The Impact of the Rereading Method on Reading Speed and Comprehension of Normal and Scrambled Texts among Arabic EFL Learners

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Received: July 16, 2024 Accepted: October 29, 2024 Online Published: January 13, 2025

doi:10.5430/wjel.v15n3p148 URL: https://doi.org/10.5430/wjel.v15n3p148

Abstract

The rereading method benefits automatic word recognition, which impacts the development of L2 learners' reading speed and text comprehension. This study aimed to compare the effect of the rereading method on reading speed and reading comprehension of normal and scrambled texts in Arabic EFL learners. It was developed through quantitative research of analytical design to analyze the behavior of reading speed and text comprehension. The study focused on 50 Arab first-year EFL learners, divided into two groups, low and high level, according to their reading ability. They were given to read scrambled (S) and normal (N) passages with the conditions NN, SS, SN, and NS. The results show that when students are confronted with reading of the second passage preceded by normal texts, they read faster, presenting the same behavior for the general sample as for the low- and high-level groups. On the other hand, the rereading method favors reading speed when the second passage is scrambled. High-level students were shown to read faster, regardless of the condition of the passage. Regarding text comprehension, when the second passages are scrambled (SS, NS), students present better text comprehension. These results suggest that despite the difficulty of the text, a transfer from the first passage to the second readings may occur. The results indicate that the rereading method improves text comprehension and reading speed.

Keywords: Automatic word recognition, reading scrambled, rereading method, reading comprehension, reading speed, Arabic EFL learners

1. Introduction

1.1 Reading in a Foreign Language

Reading in a foreign language is considered fundamental to successful second language (L2) learning. However, various studies have shown that Arabic EFL learners confront several difficulties when reading in English, such as problems in decoding and textual encoding of English vowels and difficulties with word recognition (Alhazmi, Milton & Johnston, 2019; Endley, 2016; Hayes-Harb, 2006; Masrai & Milton, 2018; Ryan & Meara, 1991). These L2 reading difficulties may occur mainly due to the particularities specific to the Arabic language and the negative transfer of first language (L1) reading strategies that Arabic speakers employ when reading an English text (Almoabdi, 2023; Masrai, 2021).

Several researchers have discussed the definition of "vowel blindness" (Alhazmi et al., 2019; Almoabdi, 2023; Masrai, 2021; Ryan & Meara, 1991) to explain the reasons for reading difficulty in Arabic EFL learners. This difficulty refers to the tendency of readers to give more attention to consonants than vowels when reading. According to Khan (2013), vowel blindness has been observed in Arab EFL learners, who tend to overlook short vowels when reading English texts due to transferring their reading skills from their L1. The reason behind this is the fact that words are formed differently from English words; in Arabic, all words are derived from a root composed of three consonants and to the reading strategies used by Arabic speakers, which are then transferred to English (Endley, 2018; Hayes-Harb, 2006; Masrai & Milton, 2018). In contrast, Alhazmi et al. (2019) argue that there is no such vowel blindness; therefore, the reading problems of Arabic EFL learners are because they observe letters more sequentially, which explains why they require more time to process words and read them aloud.

Furthermore, researchers like Grabe (1991) and Klauda and Guthrie (2008) state that slow word recognition hinders this integration process, which not only slows down reading speed but also hinders reading comprehension, a common problem in second language (L2) learners. In addition, EFL learners' ability to read texts with fluency and precision requires a lot of practice and perseverance, i.e., they must perform the reading activity over and over again (Muzammil & Andy, 2018). Generally, reading speed decreases when reading a text repeatedly.

The benefits of the rereading method affect reading speed and reading comprehension of a text in intermediate and advanced L2 learners (Collins & Levy, 2007; Faulkner & Levy, 1999; Gorsuch & Taguchi, 2008; Taguchi, Gorsuch & Mitani, 2023; Thomas & Healy, 2012). In this respect, Thomas and Healy (2012) suggest that the advantage of the rereading method is considered an over-understanding indicator of the reader's memory of the text. With the help of this memory, the reader can transfer what was learned during the first reading of a text to subsequent readings, which allows for faster reading. The rereading method shows the importance of improving automatic word

recognition for successful text comprehension by L2 learners (Chang & Millet, 2013; Han & Chen, 2010). For Thomas and Healy (2012), rereading provides the opportunity to compare the type of transfer and underlying memory in the text of L1 and L2 readers.

Moreover, automatic word recognition and precision significantly affect both reading comprehension and reading speed (Han & Chen, 2010), not only in the first language (L1) but also in a foreign language (L2) (Fender, 2008; Koda, 2005). Friesen and Jared (2007) suggest that the rereading method could be an excellent way to study reading in L2 because the results of their study seem to be consistent with those conducted for L1. Their analysis showed that less proficient L2 readers, like equally proficient L1 readers, encountered word-level transfer due to recognition problems.

