Chapter 3

Research Design & Methodology

3.1. Introduction
3.2. Variables
3.3. Participants
3.4. Instrumentation
3.5. Research Design
3.6. Procedure
3.1. Introduction

The literature reviewed in the previous chapter described the current state of thinking and research in the areas of individual difference variables and error treatment in order to define error orientation and specify its possible position in language learning. To identify error orientation as part of error treatment, it was discussed that it could be defined as one of the layers of error treatment in its broad definition. Error treatment concerns first, with how and when teachers should treat learners’ errors and which errors should be treated, second, what the learners’ and teachers’ attitudes are toward corrections and third, how learners react to their own mistakes and errors. The last of the layers which focuses on what learners do with their mistakes and errors is recognized as error orientation. Moreover, it has also been discussed that error orientation is an individual difference variable due to the fact that every learner reacts differently to their own mistakes and errors. In other words, every learner is unique based on his/her error orientation.

However, in this chapter, the researcher is about to move a step forward and discuss the methodology chosen for this study. And with having this intention in mind, he has endeavored to elaborate clearly and in detail the methodology of the study from different aspects such as the variables, participants, instrumentation, design and procedure. This step is required so as to enable the researcher to move to the next step which is analyzing the data and deriving valid conclusions on the proposed hypotheses.

3.2. Variables

In this descriptive research, two major variables are the main concerns of the study. The first one which is the independent variable is error orientation, and the second one is structural competence as the dependent variable.

Error orientation depicts how learners cope with and react to their own mistakes and corrected errors. To elaborate more on error orientation, Rybowiak and his colleagues continued quoting from Lazarus and Folkman that it has two main appraisals. One is referred to as how negatively learners perceive their own
errors and mistakes and to what extent they can anticipate the occurrence of them and the second one is related to how learners cope with and challenge their own errors and mistakes (Rybowiak et al. 529). Based on the two studies of Rybowiak and his colleagues, eight psychological sub-variables have been identified and validated for error orientation through a complex construct validating process. These psychological constructs are error anticipation, error communication, error competence, error covering, error learning, error risk-taking, error strain and error thinking which were defined in Table 2.9 on page 81.

However, these psychological levels are not homogeneous in the sense that apparently error covering and error strain are not parallel and in positive relationship to the other six variables. For instance, error covering and error communication are two opposite variables based on their definitions in Table 2.9. Therefore, it is impossible to correlate error orientation as a whole variable with structural competence. In other words, the correlation of error orientation as a whole entity with structural competence cannot be valid and reliable due to the fact that the inhomogeneous sub-variables of error orientation have negative impact on each other and definitely on the upcoming correlation. Hence, the researcher decided to correlate each of the sub-variables of error orientation separately with structural competence.

On the other hand, structural competence is part of communicative competence which was coined by Hymes as the ability to convey and interpret messages and to negotiate meanings interpersonally within specific context. Lyle Bachman schematizes the components of communicative competence (language competence) as:

I. Organizational Competence
   A. Grammatical Competence
      1. Vocabulary
      2. Morphology
      3. Syntax [Structural Competence]
      4. Phonology / Graphology
Canale and Swain define grammatical competence as that part of communicative competence which encompasses “knowledge of lexical items and of rules of morphology, syntax, sentence-grammar, semantics and phonology” (29). However, in this study, as part of the grammatical competence, the researcher merely focuses on syntax which is also known as structural competence.

### 3.3. Participants

In this part of the research, three major issues are going to be discussed: the population which was aimed in the study, the sampling method and the procedure involved in selecting the research participants.

At the outset, it is pertinent to mention some necessary measures taken for the selection of participants in order to increase the internal validity of the results by eliminating some intervening variables. Firstly, female students were taken as samples due to their higher ratio in comparison with their male counterparts in the field of language learning. This decision also helped to eliminate the gender factor as a possible intervening variable. Secondly, only senior English students with
reasonable English backgrounds took part in this study. By seniors, the researcher has referred to those students who were at the last two years of BA. The Iranian seniors were third and forth year students who took English literature as their subject, and the Indian seniors were second and third years who took English Honours and English elective courses. As a matter of fact, the researcher preferred not to use advanced learners through administering a language proficiency test because this differentiation might have negatively affected the correlation coefficient between error orientation and structural competence. This negative effect might be cast due to the fact that structural competence, the dependent variable of this study, is part of language proficiency itself. Thirdly, the samples were preferably selected from one college or department in each context. This was done in order to have nearly the same course materials, syllabuses, learning context and more with the intention of controlling the potential intervening variables and ensuring more validity and reliability of the investigation. And as the last one, the age of the participants was also limited between 20 and 25. This age limitation might have been fruitful to the research due to the fact that the age factor might also serve as an intervening variable.

