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The Effects of Orienting Instructions on Readers' Ability to Recall Literal Information from Expository Texts

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Abstract

This study aimed to examine whether instructing readers to judge text information can impair or facilitate their ability to recall information from expository texts of different genres. Experiment One used four expository texts and examined three types of orienting instructions: To answer pre-text questions, to be prepared to answer questions after the reading the text, to be prepared to judge the knowledge introduced in the text. The results of the study indicated that the use of pre-text questions did not improve readers' performance in a recall test; in fact, they impaired the readers' overall recall ability. However, being forewarned that they would be asked to provide a judgment on the information contained within a passage after reading it did enhance the participants' ability to recall information form expository texts. Experiment 2 used the same four expository texts and examined the relationship between text recall and participants' judgement of text information with particular cognitive abilities. The results reveal variations in the patterns of correlations between recall and rating of the text and other cognitive factors across the different text genres. The outcomes and implications of this research are discussed in this paper.

Keywords: Expository texts, orienting instructions, Judgement of texts, Superficial comprehension, Posttext questions

1. Introduction

Readers do not always exhibit the ability to recall the information that was presented in a passage they just read, and it is not unusual for an individual to forget key details or to recall false information. Whether encountering written passages in educational settings or daily life activities, a reader's inability to recall the facts after reading a passage can be disruptive and time consuming, and may necessitate rereading a given piece of text for a second time. Educators can often experience frustration or disappointment when students fail to recall important information from the texts presented in the classroom. In light of the importance of students being able to recall information from written passages, there is a need to develop specific insights into the parameters that can improve a reader's ability to recall the information that is presented within a given text.

One promising approach to enhancing recall effectiveness that has been the subject of much research in recent years is the provision of content enhancement instructions prior to a reading task; for example, instructing the reader to generate questions while reading (Rosenshine, Meister & Chapman, 1996); read with a specific study purpose in mind (Ishiwa, Sanjose & Otero, 2013), or summarize the text (Bean & Steenwyk, 1984; Doctorow, Wittrock & Marks, 1978; Head, Readence & Buss, 1989). Previous studies have found that issuing a reader with a set of instructions that

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encourage deep processing during the reading task can improve their ability to answer multiple choice (MC) questions (Graesser & Lehman, 2011) and, hence, creates a clearer global mental representation of the text. For example, to summarize a text, readers need to reproduce the materials and generate a mental representation of them. This process facilitates their information retrieval process (Brown, Campione & Day, 1981; Brown, Day & Jones, 1983; Wang, Sabatini, O'Reilly & Feng, 2017). A further benefit that has been linked with summarization is that it encourages readers to self-monitor their comprehension of the materials (Thiede & Anderson, 2003). However, to generate questions, the reader needs to link a piece of information to its logical class of information (Ishiwa et al., 2013; Graesser & Lehman, 2011).

Wang, Sabatini, O'Reilly, and Feng (2017) argued that the creation of global representations that integrate the information presented in a piece of text can enhance a reader's ability to accurately recall that information. They found that instructing participants to summarize the text before answering post-reading MC questions did not have a significant impact on highly efficient readers' ability to answer MC questions correctly. However, this task did increase the accuracy with which those of a low reading ability responded to the MC questions. Wang and colleagues argued that, because reading efficiently requires readers to produce a global mental model of the text while reading as a means of integrating the information presented within it, high-efficiency readers did not gain additional benefits from summarization activities. However, low-efficiency readers cannot automatically create such models unless they are asked to summarize the text. Hence, in their research, the recall performance of low-efficiency readers, as measured by their ability to answer MC questions after reading a passage, improved as a result of the summarization activity. However, the study of Wang and colleagues (2017) used a fairly simple comprehension test, and the failure of summarization to have a significant effect on the recall performance of highly efficient readers could be attributed to the ceiling effect. Specifically, the ceiling effect might have masked the effect that summarization had on highly efficient readers. Regardless of whether highly efficient readers benefit from summarization or not, the results of this study indicated that providing instructions to a reader in advance of a reading task could alter their reading strategies and, hence, influence their overall performance on a recall or comprehension task.

Many studies have focused on the effects of goal-orienting instructions, such as pre-reading questions, have on reading comprehension (Glenberg, Sanocki, Epstein & Morris, 1987; Llorens, Cerdan & Vidal-Abarca, 2013; Schommer, 1989; Walczyk & Hall, 1989), and on reading recall (McCrudden, Magliano & Schraw, 2010; Minguela, Sole & Piescle, 2015; Ramsay, Sperling & Dornisch, 2010; Rupp, Ferne & Choi, 2006; Van Den Broek, Lorch, Linderholm & Gustafson, 2001). For instance, Van Den Broek and colleagues (2001) instructed participants to either read for entertainment or read for a test. Two measures of reading were used in their study. The first measure involved analysing the thoughts participants expressed out loud as they were in the process of reading (online measure), while the second measure involved asking participants to recall the information given in the text in a free recall manner (offline measure). Their results showed that the participants who were reading for the purpose of completing a test exhibited higher recall accuracy than the group who were reading for fun. Furthermore, the participants in the test purpose group also exhibited a better ability to link the information presented in the text and to infer its meaning while reading than those who were reading for fun, who predominantly focused on evaluating the text.

Additionally, McCrudden, Magliano and Schraw (2010) used a reading recall paradigm through which they asked the participants to read a specific text from a certain prospect before answering MC questions. In addition to exhibiting a superior ability to recall the information related to the adopted prospect, the participants spent a longer amount of time reading the information. The results were confirmed through a subsequent interview, the findings of which indicated that participants were motivated to focus on the information related to their adopted prospect. Thus, the results of this study indicated that orienting instructions prior to reading can influence the strategies participants use while reading and, hence, their recall ability. The study also indicated that orienting instructions and reading strategies can work together to emphasize a reader's ability to recall certain information, albeit at the cost of other information. Finally, the effects of orienting instructions on reading strategies and reading recall were captured by both online and offline

measures.

It is important to note that the use of literal and inferential guestions to test participants after they have read a passage yields different outcomes in terms of the information they recall. Literal questions require readers to merely recall text segments, while inferential questions do not depend solely on the text. They require further processes (Sadatnia, Ketabi & Tabakoli, 2016). In this yein, Ramsay and colleagues (2010) examined the influence the provision of instructions had on readers' ability to recall different types of information, both explicit and implicit, from a long expository text. They compared spontaneous studying strategies with prompted strategies, such as asking the readers to elaborate on the main ideas. Their findings revealed that readers' ability to recall information, as assessed by a recognition test that assessed readers' grasp of both explicit and implicit information, did not vary across different strategies. However, the readers in the spontaneous strategies group performed better on a matching test, which examined the readers' memory of specific information from the text, than the other groups of readers. This implies that forcing participants to adopt specific strategies, such as elaborating on the main ideas presented in a text, can shadow secondary information in the text. Hence, it is important that any instructions that are given to readers prior to reading tasks prompt suitable reading strategies that facilitate their ability to recall information from the text.

