

## **Chapter 3: Methodology**

### **3.1. Introduction**

This chapter describes the research methodology that was used in the present study. Cognitive and metacognitive reading strategy questionnaire and think-aloud protocols were used as the data collection instruments in the present study. A mixed-method design was employed to have a comprehensive view of strategy use among Iranian EFL learners. They were mixed in the phase of results.

### **3.2. Participants**

300 high school learners were randomly chosen in Azerbaijan, Iran, consisting of 145 males and 155 females. Their age was from 15 to 17 years. High school learners were selected since they have been in English classes for six years (Birjandi, Soheili, Nowroozi, & Mahmoodi, 2000; Birjandi, Nowroozi, & Mahmoodi, 2002a; Birjandi, Nowroozi, & Mahmoodi, 2002b). Thus, they are able to express their strategies better than elementary or secondary school learners. It is assumed that students in high school would be better able to talk about their strategies than secondary or elementary school students.

#### **3.2.1. Sampling**

Stratified sampling and simple random sampling were employed in the present study. The sample was grouped into two high-proficient and low-proficient learners based on the results

of Nelson English Proficiency test. As shown in Table 3.1, we can see that there were 3000 EFL learners at the language centre: 1440 boys and 1560 girls. Of these, 1830 were high-proficient students and 1170 were low-proficient students.

Table 3.1 Proportional Stratification Sampling

<b>Population, N=3000</b>	<b>Random Sampling</b>	
Boys, N=1440	.48	145
Girls, N=1560	.52	155
		Sample= 300
Population, N=3000	Random Sampling	
High-proficient students, N=1830	.61	184
Low-proficient students, N=1170	.39	116
		Sample =300

In this study, variation in proficiency was controlled via the Nelson language proficiency test which is a standardized test. As a result, students were classified into high-proficient and low-proficient groups.

Among the 300 students, only 20 volunteered to join the think-aloud component of the research. There were 12 males and 8 females among the 20 participants. Out of the 20, 10 were high-proficient and 10 were low-proficient. Their proficiency levels were previously determined by the Nelson general language test. To address consistency among students, as presented in Table 3.2, all participants had similar background characteristics: they all had approximately the same number of years of English learning experience both inside and outside the classroom. In Iran, after junior high school, students proceed to high school for another three years and study English for two hours per week which means that all of them have 6 years of English learning.

Table 3.2 Background information of the 20 participants for think-aloud protocols

<b>Pseudonyms</b>	<b>Gender</b>	<b>Grade</b>	<b>Proficiency level assigned by Tests</b>	<b>Years of studying English in school</b>
Ali	Male	3	Low	6
Reza	Male	3	High	6
Jaafar	Male	3	Low	6
Sakineh	Female	3	High	6
Akbar	Male	3	Low	6
Yaser	Male	3	Low	6
Kobra	Female	3	High	6
Mortaza	Male	3	High	6
Nesa	Female	3	High	6
Nazila	Female	3	Low	6
Anita	Female	3	Low	6
Farhad	Male	3	High	6
Farzaneh	Female	3	Low	6
Amir	Male	3	Low	6
Afsaneh	Female	3	High	6
Nasrin	Female	3	Low	6
Faezeh	Female	3	Low	6
Armin	Male	3	High	6
Arezoo	Female	3	High	6
Meisam	Male	3	High	6

To address question 3, intermediate students were chosen for strategy training. Their general language proficiency was determined by the Nelson language proficiency test, a standardized test given to the students at the beginning of their English studies to classify them into different proficiency levels. Simple random sampling was used to select 80 students among 1100 intermediate students. After they were selected, they were assigned into 40 students in control and 40 students in experimental group.

### **3.3. Instrumentation**

Cognitive and Metacognitive Reading Strategies were adopted as a whole from Chamot and O'Malley's (1994) cognitive and metacognitive strategies (p. 61-62) (see Appendix G). A language self-efficacy scale was adopted as a whole from Chamot, Barnhardt, El-Dinary, Carbonaro, and Robbins' self-efficacy questionnaire (1993) to assess the participants' self-efficacy in English. (see Appendix H). The participants in this research were required to complete a questionnaire on the transferability of reading strategies taught during the study to new tasks. Participants were asked to provide answers for the Likert scale ranging from strongly agree (5), agree (4), neither agree nor disagree (3), and disagree (2) to totally disagree (1). The experimental group was also asked to provide answers for the Likert scale ranging from strongly agree (5), agree (4), neither agree nor disagree (3), disagree (2) to totally disagree (1) To assess their attitude toward the strategy training. One self-reflective question ("What is your attitude towards strategy training?") was added to the cognitive and metacognitive reading strategy questionnaire in the post-test phase. To estimate the reliability of the translation of the questionnaire instruments in this study, both Persian and English versions of all the questionnaires were sent to two college lecturers with doctoral degrees who have been teaching EFL at a university for fifteen years.

