



The Effect of Reading Strategies and L1 Reading Attitudes on L2 Reading Comprehension: Investigating the Intermediary Role of L2 Reading Attitudes

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The present study investigated whether and how the selected cognitive and affective predictors namely, reading strategies, L1 reading attitudes, and L2 reading attitudes contributed to L2 reading comprehension. 145 Iranian male 10th grade senior high school students of three public schools participated in the study by completing questionnaires and taking a reading comprehension test. Pearson's r was applied to estimate the degree of correlation among cognitive, affective and linguistic constructs. All Pearson observed values were then subjected to t-test for Pearson r to test the hypotheses concerning the significance of the population correlation in each instance of estimated correlation. Then, structural equation modelling was employed to verify the hypothesised model of relationships among the variables. The study revealed L1 reading attitude, reading strategies, and L2 reading attitude were all positively and significantly correlated with L2 reading comprehension. It further showed that L1 reading attitude and reading strategies both had positive correlations with L2 reading attitude, and that L2 reading attitude mediated the effect of both L1 reading attitude and reading strategies on L2 reading comprehension. Significant pedagogical implications drawn from the results of the study are discussed.

Keywords: reading strategies, reading attitudes, reading comprehension, SEM

Introduction

Researchers have long been involved in investigating individual differences in terms of cognition and affect to shed light on the nature of their relationship with linguistic competence (Anderson, 2014; Bruen, 2020; Dornyei, 2005; Frid & Friesen, 2019; Mizokawa & Hansen-Krening, 2000; Oxford, 1990). The relationship between reading strategies as a major cognitive variable and reading attitude as a key affective variable with reading ability as a representation of linguistic competence has been widely investigated by applied linguists (e.g., Bruen, 2020; Lau & Chan, 2003; Lee & Schallert, 2014; Petscher, 2010; Phakiti, 2003; Yamashita, 2007). They have found that the skilful use of different categories of strategies is linked to enhanced reading comprehension over time (Bruen, 2020; Lau & Chan, 2003), the use of strategies partly accounts for reading comprehension independent of language proficiency in both L1 and L2 (Frid & Friesen, 2019), and that successful test-takers use metacognitive strategies significantly higher than the unsuccessful test-takers (Phakiti, 2003). However, the literature provides us with mixed results with respect to reading attitudes and reading achievement. Though some researchers have found attitudes and reading achievement



are correlated (Lee & Schallert, 2014; Petscher, 2010), others have reported that only language proficiency, and not attitudes, contributes to L2 reading achievement (Lee & Schallert, 2014). To make things even more complicated, there is evidence showing that developing a positive attitude toward reading affects strategy use (Kirmizi, 2011) and that L1 reading attitudes, and L2 proficiency contribute to L2 reading attitudes (Yamashita, 2007).

Although the findings from earlier research have provided good insights into the nature of the relationships between these cognitive and affective variables and language learning ability, the current literature still has substantial gaps concerning such issues as the relationship between reading strategies and L1 and L2 reading attitudes, and their independent and cumulative effect on L2 reading comprehension. Responding to the calls for more research on these areas of inquiry, the present study aimed to investigate the relationships among cognitive, affective, and linguistic constructs represented by reading strategies, reading attitudes, and reading comprehension.

Conceptual Framework

Since thoughtful and deliberate use of reading strategies is deemed to provide a motivational advantage to strategic readers and boost their self-efficacy based on ability and effort (Afflerbach, Pearson, & Paris, 2008), we envisaged that the use of reading strategies, as a major cognitive variable, accounts for reading performance either directly or indirectly through contributing to the affective domain represented by L2 reading attitudes. Besides, in Day and Bamford’s (1998) model of L2 reading attitude development, L1 reading attitude is regarded as a contributing factor to the formation of L2 reading attitudes. Therefore, we further hypothesised that attitude towards reading in L1 would significantly affect L2 reading attitudes.

As reading strategies are characterised as deliberate, goal-directed efforts to control and modify the reader's attempts to decode a text, comprehend words, and construct meanings (Afflerbach et al., 2008), we also predicted that reading strategies would independently have a positive correlation with the learners’ level of L2 reading comprehension. Lastly, on the basis of Day and Bamford’s (1998) model of L2 reading attitude development, we hypothesised that L2 reading attitudes would mediate between the two potential antecedents, reading strategies from the pool of cognitive variables, and L1 reading attitudes from the affective pool, and reading ability. In other words, we posited that L2 reading attitudes that help learners effectively engage in the cognitive task of reading could mediate the effect of reading strategies and L1 reading attitude on L2 reading comprehension. The schematic representation of our hypothetical model is presented in Figure 1.

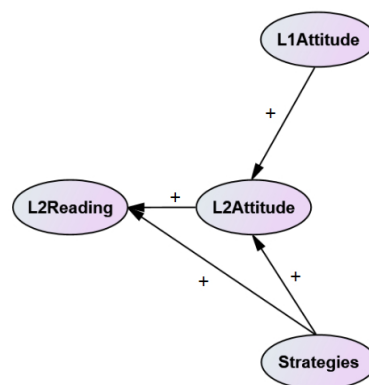


Figure 1. The hypothetical model of relationships among the variables

Literature Review

Reading Strategies and Reading Comprehension

Strategies became widely popular in psychology in the 1970s to address the cognitive aspects of information processing. However, they entered language classroom practice when they became a part of basal instruction in the early 1990s (Afflerbach et al., 2008). Several academics have put forward taxonomies of strategy use (e.g., Oxford, 1990; O'Malley & Chamot, 1990). In her early work, Oxford (1990) conceptualised strategies as direct and indirect. The direct category included memory, cognitive, and compensation strategies, and the indirect one included metacognitive, affective, and social strategies. Another popular conceptualization of strategies proposed by O'Malley and Chamot (1990) comprised three categories: metacognitive, cognitive, and social/affective strategies. While these taxonomies developed awareness of strategy use, concerns were voiced regarding their validity (Dornyei, 2005). The major concern was that although the taxonomies claimed to measure strategic competence, direct alignment with a model of information processing remained implicit (Purpura, 1999). Oxford (2011) developed an updated model of strategic competence inspired by several learning theories, which focused on how learners use strategies to regulate their language learning behaviour. It delineated meta-strategies that guided behavioural strategies, including metacognitive strategies, meta-affective strategies, and meta-sociocultural-interactive strategies.