The targeted population of this research included the subset of the student population at Islamic Azad University and the subset of the student population at Panjab University who were female and doing BA in the field of English language. The samples were selected based on a multistage random sampling. This sampling approach is a type of probability sampling that each individual has an equal chance of being selected. In order to cope with the comparative feature of this study which involves two countries (India and Iran), two universities were selected as the research target population: Panjab University from India and Islamic Azad University from Iran. The selection of these two universities was done purposefully by the researcher due to some preferences and facilities available in these two universities. However, this intentional selection did not interfere with the probability sampling owing to the fact that these two composed the research population, and the findings of the research were generalized to this population.
alone and not beyond. Next, owing to the third limitation mentioned above, just one college or department was selected from each context randomly. In this random selection, the Department of English of Rudehen Islamic Azad University and Government College for Girls (GCG) from Panjab University were selected. Next, bearing in mind the two other major limitations which required the participants to be female and senior students, twenty two classes at Rudehen Islamic Azad University and seven classes at Government College for Girls were specified as having the required conditions. And then out of these classes, five classes were selected from each context randomly.

Islamic Azad University (IAU) was founded in 1982 and spread fast all over Iran through establishing new branches in different cities. However, the central office is located in Tehran. This private university offers bachelor's, master's, doctoral, and professional degree programs to over one million students in different fields of medicine, art and engineering. One of the comprehensive branches of IAU is Rudehen Branch which is located 30 kilometers to the east of the capital. This branch of IAU was established in 1985 and caused a great progressive change in Rudehen city. This branch has over 15000 students in art and engineering. The English department of this branch is very active and has over 3000 students in the fields of English literature, English teaching and English translation at BA level. The BA course in Iran is based on nearly the American style which takes at least four years for the students to cover around one hundred and forty preset credits designed specifically for each particular subject.

Panjab University was established more than 120 years ago since its inception in 1882 at Lahore (now in Pakistan). However, this comprehensive university is now located at Chandigarh which is 266 kilometers to the north of New Delhi, the capital of India. Panjab University with its 55 teaching and research departments on the main campus has 122 affiliated colleges spread over the State of Punjab and the Union Territory Chandigarh, and has a long tradition of pursuing excellence in teaching and research in science and technology, humanities, social sciences, arts and sports.
Government College for Girls (GCG) was established in October 1956 as an affiliated college with Panjab University in Sector-11, Chandigarh, India. In recognition of its outstanding performance, it has been accredited “A” grade (between 85 to 90%) by the National Assessment and Accreditation Council (NAAC). The college faculty comprises 82 members. As many as 33 members have done their PhD. And many of them have got the degree of M.Phil. It is interesting to know that GCG offers 279 subject combinations based on the British style.

Now coming back to the sample subjects in this comparative study, two groups of subjects were invited to join the research: first, a reasonable sample of female Iranian senior English students, and as the second group, a reasonable sample of female Indian senior English students. Iranian students were estimated to be EFL and Indian as ESL learners. To be precise, it was decided to have 200 Iranian and 200 Indian students as participants. Therefore, the two instruments of the study were applied to 200 students of each context. However, in Iran 174 students and in India 172 students answered the instruments carefully and effectively. Apart from the two main samples in India and Iran, 50 Iranian students were asked to take part in the pilot study. But out of them 39 answered the questionnaires in an acceptable way, and merely 31 answered the three sections of the TOEFL test completely.

All the subjects were informed of the sensitivity of the study to cooperate with extensive care, and were well informed that taking part in this research can be a good assessment of their own error orientation and language proficiency. And those students who preferred to write their names on the answer sheets were informed of the results on the TOEFL test and Structural Error Orientation Questionnaire within two weeks.

Fortunately, most of the subjects in both countries were truly active participants in answering both instruments cooperatively and with care. Moreover, the authorities and teachers in both universities were very courteous, kind, cooperative, and helped the researcher in the process of data collection.
3.4. Instrumentation

Two valid and reliable data collection instruments were implemented in this research to obtain as valid data as possible. First, Structural Error Orientation Questionnaire (SEOQ) was designed to evaluate EFL and ESL students based on their error competence, error learning, error risk-taking, error strain, error anticipation, error covering, error communication and error thinking. Second, a standard TOEFL test was selected from Phillips’s Longman Complete Course for the TOEFL Test: Preparation for the Computer and Paper Tests (515). And out of this test, the structure section was extracted to be used as an instrument to evaluate the participants’ structural competence.

