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Exploring the Interaction of L2 Reading Comprehension with Text- and Learner-related Factors

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Abstract

As a complex cognitive skill involving a variety of processes working in concert, the ability to read along with the reading comprehension process and the factors affecting the nature of this process are continually drawing the attention of L2 researchers. The intricate nature of reading comprehension emerges evidently especially in foreign language settings, in which the readers endeavor to extract meaning from texts laden with textual and syntactic structures somewhat foreign to them. Reading comprehension in an L2 is characterized by its dynamic nature since it is affected by a combination of text-related and reader oriented variables. The present study aimed to examine L2 reading comprehension in relation to vocabulary knowledge, topic familiarity, perceived situational interest, sources of interest and strategic reading behaviors. The study was carried out at a major state university in Turkey in the fall term of 2015-2016 academic year. A total of 83 freshman students enrolled in the department of English Language Teaching participated in the research. Data were collected by means of a reading comprehension test, a vocabulary test, a topic familiarity scale, a perceived interest questionnaire, a sources of interest questionnaire, and a reading strategies inventory. The data gathered through these instruments were subjected to statistical analyses. Contrary to expectations, the study did not reveal any significant correlations between L2 reading comprehension and any of the aforementioned text- and learner-related factors. The study concluded that participants' limited lexical coverage might have built on the linguistic difficulty of the text and overridden the influence of other text- and learner-based determiners of reading comprehension. Reading comprehension especially in a foreign language is undoubtedly under the impact of different textual and learner oriented factors. However, the findings attained through this study could not provide any evidence for such an interaction and added on the inconclusive results of several previous studies.

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1. Introduction

The ability to read is undoubtedly a complex and intricate skill to define briefly with a few words. Such definitions as extracting meaning from a written text are therefore extremely simplistic to explain the multifaceted nature of the process. This is because reading is actually “a complex cognitive skill, involving many subskills, processes, and knowledge sources” (Nassaji, 2011, p. 173). Thus, the harmonious coordination of the processes and skills during reading comprehension (Koda, 2005; Perfetti & Adlof, 2012) seems to be one of the most salient reasons behind the growing research interest in comprehension processes of reading.

The complexity of reading comprehension and the processes involved in the concurrent operation of various subskills appear to get even more complicated in the case of reading in a foreign language. Reading comprehension in an L2 is characterized by its dynamic nature since it is affected by a combination of text-related factors such as the length and linguistic load of the text, its structure and complexity, and learner or reader oriented variables like the prior knowledge, working memory, and aptitude (Leeser, 2007). Therefore, a multitude of research studies investigated the interaction of L2 reading comprehension with different textual factors including lexical coverage (e.g. Laufer & Ravenhorst-Kalovski, 2010; Schmitt, Jiang, & Grabe, 2011) and textual enhancement (e.g. Yano, Long, & Ross, 1994) as well as learner-related factors such as topic familiarity (e.g. Lee, 2007; Peretz & Shoham, 1990), cultural familiarity (e.g. Alptekin, 2006; Erten & Razi, 2009), situational or text generated interest (e.g. Brantmeier, 2006), working memory (e.g. Alptekin & Erçetin, 2010; Rai, Loschky, Harris, Peck, & Cook, 2011), and the use of reading strategies (e.g. Barnett, 1988; Carrell, Pharis, & Liberto, 1989; Phakiti, 2003).

Among these studies, Brantmeier’s (2006) research on the value of reader interest in predicting L2 reading comprehension by means of a multicomponent model of interest revealed the existent role of situational interest in explaining the reading comprehension scores of advanced learners of Spanish as a foreign language, though not in all measures of reading comprehension. The present study sought to take this attempt one step forward by expanding the research scope through examining the impact of some other linguistic and psychological factors along with situational interest and sources of interest. Hence, the current study aimed to investigate L2 reading comprehension in relation to vocabulary knowledge, topic familiarity, perceived situational interest, sources of interest and strategic reading behaviors.