#### **3.3.1. Validation of Questionnaires**

In order to validate the scales developed for the study for use with these Iranian students, the following procedures were adopted. Firstly, item analysis was conducted to remove any items

that did not have discrimination power. Secondly, factor analysis was used to estimate the the relation of each item to the features of the scale. Thirdly, Cronbach's Alpha was used to estimate the reliability of the measurement.

### 3.3.1.1. Item Analysis of Reading Strategy Questionnaire

As shown in Table 3.3 except for items 4, 6, 12, 13, 20 and 23, all the other items were statistically significant and thus indicated that it has been able to discriminate well. Subsequently, items 4, 6, 12, 13, 20 and 23 were removed from the instrument.

Table 3.3 Item analysis of reading strategy

Number of items	Reading strategies	t-value	Sig. (2-tailed)
1	I decide in advance what my reading purpose is, and then I read with that goal in mind.	3.632	.000
2	I decide in advance specific aspects of information to look for, and I focus on that information when I read.	1.987	.049
3	Before I read, I think of what I already know about the topic.	4.134	.000
4	I get myself ready to read by using what is already known of the text.	1.332	.185
5	I anticipate possible content of the text.	4.337	.000
6	I look for highlighted words or expressions.	1.844	.067
7	I decide in advance to look at the text to see its layout, illustrations, etc.	2.384	.018
8	I try to find out the organizational aspects of the text.	4.806	.000
9	While I read, I periodically check whether the material is making sense to me.	2.144	.034
10	I imagine scenes or draw pictures of what I am reading.	2.918	.004

Table 3.3 continued

11	I act out the situation described in the reading (for example, using real objects to illustrate and put into contexts what I am reading).	3.430	.001
12	I identify what I don't understand in the reading, and I ask a precise question to solve the problem.	1.538	.126
13	I use reference materials (dictionary, textbook, computer programme, etc.) to help solve reading comprehension problems.	1.713	.089
14	I ask questions about the text.	4.051	.000
15	I self check comprehension.	3.397	.001
16	I pay attention to meaning rather than form.	4.149	.000
17	I connect what is read with what is already known.	3.050	.003
18	I summarize main ideas either orally or in written form.	2.432	.016
19	I look for logical relationships between paragraphs.	3.835	.000
20	I try to solve vocabulary problems using morphological knowledge.	1.783	.077
21	I guess at unfamiliar vocabulary items through contextual clues.	3.217	.002
22	I look for relationships between main ideas (topic sentences) and details.	3.074	.002
23	I look for the organizational aspects of the text in terms of its typical structure (e.g. cause – effect, compare/contrast, etc.)	1.488	.139
24	I examine how well the text is understood.	2.093	.038
25	I make critical/personal comments on the text.	4.410	.000
26	I read the text again to summarize text meanings.	3.151	.002
27	I reflect on how effectively a strategy was used.	3.647	.000
28	I check to see if my predictions were correct.	3.251	.001
29	I check whether I accomplished my goal for reading.	2.945	.004

### 3.3.1.2. Factor Analysis for Cognitive Strategy Use

Exploratory factor analysis was carried out with cognitive strategy use items. Principal axis factoring and a varimax solution were utilized. Three factors had eigenvalues greater than 1.0. As a result, principal axis factoring with a varimax solution produced three factors with eigenvalues greater than 1.0, showing for 51.25% of total variance. A display of the inferential statistics of factor analysis is presented in Table 3.3.

