two Arabic-word lists with 15 words each, also following the same pattern. After completing the task, subjects were thanked for their participation, and the session was concluded. Once the session was over, by referring to the recorded session, the words were recalled by the participant for each word-list that was recorded in Excel.

RESULT

In the current study, the *huffadh* group consisted of 28 males and 22 females, where 84% of students had memorized all 30 Ajzaa' of the Quran. Only eight students memorized less than 30 Ajzaa'. In the non-*huffadh* group, there were 37 females and 13 males. The data from the experiment was recorded on an Excel Workbook. The percentage of the total number of words recalled was calculated. Data from Excel was then imported into IBM SPSS (Statistical Package for the Social Sciences) for analysis. If the alpha value obtained is $\alpha <= 0.05$, then the p-value was considered significant.

Measures of central tendency were computed to summarize the total score variable from the two groups. Measures of dispersion were computed to understand the variability of scores for the total percentage of word recall variable. The following table shows the results of the analysis:

Table 1 Descriptive Statistics for *Huffadh* and *Non-Huffadh*

Group	Number of participants	Mean	SD
Huffadh	50	65.67	8.49
Non-*Huffadh*	50	50.27	14.7

These results show that the mean value for the total correct recall is greater among the group of *huffadh* than that of the non-*huffadh*. Therefore, the students who had not memorized Quran averaged fewer recalls of the words than those who memorized the Quran. However, the significant standard deviation in the latter group shows that the values varied greatly.

To run the independent samples t-test, it is necessary to test the data for the assumption of normality; to confirm whether the data recorded is normally distributed within each of the two populations. The analysis shows that the overall word recall scores for the two groups were normally distributed, with skewness of 0.48 (SE= 0.34) and kurtosis of -0.44 (SE= 0.66) for non-*huffadh* group 1 and skewness of 0.53 (SE= 0.34) and kurtosis of 0.62 (SE= 0.66) for *huffadh* group. According to Corder and Foreman (2014), the z-score values for skewness and kurtosis must fall within the range of ± 1.96 to pass the normality assumption for $\alpha = 0.05$. Thus, the z-score values for both groups fall within the desired range.

The analysis using the Independent Samples t-test is conducted to determine whether this difference between the mean percentage of correctly recalled words by each group of participants is significant. The level of α was considered 0.05 in this study. A p-value of less than 0.05 indicated that the difference is significant enough to conclude that the short-term memory performance of the two groups of participants was different. The analysis indicated that scores were significantly higher for *huffadh* (M = 65,7, SD = 8,49) than for non-*huffadh* (M = 50,3, SD = 14,7), t (79) = 6,42, p < 0,001, d = 1,28 (see Table 2). The effect size for this analysis (d = 1,28) was found to exceed Cohen's (1988) convention for a large effect (d = 0,80) (see Table 3). These results indicate that students who had memorized the Quran recalled a significantly higher number of words than the students who did not memorize the Quran

Table 2 Inferential Statistics: Independent Samples t-test

F	p-value	t	df	Mean different	SE
14,98	<0,01	-6.428	78.5	-15.4%	2.40%

Table 3 Independent Samples Effect Size using Cohen's d

Standardizer	Point Estimate
11.9792%	-1.286

DISCUSSION

This study aimed to investigate whether the ability to memorize the Quran *(hifdh)* affects the short-term memory performance of high school students in Saudi Arabia. This was determined by analyzing the number of correctly recalled words from word recall lists by participants who were *huffadh* and those who were not. The analysis shows that the short-term memory recall performance of the *huffadh* was significantly better than the performance of the non-*huffadh*. The findings from the current study are consistent with Slamet's (2019) findings, who conducted a

study on kindergarten students to investigate whether *hifdh* influenced the cognitive performance of the individuals. A pre and post-test measuring their cognitive performance was conducted before and after the children memorized portions from the Quran. The results obtained indicated a 15.63% increase in the mean test scores after the students memorized the Quran. Thus, the Quran memorization influenced the students' cognitive intelligence (Slamet, 2019). In the study by Slamet (2019), however, it must be noted that an increase in the test scores was found only after having memorized eight verses from the Quran, whereas the current study focused on *huffadh,* who had memorized more than half of the Quran. Moreover, in a study conducted by Nawaz and Jahangir (2015), where students' academic achievement was compared before and after doing *hifdh*, it was found that academic achievement significantly improved after students memorized the entire Quran.