SEOQ was designed based on Error Orientation Questionnaire (EOQ) which was developed by Rybowiak and his colleagues as a valid and reliable questionnaire. The five point Likert method of rating was implemented in these two questionnaires. Likert scale is a psychometric response scale which is widely used in questionnaires. Based on Likert scale, respondents are supposed to specify their level of agreement when they are answering a Likert questionnaire item (Likert).

Rybowiak and his colleagues developed a comprehensive eight scale error orientation questionnaire based on two subsequent complex studies. In the first study, six scales were developed with the help of a confirmatory factor analysis using LISREL technique. These constructs comprised error competence, learning from errors, error risk-taking, error strain, error anticipation and covering up errors. All these constructs were validated through a complex construct validating process. Most of the scales which were used for construct validity were based on standard questionnaires. These questionnaires have been referred to in Rybowiak and his colleague’s Error Orientation Questionnaire (530). And the results of construct validation of EOQ have also been presented in the same article’s Table 2 (533). Here, the only thing that might be useful to be presented is the Cronbach’s alpha of the different sections of EOQ:
Table 3.1
Cronbach’s alpha of the different sections of EOQ

<table>
<thead>
<tr>
<th>Section</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error Competence</td>
<td>0.56</td>
</tr>
<tr>
<td>Learning from Errors</td>
<td>0.89</td>
</tr>
<tr>
<td>Error Risk-Taking</td>
<td>0.74</td>
</tr>
<tr>
<td>Error Strain</td>
<td>0.79</td>
</tr>
<tr>
<td>Error Anticipation</td>
<td>0.73</td>
</tr>
<tr>
<td>Covering up Errors</td>
<td>0.78</td>
</tr>
<tr>
<td>Error Communication</td>
<td>0.67</td>
</tr>
<tr>
<td>Thinking about Errors</td>
<td>0.83</td>
</tr>
</tbody>
</table>

Source: Rybowiak et al. “Error Orientation Questionnaire (EOQ)” 537.

What can be read from Table 3.1 is the acceptable level of Cronbach’s alpha in all sections of the questionnaire as a test of reliability.

In the second study, some items were added to the scales, and also two more constructs: (1) error communication and (2) thinking about errors were included in the questionnaire. Then the questionnaire was translated from Dutch to English and piloted to 160 students in the Netherlands. As a result, it was proved that equivalence across correlation between these two language versions existed. Through this study, finally, a valid and reliable Error Orientation Questionnaire in two languages was presented based on eight psychological constructs. The items of EOQ are presented in Table 3.2.

Table 3.2
Items of EOQ based on eight psychological scales

<table>
<thead>
<tr>
<th>Error Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When I have made a mistake, I know immediately how to correct it.</td>
</tr>
<tr>
<td>2. When I do something wrong at work, I correct it immediately.</td>
</tr>
<tr>
<td>3. If it is at all possible to correct a mistake, then I usually know how to go about it.</td>
</tr>
<tr>
<td>4. I don't let go of the goal, although I may make mistakes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning from Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mistakes assist me to improve my work.</td>
</tr>
<tr>
<td>2. Mistakes provide useful information for me to carry out my work.</td>
</tr>
<tr>
<td>3. My mistakes help me to improve my work.</td>
</tr>
<tr>
<td>4. My mistakes have helped me to improve my work.</td>
</tr>
</tbody>
</table>
## Error Risk-Taking

1. If one wants to achieve at work, one has to risk making mistakes.
2. It is better to take the risk of making mistakes than to sit on one's behind.
3. To get on with my work, I gladly put up with things that can go wrong.
4. I'd prefer to err, than to do nothing at all.

## Error Strain

1. I find it stressful when I err.
2. I am often afraid of making mistakes.
3. I feel embarrassed when I make an error.
4. If I make a mistake at work, I lose my cool and become angry.
5. While working I am concerned that I could do something wrong.

## Error Anticipation

1. In carrying out my task, the likelihood of errors is high.
2. Whenever I start some piece of work, I am aware that mistakes occur.
3. Most of the time I am not astonished about my mistakes because I expected them.
4. I anticipate mistakes happening in my work.
5. I expect that something will go wrong from time to time.

