

A Study on the Interactive Information Processing Strategy for English L2 Reading

LI Xiangrui, NI Jincheng

University of Shanghai for Science and Technology, Shanghai, China

This paper investigates the usage and effectiveness of the interactive processing strategy for English L2 reading information through a scale survey. The study reveals that L2 learners who employ the interactive processing strategy for L2 reading information can significantly improve their L2 reading abilities, both in terms of speed and accuracy, and this improvement requires certain training time and a solid foundation in L2. This study holds significant theoretical and practical value for enhancing L2 learners' English reading abilities.

Keywords: English L2, text reading, the interactive processing strategy for English L2 reading information

Introduction

Reading is an essential means for people to acquire information, understand the world, and broaden their horizons. The significance in the acquisition of English as a L2 is self-evident. L2 reading is not only an instructional goal in the process of learning English L2, but also, to a certain extent, reflects the proficiency of L2 learners. Currently, many L2 learners face numerous problems related to their reading abilities, including limited vocabulary, insufficient grammar knowledge, inadequate cultural background knowledge, and lower-level reading skills. To address these issues, previous studies have explored the strategies and models to enhance reading ability of L2 learners, such as the information chunking strategy, the information extraction strategy, the interactive memory reading strategy, and the interactive reading mode. However, there has been limited exploration of the strategy concerned with the whole interactive reading system. Therefore, this article proposes the strategy of interactively processing L2 reading information, combining the use of the interactive memory reading strategy with the controlled and automatic interactive processing strategy in L2 reading. The study will adopt a scale survey to investigate L2 learners' utilization of this reading strategy and their evaluation of its effectiveness.

Literature Review

Reading is the activity through which people obtain information from visual materials, thereby expanding their horizons and understanding the world. According to Yao (2002), reading research originates in Europe in the 1870s and, as some of the researchers gradually moved to the United States, the focus of reading research

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LI Xiangrui, Master's degree candidate, College of Foreign Languages, University of Shanghai for Science and Technology, Shanghai, China.

NI Jincheng, Ph.D., doctoral supervisor, professor, College of Foreign Languages, University of Shanghai for Science and Technology, Shanghai, China.

shifted accordingly. In the first half of the 20th century, research on reading primarily concentrated on visual information, memory, and pedagogy. Since the 1960s, the research focus has transitioned to reading models and reading instruction.

Using certain strategies while reading can assist L2 learners to better comprehend texts. Research on reading strategies began in the late 1970s and primarily focused on exploring the various strategies employed during L2 reading processes to facilitate faster and more effective reading (Li & Qin, 2005, p. 43). Information processing in reading is a fundamental concept in cognitive psychology. This theory draws an analogy between human brains and computer systems, considering it as an information processing system akin to a computer. Many scholars (Gui, 2001; Randall, 2007; Ni, 2013) have conducted research on the models and processes of reading information processing, while there are relatively few scholars engaged in the study of the interactive processing of reading information.

The interactive processing strategy for L2 reading information encompasses two aspects, the interactive memory reading strategy involving the interaction of sensory memory, working memory, and long-term memory and the processing strategy involving the interactive application of controlled and automatic processing of reading information. Ni, Zhou, and He (2020) conducted a study through scale surveys and interviews to explore challenges in reading memory. They proposed the use of the bottom-up reading memory strategy, the top-down reading memory strategy, and the interactive memory reading strategy to enhance L2 reading ability. Ni and Wang (2020) researched the interaction of memory systems in L2 reading and emphasized the necessity of addressing the issues related to the interaction of memory systems to achieve sound reading comprehension. They further asserted that the interaction of memory systems can play a crucial role in improving the quality of L2 reading and reading instruction. Liao (1998) argued that the level of automation in information processing is equally essential for accuracy in comprehension. Zhang (2021) indicated that the use of the controlled reading processing strategy can significantly enhance the English reading ability of the adult students. Li and Ni (2023) stated that the interactive memory reading strategy integrates the strengths of the bottom-up and top-down reading memory strategies. This strategy allows readers to comprehend reading information from both holistic and partial perspectives, helping language learners accumulate and apply language and non-language knowledge. Furthermore, the application of the controlled reading processing contributes to reducing cognitive load, thereby enhancing automatic reading information processing skills for learners.

Prior studies on the interactive aspects of information processing in reading have primarily focused on two dimensions: the interaction of information processing in sensory memory, short-term memory, and long-term memory, as well as the interaction of reading information between controlled processing and automatic processing. However, there have been few studies from a macro perspective that investigate the interactive processing strategy for L2 reading information based on these two forms of interaction. Therefore, this paper chooses this as a starting point and introduces the concept of the interactive processing strategy for L2 reading information, which combines the use of the interactive memory reading strategy with the controlled and automatic interactive processing strategy in L2 reading. This paper employs a scale survey to investigate students' perceptions of this strategy and their agreement with various related statements. Based on the collected data, corresponding research conclusion will be drawn. To some extent, this research can help address the gap in reading strategies in L2 reading. The proposed reading strategy may also provide valuable insights for English L2 reading learners.