Strategies, in general, refer to systematic plans, consciously monitored and adapted to improve one's performance in learning (Harris & Hodges, 1995). In specific, reading strategies are considered flexible and selective ways of accessing the meanings of texts in the course of reading (Richards & Schmidt, 2010). Afflerbach et al. (2008), define them as “deliberate, goal-directed attempts to control and modify the reader's efforts to decode text, understand words and construct meanings of text” (p. 368). They further add that they are motivated by control, adaptability, and good decision-making to boost self-efficacy based on ability and effort. Accomplished readers are metacognitively aware of the strategies (Anderson, 2014), which involves deciding when to use specific strategies, knowing how to monitor the use of strategies, learning how to combine different strategies, and evaluating the effectiveness of strategy use (Anderson, 2012). Focus on reading strategies can encourage students to become independent readers, capable of making wise strategic choices concerning the interpretation of any given text (Celce-Murcia & Olshtain, 2014). Strategic readers know how to choose and skilfully apply reading strategies to foster comprehension (Ediger, 2014). This, indeed, results in a correct interpretation of the text as the writer's intention and the strategic reader's expectations match (Celce-Murcia & Olshtain, 2014).

Effective strategy use has been associated with facilitating readers' comprehension and contributing to the development of reading skills. Several studies have investigated the issues related to reading strategies and reading achievement (Bruen, 2020; Frid & Friesen, 2019; Lee, 2011; Lau & Chan, 2003; Phakiti, 2003). Bruen (2020) employed qualitative analysis of reported strategic behaviour to investigate possible relationships between strategic behaviour and success in reading comprehension tasks. The study concluded that it is the appropriate use of strategies that is more likely to be linked to enhanced reading comprehension over time.

Building upon the hypothesis that the type of strategies readers adopt in making sense of the text contributes to success in L1 and L2 reading comprehension, Frid and Friesen (2019) examined immersion students' reported strategy selection. Although students reported the use of different strategies in each language, similar strategies accounted for reading comprehension performance in English and French, suggesting that reliance on these strategies either reflected greater understanding or better consolidation of the text into their memory. Sitthitikul (2007) investigated the use of L1 and L2 reading strategies among four Thai TEFL graduate students. The results showed that the participants used a much wider range of metacognitive strategies when reading English texts. Major differences in the use of strategies were also identified across the two languages.

Lau and Chan (2003) relate effective use of strategies to strategy attribution. They compared good readers and poor readers on their ability to use reading strategies in Chinese reading comprehension, and on different reading motivation variables. The results showed that poor readers scored lower than good readers in their use of sophisticated cognitive and meta-cognitive strategies. The researchers concluded that although the ability to utilise reading strategies had the strongest correlation with reading comprehension, the reader's tendency to attribute success in a reading task to strategy use might have facilitated reading development.

In the field of testing and assessment, Phakiti (2003) employed both quantitative and qualitative data analyses to examine the relationship between test-takers' use of cognitive and metacognitive strategies and reading test performance. The results indicated that the use of cognitive and metacognitive strategies had a positive relationship with the reading test performance and that highly successful test-takers reported significantly higher metacognitive strategy use than the moderately successful and the unsuccessful test-takers.

The reviewed studies yield remarkable insights into such issues as strategic behaviour and reading success, L1 and L2 strategy use and reading comprehension, and cognitive/metacognitive strategies and reading performance. Although they have found links between the appropriate use of cognitive and metacognitive strategies and enhanced reading comprehension (Bruen, 2020; Frid & Friesen, 2019; Lau & Chan, 2003; Phakiti, 2003), the question which still awaits an answer is whether reading strategy use independently contributes to reading ability or it affects reading performance indirectly through contributing to the affective domain represented in the L2 reading attitudes.

Reading Attitudes and Reading Comprehension

Despite tremendous efforts to resolve reading problems and plenty of research about the best practices in tackling reading deficits, reading continues to be exceptionally demanding for many EFL learners. This has led to researchers' keen interest in examining the degree to which affective constructs such as reading attitudes contribute to reading performance. Reading attitude is a complex phenomenon that refers to expressions of positive or negative feelings towards a language (Richards & Schmidt, 2010). It is a state of mind, accompanied by feelings and emotions, which makes reading more or less accessible to L2 readers (Smith, 1990), and makes them approach or avoid a reading situation (Alexander & Filler, 1976). Richards and Schmidt (2010) state that readers' attitudes toward reading and text content reflect their impressions of linguistic difficulty or simplicity, ease or difficulty of learning, and degree of importance. Therefore, they influence learners' reading performance (McKenna & Kear, 1990), the reading process (Moore & Lemons, 1982), and the intention to read, the comprehension time, and the level of strategy use (Kirmizi, 2011). Moore and Lemons (1982) believe motives to read, attitude toward content, and comprehension are interconnected. Therefore, they expect reading attitude and level of comprehension to covary. Arguably, favourable attitudes as a result of motive fulfilment will help learners' comprehension, and conversely, unfavourable attitudes toward content, will slow down or block the comprehension process (McKenna & Kear, 1990).

A number of SLA scholars (e.g., Day & Bamford, 1998; Mathewson, 1994; Mizokawa & Hansen-Krening, 2000) have attempted to characterise the nature of reading attitude and to integrate it into the models that explicate reading proficiency. Mathewson (1994) believes attitude is shaped by reader values and self-concept and mediates the act of reading and learning to read. He takes the view that this construct is comprised of cognitive, affective, and conative components, which are respectively represented by (1) personal and evaluative beliefs, (2) prevailing feelings and emotions, and (3) action readiness, and behavioural intentions. Mizokawa and Hansen-Krening (2000) introduced ABC's of attitudes toward the incredibly complex task of reading. ABC represented the three domains of affect, behaviour, and cognition which are the building blocks of readers' response to reading materials. Lastly, Day and Bamford (1998) identified certain factors contributing to the development of L2 reading attitudes. The factors include L1 reading attitude, previous experiences with learning to read L2s other than English, culture and people, and

the L2 classroom environment. That L1 reading attitude contributes to the development of L2 reading attitude is a significant component of Day and Bamford's (1998) theory that will be tested in the present study.