## Covering up Errors

1. Why mention a mistake when it isn't obvious?
2. It is disadvantageous to make one's mistakes public.
3. I do not find it useful to discuss my mistakes.
4. It can be useful to cover up mistakes.
5. I would rather keep my mistakes to myself.
6. Employees who admit to their errors make a big mistake.

## Error Communication

1. When I make a mistake at work, I tell others about it in order that they do not make the same mistake.
2. If I cannot rectify an error by myself, I turn to my colleagues.
3. If I cannot manage to correct a mistake, I can rely on others.
4. When I have done something wrong, I ask others, how I should do it better.
EOQ was designed to assess the reactions to self errors and mistakes at work. Moreover, this questionnaire was intended to be used at any workplace as the context. This questionnaire and the notion of error orientation triggered the idea that learning a new language is definitely a work which learners do in language classes. Therefore, the items of this questionnaire were modified by the researcher to have the language learning atmosphere as the new context. For instance, the item “When I do something wrong at work, I correct it immediately.” changed to “When I make a structural mistake in class, I correct it right away.” Moreover, as another modification, some simplifications were also applied after piloting the questionnaire in order to have all the items clear and meaningful to the participants who were not native speakers of English. For instance, the item ‘It is better to take the risk of making mistakes than to sit on one's behind’ was simplified to ‘It is better to take the risk of making structural mistakes than to avoid communication in a language classroom’. Furthermore, with the intention of specifying the difference between mistakes and errors in language learning, some of the items were allotted to focus on learners’ mistakes and the other half on learners’ errors. In the process of language developing, learners’ errors can be just lapses or slips of tongue due to physical or psychological reasons or can be due to misunderstanding of the target language system. Corder calls the first the performance errors or mistakes and the second kind the competence errors (“The Significance”). In order to help the participants focus on the difference between errors and mistakes while

### Thinking about Errors

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>After I have made a mistake, I think about how it came about.</td>
</tr>
<tr>
<td>2.</td>
<td>I often think: ‘How could I have prevented this?’</td>
</tr>
<tr>
<td>3.</td>
<td>If something goes wrong at work, I think it over carefully.</td>
</tr>
<tr>
<td>4.</td>
<td>After a mistake has happened, I think long and hard about how to correct it.</td>
</tr>
<tr>
<td>5.</td>
<td>When a mistake occurs, I analyze it thoroughly.</td>
</tr>
</tbody>
</table>

Source: Rybowiak et al. “Error Orientation Questionnaire (EOQ)” 547.
 answering the items two strategies were taken. First a clear instruction was provided in the questionnaire through the following note:

**Note:**

1. Structural = grammatical
2. Error = something which goes wrong and the doer (himself/herself) does not identify it
3. Mistake = something which goes wrong and the doer (himself/herself) identifies it

And as the second measure, the items in each section were arranged in a way that mistake-focused items and error-focused items were separated and came together. Although this strategy helped participants to better focus on this difference, this action changed the arrangement of the items in SEOQ comparing to EOQ. The items of SEOQ are presented in Table 3.3.

<table>
<thead>
<tr>
<th>Table 3.3</th>
<th>Items of SEOQ based on eight psychological scales</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Error Competence</strong></td>
<td></td>
</tr>
<tr>
<td>1. When I have made a structural mistake, I know immediately how to deal with it.</td>
<td></td>
</tr>
<tr>
<td>2. When I make a structural mistake in class, I correct it right away.</td>
<td></td>
</tr>
<tr>
<td>3. When I receive a hint to correct a structural error, I usually know how to correct it.</td>
<td></td>
</tr>
<tr>
<td>4. Although I may make structural errors, I do not miss the goal which is communicating in the target language.</td>
<td></td>
</tr>
<tr>
<td><strong>Error Learning</strong></td>
<td></td>
</tr>
<tr>
<td>1. Structural mistakes provide me with useful information to continue my language learning.</td>
<td></td>
</tr>
<tr>
<td>2. My structural mistakes help me to learn how to prevent them in future.</td>
<td></td>
</tr>
<tr>
<td>3. Corrected structural errors assist me to improve my language.</td>
<td></td>
</tr>
<tr>
<td>4. My corrected structural errors have led me to prevent the occurrence of the same errors.</td>
<td></td>
</tr>
</tbody>
</table>
## Error Risk-Taking

1. If one wants to be successful in language learning, one has to risk making structural errors.
2. I would prefer to make structural errors, rather than not to learn the language.
3. It is better to take the risk of making structural mistakes than to avoid communication in a language classroom.
4. To continue the communication, I gladly tolerate the mistakes happening in my sentences.