The rereading method provides similar benefits when the learner reads passages with scrambled as well as normal words (Carr & Brown, 1990). On the other hand, Collins and Levy (2007) argue that there is no difference in reading comprehension when the rereading method is applied to both scrambled and normal word passages. In this sense, studies with scrambled texts in both L1 and L2 can show what learners transfer during rereading and whether the transfer occurs at the text level or the word level. Proficient readers are often better at automatic word recognition and depend on text-level transfer rather than word-level transfer (Kuperman & Van Dyke, 2011). Therefore, proficient readers can comprehend not only letters or words but the whole context of the text and do not have problems when the text is scrambled (Tsuji, 2021).

1.2 Problem Statement

This research uses the rereading method to test how successful, relative to their language level, EFL learners use their memory when reading scrambled and normal word-level texts for the second time. Unlike some previous studies (Faulkner & Levy, 1999; Thomas & Healy, 2012) that used scrambled texts at the word, sentence, or paragraph level, this study uses a new way of scrambling texts: software keeps the first and last consonants intact and scrambles all vowels and middle consonants. This method keeps the text context unchanged, helping in studying the word identification process among both L1 and L2 readers, and serves as a tool to distinguish poor from good readers.

Based on the above the goal of this study focuses on answering the following question:

- Are there differences in reading speed and reading comprehension of normal and scrambled texts in Arabic EFL learners?

The general objective of this study was to compare the effect of the rereading method on reading speed and reading comprehension of normal and scrambled texts in Arab EFL learners.

2. Literature Review

2.1 Rereading Method

In the rereading or repeated reading method, the same text is read repeatedly until the student reads it fluently and without errors. Repeated reading was initially designed by Samuels (1979) to help students with reading difficulties improve their reading fluency until teachers realized that most students could benefit from this method, which can be applied orally, silently, or with or without modeling (Anderson, 2009; Samuels, 1979). This method is based on LaBerge's (1974) principle of automatic information processing, according to which a fluent reader automatically decodes texts. If too much effort is spent on decoding the meaning of words, little is left to construct the meaning of words (Chang & Millet, 2013). The benefits of rereading go beyond reading fluency, word recognition, increased reading speed, and reading accuracy, leading to better reading comprehension (Han & Chen, 2010; Rich, 2019). Moreover, the rereading method can help overcome inability to decode words and language transfer (Chang & Millet, 2013; Han & Chen, 2010).

For learners to develop automatic word recognition, they need frequent exposure to words and word (Rasinski et al., 2016). Repeated exposure to words and word patterns allows learners to store information in their memory for use in other texts. According to Grabe (2010), creating fluent readers requires a lot of practice with words and word patterns. In that sense, the rereading method focuses directly on improving decoding fluency and reading comprehension (Hegazy & Abdel Latif, 2014; Kostewicz, Kubina, Selfridge & Gallagher, 2016; Swain, Leader-Janssen, & Conley, 2013). The rereading method is an effective intervention for reading fluency instructions.

2.2 Rereading Method in an L1 Context

The L1 rereading method has been the subject of numerous studies and has demonstrated the effectiveness of rereading in developing and increasing reading fluency and reading comprehension (Carr & Brown, 1990; Chan, 2018; Han & Chen, 2010; Kuhn & Stahl, 2003; Lin, Chen, & Chang, 2015; Moyer, 1982; Therrien, 2004). In addition, several researchers have provided empirical evidence suggesting that the rereading method offers benefits: fluency, comprehension, practice transfer effects, automatic word recognition, as well as improving reading self-esteem, sentence segmentation, and prosodic features (Chan, 2018; Cohen, 2011; Grabe, 1991, 2010; Kuhn & Stahl, 2003). Rereading increases students' confidence and motivates them to invest more time and effort in achieving the ability to read fluently (Chan, 2018; Dowhower, 1994; Gorsuch & Taguchi, 2008; Ros-Morente et al., 2022).

The effects of the rereading method are transferred to new and unused passages in terms of reading speed and comprehension (Dowhower, 1994; Han & Chen, 2010; Samuels, 1979). Furthermore, research has provided evidence for the existence of a causal relationship between improved reading fluency and reading comprehension and indicates that readers trained at an automatic word recognition level may pay more attention to complex reading comprehension processes (Gorsuch & Taguchi, 2008; Tagutchi, Takayasu-Maass, & Snipp, 2012; Taguchi et al., 2023).