A plethora of studies have addressed the relationship of L1 and L2 reading attitudes with reading ability (Petscher, 2010; Lee & Schallert, 2014; Yamashita, 2007). In a meta-analysis of the relationship between reading attitudes and achievement in reading, Petscher (2010) showed that while the mean strength of the relationship between the two variables was moderate, it was stronger for elementary students in comparison with middle school students. The study further highlighted the significance of understanding how attitudes might interact with other psychosocial constructs.

Lee and Schallert (2014) explored the relationship among L1 and L2 reading attitudes, the relative contribution of reading attitude and language proficiency to reading achievement, and various factors that shape L2 reading attitude. The results indicated that although measures of L1 reading attitude factors correlated with the L2 reading attitude factors, L1 and L2 reading attitudes displayed different tendencies.

Martínez, Aricak, and Jewell (2008) investigated the hypothesis that reading attitudes and reading skills among fourth graders significantly contribute to scores on a high-stakes state-wide reading achievement test administered four months later in the fifth grade. The results supported a temporal interactive effect of prior reading attitude and skill on later reading achievement.

Finally, Yamashita (2007) examined the transfer of reading attitudes from L1 to L2 among university-level EFL students. The results revealed the significant contribution of L1 reading attitudes and L2 proficiency to L2 attitudes. The study concluded that learners who possess a positive attitude toward L1 reading are more likely to keep it in L2 reading.

A brief review of the findings provided insights for better understanding of such issues as the nature and strength of the relationship between L2 and L1 reading attitudes, the transfer of reading attitudes from L1 to L2, and the various factors shaping L2 reading attitude. Though the findings of the previous studies have demonstrated that reading attitudes and reading achievement are related (Petscher, 2010), cognitive attitudes predict reading comprehension (Lee & Schallert, 2014), prior reading attitude and skill have a temporal interactive effect on later reading achievement (Martínez et al., 2008), and that L1 reading attitudes and L2 proficiency contribute to L2 reading attitudes (Yamashita, 2007), the issue that constitutes a focus of the present study is the cognitive and affective variables that contribute to the development of L2 reading attitudes and subsequently effective reading.

Transfer of Reading Attitudes from L1 to L2

As the transfer of reading attitudes from L1 to L2 is one of hypotheses tested in the present study it might be useful to discuss this issue in more detail. Although there appears to be a large set of distinctions between L1 and L2 reading, many points of similarity have made the investigation of L1 and L2 reading appealing. The key similarities include the reading comprehension processes and the underlying cognitive resources beyond language, the types of language resources for reading comprehension in L1 and L2 settings, the background knowledge resources, variables predicting L1 and L2 reading comprehension, the developmental processes over time, and the growth of automaticity and fluency (Li & Clariana, 2019; Nassaji, 2014; Verhoeven, 2017).

Over the past forty years, key theories have addressed the issue of L1 transfer and its impact on L2 reading development. The Interdependence Hypothesis (Cummins, 1979) posits that academic language proficiency entails common interdependent underlying language skills and can be shared between two languages in educational contexts. For L1 to L2 transfer to occur, Cummins (1981) later stated in his Threshold Hypothesis that a certain level of proficiency is required in each language (but with emphasis on the L1). The results of a study conducted on 97 undergraduate Iranian English major students (Rahimi, Sadighi & Alimorad Dastkheyr, 2009) suggest that the transfer of L2 reading strategies can occur if EFL learners reach higher levels of proficiency.

Research on possible transfer effects from L1 to L2 has investigated the phenomenon for different L1s, and has identified specific cognitive and language skills that seem to transfer. This new perspective has given a more balanced examination of these hypotheses, and has introduced the Common Underlying Cognitive Processes Framework (Geva & Ramirez, 2015) that states that common cognitive processes such as verbal working memory, reading strategies, metacognitive awareness skills, executive control skills, and motivation are all regarded as universal supports for reading abilities in any language. Besides, Koda (1998) presented a nuanced picture of L1–L2 transfer by her Transfer Facilitation Model showing that L1–L2 distance factors produce differing degrees of transfer that promote or interfere with L1–L2 transfer.

Research Questions

Based on the conceptual framework presented and discussed in the light of research evidence from the literature, the following research questions were formulated to guide the present study:

1. What is the relationship between strategy use and L2 reading attitudes?
2. What is the relationship between strategy use and reading ability?
3. What is the relationship between L1 reading attitudes and L2 reading attitudes?
4. What kind relationship is there between L1 reading attitudes, strategy use and L2 reading ability?

Method

Participants and Setting

The participants in the present study were 145 Persian-speaking Iranian male 10th grade senior high school students of three public schools in Iran with an age range of 15 to 16. English language instruction is presented for a total of six years in Iranian educational system, starting in the 7th grade in junior high school and finishing in the 12th grade in senior high school. Therefore, all the study participants had received three years of formal English instruction for two hours a week prior to the study. Their academic backgrounds varied from math and physics to experimental sciences and humanities. They had lived their entire life in Iran, where English is considered as a foreign language, and language learning is largely confined within the four walls of a classroom.

Instruments

Reading attitudes questionnaires

The authors utilised the Reading Attitude Questionnaire developed by Yamashita (2007) to measure the participants' L1 and L2 reading attitudes. The questionnaire was divided into three sections. The first section elicited demographic information, and the second and third sections used 24 five-point Likert-scale items to collect data on the students' affective reactions toward reading in L1 and L2. The items collected data on six different constructs, which included discomfort, comfort, intellectual value, practical value, anxiety, and linguistic value. The wording of each questionnaire item, written in English, was identical in the L1 and L2 questionnaires, except that the word 'English' in the original questionnaire was replaced by 'Persian' in the L1 questionnaire. To ensure that the participants fully comprehended the questionnaire items, they were translated into their mother tongue, Persian. The Persian-language version of the questionnaire was identical to the English version in its organizational structure and content. To maintain the equivalence between the original and translated versions, we used Brislin's (1970) classic back-

translation method. We used Cronbach's alpha to establish the reliability of the questionnaires. Coefficient alpha of the L1 and L2 questionnaires were 0.85 and 0.88 respectively.