As shown in Table 3.4, five items loaded on Factor 1 which showed 31.21% of the variance. After focusing on the individual items meticulously, the researcher understood that these items related to *use what you know strategies*. Factor 2 was shown by items 8, 9, and 3. These items especially dealt with *use your senses and background knowledge strategies*. Factor 3 which is showing 9.64% of the total variance, related *use your organizational skills strategies*. The exploratory factor analysis results in this study were congruent with what was proposed within O'Malley and Chamot's (1990) framework. The items in *Use your organizational skills strategies*, *Use your senses and background knowledge strategies*, and *Use what you know strategies* match the original framework with respect to cognitive strategies.

Table 3.4 Inferential statistics of factor analysis for cognitive strategy use items

Rotated Component Matrix <sup>a</sup>			
	Component		
	1	2	3
Cognitive Reading strategy 6			.716
Cognitive Reading strategy 20	.697		
Cognitive Reading strategy 19	.667		
Cognitive Reading strategy 16	.575		
Cognitive Reading strategy 4	.574		
Cognitive Reading strategy 8		.791	

Cognitive Reading strategy 9		.681	
Cognitive Reading strategy 3		.575	
Cognitive Reading strategy 13	.794		
Cognitive Reading strategy 15			.631
Cognitive Reading strategy 14			.507
Extraction Method: Principal Component Analysis			
Rotation Method: Varimax with Kaiser Normalization			
a. Rotation converged in 6 iterations			

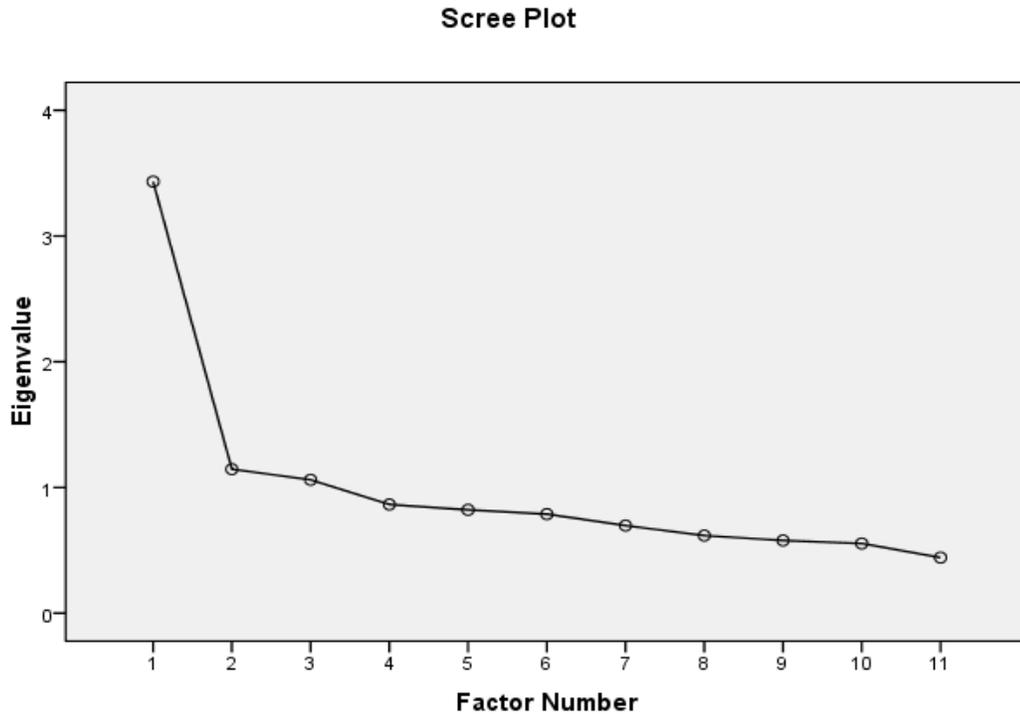
As presented in Table 3.5, the Barlett test of sphericity is significant for cognitive reading strategies and the Kaiser-Meyer-Olkin measure of sampling adequacy is far greater than .6.

Table 3.5 The Barlett test of sphericity and the Kaiser-Meyer-Olkin measure for cognitive strategies

<b>KMO and Bartlett's Test</b>		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.830
Bartlett Test of Sphericity	Approx. Chi-Square	575.254
	Df	55
	Sig.	.000

As presented in Figure 3.1., the Scree plot graphically displays the eigenvalues for each factor and shows that there is one salient factor within cognitive reading strategies.