Readers' beliefs about the importance and relevance of knowledge in a given text are important components of gaining knowledge from passages (Graesser, Singer & Trabasso, 1994; Kuhn, 1999; Mason, Gava & Boldrin, 2008). However, emphasizing particular segments of a text by instructing participants to read test questions prior to reading the text might impair their ability to recall other parts of the text. In one study, Vidal-Abarca, Salmerón and Mañá (2011) asked college students to read a passage of text before answering MC questions on that text. The students were then interviewed to elicit information about the method they employed while reading the text. The interview results indicated that the students whose performance lagged behind their peers in the MC test were those who began the exercise by reading the questions prior to reading the text.

In contrast, Bransford & Hohnson (1972) suggested that presenting participants with information about the text before they commence reading is helpful in recall tasks. They compared the effect that presenting information (via explanatory pictures) to the readers prior to or after they read the text had on their ability to recall the main information that was contained within the passage via a summary task. Their results revealed that showing pictures to the readers before they read the text facilitated their ability to recall the information contained within it better than showing them pictures after they read the text. The researchers concluded that the use of pictures might help the participants to create global representations of the information contained within the text, thereby enhancing their memory of the text.

Some scholars have suggested that the provision of orienting instructions to participants prior to reading encourages the development of a global representation of the text information, which enhances subsequent retrieval of the text. In contrast, when instructions emphasize certain segments of the text, there is a risk that a mismatch may arise between the orienting instructions and the demands of the subsequent recall task, reducing the readers' performance in the subsequent recall tasks (Ramsay et al., 2010). To summarize, the effects of orienting instructions on a reader's ability to recall information from texts might depend on whether the instructions encourage the development of a global representation or emphasize specific information in a particular reading passage.

Previous research has found that asking participants orienting questions before they read a given text may lead to them focusing on information related to the questions (Vidal-Abarca et al., 2011). On the other hand, instructions to read for a subsequent test are thought to encourage the creation of a coherent global representation of the text (Van Den Broek, Lorch, Linderholm & Gustafson, 2001). Therefore, the current study aimed to compare the effects of goal-orienting instructions, which direct readers to focus on certain parts of a text (i.e., presenting a set of questions prior to reading a text), with instructions that encourage global representation of the text (i.e., reading for subsequent questions or subsequent rating of the text). It also aimed to examine how certain cognitive factors are related to superficial reading comprehension.

2. Experiment 1

2.1 Aims

Existing research in the reading domain is yet to make a direct comparison between the effects of orienting instructions, which enhance either segments or global representations, on readers' ability to recall targeted and non-targeted information from short passages. Thus, there is a need for further studies to determine whether instructing readers to view pre-text questions before reading a passage have a different impact on their ability to recall information from the text than those readers who are instructed to read for either a subsequent test or for a subsequent rating task whereby readers are asked to evaluate the passage they have read. The hypothesis that was applied in the current study was that viewing the headline questions before reading a passage of text would not enhance readers' performance during a recall test. While providing readers with instruction to pay specific attention to instructions prior to reading may improve their ability to recall the information emphasized, it may reduce their ability to recall all other information presented in the text. Instructions, such as a subsequent test or text evaluation, in contrast, might enhance readers' ability to recall all the information contained within the text and, as such, have a better impact on their overall recall abilities than the pre-text questions condition.

2.2 Method

2.2.1 Participants

The participants in the current study were 60 female native-Arabic speakers who were aged between 18 and 39 (M= 23.48, SD= 3.57). They were recruited from the King Saud University and Princes Noura University. All participants had normal or corrected-to-normal vision, and no histories of reading difficulties were reported. The psychology students received course credits in exchange for their participation.

2.2.2 Materials

2.2.2.1 Reading test materials

The reading test consisted of four passages, each of which was approximately 300 words. The passages were expository descriptive texts. These texts were chosen because previous research has concluded that expository descriptive texts represent the simplest model of texts (Amand, 2001; Sadatnia & Ketabi, 2016). The passages covered four different topics: (1) history of arts, (2) health, (3) history of science, and (4) energy. Six multiple-choice questions were created for each passage, and the answers to the questions could be clearly found in the passages. The test included 24 guestions in total. Seven independent judges from different fields of specialities, both in science and education, assessed the responses to the test. The judges were asked to apply a three-point scale to evaluate whether the passages were clear, easy to remember, and easy to understand. The maximum score for each passage was nine. The mean score for the judges' ratings was calculated for each passage, and was 6 for the first passage, 8.43 for the second passage, 7.43 for the third passage, and 6.71 for the fourth passage. The judges were also asked to evaluate whether the questions were clear, had a direct answer, and were of an equal level of difficulty to one another by ticking the 'Yes' or 'No' boxes. The maximum score for each question was three. The judges were also asked to provide their comments if needed. The average score for each question was calculated, and the means ranged between two and three, with the exception of two questions about the first passage. The wording of these two questions was changed according to the judges' comments. The reliability of the questions was calculated after this experiment, alpha Cronbach = .8. A copy of the passages and questions is available from the author upon request.

2.2.2.2 Visual working memory task materials

Materials for the computer-based visual working memory task were developed to engender a computer-based Corsi block-tapping task (Claessen & Van der Ham, 2015). The screen displayed a white background with eight black drawing squares aligned in two horizontal lines, each of which contained four 4 x 4 cm squares. One of the squares was filled with red for one second. After that, a blank white screen appeared for one second, and a different square was filled with the red colour for a further second. The position of the red square moved randomly between the top and the bottom row at a rate of one second for each position until the end of the trial. At the end of each trial, the subject was asked to press the corresponding key to a certain square defined by its sequence in either the top or the bottom row. For example, in one of the trials, the participant was instructed to: 'Press the button that corresponds to the second appearance of the red square in the bottom row'. The buttons 'R, T, Y and U' corresponded to the squares in the top row, and the buttons 'F, G, H and J' corresponded to the squares in the bottom row.