Reading strategies questionnaire

We used the 36-item reading strategies questionnaire constructed by Tsai, Ernst, and Talley (2010) to collect data on students' general knowledge and use of English reading comprehension strategies. This questionnaire comprised five categories as follows: (1) textual content relating to linking information, and correcting ideas formed earlier in reading, (2) reader response referring to learning something new and reacting intellectually to information in the text, (3) concrete techniques which pertain to interpreting the text, visualizing the descriptions and evaluating comprehension, (4) task perception which involves aiming first for general understanding and judging the significance of meaning and pronunciation of individual words, and (5) local problem-solving techniques which refer to guessing the meaning from context and comparing the word or expression with something similar in L1 or L2. The items in each of the five categories were followed by a 5-point Likert scale. To guarantee the comprehensibility of the questionnaire, it was translated into Persian using the technique of back translation proposed by Brislin's (1970). The Persian-language version of the questionnaire also contained 36 items classified into five equivalent categories. The alpha coefficient of reading strategies questionnaire was 0.88, which substantiates high internal consistency of the measure. It must be noted that due to overlapping values in confirmatory factor analysis, and insignificant factor loading in the SEM, one reading strategy factor, labelled reader response, and two reading attitude components, comfort and discomfort, were eliminated from the final analysis.

L2 reading comprehension test

A L2 reading comprehension test was developed to measure students' level of reading ability. First two authentic passages were selected and were subsequently abridged to approximately 200 words. Then, they were analysed for their equivalence to the reading passages of 10th grade English textbook, Vision 1 (Alavi Moghaddam, Kheirabadi, Rahimi, & Davari, 2016) in terms of structural and lexical complexity utilizing the web-based interface to the LCA (Ai & Lu, 2010), and L2SCA (Lu, 2010), and also the readability statistics of Microsoft Office 2016. Then, five multiple-choice items were developed for each passage. The items addressed such areas as *content*, *language*, and *affect*. To ensure that the test enjoyed a suitable difficulty level, the questions on the test were given to a group of three 10th grade students to answer without reading the passages. The three questions which were answered correctly by the majority of test-takers were replaced by new items. The procedure continued as long as no item could be answered by the majority of the students without reading their respective passage. Then the full test was given to another group of three students to see if they could get the questions right reading the passages. Since no single question was answered incorrectly by all the test takers the test was finalised, and prepared for administration. To establish the reliability of the test, its internal consistency was measured to be .89 using Cronbach's alpha.

Procedure

We collected the data on students' reading attitude, strategy use, and reading comprehension in one session during English classes of one of the researchers. The data collection was carried out in a short period primarily to control the extraneous variables that could affect students' responses if data collection had been organised in more than one session. First, the reading attitude questionnaire was administered. Then, the students were given the L2 reading comprehension test. Given that major standard general English proficiency tests including IELTS and PTE give candidates 90 seconds per reading comprehension item, we decided to give participants 15 minutes to answer the 10 question items. Soon after submitting the test, they were asked to fill out the questionnaire on reading strategy use.

Data Analysis

Pearson’s r which is used to determine the degree of correlation assuming a linear relationship between two variables was applied to estimate the degree of correlation among cognitive, affective and linguistic constructs. All Pearson observed values were then subjected to t-test for Pearson r (see Ary, Jacobs, & Sorensen, 2010) to test the hypotheses concerning the significance of the population correlation (ρ) in each instance of estimated correlation. Then, structural equation modelling, a statistical procedure used to verify a hypothesised model of relationships among several variables, was employed using AMOS 24 software. The proposed model’s goodness of fit referring to the model’s correspondence with the data was also established. The chi-square test, a procedure used to specify whether the relationship between two or more different variables is independent, was also utilised.

Results

Correlations between Reading Strategies and L2 Reading Comprehension

As Pearson correlations matrix for the measured variables in Table 1 illustrates, with regard to the components of reading strategies, textual content had the strongest and local problem-solving techniques had the weakest correlation with L2 reading comprehension. The other two components, concrete techniques and task perception both had significant correlations with L2 reading comprehension.

Correlations between Reading Strategies and L2 Reading Attitudes

The four components of reading strategies were all positively correlated with all the factors comprising L2 reading attitude. While textual content, concrete techniques, and local problem-solving techniques had their strongest correlation with L2 intellectual value, task perception had the highest correlation with L2 anxiety. On the other hand, whereas textual content and concrete techniques had the weakest correlations with L2 anxiety, task perception and local problem-solving techniques had their weakest correlations with practical value.

TABLE 1
Pearson Correlations Matrix for the Factors and Variables

	L2RC	IV	A	LV	PV	L2IV	L2A	L2LV	L2PV	TC	CT	TP	LPST
L2RC	1												
IV	.44**	1											
A	.38**	-.09	1										
LV	.45**	.71**	-.11	1									
PV	.40**	.68**	-.11	.63**	1								
L2IV	.58**	.53**	.10	.40**	.46**	1							
L2A	.31**	.05	.52**	.00	.04	.01	1						
L2LV	.53**	.36**	.04	.44**	.30**	.53**	-.11	1					
L2PV	.51**	.36**	.16	.45**	.43**	.57**	-.01	.61**	1				
TC	.67**	.49**	.21**	.49**	.45**	.58**	.29**	.49**	.46**	1			
CT	.46**	.43**	.05	.46**	.50**	.49**	.19*	.38**	.41**	.62**	1		
TP	.37**	.04	.24**	.06	.02	.14	.34**	.17*	.06	.33**	.13	1	
LPST	.42**	.33**	.15	.34**	.44**	.39**	.34**	.31**	.28**	.64**	.61**	.19*	1

Notes. *. Correlation is significant at the 0.05 level (2-tailed)

** . Correlation is significant at the 0.01 level (2-tailed).

Correlations between L1 and L2 Reading Attitudes

Regarding the components of L1 and L2 reading attitude, as expected the strongest correlation was found to be between the counterparts. That is to say, L1 intellectual value, L1 anxiety, L1 linguistic value and L1 practical value had their strongest positive correlation with L2 intellectual value, L2 anxiety, L2 linguistic value and L2 practical value. While, L1 intellectual value, L1 linguistic value and L1 practical value had their lowest correlation with L2 anxiety, L1 anxiety had its weakest correlation with L2 linguistic value.