Figure 3.1 The Scree plot for eigenvalues of cognitive reading strategies



### 3.3.1.3. Factor Analysis for Metacognitive Strategy Use

Exploratory factor analysis was conducted with metacognitive strategy use items. Principal axis factoring and a varimax solution were utilized. Two factors had eigenvalues greater than 1.0. As a result, principal axis factoring with a varimax solution produced two factors with eigenvalues greater than 1.0, showing 44.79% of total variance. A display of the inferential statistics of factor analysis is presented in Table 3.5.

As shown in Table 3.6, nine items loaded on Factor 1 which showed 35.47% of the variance. After analyzing the individual items scrupulously, the researcher found that these items related to monitoring/planning strategies. Factor 2 was represented by items 22, 18, 21, 11, 7, 5 and 23. These items showed 9.32% of the total variance and related to evaluation

strategies. The exploratory factor analysis results in this study were partially congruent with what was suggested by within O'Malley and Chamot's (1990) framework with respect to metacognitive strategies. Monitoring or Planning strategies and Evaluation strategies partially match the originally designed framework. Monitoring and Planning strategies are grouped into different categories in the framework, while Monitoring and Planning strategies are classified in terms of one category. One reason for this variation might be related to context; this group of subjects generally learns English in an EFL rather than ESL context. Thus, their strategy use could be different from that of O'Malley and Chamot's (1990) study, which consisted of ESL learners.

Table 3.6 Inferential statistics of factor analysis for metacognitive strategy use items

<b>Rotated Component Matrix<sup>a</sup></b>		
	<b>Component</b>	
	1	2
MetaReadingstrategyafter28-22		.701
MetaReadingstrategywhile22-17	.640	
MetaReadingstrategyafter24-18		.560
MetaReadingstrategywhile14-10	.478	
MetaReadingstrategybefore2-2	.477	
MetaReadingstrategywhile16-12	.415	
MetaReadingstrategyafter27-21	.360	.350
MetaReadingstrategywhile15-11		.750
MetaReadingstrategywhile9-7		.713
MetaReadingstrategybefore1-1	.582	
MetaReadingstrategybefore7-5	.324	.364
MetaReadingstrategyafter29-23		.359
Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization		
a. Rotation converged in 3 iterations.		

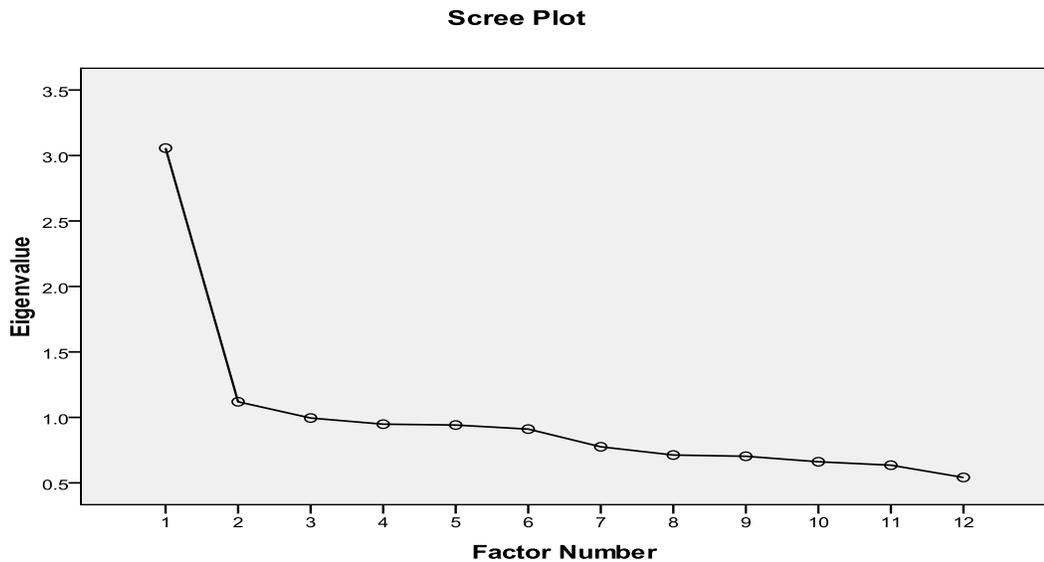
As shown in Table 3.7, the Barlett test of sphericity is significant for metacognitive reading strategies and the Kaiser-Meyer-Olkin measure of sampling adequacy is far greater than .6.