Research developed on the L1 rereading method indicates that proficient L1 readers tend to show automatic word recognition, which

allows them to create well-defined situational models (Thomas & Healy, 2012); this is because individual words are contextualized, so there is transfer at the text level, but no transfer at the word level. In contrast, Thomas and Healy (2012) note that less proficient readers have difficulty finding words when reading complex texts, and this slow word recognition can lead to word-level transfer, which may or may not hinder text-level transfer.

2.3 Rereading Method in an L2 Context

Studies on the use of the rereading method in L2 learners have received little attention (Grabe, 1991; Taguchi, Gorsuch, & Sasamoto, 2006; Taguchi et al., 2023). Cohen (2011) points out that while the rereading method in L2 classrooms has been slowly gaining popularity, its benefits have been largely overlooked, with few papers on the topic.

Earlier studies, like Taguchi and Gorsuch (2002), investigating transfer effects among EFL students, found that while rereading helped increase speed, it did not lead to greater comprehension, and the effects of transfer in repeated reading were unclear. Similarly, Taguchi, Takayasu-Maass, and Gorsuch (2004) show that repeated reading may increase reading fluency in terms of speed and word recognition among second-language learners, it did not significantly improve comprehension. Moreover, the study shows that over time, participants were able to transfer their learning gains onto new, unpractised text, as well.

On the other hand, a consequent study by Taguchi and Gorsuch (2008) reports that the rereading method is beneficial for reading fluency in terms of speed and comprehension. Unlike previous studies, the experimental group participants showed better comprehension this time. Part of this was attributed to the participants developing metacognitive strategies, such as adjusting reading speed for better understanding or focusing on key details. In their qualitative study, Taguchi et al. (2012) also point out that rereading positively affects comprehension in L2 settings, allowing the participant to move from basic decoding to higher-order comprehension, capturing more complex ideas and understanding the connection within the text.

Thomas and Healy's (2012) study examined rereading's role in both L1 and L2 contexts, finding that text difficulty and reader proficiency significantly affect rereading's benefits. Their results suggest that for proficient L2 readers, rereading could facilitate adjustments in reading speed based on material complexity. However, rereading tended to support only word-level rather than text-level processing with more challenging texts, limiting deeper comprehension gains. They also add that just as fluent L1 readers adjust their reading speed according to the difficulty of the material and the purpose of reading, so can L2 readers.

A more recent study by Maluch and Sachse (2020) also shows that while rereading improves reading speed among L2 students, this does not necessarily enhance reading efficiency, understood as the balance between reading speed and comprehension. This is especially noticeable among learners with lower proficiency. Another study by Do Amaral and Tomich (2022) indicates that only rereading improves comprehension in the short term, while other strategies like highlighting and note-taking have a more long-term effect on retention and understanding. According to their view, rereading does serve a purpose in comprehension for L2 students, but this method is limited.

Some researchers have explored multimodal approaches to enhance rereading's impact. Amin (2022), for instance, investigated combining Text-to-Speech (TTS) applications with rereading for EFL learners, which showed improved reading fluency and comprehension by providing repeated auditory input. This approach aligns with findings by Kim and Shin (2019), who suggest that auditory perceptual simulation can assist learners in processing complex syntactic structures, thereby supporting fluency gains in L2 contexts.

3. Research Questions

An exhaustive literature review has demonstrated the importance of investigating the rereading method on reading speed and reading comprehension of normal and scrambled texts in Arab EFL learners. Consequently, to achieve the research objective, to compare the effect of the rereading method on reading speed and reading comprehension of normal and scrambled texts in Arab EFL learners, we pretended to provide answers to the following questions:

1. Are there statistically significant differences in the reading speed of normal and scrambled texts in Arab EFL learners?
2. Are there statistically significant differences in reading comprehension of normal and scrambled texts in Arab EFL learners?
3. Are there statistically significant differences in the reading speed of low and high-level Arab EFL learners?
4. Are there statistically significant differences in reading comprehension of low and high-level Arab EFL learners?

4. Method

4.1 Research Design

The research was developed using the quantitative research method, employing an analytical design. Its aim was to compare reading speed and comprehension of normal and scrambled texts in Arab EFL learners by employing the rereading method in normal and scrambled texts.

4.2 Participants

The study was conducted with 50 native Arabic-speaking students, all males, aged between 18 and 22 years, enrolled in 2022 at a university in Saudi Arabia. They were randomly selected from students in two first-year EFL courses with varying language proficiency. The Arab EFL students were divided into two groups based on their reading ability. The groups were determined based on their Standardized Test of English Proficiency (STEP) reading section scores. Students scoring 30 and above correct answers, out of 40

questions, were placed in the high-level group, and those with lower scores in the low-level group. This categorization resulted in 27 high-level students and 23 low-level students.