Correlations between L2 Reading Attitudes and L2 Reading Comprehension

With respect to the components of L2 reading attitude and L2 reading comprehension, the correlation between all the underlying factors and L2 reading comprehension was positive, significant and moderately strong, with intellectual value and anxiety having the highest and weakest correlation with L2 reading comprehension.

Structural Equation Modelling

We used AMOS 24 to analyse the links among the endogenous and exogenous variables and their indicators and test our proposed model. As maximum likelihood estimation (MLE), which is the standard estimation approach in AMOS, assumes that the variables included in the analysis exhibit multivariate normality, we first assessed the multivariate normality of the data in AMOS 24. The output under the assessment of normality for 145 cases showed the data significantly departed from the norms of multivariate normality since the multivariate kurtosis of the present data was 15.01, and the critical ratios were 4.57.

The issue of multivariate non-normality

To tackle the issue of multivariate non-normality, we assessed the presence of multivariate outliers using Mahalanobis distance. This statistic represents the squared distance from the centroid of a data set. The farther the item from the mean distribution, the bigger is the distance (Collier, 2020). Cases with Mahalanobis d-squared values departing substantially from the others are more likely to be multivariate outliers (Byrne, 2010). Checking the observations farthest from the centroid, we omitted 10 outliers. This omission decreased multivariate kurtosis and critical ratios to around a fifth of the initial values from 15.01 and 4.57 to 3.16 and .93, respectively. Therefore, the data gained the proper normality conditions required for structural equation modelling.

The structural equation model of interrelationships

Conducting SEM made it possible to test out hypotheses drawn from the related literature with regard to the nature and the direction of the relationships among the variables. In the analysis, the main endogenous factor (dependent latent variable) was L2 reading ability (L2Reading, for short) which was regressed on the exogenous factors (independent latent variables) of L1 reading attitudes, L2 reading attitudes and reading strategies. Figure 2 illustrates the measured variables loading on each of these endogenous and exogenous latent variables. In this model, all regression paths between measured variables and their latent factors, in addition to the ones between exogenous factors and the L2 reading ability were statistically significant. In other words, the three independent variables, L1 reading attitudes, reading strategies, and L2 reading attitudes were all positively and significantly correlated with the dependent variable, L2 reading ability. Among the exogenous variables, L2 reading attitudes had the strongest direct effect on L2 reading ability with a correlation coefficient of 0.62 while reading strategies had the weakest direct effect on L2 reading ability ($r=0.40$). What is more, both L1 reading attitudes and reading strategies had positive

correlations with L2 reading attitudes with a strong correlation ($r=0.90$) for reading strategies and a moderate one for L1 reading attitudes ($r=0.44$). Therefore, it can be concluded that the model illustrated in figure 2, arguably confirms the hypotheses proposed in Figure 1.

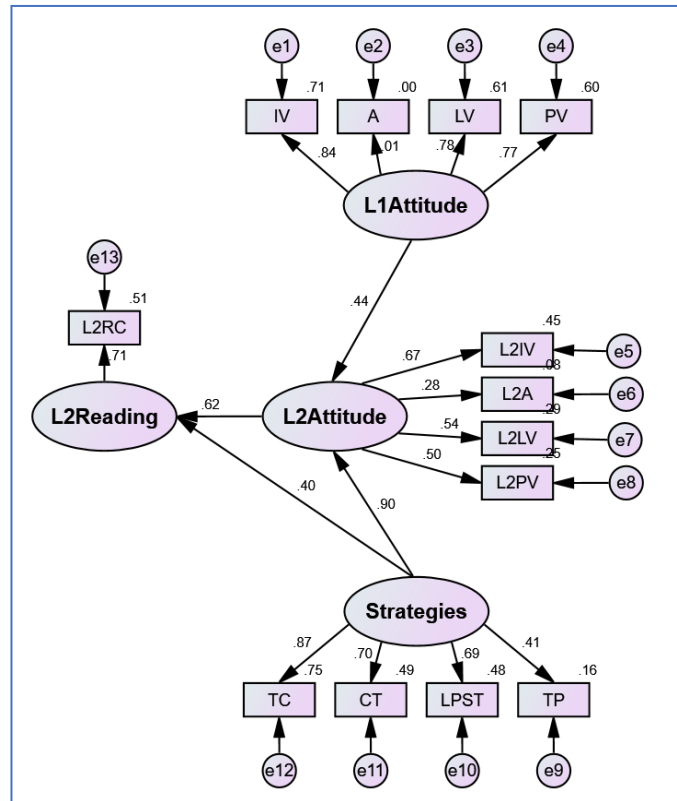


Figure 2. The structural equation model of interrelationships among observed variables

Measuring the indirect effects

The indirect effect was estimated using Hayes (2018) Process v3.3 for mediation through conducting linear regression with bootstrapping using 5000 bootstrap samples at 95 bias-corrected confidence level in SPSS software. According to the standard procedure, if the lower and upper bounds of the 95% confidence interval includes zero, then the inference is that the population indirect effect is null. Conversely, if zero falls outside the confidence interval, then the indirect effect is inferred to be non-zero. As can be seen from Table 2, zero falls outside the upper and the lower bounds. Therefore, the indirect effect of reading strategies on L2 reading comprehension through L2 reading attitude is present.