2. Literature review

2.1. Reading comprehension in a foreign language

Reading in a foreign language cannot be degraded to an assumedly poor form of reading in the native language (Bernhardt & Kamil, 1995). As a matter of fact, reading comprehension involves the coordinated operation of lower level and higher level processing (Grabe, 2009). While lower level processes work for decoding what is written at the recognition level, higher level processes get beyond recognition, retrieve the information provided in the text in an explicit or implicit manner and integrate it with the reader’s background information about the topic (Hannon, 2012). Given the language used is not the mother tongue of the reader in the case of L2 reading, the concurrent operation of these processes ranging from the decoding of lexis and sentence structures to the synthesis of textual information with prior knowledge appears to take place miraculously and is affected by learner-related factors to a greater extent when compared to L1 reading.

It is beyond doubt that the processes existent in reading in a foreign language are prone to the influence of various factors. In an L2 setting involving reading instruction, these include such factors as the learners’ L2 proficiency, age, learner motivation, the relationship between L1 and L2, cognitive processing, and teacher-related issues (Grabe, 2004). When it comes to the L2 reading at the individual level, the comprehension skills interact with a variety of factors including L2 grammar and vocabulary knowledge, L2 decoding, orthographic knowledge, phonological awareness, and working memory (Jeon & Yamashita, 2014). Accordingly, under the impact of a multitude of factors, variation appears to prevail both in the use of L2 reading skills and the success in reading comprehension.

The research on L1 and L2 reading investigating the influence of various factors including text and topic familiarity, word recognition and the implementation of reading strategies on proficiency in reading seems to have

reached a considerable progress; however, it appears to have spread out into various disciplines in the form of different pieces of research (Pang, 2008). In L2 settings, there is a substantial body of research highlighting the interaction of reading comprehension with a variety of reader-related factors (e.g. Kondo-Brown, 2006; Leeser, 2007; McNeil, 2011) and text-based variables (e.g. Lee, 2007; Wong, 2003). The following section will briefly explore the potential relationship of L2 reading comprehension to some certain text- and learner-related factors within the scope of the current study.

2.2. Factors affecting L2 reading comprehension

2.2.1. Vocabulary knowledge

The interaction between L2 reading comprehension and vocabulary knowledge is dominated by a bi-directional relation (Nation, 2001; Schmitt, 2010), indicating the mutual impact of one factor on the other. Hence, while reading in a foreign language contributes to the attainment of additional vocabulary knowledge, greater amounts of vocabulary knowledge result in a more successful reading comprehension as well. As pointed out by Koda (2005), an adequate amount of L2 vocabulary knowledge is deemed essential for learners to comprehend a written text. In this sense, how much lexical coverage, the amount of lexical items known by the reader or learner, is needed for reading comprehension appears to be an important issue (Van Zeeland & Schmitt, 2013). The vocabulary size necessary for the comprehension of a written text has been subject to various research attempts. An early study by Laufer (1989) pointed out that a coverage of 95% is essential for the comprehension of written discourse. This attempt was then taken further by a later study (Hu & Nation, 2000), which highlighted a lexical coverage of 98% as necessary for reading comprehension. The same percentage for lexical coverage was supported by Schmitt et al.'s (2011) study underlining a linear interaction between vocabulary knowledge and reading comprehension. Thus, the relevant study emphasized the fact that the essential amount of lexical coverage is based on the degree of comprehension deemed necessary for the reader. Thus, although it is quite difficult to define an exact amount of vocabulary knowledge for comprehension of any written text, it is clear that greater amounts of lexical knowledge result in greater reading comprehension.

2.2.2. Topic familiarity

Topic familiarity constitutes a second learner-related factor with a potential impact on L2 reading comprehension. The reader's familiarity with the topic of the text refers to his or her background knowledge about the topic or the knowledge of content area (McNeil, 2011). Research into the effect of background knowledge on reading comprehension has displayed the collaborative role of topic familiarity in L1 reading (e.g. Moravcsik & Kintsch, 1993). A similar impact has been hypothesized to appear in L2 reading comprehension with the idea that the enhanced simplicity of the reading text resulting from the familiarity with the topic will help attention resources to focus on both form and meaning (Lee, 2007). The facilitative role of topic familiarity in L2 reading comprehension was corroborated by various studies (e.g. Barry & Lazarte, 1995; Schmitt et al., 2011). However, despite the general consensus pertaining to the role of topic familiarity as a driving force, there are also studies providing counter evidence to the existence of a positive relationship between topic familiarity and L2 reading comprehension (e.g. Peretz & Shoham, 1990). Thus, the nature of the interaction between topic familiarity and L2 reading comprehension is readily open to further research.