The sample size of 50 participants was determined based on Cohen's guidelines (1988) for detecting medium to large effect sizes in repeated measures designs. According to Cohen (1988), a sample size of 30 to 50 participants is often adequate to achieve a statistical power of 0.80 when expecting medium to large effects (Cohen's d = 0.5 to 0.8) at a significance level of 0.05. Prior research in similar educational settings has typically reported medium to large effect sizes for interventions aimed at enhancing EFL learning outcomes. For instance, Cheung and Slavin (2016) in their meta-analysis found that smaller studies, those with fewer than 100 participants, had an average effect size of +0.38, indicating that such sample sizes can effectively detect significant effects. Furthermore, Kraft (2020) emphasizes that smaller, well-controlled studies often achieve medium to large effect sizes, supporting the adequacy of our sample size in capturing meaningful educational outcomes. Therefore, the chosen sample size is sufficient to detect statistically significant differences and ensures robust and reliable results. Practical considerations, such as the availability of participants and resources, also informed the sample size decision, ensuring feasibility while maintaining methodological rigor. Future studies with larger samples could further validate these findings and enhance generalizability.

4.2 Data Collection

The primary instrument for data collection was the passages from the students' reading skills book, scrambled of each word using a designated website suitable for this kind of educational research (leaving the positions of the first and last consonants unchanged) (https://www.togglecase.com/). This scrambling transformed the texts into a format appropriate for a short test to assess reading comprehension and speed. Comprehension was evaluated using standardized multiple-choice questions addressing each passage's key aspects, such as main ideas and details. Responses were scored on a scale from 1 to 5 to measure comprehension levels. Additionally, reading speed was measured with a digital stopwatch; participants began reading upon command, and the duration taken to complete each passage was recorded using their cell phones' stopwatches.

4.3 Procedure

At the beginning of each class, without prior knowledge or preparation, students were presented with passages from their reading comprehension book that they had not seen before. These passages included strategically created gaps where specific keywords had been removed and selected based on their importance to the passage's overall comprehension and thematic significance. The passages were presented in four configurations: normal + normal (NN), normal + scrambled (NS), scrambled + normal (SN), and scrambled + scrambled (SS). This variety was designed to assess adaptability and comprehension under different cognitive loads.

Students were informed that these tasks were part of their assessments, contributing to their final grades as pop quizzes. They were instructed to read each passage at their natural reading pace, using their cell phones to time the reading from start to finish. This timing process was standardized across the group by a synchronized start signal from the researcher, who also ensured that all students began and ended timing simultaneously.

The introduction of scrambled passages was intended to evaluate their ability to process text under unexpected conditions, simulating real-world scenarios where textual information may not always be presented cleanly. Their reactions—surprise and perplexity—were noted as part of the observational data to assess emotional and cognitive responses to scrambled texts.

The sequence of the six passages alternated between scrambled and normal texts:

- Three passages were initially presented in scrambled form, followed by their normal versions.
- Three passages were given in the normal form, followed by their scrambled counterparts.

This structure was chosen to measure the impact of initial exposure type on subsequent reading performance and comprehension. Each session was spaced with a five-minute interval to reset attention and minimize fatigue effects.

4.4 Data Analysis

The statistical analysis aimed to evaluate the effects of the rereading method on reading speed and comprehension under different text conditions (NN, NS, SN, SS). Reading speed was operationalized as the time each participant took to read each passage, measured in seconds using digital stopwatches. Reading comprehension was assessed through scores from standardized multiple-choice questions, with responses scored on a scale of 1 to 5. Descriptive statistics calculated mean and standard deviations for both variables across all conditions and groups. Repeated measures ANOVA was utilized to analyze within-subject effects across conditions, with Bonferroni's multiple comparisons test applied for post-hoc analysis. Independent samples t-tests were conducted to compare the performance between low and high-proficiency groups. A significance level of 5% was established to identify statistically significant differences.

5. Method

5.1 Reading Time between the Four Conditions

5.1.1 Overall Sample Results

The analysis of the time it took students to read second passages in the NN, NS, SN, and SS conditions was performed. Table 1 shows the descriptive statistics (mean and standard deviation) of the reading times in these four conditions. It is observed that passages in the NN

condition (M = 1.17, SD = 0.49) were read faster. For the other three conditions involving scrambled texts, it is evident that the passages were read more slowly, with the passages in the SN condition (M = 2.00, SD = 0.71) having the slowest reading time, followed in increasing order of speed by SS (M = 1.64, SD = 0.714), and the NS condition (M = 1.45, SD = 0.62) having the fastest reading time among the conditions involving scrambled texts. This could indicate that when involving passages with scrambled textsthere is a difficulty in reading speed.