## Error Strain

1. I find it stressful when I make structural mistakes.
2. I am often afraid of making structural mistakes.
3. If I make a structural mistake, I get angry.
4. I feel shy when I get corrected on a structural error.
5. While communicating in the target language, I worry that structural errors may happen.

## Error Anticipation

1. While communicating in the target language, the structural errors are more likely to happen.
2. Most of the time I am not shocked at my corrected structural errors because I expected them.
3. Whenever I start communicating in the target language, I am aware that structural mistakes may occur.
4. I expect structural mistakes to happen in my sentences.
5. While communicating in the target language, I expect sentences to go wrong structurally from time to time.

## Error Covering

1. Why do I mention a structural mistake when it isn't obvious?
2. It is disadvantageous to make one's structural mistakes public.
3. It can be useful to cover up structural mistakes.
4. I do not find it useful to discuss my structural errors.
5. Students who accept their structural errors or mistakes make a big mistake.
SEOQ was piloted to a homogeneous group of learners to get the items revised more practically. This group comprised 50 female Iranian senior students from Rudehen Islamic Azad University who were studying at the third and forth years of English literature. These students were also selected based on another variable that they were all working part-time in addition to their studies. This variable was taken into account in order to make the administration of the EOQ to the pilot group plausible. The results were needed in order to apply the concurrent and the construct validity methods between SEOQ and EOQ as a standard test. This will be elaborated more fully in the procedure section.

Furthermore, the items of this questionnaire were adapted and revised with the help of a group of psychologists and linguists to address the issues raised in the pilot study. For instance, some problems were raised with the interpretation of some of the items, and in some cases the participants indicated that certain items seemed to be duplicated. Surprisingly, the repetition of one item was confirmed by the specialist group which was subsequently deleted.

<table>
<thead>
<tr>
<th>Error Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When my structural error is corrected, I tell others about it that they do not make the same error.</td>
</tr>
<tr>
<td>2. If I cannot correct a structural error by myself, I ask someone who knows it.</td>
</tr>
<tr>
<td>3. If I do not correct a structural mistake, I appreciate others’ correction although I could do it myself.</td>
</tr>
<tr>
<td>4. After I have corrected my structural mistake, I appreciate discussing it.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error Thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. After I face a correction on my structural error, I think about how the error happened.</td>
</tr>
<tr>
<td>2. I often think: ‘How could I have prevented this?’</td>
</tr>
<tr>
<td>3. When my structural error is corrected by others, I analyze it completely.</td>
</tr>
<tr>
<td>4. When a structural mistake has happened, I think whether to correct it or not.</td>
</tr>
<tr>
<td>5. After I make a structural mistake in class, I think it over carefully.</td>
</tr>
</tbody>
</table>
As mentioned earlier, SEOQ was also simplified with the help of a group of psychologists and linguists. Nearly all the professors who helped us in developing this questionnaire believed that due to the existence of certain expressions, the items of EOQ were designed for native speakers of English. However, since SEOQ was to be used for EFL and ESL English learners, the items were simplified to the point that all learners could understand the meaning of the items clearly. Furthermore, the item 5 of the section ‘covering up errors’ in EOQ (Table 3.2) was omitted because nearly all the colleagues stressed that it was a repetition of the items 3 and 4 in the same section. Thus, 37 items in EOQ reduced to 36 items in SEOQ.

Furthermore, content validity, criterion related validity and construct validity along with reliability of the questionnaire were taken into consideration in order to have a valid and reliable questionnaire.

In the process of scoring SEOQ, the researcher was faced with eight separate questionnaires within SEOQ based on the eight psychological constructs of error orientation. The five point Likert method of rating was implemented in each of these sub-questionnaires with the intention of finding out to what extent each item applied to each participant based on these five scales: (1) not at all, (2) a bit, (3) neither a bit, nor a lot, (4) a lot, and (5) totally.

In this study, the item responses in each section of SEOQ were summed up to create a score for the whole section. Then the overall scores of each section were treated as interval data in the related data analysis. According to Likert, item responses in Likert scale can be summed up to create an overall score for a group of items. He stresses that when responses to several Likert items are summed up, they may be treated as interval data measuring a latent variable. However, each Likert item can also be analyzed separately. In this case, responses to a single Likert item can be treated as ordinal data.