2.2.3 Design & Procedures

Participants were randomly assigned to one of three groups: pre-and post-text questions, post-text questions or a control group, where neither pre-text nor post-text questions were presented in the first phase of the experiment, and participants were asked to read the texts for subsequent rating scale. The dependent variable was the number of questions correctly answered by participants in the second phase of the experiment.

Participants were tested individually in a single session that lasted approximately 50 minutes. All tests were administered and performed using E-Prime software (v.2) on a PC computer. The first phase of the reading test involved reading four texts, which were presented in a black 20 pt. plus body font, each on a single white screen. Before they commenced reading the texts, the participants were given the following instructions: 'You will be asked to read four different texts. Each text will be presented on a single screen. Your task is to read each text once and then press the space bar when you have finished reading'. In the control condition, the additional instructions were as follows: 'After you have read each text, you will be asked to respond to six statements related to your opinion about each text by rating each statement on a five-point scale'. In the emphasizing questions group (the post-text question condition), the additional instructions were as follows: 'After each text, you will be asked to answer three multiple-choice questions related to the text. After you have answered each question, you will be presented with the sentence that contains the answer'. The instructions in the emphasizing and guiding guestion group (the pre-and-post text question condition) were similar to those provided to the post-text question group; however, before the participants began reading each text, three leading questions were presented on the screen. The participants were asked to read the questions and then press the space bar when they were ready to start reading the text. The participants were told that the three questions were related to the main points of the text. The three questions were exactly the same questions as those presented after each text. All participants in all groups were told to answer the questions by pressing the numbered button on the keyboard that corresponded to their answer choice. After the participants had answered each question in the post-text and pre-and-post text questions conditions, the text was masked and presented to the participants in such a way that the sentence that contained the answer to the question was highlighted. This phase of the experiment lasted approximately 15 to 20 minutes.

In the second stage of the study, the participants performed the visual working memory task. This task was used as a distracting task that consisted of 18 trials divided into three levels. The number of highlighted squares varied across the three levels. There were five red squares, seven red squares and nine red squares in the first, second and third levels respectively. The order of trials in each level was varied across participants, and each trial started with a black cross fixated on a grey screen for 1 second. The whole visuospatial working memory task lasted between seven and ten minutes. The instructions were explained to the participants, and they were provided with an opportunity to participate in two training trials so that they could practice the test prior to

commencing the real assessment.

Participants were then asked to perform the second phase of the reading test. They were told that a sequence of 24 multiple-choice questions was going to be presented to them, and that the questions were related to the four texts they read at the beginning of the experiment. The participants in the two experimental groups were informed that some of the questions had already been presented to them. All participants were asked to answer each question by pressing the number on the keyboard that corresponded to their answer choice. Each question was presented on a single screen and remained in place until the participant pressed a number key to answer the question or the space bar to progress to the next question without responding. The order of questions was randomised across participants, and it took each participant around seven to ten minutes to complete this stage of the experiment. After that, the participants were questioned about the type of assessment they had anticipated when they read the four texts, and whether they had expected to be asked additional questions on the text at some point in the experiment. The majority of the participants in all conditions reported that they had expected to be asked additional questions on the four texts while they were performing the first phase of the reading test. However, they had not been expecting any additional questions on the texts when they progressed to the visuospatial working memory task.

2.3 Results

Figure 1 presents the means and standard errors for the questions that were correctly answered in each of the conditions. In all three groups, there were two types of questions: questions which were presented in the first phase and repeated in the second phase 'old questions', and questions that were not presented until the second phase of the experiment 'new questions'. In addition, questions which were presented immediately after the texts were called immediate questions. Immediated questions were only presented in the pre-and post-text questions and post-text questions groups. The participants could score a maximum of 12 for each condition.

A one-way analysis of variance (ANOVA) between groups was carried out on the questions in the test phase. Exposure to orienting and emphasizing questions (pre-and-post text questions) had a marginally significant main effect *F* (2, 57) = 3.14, *p* = .05, *MSe* = 4.93, $\eta^2 p$ = .1. The follow-up analyses via Tukey HSD tests indicated that the performance of the pre-and-post-text questions group (*M* = 5.4, *SD* = 2.43) was significantly lower than that of the post-text questions group (*M* = 7.15, *SD* = 2.11), *p* < .05. The performance of the control group (*M* = 6.1, *SD* = 2.1) did not differ from the other conditions, *p* = ns.



Figure 1: The average of correct answers given by participants in each condition to each set of questions

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Similarly, a one-way analysis of variance (ANOVA) between groups was carried out on the new questions in the test phase. Exposure to orienting and emphasizing questions (pre-and-post text questions) had a significant main effect: F(2, 57) = 22.36, p < .001, MSe = 3.09, $\eta^2 p = .44$. Follow-up analyses by Tukey HSD tests indicated that the performance of the control group (M = 7.65, SD = 2.15) was significantly lower than that of both the pre-and-post (M = 11.05, SD = .5) and post text questions group (M = 10.65, SD = 1.53) and, in both cases, p was less than .001. The performance of the pre- and post-text question group did not significantly differ from the post-text question group, p = ns.

Finally, an independent sample *t*-test was conducted to compare the performance of the participants in the immediate questions in the pre-and post-text questions GROUP (M = 7.82, SD = 2.09) and post-text questions group (M = 8.52, SD = 2.01). This comparison revealed that there was no significant difference between the two groups, t(38) = .83, p = ns.

2.4 Discussion

The experiment employed four short expository texts to examine the effect orienting instructions had on participants' ability to correctly answer MC questions on a passage they had just read. The study compared the effects of pre-text questions, post-text questions, and instructions to rate the topics of each text on the recall performance of the readers. The results revealed that pre-text questions, which were used as headlines prior to reading, did not improve the readers' superficial comprehension of the information that had been highlighted in the pre-text questions. Furthermore, the use of pre-text questions impaired the readers' ability to recall other parts of the texts. In contrast, the same questions had a different effect when they were not shown to the readers until after they had finished reading the text; i.e., post-text questions. In this case, such questions emphasized specific information while maintaining the participants' ability to recall the alternative information that was presented in the texts. The third type of orienting instructions involved instructing the participants to read with the expectation that they would be subsequently asked to evaluate each text. The results showed that when the participants read a task in the knowledge that they would be asked to evaluate it once they had finished reading, they achieved a similar level of ability to recall the information contained within it as they did when they were instructed to read it to answer some subsequent MC questions. The question here is whether reading for judgment facilitated recall of text information independently of the participants' judgement of the text. To develop meaningful insights that could answer this question. Experiment 2 used the same four expository texts and examined the relationship between the participants' ability to recall information and levels of text rating alongside other cognitive abilities that are believed to be related to superficial reading comprehension.