The findings from the current study can be taken to support further the benefits of memorizing the Quran. Practicing *hifdh* involves several cognitive and memory-enhancing techniques. A hafidh is memorizing the Quran words and the sequential order of the verses, chapters and remembering the placement of the words on the pages (Saleem, 2015). Most of the memorizers of the Quran, especially the non-Arabic speakers, heavily rely upon repetition and rehearsal for *hifdh* (Saleem, 2015; Dzulkifli et al., 2016). This practice of regular rehearsing may have led to an improved short-term memory performance among the *huffadh*. This is also supported by past studies that repeated rehearsing increases memory performances, including increasing the duration of short-term memory and the consolidation of long-term memory (Parle, Singh, and Vasudevan, 2006; Loom et al., 2008; Cherry, 2020; Nader et al. as cited in Saleem, 2015).

However, this is not the only memory-enhancing practice involved in *hifdh*. Saleem (2015) mentions the mental exercises involved in the Quran memorization by conceptualizing. A hafidh attempts to remember a text from the Quran by holding onto several 'tentacles' using semantics, focusing on the meaning of episodic memory, remembering location, time, and people they learn with, short-term memory, engaging in repetitive rehearsal, sensory memory, paying attention to auditory and visuals, and using associative memory that includes images and mnemonics. This extensive practice of the *huffadh* involved in memorizing the Quran can explain the improved short-term memory recall performance observed in this study. Moreover, just as information cannot be processed to the short-term memory until it passes through the sensory memory, similarly, it cannot be retained in long-term memory until it passes through the short-term memory (McGill, n.d.). Since *huffadh* retains the Quran from cover to cover in their long-term memory, it is inevitably required for them to rigorously exercise their short-term memory to allow for the information to enter their long-term memory. Thus, explaining the difference between the short-term memory performances between the *huffadh* and the non-*huffadh*.

Saleem (2015) highlighted an interesting point in his study on *hifdh* and memory reveals that *huffadh* can also recall the position of a word in the exact chapter and page it is located in from the Quran. This extraordinary ability to remember chapters in a sequence and locate words from the Quran from its exact position is not attributed by the *huffadh* to their efforts alone. They possess a spiritual belief that this ability to complete *hifdh* is a 'gift from God' and 'God opens their chests' to facilitate memorization for them, and that this cannot be achieved except by 'help from God'. Allah says in the Quran, "And We have certainly made the Qur'an easy for

remembrance, so is there any who will remember?" [54:17]. This is from the core beliefs of a Muslim that Quran is the word of the Almighty, and its miraculous nature is evident in the fact that this is the only book on Earth memorized cover to cover by Muslims of all ages- regardless of their races and linguistic backgrounds. It is memorized by native Arabic speakers, non-Arabic speakers, by the seeing, and even by the blind (Saleem, 2015).

This study was the first of its kind to be conducted on high school students in Saudi Arabia. The investigation looked into studying the effects of *hifdh* on memory. Thus, each participant experimented individually, eliminating several moderating variables that otherwise would have influenced the scores recorded. However, there were several limitations to this study. Primarily, due to the COVID-19 pandemic, the experiments were conducted online.

Consequently, it was unattainable to guarantee uniform conditions for all participants during the experiment. Schools and religious institutes were all closed due to the pandemic, consequently narrowing down the reach of potential participants for the study. Therefore, convenience sampling was employed to recruit participants who may have produced fewer representative results. Because the reach for potential participants was very limited, the criteria were revised to include students who memorized even 15 Ajzaa' from the Quran to participate in this study. Additionally, only one recall task measured the participants' short-term memory performance, which may not have produced highly accurate results. Using an independent-group design for the experiment to compare short-term memory performances may not have necessarily eliminated the differences in scores resulting from individual differences.

Considering the limitations of this study, future researchers may conduct experiments in-person to minimize moderating variables. Moreover, this study only consisted of students residing in Saudi Arabia with an unequal number of males and females in each group, limiting the results' generalizability. Future studies may focus on populations from diverse backgrounds reducing gender differences. Additionally, including more than one task measuring short-term memory performance may give more representative short-term memory performance scores. To minimize individual differences and increase validity, the design of the experiment may be revised to adopt a longitudinal study and a within-subject design to record STM performance scores before and after completing *hifdh*.

CONCLUSION

In summary, this research aimed to investigate the influence of memorization of the Quran on short-term memory recall of individuals through a word-recall task performance. The results indicated that those who memorized the Quran scored significantly higher in the word-recall task than those who did not memorize the Quran. This suggests a significant difference in the short-term memory recall performance of the *huffadh* when compared with the non-*huffadh*. It was concluded that *hifdh* has a significant and positive influence on the short-term memory performance of individuals. The study provides a significant insight into the long-term influence of *hifdh* on the memory performance of high school students. The results indicate that the memorization techniques adopted by *huffadh* teachers in Saudi Arabia are efficient and effective in enhancing the short-term memory of the *huffadh*. Muslim communities should encourage memorizing the Quran from a young age to strengthen memory and enhance cognitive-based skills among young adults.

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