The second instrument of this study was a standard TOEFL test out of which the structure section was extracted to be used as an instrument to evaluate the participants’ structural competence. This part of the selected TOEFL test
consisted of forty items. The first fifteen items were incomplete sentences that four words or phrases were beneath each, and one should have been selected as the best structural answer. In the second part, there were twenty five items. Each item of this section had one sentence with four underlined words or phrases which were marked (A), (B), (C) and (D). The participants were asked to identify the one underlined word or phrase which had to be changed in order for the sentence to be grammatically correct. The answers of the two sections were supposed to be transferred to the answer sheet which was designed with forty items. The time allotted for answering these forty items along with reading directions was twenty five minutes. The structure section of the TOEFL test is presented in Table 3.4.

Table 3.4
Structural items of the standard TOEFL

<table>
<thead>
<tr>
<th>Section 1</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. __, the outermost layer of skin, is about as thick as a sheet of paper</td>
<td>(A) It is the epidermis (B) In the epidermis (C)</td>
</tr>
<tr>
<td>over most of the skin.</td>
<td>The epidermis* (D) The epidermis is</td>
</tr>
<tr>
<td>2. Sam Spade in The Maltese Falcon and Rick Blaine in Casablanca ___ of</td>
<td>(A) they are two (B) two of them are (C) two of them</td>
</tr>
<tr>
<td>Humphrey Bogart's more famous roles.</td>
<td>(D), are two*</td>
</tr>
<tr>
<td>3. The compound microscope has not one ___ two lenses.</td>
<td>(A) and also (B) but* (C) and there are (D) but there</td>
</tr>
<tr>
<td></td>
<td>are</td>
</tr>
<tr>
<td>4. During the Precambrian period, the Earth's crust formed, and life ___</td>
<td>(A) first appeared* (B) first to appear (C) is</td>
</tr>
<tr>
<td>in the seas.</td>
<td>first appearing (D) appearing</td>
</tr>
<tr>
<td>5. The hard palate forms a partition ___ and nasal passages.</td>
<td>(A) the mouth (B) between the mouth* (C) is between</td>
</tr>
<tr>
<td></td>
<td>the mouth (D) it is between the mouth</td>
</tr>
<tr>
<td>6. Conditions required for seed germination include abundant water, an</td>
<td>(A) the temperatures must be appropriate (B) having</td>
</tr>
<tr>
<td>adequate supply of oxygen, and ___.</td>
<td>appropriate temperatures* (C) appropriate temperatures*</td>
</tr>
<tr>
<td></td>
<td>(D) appropriately temperate</td>
</tr>
</tbody>
</table>
7. When fluid accumulates against the eardrum, a second more insidious type of ___.
   (A) otitis media may develop*      (B) developing otitis media
   (C) the development of otitis media (D) to develop otitis media

8. Some general theories of motivation ___ of central motives, from which other motives develop.
   (A) identify a limited number*      (B) identification of a limited amount
   (C) identify a limited amount       (D) identifying a limited number

9. Before the Statue of Liberty arrived in the United States, newspapers invited the public to help determine where ___ placed after its arrival.
   (A) should the statue be (B) the statue being
   (C) it should be the statue        (D) the statue should be*

10. Hydroelectric power can be produced by ___ and using tidal flow to run turbines.
    (A) water basins are dammed       (B) damming water basins*
     (C) to dam water basins          (D) dams in water basins

11. Abraham Lincoln and Jefferson Davis, ___ of the Union and the Confederacy during the Civil War, were both born in Kentucky.
    (A) they were opposing presidents  (B) were opposing presidents
     (C) opposing presidents*          (D) presidents opposed

12. A stock ___ at an inflated price is called a watered stock.
    (A) issued*                       (B) is issued
     (C) it is issued                  (D) which issued

13. The leaves of the white mulberry provide food for silkworms, ___ silk fabrics are woven.
    (A) whose cocoons                  (B) from cocoons
     (C) whose cocoons are from        (D) from whose cocoons*

14. Not only ___ generate energy, but it also produces fuel for other fission reactors.
    (A) a nuclear breeder reactor      (B) it is a nuclear breeder reactor
     (C) does a nuclear breeder reactor*  (D) is a nuclear breeder reactor