TABLE 2

Indirect Effect of Reading Strategies on L2 Reading Comprehension

Indirect effect of X on Y				
	Effect	BootSE	BootLLCI	BootULCI
L2RA	.26	.03	.19	.34

Similarly, Process v3.3 was also utilised to estimate the indirect effect of L1 reading attitude on L2 reading comprehension through L2 reading attitude. The results of linear regression with bootstrapping using 5000 bootstrap samples at 95 bias-corrected confidence level showed that, since zero falls outside the lower and upper limits, L2 reading attitude mediates the effect of L1 reading attitude on L2 reading comprehension (Table 3).

TABLE 3

Indirect Effect of L1 Reading Attitude on L2 Reading Comprehension

Indirect effect of X on Y				
	Effect	BootSE	BootLLCI	BootULCI
L2RA	.47	.06	.33	.61

Discussion and Conclusion

Research Question One

The study investigated whether and how reading strategy use, and L1 and L2 reading attitudes affected L2 reading ability. It was clearly shown that strategy use and all its four components were highly correlated with L2 reading attitudes. This finding was in line with Afflerbach et al. (2008) who argued that thoughtful and deliberate use of reading strategies provides a motivational advantage to strategic readers and boost their self-efficacy based on ability and effort. Task perception, as a cognitive strategy, had the highest correlation with L2 reading anxiety. This strong correlation is plausible because if readers perceive themselves to be inefficient in the sense that they do not understand every word, and have problems with the pronunciation of lexical items, they feel the pressure and anxiety that is detrimental to task performance. The other three factors underlying strategy use, textual content, concrete techniques, and local problem-solving techniques, had the strongest correlation with L2 intellectual value. It can be hypothesised that when a strategic reader links, organises, and guesses upcoming information, and push ahead and skip the difficulty when blocked, she will feel competent enough to get various forms of information, know about new ways of thinking, learn to express herself better, and get acquainted with different value systems by reading in English. The study also supports findings of the previous studies that reading attitudes and reading achievement are related (Petscher, 2010), cognitive attitudes predict reading comprehension (Lee & Schallert, 2014), and that both prior reading attitude and skill have a temporal interactive effect on later reading achievement (Martinez et al., 2008).

Research Question Two

Drawing upon Anderson’s (2012) finding that accomplished readers are metacognitively aware of the strategies, and Ediger’s (2014) claim that strategic readers know how to choose and apply reading strategies that result in a correct interpretation of the text, we hypothesised that the two constructs are related. The results of the study confirmed the hypothesis as they showed the use of reading strategies is independently correlated with the learners’ L2 reading ability. This finding is also consistent with Afflerbach et al. (2008) who characterised reading strategies as deliberate, goal-directed efforts to control and modify the reader’s attempts to comprehend words, decode and construct meanings of a text. As expected, textual content, as an underlying component of strategy use, had a very strong correlation with reading ability. Clearly, the readers’ ability to draw on their knowledge of the subject, keep ideas in their mind, pay greater attention to the key points in the text, identify the organization of details, and correct or change ideas formed earlier will improve learners’ reading comprehension. By contrast, local problem-solving techniques, as another underlying factor, had the weakest correlation with L2 reading comprehension. A speculative argument for this finding is that since the reading comprehension test was developed in a painstaking process of lexical and structural text analysis to make sure the passages and questions were at the right difficulty level; the learners might not have felt much need to resort to problem-solving techniques such as comparing the problematic lexical items with a related word in Persian or English, guessing the meaning from context, or analysing words and expressions. Moreover, the results of the study corroborate the findings of the previous studies that it is the appropriate use of strategies that is more likely to be related to enhanced reading comprehension (Bruen, 2020), the ability to utilise reading strategies had the strongest correlation with

reading comprehension (Lau & Chan 2003), and that the use of cognitive and metacognitive strategies had a positive relationship with the reading test performance (Phakiti, 2003).

Research Question Three

Guided by Day and Bamford's (1998) model of L2 reading attitude development that recognises L1 reading attitude as one of the factors contributing to the development of L2 reading attitudes, we hypothesised that L1 reading attitudes would affect L2 reading attitudes. The results of the study revealed a significant correlation between attitudes towards reading in L1 and L2 reading attitudes. In other words, learners' attitudes toward L1 reading are transferrable to L2 reading. The implication is that those who see intellectual, practical, and linguistic value in reading in L1 are likely to assume similar values in reading in L2, or those who feel anxious reading in L1 are predisposed to experience the same feelings in reading in the target language. Therefore, it can be concluded that what the EFL learners have acquired in their L1 reading functions as a solid basis on which L2 reading develops. The results of the study are consistent with the findings of the previous studies that measures of variables related to L1 reading attitude correlated with the L2 reading attitude variables (Lee & Schallert, 2014), and that learners who possess a positive attitude toward L1 reading are more likely to keep it in L2 reading (Yamashita, 2007).

Research Question Four

Moore and Lemons (1982) theorised that motives to read, attitude toward content, and comprehension are interconnected, and that reading attitude and level of comprehension covary. On this basis, we finally hypothesised that L2 reading attitudes and reading ability are related and that L1 reading attitude and strategy use have an influence on reading ability by affecting L2 reading attitudes. The statistical analyses utilised approved the hypotheses and clearly showed that L2 reading attitudes that help learners effectively engage in the cognitive task of reading play a mediatory role facilitating the effect of both L1 reading attitudes and strategy use on L2 reading ability. This is a finding confirming McKenna and Kear's (1990) hypothesis that favourable attitudes as a result of motive fulfilment will help learners' comprehension, and conversely, unfavourable attitudes toward content will slow down or block the comprehension process, Kırmızı's (2011) claim that developing a positive reading attitude can have an effect on the students' development towards becoming good readers.

Pedagogical Implications

Significant pedagogical implications can be drawn from the results of the present study. Since there was a strong correlation between L1 and L2 reading attitudes, it can be inferred that learners with negative attitudes toward L1 reading may not fully develop their potential as L2 readers and stop practicing and developing their ability as soon as the requirements such as assignments or exams are met. The reason is that they do not tend to get themselves further involved with L2 reading even if they have, at some point of their development, been successful L2 readers. On the other hand, the learners with favourable attitudes toward reading in their mother tongue are more likely to keep them towards reading in L2. Thus, teachers should make efforts to understand learners' attitudes toward reading, encourage EFL learners to read in both languages, and suggest them appropriate reading materials at the right difficulty level with attractive topics that can appeal to them. Respecting learners' interests by introducing appealing reading materials is a significant step in this process, and might be conducive to developing positive attitudes. By nurturing positive attitudes toward reading in general, even readers who are not currently successful L2 readers will likely become more skilful as they have the necessary potential.