3. Experiment 2

Previous research has indicated that orienting instructions can have both a positive and negative effect on a reader's recall ability. Some scholars have argued that the effect of orienting instructions depends on the text type, the reader's ability to follow a reading strategy according to a given instruction, and the cognitive abilities of a reader (Sadatnia & Ketabi, 2016; Gajria, Jitendra, Sood & Sacks, 2007). Furthermore, readers' interests and motivation to read are thought to be strongly correlated with their comprehension of a given passage (Guthrie, Hoa, Wigfield, Tomks & Perencevich, 2006; Middleton, 2011; Schommer, 1989). In particular, situational interest, which is assessed for a particular reading passage, is thought to be related to superficial reading comprehension (Minguela et al., 2015; Ramsay et al., 2010).

However, the measures that have been used to assess participants' interests have varied across studies. Some studies have used online measures to assess participants' interest in the reading passages, such as thinking aloud while reading (Kucan & Beck, 2003) and time of reading (Budd, Whitney & Turley, 1995; Dhanapala & Yamada, 2015; Kendeou, Muis & Fulton, 2011; McKoon & Ratcliff, 1992; Minguela et al., 2015), and offline measures such as summarization (Bohn-Gettler & Kendeou 2014; Bransford & Hohnson, 1972). Occasionally, some studies failed to

prove a relationship existed between the outcomes of online and offline measures (Kendeou, Muis & Fulton, 2011). Therefore, multiple measures should be used to examine the relation between superficial reading comprehension and other situational variables.

3.1 Aims

This experiment used the same reading paradigm as that used in Experiment 1 and employed both online measurements (the time taken to read each text) and offline measures (self-rating of the text) to assess participants' interest and engagement in the reading task. Additionally, the study assessed the participants' judgement of the text as opposed to judgement of the reader's comprehension of the passage to examine the relationship between the reader's evaluation of the text and her ability to recall the information that was presented within it. This was deemed to be necessary because some studies have argued that participants do not provide an accurate estimate of their comprehension because they judge the topic of the text rather than the gained knowledge (Glenberg, Sanocki, Epstein & Morris, 1987). It was also anticipated that this reading paradigm would facilitate a comparison of the correlation between rating scores and recall accuracy for each of the four different texts, as it has previously been suggested that motivation is text dependent (Neugebauer, 2011).

The first hypothesis was that there would be a significant correlation between the judgement of text scores allotted by the reader and her ability to recall the information presented in the text. This hypothesis was based on the expectations that the readers would generate a mental representation of the text when reading it for the purposes of evaluation. Generating an unambiguous representation has been previously linked with a reader's ability to evaluate the texts and more accurately recall the content of it (Butler & Winne, 1995; Carver & Scheier, 1990).

The second hypothesis asserted that the longer an individual spent reading a passage of text, the higher their recall accuracy. According to constructivist views of reading comprehension, monitoring during reading requires additional time (Graesser, Singer & Trabasso, 1994). Therefore, it was expected that the participants in the current study would take more time to construct their mental representation of the text as they were in the process of reading it. It was anticipated that the better the mental representation that was constructed, the more time the participants invested in reading the text, and the more accurate their recall responses.

In relation to cognitive abilities and superficial comprehension of the texts, it is thought that one needs to recall information and consign it to working memory to facilitate comprehension of the texts (Kintsch, 1988; Kintsch & Van Dijk, 1978). This indicates that an individual's working memory capacity affects his or her level of reading comprehension (Hyönä, Lorch & Kaakinen, 2002). Additionally, individual differences in readers' abilities to build associations are thought to affect the reading strategies they employ (Bohn-Gettler & Kendeou 2014). Therefore, in the current study, cognitive abilities related to working memory capacity and reasoning abilities were expected to be correlated with the scores of the post-reading MC literal questions.

Finally, it is not clear whether interest and involvement in reading particular texts are superior to cognitive variables when the reading test only requires retrieval of explicit information from the texts. Therefore, this experiment compared the correlations between the accuracy of recall from the texts with participants' interests on the one hand, and with participants' visual working memory capacity, verbal reasoning and non-verbal reasoning on the other.

3.2 Method

3.2.1 Participants

The participants consisted of 64 female native Arabic speakers who were aged between 19 and 40 (M= 22.26, SD= 3.94). They were recruited from the King Saud University. The inclusion criteria of Experiment 1 was applied.

3.2.2 Materials

3.2.2.1 The reading test and visual working memory task materials

The reading test and the visual working memory task that were employed in Experiment 1 were also employed in Experiment 2.

3.2.2.2 Evaluating assumptions task materials

The materials that were employed to evaluate the assumptions were taken from a subtest of the critical thinking test described by Abdulsalam and Solaiman (1982). The test was validated on a sample of 2475 Saudi students between the age of 15 and 20 years old, and the reliability test revealed an alpha Cronbach of .75. The task included ten written sentences, each of which was followed by three assumptions. The task required the participant to specify whether each assumption was derived or not derived from the original sentence. For instance, a practice trial included the following sentence: 'When children are young, parents should tolerate their children's behaviour even if they do not accept the behaviour'. One of the following assumptions was: 'Parents are not patient with their children'.

3.2.2.3 Non-verbal analytic reasoning task materials

The materials for the non-verbal analytic reasoning task were taken from the Arabic version of the Stanford-Binet 5 intelligence scale standardised by Safwat (2011). A sequence of 13 matrices from the adults' level were chosen and reproduced for the purposes of the current research. Each question involved the presentation of a four- or nine-square matrix that was filled with geometric shapes with the exception of one square, which contained a question mark. A line-up of five alternative shapes was presented at the bottom of the screen.

3.2.3 Design & Procedures

All participants performed all four computer-based tests mentioned in the previous section. Participants were tested individually in a single session that lasted approximately 50 min. Similar to Experiment 1, participants first performed the first phase of the reading test. Each text was presented on a single screen until the participant pressed the spacebar to view the rating questions. Each question was also presented on a single screen. The instructions given to all participants in the control condition in Experiment 1.

The participants were then asked to perform the second phase of the reading test (answering 24 MC questions). After that, they performed the visual working memory task.