2.2.3. Situational interest and its sources

A common distinction is usually made between personal or individual interest and situational interest by researchers (Eidswick, 2010; Schraw, Bruning, & Svaboda, 1995). Situational interest is quite different from the personal interest, which refers to an individual's unique and permanent state of mind that is also prevalent before reading a specific text (Hidi, 1990). Situational interest, on the other hand, can be defined as a temporary situation-related state of mind resulting from the very nature of the existent conditions like the characteristics of a reading text (Schiefele, 1999). Various resources can provide a trigger for the emergence of this kind of an interest. Due to its context-specific nature, certain features of a reading text such as novelty, intensity and visual imagery exert an impact on it (Hidi & Baird, 1988). In an attempt to explore the reasons behind the occurrence of situational interest

in an L2 reading context, Brandmeier (2006) divided its sources into five as engagement, cohesion, ease of recollection, prior knowledge, and emotiveness. Moreover, readers' situational interest has been subject to research attempts in different L2 settings. However, as highlighted by Eidswick (2010), in spite of the substantial evidence for the existence of a relationship between interest and L1 reading comprehension, similar studies conducted in L2 contexts (e.g. Eidswick, 2009) did not produce evident results about a positive interaction between interest and comprehension with such clarity. The results of Brandmeier's (2006) study demonstrating the interaction of merely some sources of situational interest with certain measures of reading comprehension builds on this uncertainty.

2.2.4. *Reading strategies*

There is a consensus in both L1 and L2 research that effective use of reading strategies is a key component of successful reading comprehension (Nassaji, 2011). Such actions as the selection and utilization of various reading strategies in an effective manner based on the purpose of reading, text type and the reading context constitute certain distinctive features of strategic reading behaviors (Grabe, 2009). According to Guthrie and Wigfield (2000), engaged readers are characterized by their increased motivation to learn and the implementation of strategic reading in turn. One such distinctive strategic behavior carried out during reading comprehension by good and engaged readers is lexical inferencing (Grabe & Stoller, 2013). The contribution of these kinds of strategic reading behaviors to L2 reading comprehension has been corroborated by various research studies (e.g. Carrell et al., 1989; Pappa, Zafiropoulou, & Metallidou, 2003; Salataci & Akyel, 2002). Moreover, when used effectively, reading strategies might get beyond specific reading tasks, promote learner autonomy and provide the readers with the opportunity to use independent reading for additional learning (Taylor, Stevens, & Asher, 2006). Thus, strategic reading is of critical value for both reading comprehension and L2 learning in general.

Given the research findings pertaining to the interaction of various text- and learner-related factors with reading comprehension are far from being conclusive, there is still a need for further research. Thus, the present study sought to investigate the potential relations of the aforementioned text- and learner-related variables to L2 reading comprehension. The study specifically aimed to examine students' levels of L2 reading comprehension in relation to vocabulary knowledge, topic familiarity, perceived situational interest, sources of interest and strategic reading behaviors.

To this end, the following research questions were formulated:

1. How does the vocabulary knowledge interact with reading comprehension levels?
2. How do the factors of topic familiarity, perceived situational interest, sources of interest and strategic reading behaviors interact with reading comprehension levels?

3. Method

3.1. *Setting and participants*

The current study was carried out at a major state university in Turkey in the fall term of 2015-2016 academic year. A total of 83 freshman English language teaching (ELT) students studying at the Faculty of Education participated in the research. Of participant students, 72% were (n = 60) female and 28% (n = 23) were male due to female dominance of the ELT department. Participants appear to reflect a homogenous group in terms of their proficiency in English as the department accepts students according to their university entrance exam scores, which allocate a substantial portion of the total score to the English test. Reading comprehension occupies an important place in this centrally administered English test. Given the students are all in their first year of study at a major ELT program with one of the highest entrance scores among all universities in Turkey, the participants are all assumed to be advanced English language learners.