15. D. W. Griffith pioneered many of the stylistic features and filmmaking techniques ___ as the Hollywood standard.
    (A) that established               (B) that became established*
     (C) what established              (D) what became established

Section 2

16. Mosquitoes will accepts the malaria parasite at only one stage of the parasite's complex
    (A)* (B) C D
17. The counterpart of a negative electrons is the positive proton.  
A  B  C*  D

18. The ankle joint occur where the lower ends of the tibia and fibula slot neatly around the talus.  
A*  B  C  D

19. In the United States and Canada, motor vehicle laws affect the operate of motorcycles as well as automobiles.  
A  B  C*  D

20. The neocortex is, in evolutionary terms, most recent layer of the brain.  
A  B  C*  D

21. There are more than eighty-four million specimens in the National Museum of Natural History's collection of biological, geological, archeological, and anthropology treasures.  
A  B  C  D*

22. After George Washington married widow Martha Custis, the couple came to resides at Mount Vernon.  
A  B  C  D*

23. At this stage in their development, rubberized asphalt can hardly be classified as cutting edge.  
A*  B  C  D

24. Rhesus monkeys exhibit patterns of shy similar to those in humans.  
A  B*  C  D

25. In space, with no gravity for muscles to work against, the body becomes weakly.  
A  B  C*  D*

26. Fort Jefferson, in the Dry Tortugas off the southern tip of Florida, can be reach only by boat or plane.  
A  B  C*  D

27. A zoom lens produces an inverted real image, either on the film in a camera and on the light-sensitive tube of a television camera.  
A  B  C  D*

28. Supersonic flight is flight that is faster the speed of sound.  
A  B  C*  D

29. The Betataken House Ruins at Navajo National Monument is among the largest and most elaborate cliff dwellings in the country.  
A*  B  C  D
30. It is a common observation that liquids will soak through some materials but not through other.  
   A B C  
   D*  

31. The number of wild horses on Assateague are increasing lately, resulting in overgrazed marsh and dune grasses.  
   A B C D  

32. The newsreels of Hearst Metronome News, which formed part of every moviegoer's experience in the era before television, offer an unique record of the events of the 1930s.  
   A B C D  

33. Unlikely gas sport balloons, hot air balloons do not have nets.  
   A B C D  

34. Born in Massachusetts in 1852, Albert Farbanks has begun making banjos in Boston in the late 1870s.  
   A B C D  

35. Dwight David Eisenhower, military officer and thirty-fourth president of the United States, lived in the White House and of least thirty-seven other residences.  
   A B C D  

36. Methane in wetlands comes from soil bacteria that consumes organic plant matter.  
   A B C D  

37. Alois Alzheimer made the first observers of the telltale signs of the disease that today bears his name.  
   A B C D  

38. Edward MacDowell remembers as the composer of such perennial favorites as "To a Wild Rose" and "To a Water Lily".  
   A B C D  

39. Animism is the belief that objects and natural phenomena such as rivers, rocks, and wind are live and have feelings.  
   A B C D  

40. Newtonian physics accounts for the observing orbits of the planets and the moons.  
   A B C D  

* The best answer
In most TOEFL tests, there are three main sections: listening comprehension, structure and written expression, and reading comprehension. To evaluate any standard TOEFL test, first, the raw scores are calculated by allotting one point to each correct answer in each section. Second, the raw scores are converted into overall scores based on the conversion chart in Table 3.5. Then the converted scores should be added up and divided by three to have the mean. And as the last step, the mean is multiplied by 10 to have the overall TOEFL score. The overall score comes between 217 and 677.