Research Design

Research Contents and Participants

The subjects of this research are college students from University of Shanghai for Science and Technology, who are native speakers of China and use English as their L2. A total of 160 participants took part in the scale survey. The primary focus of this study revolves around the students' recognition degree of the usage and effectiveness of the interactive processing strategy for L2 reading information.

Research Methods

The researcher conducted a scale survey among students at University of Shanghai for Science and Technology, collected survey data, and then conducted inductive statistics, summarization, and analysis to draw conclusions. The researcher employed a Likert seven-point scale to assess the various levels of relevance for the scale survey on the interactive processing strategy for L2 reading information. Values 1 to 7 correspond to the following levels of agreement: "Disagree", "Basically Disagree", "Somewhat Disagree", "Uncertain", "Somewhat Agree", "Basically Agree", and "Agree" respectively. Participants completed the scale survey as required, and subsequent statistical and analytical processes were based on the survey results.

Research Steps

The researchers distributed survey questionnaires among college students. Upon obtaining the intended sample size, the questionnaires were collected. Subsequently, the survey data were organized and collected, and relevant data were subjected to statistical and analytical procedures, including means, standard deviations, Z-value, etc.

Data Collection and Statistical Methods

This study employed "Wenjuanxing" for the distribution and retrieval of survey questionnaires. Subsequently, SPSS 25.0 was used to analyze the collected data, involving calculating the means, standard deviations, and Z-values for the measured values of participants' agreement with various statements. Statistical analysis, inference, and research conclusions were drawn based on the data and information obtained through the scale survey.

Reliability and Validity Analysis

This study employed Cronbach's alpha coefficient to assess the reliability of the collected data. The reliability coefficient was calculated using the Cronbach's alpha formula. Generally, if the reliability coefficient is greater than 0.7, the research data can be considered acceptable. After analysis and testing in SPSS 25.0, the Cronbach's alpha coefficient for the scale survey data in this study was found to be 0.843, indicating excellent reliability. This study's 12 survey items were categorized into three dimensions. To assess the validity, exploratory factor analyses were conducted on the research data, revealing a strong correspondence between the 12 items and the dimensions, consistent with the research expectations. Additionally, the KMO value was calculated to be 0.837, exceeding the threshold of 0.6, indicating a high level of structural validity for the data of this study.

Data Statistics, Analysis, and Discussion

In this study, a Z-test was conducted to compare the values of the ratios R_1 and R_2 , representing the number of participants who selected Values 6-7 and 1-2 for each statement in the questionnaires, relative to the total number of the participants. The results are shown in Table 1. Table 1 indicates that, regarding Statement 6 "Reading materials with some unfamiliar words but not significantly affecting comprehension contribute to

improving the L2 reading ability of learners”, the ratios of the participants selecting Values 6-7 and 1-2 are 28% and 11% respectively. The Z-value calculated for these two ratios is 3.934, significantly exceeding the critical value ($Z_{0.05} = 1.645$). Therefore, it can be concluded that the ratio of the participants who agree or basically agree with this statement is significantly higher than the ratio of the participants who disagree or basically disagree. The Z-values for Statements 1 and 7 are positive but less than the critical value ($Z_{0.05} = 1.645$), indicating that the difference in ratios between the participants who agree or basically agree with the above statements and those who disagree or basically disagree is not statistically significant.

Based on the data from the scale survey, the following statements can be made: When reading, having a higher level of memory, and employing the interactive memory reading strategy can correspondingly enhance the L2 reading proficiency of the readers. Additionally, reading materials with a slightly higher level of difficulty, including some unfamiliar words and somewhat complex grammatical structures, can aid readers in improving their L2 reading abilities. Furthermore, a significant number of participants believe that emphasizing the use of the controlled and automatic interactive processing strategy during reading can effectively enhance readers' comprehension levels. Additionally, employing the interactive information processing reading strategy can improve both the reading speed and accuracy of the readers.

Table 1

Statistical Results of the Measure of Agreement for Each Statement of the Scale Survey