3.2. *Instruments*

Reading comprehension: In order to measure the participant students' levels of reading comprehension, a reading test in the TOEFL test format was employed by excluding the questions on vocabulary. Since the study aimed to test the interaction between reading comprehension and such reader-related factors as situational interest and topic

familiarity among others, a reading text on schooling behaviors of fish was specifically chosen so that the text would generate differential interest and familiarity effects on the participant students. The reading text was also checked for readability by means of a readability measure and a small scale piloting, and it was thought to be appropriate for the advanced level of proficiency in English. A total of 11 reading comprehension questions were utilized in the test. While the first nine questions were in an ordinary multiple choice format, the last two questions required the participants to make an overall evaluation of the text and to complete diagrams with matching items. The reading test measured three types of reading comprehension existent in Day and Park's (2005) six-component taxonomy of comprehension. The types of reading comprehension assessed in the test were literal comprehension, inference and evaluation. According to the taxonomy involving six types of comprehension, literal comprehension reflects the straightforward meanings in the texts. On the other hand, inference questions necessitate the integration of the text coverage with background knowledge. In essence, the reader attempts to get beyond the literal meaning in this phase and tries to make deductions. As for the last component, evaluation questions require the reader to elicit a global understanding of the text. The study employed these three types of reading comprehension along with the overall reading comprehension levels of the participants.

Vocabulary knowledge: The study made use of a vocabulary test to measure the participants' estimated vocabulary sizes. A total of twenty words were retrieved from the reading text by specifically identifying the more infrequent words with a substantial impact on the meaning in the text. The vocabulary test was prepared based on the Vocabulary Knowledge Scale (Paribakht & Wesche, 1997), which is "the best known and most widely-used depth-of-knowledge scale" as pointed out by Schmitt (2010, p. 218). The scale appears to display a high level of reliability (0.89) given the results of a test-retest method (Wesche & Paribakht, 1996). The primary purpose behind the use of the Vocabulary Knowledge Scale (VKS) was to reflect the participants' vocabulary knowledge more accurately by indicating the current level of knowledge from partial to precise and from receptive to productive.

Topic familiarity: To examine the participants' familiarity with the topic of the text used in the reading test, a five-point scale involving a total of four items were specifically prepared for the present study. Participant students filled out the scale starting with the prompt "The topic of the text was ..." by indicating to what extent the topic was (1) familiar to them, (2) something they had read about before, (3) something they were informed about, and (4) something they knew before. The scores represented the readers' familiarity with the topic.

Situational interest: The study measured the participants' perceived situational interest by means of the Perceived Interest Questionnaire (PIQ) developed by Schraw, Bruning and Svoboda (1995). The original PIQ consists of 10 items with a 5-point Likert scale through which the respondents indicate the extent to which they agree with the statements and are interested in a specific text. The items in the questionnaire were subjected to slight changes due to the nature of the text used in the current study. As the present study made use of an informative text about aquatic schools, the statements related to the "story" in the original PIQ were transformed into statements with the word "text". Moreover, as in Brantmeier's (2006) study, the item "I'll probably think about the implications of this story for some time to come" was excluded from the questionnaire. The internal consistency of the single factor PIQ involving 10 items was calculated as 0.91 (Schraw et al., 1995). Using Cronbach's alpha again, the internal consistency of the 9-item questionnaire in the present study was calculated as 0.89.

Sources of interest: To find out the sources of interest pertaining to the topic of the text, Sources of Interest Questionnaire (SIQ) developed by Schraw et al. (1995) was used. However, instead of the original 17-item SIQ, Brantmeier's (2006) version was administered to the participants with two slight changes about word choice in order not to have any comprehension problems about the statements. As done with the PIQ, the statements about the "story" in the original questionnaire were changed into prompts with the "text". The factor analysis performed in Brantmeier's (2006) study provided the following five-factor structure: (1) cohesion, (2) prior knowledge, (3) engagement, (4) ease of recollection and (5) emotiveness. As for the reliability results, the overall internal consistency of the questionnaire using Cronbach's alpha coefficient was calculated as 0.79 in the current study.