After the participants had completed the visual working memory task, they performed the evaluating assumptions task. In this task, each sentence appeared with one of the assumptions on the screen until the participant judged whether the assumption was derived or not derived from the sentence. The sentence was written in a 20-pt. plus body black font and was positioned at the top of a white screen. The assumption was presented at the bottom. The participants gave their responses by pressing one of two keys on the keyboard. Then, the same sentence appeared with the second and then the third assumption. After that, the second sentence appeared together with a set of assumptions using the same method. Each trial remained on the screen for 30 seconds or until the participant responded.

Finally, the participants performed a non-verbal analytic reasoning task. For this task, they were presented with each question on a single screen and were asked to choose the missing item in each matrix from five alternatives presented in a line-up at the bottom of the screen. The participants gave their responses by pressing the number on the keyboard that corresponded with their choice. Each question was presented for 30 seconds, and no feedback was given to participants.

3.3 Results

Table 1 presents the means and standard deviations for each variable.

 Table 1: Means and standard deviations for each variable

	Mean	Standard deviation	Skewness	Kurtosis
Visuospatial working memory	17.83	5.45	.09	17
Evaluating verbal assumptions	22.38	2.87	33	54
Analytic reasoning	8.48	1.82	01	11
Time of reading	111718 ms	54197	2.73	8.91
Superficial reading comprehension	12.59	4.23	.08	71

Correlations were used to examine the relationship between cognitive factors (non-verbal analytic reasoning, evaluation of verbal assumptions and visuospatial working memory), time of reading and scores of superficial reading comprehension. Both time of reading, evaluating verbal assumptions and analytic reasoning correlated with superficial reading comprehension. These results were entirely consistent with the hypotheses of the study with the exception of any significant correlation between visuospatial working memory and superficial reading comprehension. See Table 2 for the correlation coefficient scores. Using Fisher's r-to-z transformation, each correlation coefficient score was transferred to a z-score to compare the strength of each correlation. Superficial comprehension strongly correlated with time of reading, analytic reasoning and evaluating verbal assumptions, respectively.

Table 2: Correlations between cognitive factors and superficial reading comprehension

	Т	VSWM	EVA	AR	SRC
Superficial reading comprehension (SRC)	.41***	.05	.25*	.27*	
Analytical reasoning (AR)	.19	.25*	.13		
Evaluating verbal assumptions (EVA)	.00	15			
Visuaspatial (VS) WM	06				
Time of reading (T)					
Notes: * = $p < .05$, ** = $p < .01$ and *** = $p < .001$.					

Hierarchical multiple regressions were used to examine the amount of variance in the superficial reading comprehension explained by cognitive variables after controlling for the effects of time of reading. Two models were considered. The first model examined the extent to which the cognitive variables (visuospatial working memory, evaluating verbal assumptions and analytic reasoning) predicted superficial reading comprehension. The second model considered the amount of time the participants spent reading as a predictor. See Table 3 for the results of the hierarchical regression analyses.

 Table 3: Hierarchical multiple regression analyses with cognitive variables, time of reading as predictors and superficial reading comprehension as a dependent variable

Model	Added variables	В	Т	R	R^{2}	Changes of R ²
	Step 1:					
1	Visuaspatial WM	.18	.02	35	12	12
1	Evaluating verbal assumptions	.22	1.8	.55	.12	.12
	Analytical reasoning	.24	1.85			
	Step 2:					
	Visuaspatial WM	.03	.3			
2	Evaluating verbal assumptions	.24	2.18*	.59	.35	.23
	Analytical reasoning	.31	2.9**			
	Time of reading	.49	4.53***			

Notes: * = p < .05, ** = p < .01 and *** = p < .001.

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Cognitive variables explained 12% of the variance in superficial reading comprehension and the first model was found to be significant, F(3, 63) = 2.78, p < .05, MSe = 16.53. In the second model, adding the time variable significantly changed \mathbb{R}^2 , F(4, 63) = 7.88, p < .001, MSe = 12.47, and time spent reading accounted for 23% of the variance in superficial reading comprehension that was observed. An evaluation of each single variable revealed that visuospatial working memory did not have a significant impact on the scores.

The regression models were examined using tests for collinearity. The variance inflation factors for predictors ranged between 1.06 and 1.23, with an average of 1.15. The tolerance scores ranged between .81 and .94, with an average of .87. Thus, collinearity was not an issue for these analyses.

In terms of the types of texts, multiple correlations were performed between accuracy of recall, represented by the number of correct answers in the reading test, and each of the cognitive and motivation variables. First, the time the participant spent reading each text positively correlated with the number of correct answers she scored in the reading test. There was a significant positive correlation between the time spent reading and the reading test score for the science texts, r = .27, and r = .25, p < .05. There was also a positive correlation between accuracy of recall and time spent reading the history of art texts, r = .48. p < .001. There was a marginally significant positive correlation between accuracy of recall and time spent reading history in science texts, r = .21, p = .09.

Additionally, a correlation coefficient analysis was used to determine the relationship between the scores of the self-rating scale for each text and ability to accurately recall the information presented within it. Significant correlations were identified between the scores of the self-rating scale of the texts and accuracy of recall in history of art and history of science texts, r = .38 and r = .3, p < .05, respectively. On the other hand, no correlation was found between the self-rating scale scores and the accuracy of recall for both the health science and industrial science texts, r = .02, and r - .04, p = ns, respectively.

Finally, mixed results were observed for verbal and non-verbal reasoning as represented by the scores of the evaluating verbal assumption and the analytic non-verbal reasoning tasks. Analytic reasoning revealed that there was a significant correlation between text type and non-verbal reasoning with both health science, r = .29, p < .05, and industrial science, r = .27, p < .05. On the other hand, no significant correlations were observed between verbal assumptions and each single text, although a positive correlation was found between overall recall accuracy and evaluating verbal assumption scores.

3.4 Discussion

Since reading is based on several abilities (Bohn-Gettler & Kendeou, 2014; McCrudden & Schraw, 2007; McCrudden, Magliano & Schraw, 2010), Experiment 2 examined the relationship between two reading motivation components and a reader's ability to recall the information presented in collective expository texts at a 'superficial comprehension' level (the lowest level of text comprehension). Besides motivation components, non-verbal working memory, non-verbal analytic reasoning and assumption recognition from verbal statements were also examined. The results revealed that there was a significant correlation between time spent reading the text and ability to recall the information contained within it by answering MC questions correctly. This correlation was apparent across all texts. In comparison, self-rating of the text correlated with the reader's ability to recall the information presented in the two history texts, but no significant correlation between self-rating and recall was identified in the science texts. Finally, verbal and non-verbal reasoning abilities were found to be suitable predictors of recall from reading, while, surprisingly, there no correlation was identified between visual working memory and recall from reading.