Table 3.7 The Barlett test of sphericity and Kaiser-Meyer-Olkin for metacognitive strategies

<b>KMO and Bartlett Test</b>		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.815
Bartlett Test of Sphericity	Approx. Chi-Square	414.456
	Df	66
	Sig.	.000

As shown in Figure 3.2., the Scree plot graphically displays the eigenvalues for each factor and indicates that there is one salient factor within metacognitive reading strategies.

Figure 3.2 The Scree plot for eigenvalues of metacognitive reading strategies



### 3.3.2. Face and Content Validity

To validate the questionnaire in terms of wording (i.e. face and content validity), university professors were consulted. Reliability was calculated for the instruments using Cronbach's Alpha. The overall Cronbach's Alpha reliability for the reading questionnaire was .85, showing it was a reliable instrument in investigating Iranians' cognitive and metacognitive reading strategies. The internal consistency reliability of each category is .73 and .77 for metacognitive and cognitive strategies respectively. Since all Cronbach's Alpha values are larger than .70, this questionnaire has good internal consistency to evaluate students' reading strategy use.

As displayed in Table 3.8, reliability was calculated for the instruments using Cronbach's Alpha. The overall Cronbach's Alpha reliability for the reading questionnaire given as a pre-measure was .85 and .94 on the post-test.

Table 3.8 Reliability for the reading questionnaire given as a pre-measure and post-measure

Reliability Statistics			
Cronbach's Alpha		Cronbach's Alpha Based on Standardized Items	N of Items
pre-measure	.859	.858	23
post-measure	.946	.944	23

### Reliability for Cognitive Strategies

<b>Reliability Statistics</b>			
Cronbach's Alpha		Cronbach's Alpha Based on Standardized Items	N of Items
pre-measure	.775	.772	11
post-measure	.877	.881	11

### Reliability for Metacognitive Strategies

<b>Reliability Statistics</b>			
Cronbach's Alpha		Cronbach's Alpha Based on Standardized Items	N of Items
pre-measure	.731	.732	12
post-measure	.865	.879	12

### 3.3.3. Validating the Reading Test

Item analysis was conducted to evaluate the quality of the test to be used in the study. As shown in Table 3.9 on the item analysis for the test, there was a statistically significant difference between the two groups (the top 27% and bottom 27% of the sample), thus showing good discrimination.

Table 3.9 Item analysis for the reading test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Test	Equal variances assumed	.038	.846	12.613	42	.000	11.75000	.93155	9.87005	1.363001
	Equal variances not assumed			12.613	4.1991	.000	11.75000	.93155	9.87004	1.363001

It was found that the person separation reliability (equivalent to KR-21) of the total test was acceptable (0.78). As shown in table 3.10 the reliability estimate for the test using Cronbach's Alpha as a pre-measure was .74 and .83 on the post-test.

Table 3.10 Reliability for the reading test given as a pre-measure and post-measure

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
pre-measure	.741	50
post-measure	.835	50

Considering the other main characteristics of the reading test, namely criterion validity of the reading test, the standardized Nelson language proficiency test (1977) was used which showed .81 of coefficient of determination – satisfactory for such a test.

### **3.3.4. Validating the Self-efficacy Questionnaire through Item Analysis**

Item analysis of a test increases its validity and reliability. Table 3.11 presents the item analysis for self-efficacy items. All the items were statistically significant at  $p < 0.001$  and thus indicated that they have the power of discrimination.

Table 3.11 Item analysis for self-efficacy items

		Independent Samples Test									
		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper	
High to low proficient student 1	Equal variances assumed	11.943	.001	2.340	42	.024	8.636361	.36914	1.186791	1.608590	
	Equal variances not assumed			2.340	3.1991	.026	8.636361	.36914	1.117061	1.615570	
High to low proficient student 2	Equal variances assumed	4.295	.044	3.354	42	.002	1.227270	.36593	4.887981	1.965750	
	Equal variances not assumed			3.354	3.7231	.002	1.227270	.36593	4.859871	1.968560	
High to low proficient student 3	Equal variances assumed	4.481	.040	3.088	42	.004	1.045450	.33856	3.622211	1.728690	
	Equal variances not assumed			3.088	3.4371	.004	1.045450	.33856	3.576971	1.733210	