Strategic reading: In order to measure the strategic reading behaviors of the participants, the Metacognitive Awareness of Reading Strategies Inventory (MARSİ) developed by Mokhtari and Reichard (2002) was administered in the study. The MARSİ is a 30-item reading strategies inventory with a 5-point scale asking the respondents to indicate how frequently they do the provided actions while reading a text. The scale has a three-factor structure involving the following domains: (1) global reading strategies, (2) problem-solving strategies, and (3) support

reading strategies. In the present study, two items of the original inventory were left out since they were found irrelevant to the scope of the current study. These were the 9th and 15th items in the original questionnaire, which were related to discussing the text and using reference materials respectively. As the reading test was administered to the participants on an individual level, these two items were excluded. Using Cronbach's alpha, the overall internal consistency of the scale was found to be 0.89 in the original study. The alpha values per subscale were as follows in Mokhtari and Reichard's (2002) study: global reading strategies (0.92), problem-solving strategies (0.79), and support reading strategies (0.87). The same reliability analysis procedures were followed in the current study, and the overall internal consistency of the 28-item questionnaire used in this study was calculated as 0.89 again. As for the alpha values per subscale, the internal consistency was calculated as 0.80 for the first subscale (global reading strategies), 0.72 for the second (problem-solving strategies), and 0.74 for the third (support reading strategies).

3.3. Data collection and analysis

The instruments were administered to the participants during normal class time at a course. The participant students initially took the vocabulary test. Special attention was paid to having students complete the vocabulary test and submit it back to the researcher before the administration of the reading test in order to make sure that the students reflect their current vocabulary knowledge without any help from the contextualized use of vocabulary in the reading text. After the vocabulary test, the participants read the text, filled out the topic familiarity scale, perceived interest questionnaire, and sources of interest questionnaire respectively. Following this, the participants answered the reading comprehension questions and lastly indicated their use of strategies during reading.

Data analysis was performed by means of SPSS 21. The gathered data were initially subjected to normality tests, and the results demonstrated that the data were normally distributed. Therefore, in order to test the possible interaction between L2 reading comprehension, and text- and learner-factors, a Pearson correlation coefficient test was carried out for each of the two research questions.

4. Findings

The present study specifically addressed (1) the interaction between vocabulary knowledge and reading comprehension, and (2) the relationship between reading comprehension and the factors of topic familiarity, perceived situational interest, sources of interest and strategic reading behaviors.

4.1. Interaction between reading comprehension and vocabulary knowledge

The first research question sought to investigate the potential relationship between reading comprehension and vocabulary knowledge using Pearson correlation coefficients. Both the overall reading comprehension score and three types of comprehension were used along with the vocabulary size. The results of the test are given in Table 1.

Table 1. Relationship between L2 reading comprehension and vocabulary knowledge

	1	2	3	4	5
1. Overall reading comprehension	1				
2. Literal comprehension	.694**	1			
3. Inference	.563**	.254*	1		
4. Evaluation	.731**	.105	.204	1	
5. Vocabulary knowledge	.121	.132	.022	.067	1

*p<.05; **p<.01

As is clear from the table above, Pearson correlation coefficients revealed that vocabulary knowledge estimate did not correlate with either overall reading comprehension or the three types of comprehension included in the test,

namely literal comprehension, inference or evaluation, at a statistically significant level ($p > .05$). In other words, no significant relationship was found between L2 reading comprehension and vocabulary knowledge.

4.2. Interaction between reading comprehension and other text- and learner-related factors

The second research question aimed to explain the possible interaction of topic familiarity, perceived situational interest, sources of interest and strategic reading behaviors with L2 reading comprehension. A Pearson correlation coefficient test was performed to investigate the potential relationship of these factors with reading comprehension by entering both the overall reading comprehension scores and the three types of reading comprehension involving literal comprehension, inference and evaluation as was done with the first research question. The table below presents the results of the correlation coefficient test.

Table 2. Relationship between L2 reading comprehension and some text- and learner-related factors

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Overall reading comp.	1													
2. Literal comp.	.694**	1												
3. Inference	.563**	.254*	1											
4. Evaluation	.731**	.105	.204	1										
5. Topic familiarity	-.208	.063	-.098	-.348**	1									
6. Perceived interest	.000	-.071	.051	.040	.157	1								
7. Cohesion	.030	.057	.065	-.034	.254*	.416**	1							
8. Prior knowledge	-.012	-.124	-.010	.098	.032	.899**	.392**	1						
9. Engagement	-.001	.002	.032	-.019	.188	.535**	.327**	.464**	1					
10. Ease of recollection	-.079	-.138	.100	-.052	.350**	.577**	.549**	.501**	.342**	1				
11. Emotiveness	.005	-.171	.014	.157	-.110	.505**	.174	.574**	.348**	.350**	1			
12. Global reading str.	-.163	-.209	-.012	-.070	.303**	.445**	.218*	.433**	.288**	.376**	.363**	1		
13. Support reading str.	-.097	-.054	.081	-.148	.199	.335**	.110	.268*	.111	.275*	.224*	.681**	1	
14. Problem solving str.	.054	-.044	.145	.057	-.013	.137	-.084	.200	.101	.116	.175	.592**	.521**	1