4. General Discussion

The two experiments presented in this study indicated that orienting instructions can either emphasize segments of the texts and, hence, impair a reader's ability to recall other parts of the

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same text, or generate a stronger coherent representation of the text. The results of the study indicated that the creation of a global representation of a text can facilitate a reader's ability to recall the information presented within it. The main finding of this study was that reading for the purpose of judging the texts encourages global representation. Furthermore, to develop this global representation, the readers are required to spend more time reading the text. This was evidenced by the positive correlation between the time spent reading the text and reasoning abilities identified in this study.

The use of orienting questions was found to have a negative effect on the reader's ability to recall the secondary information presented in the text. This finding builds on the work of Ramsay and colleagues (2010), who speculated that giving participants instructions to extract the main ideas from a given passage shifted their focus away from information about specific historical figures and events in each section of a long history text. In the current study, directly comparing the pre- and post-texts question conditions with the post-text question condition showed that, in the latter condition, the readers' ability to answer the new questions in the second reading phase was higher than their ability to answer the questions in the former condition: The pre- and post-text question condition. This could be attributed to the fact that the participants in the pre- and post-text question condition may have considered the headlines as primary questions and focused on these, treating the remaining information in the texts as secondary information. This result was consistent across the four different genres of text. One might argue that the participant ignored any information that was contained within the text that was not directly related to the headline. However, this is not necessarily the case. First, a preliminary investigation of the data revealed that participants in both conditions spent roughly the same amount of time reading the texts. If the headlines had detracted their attention away from parts of the texts, the time they spent reading the passages should have been shorter in the pre- and post-text questions condition. Second, participants were instructed to read the whole passage and not to search for specific information.

McCrudden & Schraw (2007) classified instructions to readers into four categories. Among them were instructions to search for answers to specific questions while reading, which might motivate readers to focus on specific segments of texts. This type of instruction might detract from any information that is not emphasized in the main instructions. Additionally, emphasising some information does not necessarily entail that that information is more accessible than the other, more general, types of instructions given to participants. Therefore, McCrudden and Schraw suggested that an alternative approach of specifying the end-goal of the reading task in advance, for instance, for taking a test or to form a judgement, would be more effective.

One of the main variables that exhibited a strong relationship with gaining knowledge from reading was motivation to read (Guthrie et al., 2006; Middleton, 2011). Some previous studies (e.g., Schommer, 1989) have argued that knowledge domains are equivalent in relation to participant's interests and beliefs. However, differences in motivation to read were observed between the history and science genres in Experiment 2. This difference has its roots in previous studies. Articles that describe historical events typically use a type ordering component that requires readers to use mental processes that are different from those they employ when they read non-historical information (Ohtsuka & Brewer, 1992). However, it is still unclear as to why history texts are more related to motivation than science articles. This discrepancy could be the focus of further studies in this domain.

Although Walczyk & Hall (1989) have argued that confidence rating questions do not have a significant effect on a reader's ability to comprehend texts unless combined with questions during reading or immediately after reading, the instruction to read for judgement was found to be of a positive effect on recall. This idea is supported by the premise that when readers are asked to judge the value of a text and their level of engagement when reading it, they generate a mental representation of the text. The internal mental representation is the source of their judgement. Generating an unambiguous representation is equally related to an ability to more effectively evaluate texts and recall the information presented within them (Butler & Winne, 1995; Carver & Scheier, 1990). Further studies should examine whether combining the two types of orienting instructions, the instruction to read for judgement and to answer questions immediately after reading the passage, would result in a better performance than that achieved when the reader is

provided with a single type of instruction.

The absence of correlation between visual working memory and accuracy of reading was also found in previous studies (Amand, 2001; Budd, Whitney & Turley, 1995; Sadatnia & Ketabi, 2016). This could be attributed to the fact that working memory does not play a role in superficial comprehension tests. However, in the current study, a significant correlation between both verbal and non-verbal reasoning and ability to recall information from the texts was found. This might indicate that even the superficial level of comprehension, which requires recall of literal information, benefits from a reader's reasoning ability. However, the role of reasoning and the extent to which it is important for each type of text remains unclear. For instance, further investigation of the correlations between recall and reasoning abilities revealed that only non-verbal reasoning was correlated with science texts. This finding could be attributed to the fact that non-verbal reasoning facilitates the creation of logical visual representation of causes and effects in science and, hence, enhances readers' ability to recall this information (Safwat, 2011). However, this assumption requires further examination.

The study highlighted a very important aspect for orienting instructions given to participants prior to reading. Encouraging participants to develop a global representation of each short text in preparation for a subsequent test or to make a later judgement on the content of the passage can enhance the reader's ability to recall the information presented in the text. This enhancement in knowledge acquisition from texts is related to different variables: Some of them are situational; for example, level of engagement in the reading activity (time spent reading the text) and the value of the text (as assessed by the self-rating scale). The rest are less closely related, and some involve cognitive abilities; specifically, reasoning abilities. These results indicate readers of different levels of reading comprehension use different processes to recall information from a given passage. They also indicate that situational variables are stronger than cognitive abilities in terms of an individual's ability to acquire knowledge from short expository texts.

5. Limitations

This study had some inherent limitations. First, the research employed superficial multiple-choice questions and did not use questions that were designed to elicit deeper insights into the reader's comprehension of the text studied. However, previous studies (Minguela, Sole & Piescle, 2015) have found that readers' performance significantly differed according to the types of questions they were asked and that both skilled and less-skilled readers found superficial questions easier to answer. Minguela and colleagues also found that, for both skilled and less skilled readers, there was a stronger relationship between ability to answer superficial comprehension questions and self-rating scales of confidence. Therefore, the current study focused on superficial questions as a means of examining the relationship between recall from text and situational interest using a self-rating scale across different types of readers.

Another limitation of this study was that it relied solely on MC questions. MC questions are less likely to recruit a range of cognitive strategies (McKoon, & Ratcliff, 1992; Rupp, Ferne, & Choi, 2006). Other recall methods that could have been employed in this research included writing summaries of texts (Bransford & Johnson, 1972; Kendeou et al., 2011). However, one issue with the use of such a strategy is that some participants may have poor composition ability yet the ability to store the information presented within a passage of text in their memory. Therefore, multiple choice questions can remove the effect of participant composition abilities and test text memory. Further studies could extend the results of the current study by using different tools to assess readers' ability to recall information.