Table 3.11 continued

High to low proficient student 4	Equal variances assumed	23.276	.000	3.651	42	.001	1.363640	.37351	6.098561	2.117420
	Equal variances not assumed			3.651	3.1711	.001	1.363640	.37351	6.025381	2.124730
High to low proficient student 5	Equal variances assumed	5.769	.021	2.318	42	.025	8.181821	.35293	1.059471	1.530420
	Equal variances not assumed			2.318	3.5941	.026	8.181821	.35293	1.023701	1.533990
High to low proficient student 6	Equal variances assumed	3.403	.072	2.945	42	.005	1.045450	.35501	3.290131	1.761900
	Equal variances not assumed			2.945	3.6961	.006	1.045450	.35501	3.261071	1.764800
High to low proficient student 7	Equal variances assumed	.134	.716	3.783	42	.000	1.136360	.30037	5.301981	1.742530
	Equal variances not assumed			3.783	4.1161	.000	1.136360	.30037	5.298321	1.742900

Table 3.11 continued

High to low proficient student 8	Equal variances assumed	3.163	.083	2.282	42	.028	8.181821	.35846	9.478262	1.541580
	Equal variances not assumed			2.282	3.9731	.028	8.181821	.35846	9.355752	1.542810
High to low proficient student 9	Equal variances assumed	7.259	.010	4.244	42	.000	1.545450	.36418	8.105151	2.280390
	Equal variances not assumed			4.244	3.5441	.000	1.545450	.36418	8.064631	2.284450
High to low proficient student 10	Equal variances assumed	6.451	.015	3.526	42	.001	9.545451	.27074	4.081781	1.500910
	Equal variances not assumed			3.526	3.4091	.001	9.545451	.27074	4.043951	1.504700
High to low proficient student 11	Equal variances assumed	.045	.833	2.226	42	.031	9.545451	.42882	8.915712	1.819930
	Equal variances not assumed			2.226	4.1981	.031	9.545451	.42882	8.914222	1.819950

### **3.3.4.1. Factor Analysis for Self-efficacy Questionnaire**

Exploratory factor analysis was conducted with self-efficacy items. Principal axis factoring and a varimax solution were employed since they appeared to increase interpretation after comparison with the results from different other methods of factor analysis. Two factors had eigenvalues greater than 1.0. As a result, principal axis factoring with a varimax solution produced two factors with eigenvalues greater than 1.0, showing 50.12% of total variance. The inferential statistics of factor analysis is presented in Table 3.12.

As shown in Table 3.12, seven items loaded on Factor 1 which showed 39.91% of the variance. After analyzing the individual items meticulously, the researcher found that these items related to use your organizational self-efficacy items. Factor 2 was represented by items 7, 11, 5 and 9. These items showed 10.21% of the variance and related to use what you know self-efficacy items. The overall Cronbach's alpha reliability for the 11-item self-efficacy given as a pre-measure was .84 and .89 on the post-test. Cronbach's alpha of more than 0.70 was set as an indication of good reliability.

Table 3.12 Inferential statistics of factor analysis for self-efficacy items

Rotated Component Matrix <sup>a</sup>		
	Component	
	1	2
Self-efficacy 1 control experimental pre-test	.826	
Self-efficacy 2 control experimental pre-test	.728	
Self-efficacy 3 control experimental pre-test	.613	
Self-efficacy 4 control experimental pre-test	.582	
Self-efficacy 8 control experimental pre-test	.575	
Self-efficacy 6 control experimental pre-test	.526	
Self-efficacy 7 control experimental pre-test		.749
Self-efficacy 11 control experimental pre-test		.704
Self-efficacy 5 control experimental pre-test		.690
Self-efficacy 9 control experimental pre-test		.594
Self-efficacy 10 control experimental pre-test	.455	
Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization		
a. Rotation converged in 3 iterations.		

### 3.3.5. Face and Content Validity of Cognitive and Metacognitive Reading Strategy Questionnaire

Two college English lecturers of Persian origin were asked to give feedback on the face validity of the cognitive and metacognitive reading strategy questionnaire. They were asked to comment on the appropriateness sample of the items in the questionnaire and wording of the items clearly in the Persian language to measure the chosen strategies. For example, they

suggested removing the variables of *degree of liking English* and *strategy awareness*, and to focus instead on two variables of *gender* and language proficiency.