Table 1. Means and standard deviations of reading times in the four conditions

Condition	Mean	Std. Deviation
NN	1.17	0.49
SS	1.64	0.74
SN	2.00	0.71
NS	1.45	0.62

A repeated measures ANOVA was used to compare the means of the reading times of the four conditions. As shown in Table 2, statistically significant differences are observed in the means of the reading times of the four conditions, $F(3, 90) = 21.39$, $p < 0.05$ (the assumption of sphericity was met). Therefore, the reading time is affected by the passage condition.

Table 2. Repeated-measures analysis of variance (ANOVA) results comparing overall sample differences

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
condition	Sphericity Assumed	11.25	3.00	3.75	21.39	0.00*	0.42
	Greenhouse-Geisser	11.25	2.82	3.99	21.39	0.00*	0.42
	Huynh-Feldt	11.25	3.00	3.75	21.39	0.00*	0.42
	Lower-bound	11.25	1.00	11.25	21.39	0.00*	0.42
Error(condition)	Sphericity Assumed	15.77	90.00	0.18			
	Greenhouse-Geisser	15.77	84.63	0.19			
	Huynh-Feldt	15.77	90.00	0.18			
	Lower-bound	15.77	30.00	0.53			
Note. * The mean difference is significant at the .05 level							

However, a post hoc pairwise comparison with Bonferroni correction was used to find out between which pairs of conditions these differences in means exist. Table 3 shows that there are no statistically significant differences in reading time between the NN-NS conditions as well as between SS-NS with $p > 0.05$. On the contrary, there are statistically significant differences in the reading time between the conditions: NN-SS, NN-SN, SS-SN, and SN-NS, reporting a $p < 0.05$. Where the reading time for the NN condition (M = 1.17, SD = 0.49) is lower than that of the SS condition (M = 1.64, SD = 0.714) and the reading time of the SN condition (M = 2.00, SD = 0.71), therefore students read more quickly the passages in the NN condition, than those passages where in the first reading they are presented with jumbled texts. Likewise, the results for reading time in the SS condition (M = 1.64, SD = 0.714) were lower than SN (M = 2.00, SD = 0.71). However, the reading time results for the SN condition (M = 2.00, SD = 0.71) were higher than those for the NS condition (M = 1.45, SD = 0.62).

Table 3. Pairwise Comparisons (Bonferroni) results

Condition		Mean Difference	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
NN	SS	-0.468*	0.112	0.001	-0.783	-0.152
	SN	-0.828*	0.092	0.000	-1.086	-0.569
	NS	-0.275	0.106	0.087	-0.575	0.024
SS	NN	0.468*	0.112	0.001	0.152	0.783
	SN	-0.360*	0.106	0.011	-0.658	-0.062
	NS	0.192	0.121	0.744	-0.151	0.535
SN	NN	0.828*	0.092	0.000	0.569	1.086
	SS	0.360*	0.106	0.011	0.062	0.658
	NS	0.552*	0.099	0.000	0.273	0.832
NS	NN	0.275	0.106	0.087	-0.024	0.575
	SS	-0.192	0.121	0.744	-0.535	0.151
	SN	-0.552*	0.099	0.000	-0.832	-0.273
Note. * The mean difference is significant at the .05 level. b. Adjustment for multiple comparisons: Bonferroni.						

5.1.2 The Results of the Groups

The descriptive statistics of the reading times spent by low and high-level Arab EFL learners in reading second passages in the NN, NS, SN, and SS conditions are shown in Table 4, where it is observed, for all conditions, that high-level learners read passages faster than low-level learners. The mean reading times of the second passages in each condition, in both groups (by the overall scores of the sample), from the shortest to the longest, were: NN, NS, SS, and SN.

Table 4. Means and standard deviations of reading times between the groups in the four conditions

Condition	Level Group	Mean	Std. Deviation
NN	Low	1.46	0.38
	High	1.03	0.48
SS	Low	1.97	0.80
	High	1.48	0.67
SN	Low	2.30	0.57
	High	1.86	0.73
NS	Low	1.69	0.53
	High	1.33	0.63

An independent samples t-test was used to compare the means of the reading times of the groups of students. Levene's test results show that the condition of homogeneity of variances is assumed ($p > 0.05$). Even though high-level students present lower times in all conditions, Table 5 shows that there were no statistically significant differences in reading times between the two groups of students in any of the four conditions [NN, $t(43) = 1.811$, $p > 0.05$; SS , $t(38) = 1.350$, $p > 0.05$; SN $t(40) = 0.576$, $p > 0.05$ and NS, $t(48) = 0.963$, $p > 0.05$].