6. Conclusion

The current study revisited a very basic aspect of reading expository texts. The minimum level of reading comprehension (recall of information) is largely influenced by situational interest. The findings of the research indicated that presenting readers with headlines before they read a passage did not improve their superficial comprehension of the specific information referred to in

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the headlines in comparison to alternative orienting instructions. In contrast, headlines impaired the readers' ability to recall the secondary information that was presented in the texts. Orienting instructions, which are thought to encourage the creation of global representation of the information, on the other hand, were found to be more likely to improve a reader's ability to recall text information. Additionally, the findings indicated that reading for judgement represents a feasible technique for enhancing a reader's ability to gain knowledge from a written text. Orienting instructions to judge texts are not independent of other variables. Situational interest, assessed by the time spent reading, and rating scales are important variables that do impact superficial comprehension. The image is more complicated when verbal and non-verbal reasoning is also presented as closely related to superficial comprehension. These findings indicated that multiple factors are related to superficial comprehension. These results can support educational and advertising applications.

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References

- Abdulsalam, F. & Solaiman, M. (1982). *The Critical Thinking Test.* Saudi Arabia: Centre for Educational and Psychological Research in Om Al-Qura University.
- Amand, F. (2001). Learning from expository texts: Effects of the interaction of prior knowledge and text structure on responses to different question types. *European Journal of Psychology of Education*, 16(1), 76-86. Doi: doi:10.1007/BF03172995
- Bean, T. W., & Steenwyk, F. L. (1984). The effect of three forms of summarization instruction on sixth graders' summary writing and comprehension. Journal of Literacy Research, 16(4), 297-306. doi:10.1080/10862968409547523
- Bohn-Gettler, C. M., & Kendeou, P. (2014). The interplay of reader goals, working memory, and text structure during reading. *Contemporary Educational Psychology*, 39(3), 206–219. doi:10.1016/j.cedpsych.2014.05.003[CrossRef],
- Bransford, J.D. & Johnson, M.K. (1972). Contextual prerequisites for understanding: Some investigations of comprehension and recall. *Journal of Verbal Learning and Verbal Behavior*, 11, 717-721, doi:10.1016/ S0022-5371(72)80006-9.
- Brown, A. L., Campione, J. C., & Day, J. D. (1981). Learning to learn: On training students to learn from texts. Educational Researcher, 10(2), 14-21. doi:10.3102/0013189X010002014
- Brown, A. L., Day, J. D., & Jones, R. S. (1983). The development of plans for summarizing texts. Child Development, 54(4), 968-979. doi:10.2307/1129901
- Budd, D., Whitney, P. & Turley, K. J. (1995). Individual differences in working memory strategies for reading expository text. *Memory & Cognition*, 23(6), 735-748
- Butler, D. L., & Winne, P. H. (1995). Feedback and self- regulated learning: A theoretical synthesis. *Review of educational research*, 65(3), 245-281.
- Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-process view. *Psychological Review*, 97, 19-35.
- Cerdán, R., Gilabert, R., & Vidal-Abarca, E. (2011). Selecting information to answer questions: Strategic individual differences when searching texts. *Learning and Individual Differences*, *21*(2), 201-205.
- Claessen, M. G. &Van der Ham, I. J. (2015). Computerization of the standard Corsi block-tapping task affects its underlying cognitive concept: A pilot study. Applied Neuropsychology: Adult, 22, 180-188. doi: 10.1080/23279095.2014.892488.
- Dhanapala, K. V., & Yamada, J. (2015). Reading Processing Skills among EFL Learners in Different Proficiency Levels. *Reading Matrix: An International Online Journal*, *15*(1), 25-40.
- Doctorow, M., Wittrock, M. C., & Marks, C. (1978). Generative processes in reading comprehension. Journal of Educational Psychology, 70(2), 109-118. doi:10.1037/0022-0663.70.2.109.
- Gajria, M., Jitendra, A. K., Sood, S., & Sacks, G. (2007). Improving comprehension of expository text in students with LD: A research synthesis. *Journal of Learning Disabilities, 40*(3), 210-225.
- Glenberg, A. M., Sanocki, T., Epstein, W., & Morris, C. (1987). Enhancing Calibration of comprehension. Journal of Experimental Psychology: General, 116, 119-136. Abstract retrieved from

E-ISSN 2240-0524	Journal of Educational and	Vol 7 No 3
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http://psycnet.apa.org/index.cfm?fa=buy.optionToBuy&id=1987-30302-001.