### **3.4. Instrumentation with Regard to Qualitative Phase of Question 1**

#### **3.4.1. Data Collection Procedures for Qualitative Part of Question 1**

Think-aloud Protocols give the researcher this opportunity to understand readers' cognitive process directly (Pressley & Afflerbach, 1995). Cohen et al. (2000) considered using the consent form, confidential point, and the results of the research to control ethical points in the studies. In relation to these issues, consent forms along with the explanation of the results of the study were presented to the subjects (see Appendix C).

#### **3.4.2. Data Collection Procedures for Questions 1 and 2**

The think-aloud protocols were employed to assess learners' actual use of strategies while reading. The participants were allowed to talk about the reading strategies in Persian. Five piloting sessions were carried out with five participants to find out the possible difficulties that might happen in real think-aloud protocols. The researcher performed a sample think-aloud protocols to familiarize the participants with it. Different texts were given to the participants during the training and real think-aloud protocols. The researcher conducted the thin-aloud protocols by asking the participants to express their thoughts in L1 while they were reading texts.

The researcher facilitates the performance of think-aloud protocol by asking them different questions like ‘what are thinking about now’ ‘how did you understand that?’ to make them understand it. In order to control the researches’ interference I think-aloud procedures, the participants were asked to choose the moments that they like to express their verbalization. They were also asked to raise their fingers where they were ready to verbalize.

Coding of the transcription from the verbal protocols was based on a statement that finished when the shift happened in the statement (Green, 1998). Each unit classified into the coding index suggested by Chamot and El-Dinary (1999) (see Appendix B). the instructions were given in both English and Persian. The reading texts were used to assess the participants’ reading strategies which were approximately 568 words in length (see Appendix A: Reading passage). The texts were selected from an English textbook which is widely used in Iran: *New Interchange 3* (Richards, 2003). The participants’ responses were audio recorded, the protocols were changed into codes employing coding index of Chamot and El-Dinary (1999) (see Appendix B). A sample transcription analysis is presented in Appendix F. Inter-rater reliability checks were estimated.

### **3.5. Data Collection Procedures for Question 3**

The stages of investigating the impact of teaching cognitive and metacognitive reading strategies on high school learners’ reading comprehension, self-efficacy, and transfer of strategies are explained in this chapter which is based on data collection. The reading comprehension section of the standard *New Interchange 3* was utilized as pre-test and post-test measurement. Cognitive and metacognitive reading strategy questionnaire was used to

assess the frequency of learners' use of strategies in pre-test and post-test measurement. The experimental group was taught strategies, but the control group was not taught strategies. To control ethical issues, the control group was taught strategies after the study was finished.

Strategy training is initiated actively learners' strategies that they have used them (Chamot et al, 1999; Cohen, 1998). In order to activate learners' consciousness of strategies, two questions were asked: (1) which strategies did you know about reading strategies? (2) what did you know about strategies?. All of the participants were asked to discuss strategies which are presented in Appendix H., then the researcher explained strategies for the participants to familiarize them with strategies using CALLA model. By elapsing of time, the teacher helped the participants to employ strategies independently.

### **3.6. Data Analysis Procedures for Questions 1, 2, and 3**

Data collected from the cognitive and metacognitive reading strategy questionnaire was analyzed using the Statistical Package for Social Science (SPSS, version 16). Data analysis procedures for this phase of the study were calculating descriptive statistics (mean and standard deviation) and independent t-tests (including gender and proficiency). Two coders identified and coded reading strategies independently. They agreed on coding the strategies 79% of the time. Their strategy coding was congruent due to inter-rater reliability at 0.83 or 0.86. Each instructor was given the coding guidelines (see Appendix B). The explanations about strategies were given (see Appendix C). Descriptive statistics were used to summarize the data. A paired-sample t-test was used to compare significant differences within one group. An independent t-test was used to compare significant differences between two

different groups. Effect size was employed to find out means between groups considering statistically significant differences.

### **3.7. Conclusion**

This chapter described the methodology used in three questions. The reason for choosing a mixed-method design was explained which is based on a triangulation model in terms of qualitative and quantitative research. The results of phases 1, 2 and 3 will be reported in chapters 4, 5 and 6 respectively.