Table 5. T – test results comparing differences in reading times between low-level and high-level groups

Condition		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
NN	Equal variances assumed	1.896	0.176	1.811	43	0.077	0.23	0.13	-0.03	0.49
	Equal variances not assumed			1.836	42.798	0.073	0.23	0.13	-0.02	0.49
SS	Equal variances assumed	0.558	0.460	1.350	38	0.185	0.32	0.23	-0.16	0.79
	Equal variances not assumed			1.300	24.054	0.206	0.32	0.24	-0.18	0.82
SN	Equal variances assumed	1.797	0.188	0.576	40	0.568	0.12	0.20	-0.29	0.53
	Equal variances not assumed			0.592	39.562	0.557	0.12	0.20	-0.28	0.52
NS	Equal variances assumed	0.265	0.609	0.963	48	0.340	0.15	0.16	-0.16	0.47
	Equal variances not assumed			0.983	47.624	0.331	0.15	0.15	-0.16	0.46

5.2 Reading Time between the Four Conditions

5.2.1 The Overall Results of the Sample

A descriptive analysis of the behavior of the text comprehension scores for the four conditions: NN, NS, SN and SS is shown in Table 6 with the results of the mean scores of text comprehension, where it is observed that the students reading the passages with the SS condition ($M = 4.23$, $SD = 0.72$) reported the highest level of comprehension (highest mean number of questions answered correctly). The somewhat lower level was recorded in the SN condition ($M = 3.94$, $SD = 1.06$). Equal mean levels of comprehension were observed in the NN and NS conditions ($M = 3.87$, $SD = 1.06$; $M = 3.87$, $SD = 1.54$), with the lowest score. Therefore, the results do not match the expected patterns. Despite this, it should be noted that the participants showed comprehension levels in all four conditions above the mean of 3, by noting that the lowest mean is NN, $M = 3.8$ above 3.

Table 6. Means and standard deviations of the quiz scores in the four conditions

Condition	Mean	Std. Deviation
NN	3.87	1.06
SS	4.23	0.72
SN	3.94	1.06
NS	3.87	1.54

The measures of text comprehension scores for the four conditions are different, inferential statistics were used to compare the conditions statistically. A repeated measures ANOVA was applied to test whether there were statistically significant differences between the means of the text comprehension scores of the four conditions. It can be seen from Table 7 that no statistically significant differences were evident between the means of the text comprehension scores of the four conditions, $F(3,90) = 0.870$, $p > 0.05$. Therefore, it can be inferred that the Arab EFL learners, regardless of the condition, extracted meaning from the passages.

Table 7. Repeated-measures analysis of variance (ANOVA) results comparing overall sample differences

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
score	Sphericity Assumed	2.669	3	0.890	0.870	0.460	0.028
	Greenhouse-Geisser	2.669	2.426	1.100	0.870	0.441	0.028
	Huynh-Feldt	2.669	2.655	1.006	0.870	0.449	0.028
	Lower-bound	2.669	1.000	2.669	0.870	0.358	0.028
Error(score)	Sphericity Assumed	92.081	90	1.023			
	Greenhouse-Geisser	92.081	72.776	1.265			
	Huynh-Feldt	92.081	79.641	1.156			
	Lower-bound	92.081	30.000	3.069			

5.2.2 The Results of the Groups

The descriptive statistics, which include the mean and standard deviation of the text comprehension scores of the low- and high-level Arab EFL learners' text comprehension in the NN, NS, SN, and SS conditions, are set out in Table 8. The results demonstrate the expected difference between the groups, as the high-level group obtained higher scores and thus demonstrated better text comprehension in all four conditions. However, the SS condition in both groups inexplicably shows the best text comprehension, where the low-level group scored (M = 4.21, SD = 0.80) lower than the high-level group (M = 4.42, SD = 0.64). On the other hand, the behavior of text compression scores for both groups, in the NN, SN and NS conditions were (from highest to lowest): for the low-level group NS, NN, and SN; and for the high-level group SN, NS and NN. For the high-level group of students, reading comprehension presents better scores when they read passages involving scrambled texts.

Table 8. Mean values of the quiz scores between the groups in the four conditions

Condition	Level Group	Mean	Std. Deviation
NN	Low	3.45	1.26
	High	3.96	1.00
SS	Low	4.21	0.80
	High	4.42	0.64
SN	Low	3.35	1.37
	High	4.26	1.26
NS	Low	3.61	1.24
	High	4.21	0.78

To compare these differences between the means of the student groups for each condition, the independent samples t-test was used. Table 9 shows that the only condition where there is a statistically significant difference is NS, $t(48) = -2.45$, $p < 0.05$, indicating a significantly better reading comprehension for the high-level group (M = 4.21, SD = 0.78), with respect to the low-level group that presented a reading comprehension level (M = 3.61, SD = 1.24). The NN, SS and SN conditions did not show marked differences as they did not present statistical significance ($p > 0.05$).