- Graesser, A.C., Singer, M. & Trabasso, T. (1994). Constructing inferences during narrative text comprehension. *Psychological Review*, 101(3), 371-395, doi:10.1037/0033-295X.101.3.371.
- Graesser, A., & Lehman, B. (2011). Questions drive comprehension of text and multimedia. In M. T. McCrudden, J. P. Magliano, & G. Schraw (Eds.), Text relevance and learning from text (pp. 53-74). Charlotte, NC: Information Age.
- Guthrie, J. T., Hoa, L. W., Wigfield, A., Tomks, S. M., & Perencevich, K. C. (2006). From spark to fire: Can situation reading interest lead to long-term reading motivation? *Reading Research & Instruction, 45(2),* 91-117.
- Head, M. H., Readence, J. E., & Buss, R. R. (1989). An examination of summary writing as a measure of reading comprehension. Literacy Research and Instruction, 28(4), 1-11. doi:10.1080/19388078909557982
- Hyönä, J., Lorch, J. R. F., & Kaakinen, J. K. (2002). Individual differences in reading to summarize expository text: Evidence from eye fixation patterns. Journal of Educational Psychology, 94(1), 44-55. doi:10.1037/0022-0663.94.1.44
- Ishiwa, K., Sanjose, V. & Otero, J. (2013). Questioning and reading goals: Information-seeking questions asked on scientific texts read under different task conditions. *Educational Psychology*, 83(3), 502-520. doi; 10.1111/j.2044-8279.2012.02076.
- Kendeou, P., Muis, K. R. and Fulton, S. (2011), Reader and text factors in reading comprehension processes. Journal of Research in Reading, 34: 365-383. doi:10.1111/j.1467-9817.2010.01436.
- Kintsch, W. (1998). Comprehension: A paradigm for cognition. New York, NY: Cambridge University Press.
- Kintsch, W., & Van Dijk, T. A. (1978). Toward a model of text comprehension and production. Psychological Review, 85(5), 363-394. doi:10.1037/0033-295X.85.5.363.
- Kucan, L. & Beck, I. L. (2003). Inviting students to talk about expository texts: A comparison of two discourse environments and their effects on comprehension. *Reading Research & Instruction*, 42(3), 1-31.
- Kuhn, D. (1999). A developmental model of critical thinking. *Educational Researcher*, 28(2), 16-26.
- Llorens, A. C., Cerdan, R., & Vidal-Abarca, E. (2013). Adaptive formative feedback to improve strategic search decisions in. doi: 10.1111/jcal.12050.
- Mason, L., Gava, M. & Boldrin, A. (2008). On warm conceptual change: The interplay of text, epistemological beliefs, and topic interest. *Journal of Educational Psychology*, 100, 291-309, doi:10.1037/0022-0663.100.2. 291.
- McKoon, G. & Ratcliff, R. (1992). Inference during reading. Psychological Review, 99(3), 440-466.
- McCrudden, M. T., & Schraw, G. (2007). Relevance and goal-focusing in text processing. *Educational Psychology Review*, 19(2), 113-139. doi:10.1007/s10648-006-9010-7.
- McCrudden, M. T., Magliano, J. P., & Schraw, G. (2010). Exploring how relevance instructions affect personal reading intentions, reading goals and text processing: A mixed methods study. Contemporary Educational Psychology, 35(4), 229-241. doi:10.1016/j.cedpsych.2009.12.001.
- Meyer, L. (1986). Strategies for correcting students' wrong responses. Elementary School Journal, 87, 227-241.
- Middleton, M. E. (2011). *Reading Motivation and Reading Comprehension*. Master Thesis. Ohio State University, Graduate School, 36.
- Minguela, M., Sole, I., & Piescle, S. (2015). Flexible self-regulated reading as a cue for deep comprehension: evidence from online and offline measures. *Reading & Writing, 28*, 721-744. doi: 10.1007/s11145-015-9547-2.
- Morgan, P. & Fuchs, D. (2007). Is there a bidirectional relationship between children's reading skills and reading motivation. *Exceptional Children*, 73(2), 165-183.
- Neugebauer, S. R. (2011). A Reader inside and out: Exploring Ecologically Valid Understandings of Reading Motivation. Doctoral Dissertation. College of Education, Harvard University, 160.
- Ohtsuka, K. & Brewer, W. F. (1992). Discourse organization in the comprehension of temporal order of narrative texts. Discourse Processes, 15(3), 317-336.
- Ramsay, C. M., Sperling, S. A., & Dornisch, M. M. (2010). A comparison of the effects of students' expository text comprehension strategies. *Instruction Science*, 38, 551-570. doi: 10.1007/s11251-008-9081-6.
- Rosenshine, B., Meister, C., & Chapman, S. (1996). Teaching students to generate questions: A review of the intervention studies. Review of Educational Research, 66(2), 181–221. doi:10.3102/00346543066002181.
- Rouet, J., & Vidal-Abarca, E. (2002). 'Mining for meaning': Cognitive effects of inserted questions in learning from scientific text. In J. Otero, J. León, & A. Graesser (Eds.), *The psychology of science text comprehension* (pp. 417-xxx).
- Rupp, A. A., Ferne, T., & Choi, H. (2006). How assessing reading comprehension with multiple-choice questions shapes the construct: A cognitive processing perspective. Language Testing, 23(4), 441–474. doi:10.1191/0265532206lt337oa.
- Sadatnia, M., Ketabi, S. & Tavakoli, M. (2016). EFL learner's levels of comprehension across text structures: A comparison of literal and inferential comprehension of descriptive and enumerative expository texts. *Journal of Psycholinguistic Research*, *45(6)*, 1499-1513. doi: 10.1007/s10936-016-9414-6.

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ISSN 2239-978X	Social Research	September 2017

Safwat, F. (2011). Stanford-Binet 5 intelligence scale. Egypt: Egyptian Anglo Library.

- Schommer, M. (1989). Students' beliefs about the nature of knowledge: what are they and how do they affect comprehension?. *Center for the Study of Reading Technical Report;* No. 484.
- Thiede, K. W., & Anderson, M. C. (2003). Summarizing can improve metacomprehension accuracy. Contemporary Educational Psychology, 28(2), 129-160. doi:10.1016/S0361-476X(02)00011-5.
- Thiede, K. W., Anderson, M. C. M., & Therriault, D. (2003). Accuracy of metacognitive monitoring affects learning from texts. *Journal of Educational Psychology*, 95(1).
- Van Den Broek, P., Lorch, R. F., Linderholm, T., & Gustafson, M. (2001). The effects of readers' goals on inference generation and memory for texts. Memory & Cognition, 29(8), 1081-1087. doi:10.3758/BF03206376.
- Vidal-Abarca, E., Gilabert, R., Ferrer, A., Ávila, V., Martínez, T., Mañá, A., Llorens, A.C., Gil, L., Cerdán, R., Ramos, L., & Serrano, M. A. (In press). TuinLEC, un tutor inteligente para mejorar la competencia lectora [TuinLEC, an intelligent tutoring system to improve reading literacy skills]. *Infancia y Aprendizaje*, 37(1).
- Vidal-Abarca, E., Mañá, A., & Gil, L. (2010). Individual differences for self-regulating task-oriented reading activities. Journal of Educational Psychology, 102(4), 817-826.
- Vidal-Abarca, E., Martínez, T., Salmerón, L., Cerdán, R., Gilabert, R., Gil, L., Ferris, R. (2011). Recording online processes in task-oriented reading with Read&Answer. *Behavior Research Methods*, 43, 179-192.
- Vidal-Abarca, E., Salmerón, L., & Mañá, A. (2011). Individual differences in task-oriented reading. In M. T. McCrudden, J. P. Magliano, & G. Schraw (Eds.), *Relevance instructions and goal focusing in text learning* (pp. 267-294). Greenwich, CT: Information Age Publishing.
- Walczyk, J. J., & Hall, V. C. (1989). Effects of examples and embedded questions on the accuracy of comprehension self-assessments. *Journal of Educational Psychology,* 81, 435-437.
- Wang, Z., Sabatini, J., O'Reilly, O. & Feng, F. (2017). How individual differences interact with task demands in text processing. *Scientific Studies of Reading*, 21, (1) http://dx.doi.org/10.1080/10888438.2016.1276184.
- Whyte, M. M., Karolick, D. M., Neilsen, M. C., Elder, G. D., & Hawley, W. T. (1995). Cognitive styles and feedback in computer-assisted instruction. *Journal of Educational Computing Research*, *12*, 195-203.