* $p < .05$; ** $p < .01$

An examination of the table above indicates that there is no significant correlation between reading comprehension and any of the aforementioned text- and learner-related factors included in the test ($p > .05$). In other words, neither the overall reading comprehension scores nor the three dimensions of the reading comprehension involving literal comprehension, inference and evaluation significantly correlated with any of the text- and learner-based factors, namely topic familiarity, perceived situational interest, sources of interest (cohesion, prior knowledge, engagement, ease of recollection and emotiveness) and strategic reading behaviors (the use of global reading strategies, support reading strategies and problem solving strategies). The only exception for this result was pertaining to the correlation between the evaluation domain of reading comprehension and topic familiarity due to the fact that a medium negative correlation was found between these two variables, $r = -.348$, $n = 83$, $p < .01$, associating high levels of topic familiarity with lower levels of evaluation in reading comprehension contrary to expectations.

5. Discussion and conclusion

The harmonious processing of various procedures during reading comprehension and the impact of different factors on the effective operation of these procedures constitute key issues extensively examined in L2 reading research. To illustrate, various factors such as the capacity of working memory, reading strategies, prior knowledge

and situational interest and their relation to L2 reading comprehension have been repeatedly researched in different settings (e.g. Brantmeier, 2006; Lee, 2007; Leaser, 2007; McNeil, 2011).

Despite the incremental research into the interaction of L2 reading comprehension with both text- and learner-related variables, such attempts have generally been limited with fragments of research with a specific focus on some of these factors in different fields of study (Pang, 2008). Therefore, adopting two specific variables, namely situational interest and sources of interest, examined in Brantmeier's (2006) study in relation to L2 reading comprehension as a point of departure, the current study attempted to investigate various text- and learner-based factors and their potential relation to L2 reading comprehension. The study specifically focused on the interaction of the readers' vocabulary knowledge, topic familiarity, situational interest, sources of interest, and strategic reading behaviors with the levels of L2 reading comprehension.

Contrary to expectations, the present study did not reveal any significant correlations between L2 reading comprehension and any of the aforementioned factors. In other words, none of the relevant text- and learner-related factors correlated significantly with either overall L2 reading comprehension or the three types of comprehension included in the scope of the research, namely literal comprehension, inference and evaluation. Thus, the results of the current study differed substantially from other research findings underlining the positive interaction of L2 reading comprehension with different factors including vocabulary knowledge (e.g. Jeon & Yamashita, 2014; Laufer & Ravenhorst-Kalovski, 2010; Perfetti, 2007; Schmitt et al., 2011), topic familiarity (e.g. Barry & Lazarte, 1995; Pulido, 2004) and the use of reading strategies (e.g. Carrell et al., 1989; Zhang, 2008).

The lack of an evident correlation in the current study might most probably have resulted from the specific characteristics of the text used in the reading test. Given the fact that it is essential to have a lexical coverage of at least 98% (Hu & Nation, 2000; Schmitt et al., 2011), participants' lexical coverage of an approximate 50% might have built on the linguistic difficulty of the text and overridden the influence of other determiners of reading comprehension. The participants' partial receptive knowledge might have led to accessibility problems during the reading test. Therefore, the results of the current study is in a sense in line with other research findings demonstrating the overshadowing impact of problems related to L2 readers' inadequate language proficiency and text difficulty on the positive interaction of prior knowledge and topic familiarity with reading comprehension (Barry & Lazarte, 1998; Lee, 2007). In addition, the lack of task motivation as a factor within the scope of the study is a certain limitation.

L2 reading comprehension is undoubtedly under the impact of different textual and learner-related factors. However, the findings attained through this study could not provide any evidence for such an interaction. Thus, the study added on the inconclusive results of the previous research studies. A future research route to follow might therefore be the impact of different learner-related factors on L2 reading comprehension through the exclusion of any distorting effects resulting from the linguistic difficulty of the reading text.

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