Table 9. *t – test* results comparing differences in comprehension scores between low-level and high-level groups

Condition		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
NN	Equal variances assumed	3.783	0.058	-1.507	44	2.139	-0.50	0.33	-1.18	0.17
	Equal variances not assumed			-1.492	40.002	2.144	-0.50	0.34	-1.19	0.18
SS	Equal variances assumed	.871	0.357	-2.898	38	2.375	-0.21	0.23	-0.68	0.26
	Equal variances not assumed			-2.840	22.188	2.410	-0.21	0.25	-0.72	0.31
SN	Equal variances assumed	6.622	0.014	-1.910	40	0.063	-0.60	0.31	-1.23	0.03
	Equal variances not assumed			-1.791	26.770	0.085	-0.60	0.33	-1.28	0.09
NS	Equal variances assumed	.656	0.422	-2.452	48	0.018*	-0.91	0.37	-1.66	-0.16
	Equal variances not assumed			-2.435	45.244	0.019	-0.91	0.37	-1.67	-0.16

Note. * The mean difference is significant at the .05 level.

6. Discussion

The primary aim of this study was to compare the effects of the rereading method on reading speed and comprehension of normal and scrambled texts among Arabic EFL learners. It was hypothesized that rereading would enhance both reading speed and comprehension, particularly for passages presented in the NN (normal-normal) condition. Additionally, it was anticipated that low-level Arab EFL learners would show more significant improvements in reading efficiency with the NN condition due to the benefits of repeated exposure to coherent text. To test these hypotheses, we conducted detailed analyses of reading speed and comprehension for the entire sample and for subgroups of low and high-level learners using a combination of descriptive statistics, repeated measures ANOVA, and post hoc pairwise comparisons.

6.1 Reading time among the four conditions

The analysis of the reading time for the second passages among the four conditions showed that students, on average, read faster when normal or scrambled second passages followed normal passages (NN and NS conditions). These results replicate previous research showing reading fluency when second passages were preceded by normal passages, suggesting the occurrence of a transfer from the first reading to these second readings (Faulkner & Levy, 1999; Levy et al., 1991; Thomas & Healy, 2012). This word-level transfer likely influences the decrease in reading times in the NS condition (Faulkner & Levy, 1999; Thomas & Healy, 2012).

Statistically significant differences were found among the four conditions (NN, SS, SN, NS) as determined by repeated measures ANOVA and Bonferroni post hoc tests. Specifically, Arab EFL learners read the second passages faster in the NN condition compared to the SS and SN conditions. Faster reading in the NN condition indicates the contextual specificity of the transfer of rereading the text, as suggested by Levy et al. (1991). Regarding the differences between the SS and SN conditions, students read the second passages faster in

the SS condition. Similarly, between the SN and NS conditions, students read the second passages faster in the NS condition. Therefore, it can be inferred that the rereading method benefits the reading time of the second passage when it is scrambled. These results are consistent with other research, which reports that reading speed generates a significant gap in reader performance when faced with scrambled text passages (Thomas & Healy, 2012). The rereading method positively affects reading speed (Gorsuch et al., 2015; Lynn, 2021; Taguchi et al., 2023). Caution should be exercised in attributing these results of rereading scrambled texts only to abstract word-level representations (Levy et al., 1991), so other factors that might influence reading speed should be considered.

Regarding the reading time of the passages by the Arab EFL students of low and high levels for the four conditions, the findings evidenced no statistically significant differences between the two groups regardless of the condition of the passage. However, the reading times of the high-level group of students exceeded those of the low-level group in all four conditions. Additionally, reading speed was slower for both groups when the second normal or scrambled passages followed the scrambled passages, consistent with previous research (Thomas & Healy, 2012). Proficient readers demonstrated fluent reading transfer at the text level, while less proficient readers showed less fluency at the word level (Faulkner & Levy, 1999; Levy & Burns, 1990).

6.2 Text Comprehension

The analysis of text comprehension scores across the four conditions (NN, SS, SN, NS) showed that all conditions presented a mean above the expected mean (M = 3), consistent with the findings of Thomas and Healy (2012). This indicates that readers were able to extract meaning from the passages regardless of the condition. Notably, students demonstrated better comprehension when reading the second scrambled passages preceded by scrambled passages (SS), followed by the NS condition. These results contradict those obtained by Thomas and Healy (2012), where the SS and NS conditions had the lowest comprehension scores, with the SS condition being the lowest.