Concerning reading strategies, it must be noted that the study clearly demonstrates that the use of strategies positively affects reading ability as skilled readers draw upon more strategies in different contexts. Thus, a major implication is that teaching strategy use can assist learners with improving their reading

ability. Teachers should acquaint learners with a helpful repertoire of reading strategies and help them develop and hone strategic skills by giving them the necessary information to use strategies so that they can acquire and expand the metacognitive knowledge needed for successful strategic reading. Besides, EFL instructors should recognise the application of different reading strategies. While certain strategies such as linking information, organizing details, and skipping difficulties are common to both L1 and L2 reading, others such as translation to L1 or pronouncing words and analysing their structure are particularly utilised by skilled L2 readers. Therefore, EFL instructors should be aware of the function and application of different reading strategies used in L1 and L2 and integrate them with language education.

In line with the framework of Smidt and Helgelheimer (2004), teachers are advised to take up activities to improve EFL learners' use of inferencing, elaboration, translation, and transfer strategies. Some examples would be analysing words into roots, prefixes, and suffixes; relating new to known information; translating the word or sentences into one's L1; and transferring L1 linguistic knowledge to L2. We should not forget, though, that a prerequisite to strategy use is the basic knowledge of L2. Yang (2006) emphasises that readers will not be able to apply reading strategies to support their comprehension if they lack the necessary basic language knowledge.

Limitations

Despite the key findings of the study regarding the relationship between L1 and L2 reading attitudes and reading strategies, the results should be taken as tentative due to limitations of the study. First, although we made sure the questionnaires and passages did not represent any bias for or against study participants, the scope of data collection was limited to male participants of the same grade and age group in just three schools of one city. Arguably, studies in different sociocultural contexts and educational systems including female participants of different grades and age group living in other geographical locations with different L1 backgrounds may produce different results. Second, the high correlation between L1 and L2 reading attitudes could be induced by using the same questionnaire formats. Future studies may use different measures to tap attitudes toward L1 and L2. Finally, the study used self-reported questionnaires in data collection. Future studies may need to further analyse descriptive information by drawing on qualitative tools such as think-aloud protocols.

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References

- Afflerbach, P. P., Pearson, P. D., & Paris, S. (2008). Clarifying differences between reading skills and reading strategies. *The Reading Teacher*, 61(5), 364-373. <https://doi.org/10.1598/RT.61.5.1>
- Ai, H., & Lu, X. (2010, June 8–12). A web-based system for automatic measurement of lexical complexity. In *27th Annual Symposium of the Computer-Assisted Language Consortium* [Paper presentation]. CALICO-10, Amherst.
- Alavi Moghaddam, S. B., Kheirabadi, R., Rahimi, M., & Davari, H. (2016). *Vision 1: English for schools*. Organization for Educational Research and Planning (OERP).
- Alexander, J. E., & Filler, R. C. (1976). *Attitudes and reading*. International Reading Association.
- Anderson, N. J. (2005). L2 strategy research. In E. Hinkel (Ed.), *Handbook of research in second language teaching and learning*. (pp.757-772). Lawrence Erlbaum Associates.
- Anderson, N. J. (2012). Metacognition: Awareness of language learning. In S. Mercer, S. Ryan, M. Williams (Eds.), *Psychology for language learning: Insights from research, theory and pedagogy*. (pp. 169-187). Palgrave Macmillan.
- Anderson, N. J. (2014). Developing engaged second language readers. In M. Celce-Murcia, D. Brinton, and M.A. Snow (Eds.), *Teaching English as a second or foreign language*. (pp. 170–188). National Geographic Learning.
- Ary, D., Jacobs. L. C., & Sorensen, C. (2010). *Introduction to research in education (8th ed)*. Cengage Learning.
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3), 185–216. doi:10.1177/135910457000100301
- Bruen, J. (2020). Language learning strategies for reading comprehension: assessing the strategy use of young adults at beginners' level taking Chinese, German, Japanese or Spanish as foreign languages at university. *The Language Learning Journal*, 48(2), 170-186. <https://doi.org/10.1080/09571736.2017.1370606>
- Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming (2nd ed.)*. Routledge/Taylor & Francis Group.
- Celce-Murcia, M. & Olshtain, E. (2014). Teaching language through discourse. In M. Celce-Murcia, D. Brinton, and M.A. Snow (Eds.), *Teaching English as a second or foreign language*. (pp. 424–437). National Geographic Learning.
- Collier, J. (2020). *Applied Structural Equation Modeling using AMOS: Basic to Advanced Techniques* (1st ed.). Routledge. <https://doi.org/10.4324/9781003018414>
- Cummins, J. (1979). Linguistic interdependence and the development of bilingual children. *Review of Educational Research*, 49(2), 222–251. <https://doi.org/10.2307/1169960>
- Cummins, J. (1981). The Role of Primary Language Development in Promoting Educational Success for Language Minority Students. In California State Department of Education (Ed.), *Schooling and Language Minority Students: A Theoretical Rationale* (pp. 3-49). California State University.
- Day, R., & Bamford, J. (1998). *Extensive reading in the second language classroom*. Cambridge University Press.