Type	Statements	Mean	SD	R ₁ vs. R ₂	Z-value
Interactive memory reading strategy	1. Using certain reading memory strategies during reading is advantageous for my understanding of the text's content.	4.313	1.610	0.26/0.18	1.629
	2. When I don't use reading memory strategies during reading, I often find myself repeatedly going back to the text, resulting in suboptimal comprehension.	4.450	1.651	0.29/0.16	2.832
	3. If my memory improves, my reading ability will also correspondingly improve.	4.469	1.682	0.31/0.19	2.609
	4. Utilizing interactive memory reading strategy can enhance the working memory capacity of L2 language English learners and, in turn, improve their L2 reading proficiency.	4.438	1.512	0.26/0.13	3.031
Controlled and automatic interactive processing strategy	5. The greater the difficulty of L2 reading materials, the faster the improvement in the reading proficiency of L2 learners.	4.425	1.673	0.28/0.15	2.766
	6. Reading materials with some unfamiliar words but not significantly affecting comprehension contribute to improving the L2 reading ability of learners.	4.594	1.506	0.28/0.11	3.934
	7. Reading materials with slightly complex grammatical structures are beneficial for improving the L2 reading ability of learners.	4.331	1.565	0.26/0.18	1.629
	8. Using controlled and automatic interactive processing strategy can effectively enhance the reading comprehension level of L2 learners.	4.519	1.644	0.29/0.14	3.336
Interactive processing strategy for L2 reading information	9. The use of reading strategies is advantageous for improving the L2 reading ability of learners.	4.450	1.597	0.28/0.14	2.924
	10. Interactive processing strategy for L2 reading information can elevate the L2 reading proficiency level of learners.	4.344	1.602	0.23/0.14	2.018
	11. Employing interactive processing strategy for L2 reading information can increase the reading speed of L2 learners.	4.444	1.693	0.31/0.17	3.051
	12. Utilizing interactive processing strategy for L2 reading information can enhance the accuracy of reading comprehension for L2 learners.	4.531	1.682	0.30/0.18	2.656

Notes. (1) There were 160 participants; (2) Mean represents the mean values of each statement point; (3) SD stands for the standard deviation of each statement point; and (4) R₁ and R₂ respectively denote the ratio of the number of individuals who selected statement Values of 6-7 and 1-2 to the total number of participants.

A scale survey is used in this study to examine participants' agreement with the use of the interactive processing strategy for L2 reading information. First, with regard to Statements 3, 11, and 12, over 30% of the participants "Agree" or "Basically agree" with these statements. The author believes that if L2 learners possess better memory, they can effectively employ the interactive memory reading strategy, increase working memory capacity, and thus better remember the relevant key information in the text. When encountering complex or unclear parts of the text, they can analyze the content alongside the key information, which ultimately results in a higher level of L2 reading proficiency. This, in turn, aids them in using the interactive processing strategy for L2 reading information, leading to improved reading speed and accuracy. As for Statement 7, its Z-value is 1.629, which is less than the critical value ($Z_{0.05} = 1.645$), suggesting that the ratio of the participants who agree or basically agree with this statement is not significantly higher than the ratio of the participants who disagree or basically disagree. In other words, the use of slightly complex grammatical structures in reading materials and the enhancement of learners' L2 reading ability are related, but the correlation is not significant. The author of this paper believes that if L2 learners have a solid foundation in grammar knowledge, they can use their existing grammatical knowledge to analyze and break down complex sentence structures. This process reinforces their grammar knowledge and allows them to learn new grammar concepts while enhancing their L2 reading ability. If L2 learners have a weaker grammar foundation, they may struggle to understand and analyze unfamiliar grammar concepts in slightly complex sentence structures. In such cases, they cannot effectively apply their existing grammar knowledge to assist in reading, leading to the delays in reading and decreased reading efficiency. This, in turn, affects the motivation of L2 learners. Regarding the interactive processing strategy for L2 reading information, the Z-values for the four statements are all around Statements 3, indicating that the ratio of the participants who agree or basically agree with these statements is significantly higher than the ratio of the participants who disagree or basically disagree. In other words, most survey participants believe that the interactive processing strategy for L2 reading information contributes to their L2 reading abilities, as well as to the improvement of reading speed and accuracy. However, the Z-values of the statements related to it do not significantly exceed 1.645. This might be that the interactive processing strategy for L2 reading information requires L2 learners to have higher cognitive abilities, including perception, attention, memory, reasoning, judgment, etc. Some readers with weaker cognitive abilities might encounter more difficulties in applying this strategy. Additionally, mastering and applying the interactive processing strategy for L2 reading information may require more extensive practice. For the learners with lower L2 proficiency, it might take more time to acquire and apply this strategy effectively.

Conclusion

This study makes use of a scale survey to probe into the interactive processing strategy for L2 reading information. The research findings are as follows: (a) Employing the interactive processing strategy for L2 reading information that combines the interactive memory reading strategy with the controlled and automatic interactive processing strategy can assist L2 learners in improving their L2 reading proficiency; and (b) the interactive processing strategy for L2 reading information can help enhance reading comprehension abilities of L2 learners, but the learners with lower L2 proficiency may require more extended training. When engaging in L2 reading, learners can select specific reading strategies to aid them in memorizing what they have read, gaining a comprehensive understanding of reading materials, and thus enhancing their L2 reading abilities. However, it is essential that the strategies chosen by the learners are not overly complex and align well with their own L2

proficiency levels, to avoid difficulties in applying the selected reading strategies. As for the limitations of this study, it primarily relied on a scale survey and lacked the experimental data to support the survey data. Subsequent research could involve relevant strategy experiments to gain more specific insights into how L2 learners use the interactive processing strategy for L2 reading information, thereby enhancing the objectivity and persuasiveness of related research.

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