For the overall sample, repeated measures ANOVA revealed no significant differences in comprehension scores among the four conditions. However, when analyzing text comprehension between the low and high-level student groups, an independent samples t-test showed statistically significant differences in the NS condition, where high-level students reported better comprehension. This suggests that high-level learners might be more adept at utilizing rereading strategies to comprehend scrambled texts.

The findings indicate that Arab EFL learners, particularly when reading the second passages preceded by scrambled texts (SS and SN), present better text comprehension scores. This could imply that these learners take better advantage of the benefits of the rereading method, possibly due to increased cognitive engagement when encountering scrambled texts. These results support the theory that rereading facilitates deeper cognitive processing, which enhances comprehension (Faulkner & Levy, 1999; Thomas & Healy, 2012).

6.3 Implications of Findings

This study's findings underscore the rereading method's significant role in enhancing reading speed and comprehension among Arabic EFL learners. These results align with the theoretical framework of automaticity theory, which posits that repeated exposure to text enables learners to recognize words more quickly and effortlessly, thereby improving overall reading fluency. Additionally, the study's results support the transfer of learning theory, demonstrating that skills acquired during initial readings can be effectively transferred to subsequent readings, enhancing comprehension and speed. Practically, these findings suggest that educators can incorporate the rereading method into their instructional practices to bolster L2 reading proficiency. This could involve structured rereading exercises, both with normal and scrambled texts, to challenge and improve students' cognitive processing and adaptability.

6.4 Limitations

While the findings provide valuable insights, this study has limitations that should be acknowledged. The narrow emphasis on Arabic EFL learners from Saudi Arabia and only males may limit the generalizability of the results to other learner populations. Additionally, the particular reading tasks used in this study, such as the scrambling of texts, might not fully represent all types of reading activities encountered by EFL learners. Future studies could address these limitations by including a more diverse sample of learners and a wider range of reading tasks.

6.5 Future Research Directions

Future research could investigate the long-term effects of the rereading method on reading proficiency and comprehension. Longitudinal studies tracking students over several years could provide insights into the sustained impact of repeated reading exercises. Additionally, exploring the applicability of the rereading method across different languages and learner populations can help generalize the findings. Comparative studies involving learners of various L1 backgrounds and languages could shed light on the universal applicability of the rereading method. Finally, testing the rereading method with different types of texts and reading tasks could offer a more comprehensive understanding of its benefits. These varied reading tasks can help evaluate different aspects of reading comprehension and fluency, providing a broader perspective on the effectiveness of the rereading method.

7. Conclusion

The present study aimed to compare the effect of the rereading method on reading speed and reading comprehension of normal and scrambled texts in Arabic EFL learners, providing evidence that the rereading method can lead to gains in terms of fluency and accuracy. Repeated reading has the potential to develop readers' fluency, increase reading comprehension, and help them become independent readers (Samuels, 1979; Taguchi et al., 2004).

Faster reading times for second normal passages preceded by normal passages, both for the overall sample and for the low- and high-level student groups, provide evidence of a text-level transfer in view of automatic word recognition. Repeated reading helps to increase automatic word recognition, which positively impacts reading speed as well as reading comprehension (Chang & Millet, 2013; Gorsuch & Taguchi, 2010). In addition, Samuels (1979) states that an important function of the rereading method is providing the necessary practice for developing automatic word recognition.

Through the rereading method, students were able to focus on the meaning of the passage rather than decoding the words, regardless of the condition of the passage. Success in reading comprehension is determined by decoding ability and language comprehension (Thomas & Healy, 2012; Tsuji, 2021). The rereading method enhances reading comprehension in a mixed manner.

Both low and high-level students benefited from the rereading method even when faced with scrambled texts, reporting the highest text comprehension scores in these conditions. Considering that passages with scrambled text involve some difficulty, existing research indicates that word transfer coincides with text-level transfer when texts are difficult (Carr & Brown, 1990; Faulkner & Levy, 1999).

These findings align with the theoretical frameworks of automaticity theory and transfer of learning, underscoring the value of repeated exposure in developing reading fluency and comprehension. Educators can incorporate structured rereading exercises into their instructional practices to enhance L2 reading proficiency. However, this study's narrow focus on male Arabic EFL learners from Saudi Arabia and specific reading tasks limit the generalizability of the results. Future research could investigate the long-term effects of the rereading method and explore its applicability across different languages and learner populations.

Acknowledgments

Not applicable.

Authors' contributions

Not applicable.

Funding

Not applicable.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Sciedu Press.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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