- Dornyei, Z. (2005). *The psychology of the language learner: Individual differences in second language acquisition*. Lawrence Erlbaum Associates.
- Ediger, A. (2014). Teaching second/foreign language literacy to school-age learners. In M. Celce-Murcia, D. Brinton, and M.A. Snow (Eds.), *Teaching English as a second or foreign language*. (pp. 154-169). National Geographic Learning.
- Frid, B., & Friesen, D. C. (2019). Reading comprehension and strategy use in fourth- and fifth-grade French immersion students. *Reading and Writing, 33*(5), 1213-1233. <https://doi.org/10.1007/s11145-019-10004-5>
- Geva, E., & Ramirez, G. (2015). *Focus on reading*. Oxford University Press.
- Harris, T., & Hodges, R. (1995). *The literacy dictionary: The vocabulary of reading and writing*. International Reading Association.
- Hayes, A. F. (2018). *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-based Approach*. 2nd ed. Guilford Press.
- Kırmızı, F. S. (2011). The relationship between reading comprehension strategies and reading attitudes. *Education 3-13, 39*(3), 289-303. <https://doi.org/10.1080/03004270903514320>
- Koda, K. (1998). The role of phonemic awareness in second language reading. *Second Language Research, 14*(2), 194-215. <https://doi.org/10.1191/026765898676398460>
- Lau, K. L., & Chan, D. W. (2003). Reading strategy use and motivation among Chinese good and poor readers in Hong Kong. *Journal of Research in Reading, 26*(2), 177-190. <https://doi.org/10.1111/14679817.00195>
- Li, P., & Clariana, R. B. (2019). Reading comprehension in L1 and L2: An integrative approach. *Journal of Neurolinguistics, 50*, 94-105. <https://doi.org/10.1016/j.jneuroling.2018.03.005>
- Lee, J., & Schallert, D. L. (2014). Literate actions, reading attitudes, and reading achievement: Interconnections across languages for adolescent learners of English in Korea. *The Modern Language Journal, 98*(2), 553-573. <https://doi.org/10.1111/modl.12088>
- Lee, K. R. (2011). Which reading strategy is more helpful for EFL readers, using graphic organizers or enhancing input? *The Journal of Asia TEFL, 8*(4), 111-133.
- Lu, X. (2010). Automatic analysis of syntactic complexity in second language writing. *International Journal of Corpus Linguistics, 15*(4), 474-496. <https://doi.org/10.1075/IJCL.15.4.02LU>
- Martínez, R. S., Arıcak, O. T., & Jewell, J. (2008). Influence of reading attitude on reading achievement: A test of the temporal-interaction model. *Psychology in the Schools, 45*(10), 1010-1023. <https://doi.org/10.1002/pits.20348>
- Mathewson, G. C. (1994). Model of attitude influence upon reading and learning to read. In R. B. Ruddell, M. R. Ruddell, & H. Singer, (Eds.), *Theoretical models and processes of reading*. (pp. 1121-1161). International Reading Association.
- Mizokawa, D., & Hansen-Krening, N. (2000). The ABCs of attitudes toward reading: Inquiring about the reader's response. *Journal of Adolescent & Adult Literacy, 44*(1), 72-79. <https://doi.org/10.2307/40016860>
- McKenna, M. C. & Kear, D. J. (1990). Measuring attitude toward reading: A new tool for teachers. *The Reading Teacher, 43*(9), 626-639. <https://doi.org/10.1598/RT.43.8.3>
- Moore, S. C., & Lemons, R. (1982). Measuring reading attitudes: Three dimensions. *Reading World, 22*(1), 48-57. <https://doi.org/10.1080/19388078209557678>
- Nassaji, H. (2014). The role and importance of lower-level processes in second language reading. *Language Teaching, 47*(1), 1-37. <https://doi.org/10.1017/S0261444813000396>
- O'Malley, J. M., & Chamot, A. U. (1990). *Learning strategies in second language acquisition*. Cambridge University Press.
- Oxford, R. L. (1990). *Language learning strategies: What every teacher should know*. Heinle & Heinle.
- Oxford, R. L. (2011). *Teaching and researching language learning strategies*. Pearson Longman.

- Phakiti, A. (2003). A closer look at the relationship of cognitive and metacognitive strategy use to EFL reading achievement test performance. *Language Testing*, 20(1), 26–56. <https://doi.org/10.1191/0265532203lt243oa>
- Petscher, Y. (2009). A meta-analysis of the relationship between student attitudes towards reading and achievement in reading. *Journal of Research in Reading*, 33(4), 335–355. <https://doi.org/10.1111/j.14679817.2009.01418.x>
- Purpura, J. E. (1999). *Learner strategy use and performance on language tests: A structural equation modeling approach*. Cambridge University Press.
- Rahimi, M., Sadighi, F., & Alimorad Dastkheyr, Z. (2009). Do L2 proficiency and L1 reading strategies affect Persian EFL learners' use of English reading strategies? Threshold hypothesis revisited. *The Journal of ASIA TEFL*, 6(3), 177-200.
- Richards, J. C., & Schmidt, R. W. (2010). *Longman dictionary of language teaching and applied linguistics*. Routledge.
- Sitthitikul, P. (2007). A comparative analysis of awareness in reading L1 and L2 texts: EFL Thai students' strategies use, processing speed and linguistic knowledge. *The Journal of ASIA TEFL*, 4(3), 129-160.
- Smidt, E., & Hegelheimer, V. (2004). Effects of online academic lectures on ESL listening comprehension, incidental vocabulary acquisition, and strategy use. *Computer Assisted Language Learning*, 17(5), 517–556. <https://doi.org/10.1080/0958822042000319692>
- Smith, M. C. (1990). The development and use of an instrument for assessing adults' attitudes toward reading. *Journal of Research & Development in Education*, 23(3), 156–161
- Tsai, Y. R., Ernst, C., & Talley, P. C. (2010). L1 and L2 strategy use in reading comprehension of Chinese EFL readers. *Reading Psychology*, 31(1), 1–29. <https://doi.org/10.1080/02702710802412081>
- Verhoeven, L. (2017). Learning to read in a second language. In K. Cain, D. Compton, & R. Parrila (Eds.), *Theories of reading development* (pp. 215–234). John Benjamins.
- Yamashita, J. (2007). The relationship of reading attitudes between L1 and L2: An investigation of adult EFL learners in Japan. *TESOL Quarterly*, 41(1), 81–105. <https://doi.org/10.1002/j.1545-7249.2007.tb00041.x>
- Yang, Y. F. (2006). Reading strategies or comprehension monitoring strategies? *Reading Psychology*, 27(4), 313–343. <https://doi.org/10.1080/02702710600846852>

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