Table 3.5
Conversion table of TOEFL scores

<table>
<thead>
<tr>
<th>NUMBER CORRECT</th>
<th>CONVERTED SCORE SECTION ONE</th>
<th>CONVERTED SCORE SECTION TWO</th>
<th>CONVERTED SCORE SECTION THREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>68</td>
<td>-</td>
<td>67</td>
</tr>
<tr>
<td>49</td>
<td>67</td>
<td>-</td>
<td>66</td>
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<tr>
<td>48</td>
<td>66</td>
<td>-</td>
<td>65</td>
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<tr>
<td>47</td>
<td>65</td>
<td>-</td>
<td>63</td>
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<td>46</td>
<td>63</td>
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<td>61</td>
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<tr>
<td>45</td>
<td>62</td>
<td>-</td>
<td>60</td>
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<tr>
<td>44</td>
<td>61</td>
<td>-</td>
<td>59</td>
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<td>43</td>
<td>60</td>
<td>-</td>
<td>58</td>
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<tr>
<td>42</td>
<td>59</td>
<td>-</td>
<td>57</td>
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<tr>
<td>41</td>
<td>58</td>
<td>-</td>
<td>56</td>
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<tr>
<td>40</td>
<td>57</td>
<td>68</td>
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<td>57</td>
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<td>36</td>
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<tr>
<td>28</td>
<td>49</td>
<td>52</td>
<td>46</td>
</tr>
<tr>
<td>27</td>
<td>49</td>
<td>51</td>
<td>46</td>
</tr>
</tbody>
</table>
In this study, the structure section of the TOEFL test was implemented to assess the participants’ structural competence. In order to convert the raw scores of this section, the raw score obtained from each participant was converted based on the above table, and this amount was multiplied by 10 to have the overall score.

### 3.5. Research Design

The central plan, strategy and logic behind any study are manifested in its research design which makes drawing conclusions and inferences possible for the researcher. In other words, research design enables any researcher to investigate
research questions by setting up a study in which proper research techniques are implemented. Adams and Schvaneveldt stress the same idea by restating that research design is the plan or structure of any systematic and scientific study which makes addressing specific research questions or hypotheses possible.

This comparative study benefited from descriptive correlational design. Descriptive studies describe and interpret the ongoing conditions or relations, believed opinions, existing processes, significant influences or current trends (Best and Kahn). Four distinguishing characteristics have been addressed by Best and Kahn for descriptive studies which are:

1. They involve hypothesis formulation and testing.
2. They use the logical methods of inductive-deductive reasoning to arrive at generalizations.
3. They often employ methods of randomization so that error may be estimated when population characteristics are inferred from observations of samples.
4. The variables and procedures are described as accurately and completely as possible so that the study can be replicated by other researchers. (129)

Out of these characteristics, it sounds that the main difference between descriptive and experimental researches is the lack of manipulation in descriptive studies (Seliger and Shohamy).

On the other hand, correlational studies look for the degree of correlation between variables. Correlational studies can suggest that there is meaningful relationship between two variables, but they cannot bear the idea out that one variable causes a change in another one (Best and Kahn). In other words, they merely express the existence or nonexistence of relationship between variables and do not tell us which variable causes the other.

Actually, this correlational descriptive design enabled the researcher to find the degree of correlation between the constructs of error orientation and the
learners’ structural competence in EFL and ESL contexts, and also enabled him to compare the findings in these two contexts.

3.6. Procedure

The procedure of this study can be depicted in three phases. In the first phase, the researcher was in the process of developing the two instruments of the study. As a first step, Structural Error Orientation Questionnaire (SEOQ) was designed and revised with the help of a group of linguists and psychologists. In this process SEOQ was developed based on Error Orientation Questionnaire (EOQ). The EOQ items were modified to have classroom as the context of workplace. And the items were also simplified in order to help the EFL and ESL participants understand them well and to facilitate having more reliable and valid answers. Also a differentiation between error and mistake was implemented in the questionnaire. Along with this, a standard TOEFL test was also specified to have its structure section as the second research instrument.

A pilot study was done by administering the two instruments to fifty homogeneous students in Iran. This pilot study was designed to enable the researcher to:

1. practice item analysis on the items of the TOEFL structure section,
2. apply KR-21 method for estimating the reliability of the TOEFL structure section,
3. apply Principle Component Analysis method for proving the construct validity of the TOEFL test,
4. revise the items of SEOQ based on the feedback of participants,
5. apply concurrent validity as a form of criterion validity on SEOQ,
6. correlate the scores of SEOQ sections with standard measures as the test of construct validity,
7. have a test-retest reliability analysis for SEOQ,
8. and apply Cronbach’s alpha to the results of SEOQ with the purpose of estimating reliability.
The participants in this pilot study were seniors in the field of English literature from Rudehen Islamic Azad University who had also the experience of working. This experience was needed because they were supposed to answer EOQ which assessed their error orientation at work place. This pilot study was held in two separate sessions within two weeks interval. In the first session the participants were given SEOQ and the complete TOEFL test. The time allotted was 40 minutes for the questionnaire and 115 minutes for the TOEFL (35 minutes for listening comprehension section, 25 minutes for structure and written expression section, and 55 minutes for reading comprehension section). After a gap of two weeks, the second session was held in which SEOQ (for the second time) and EOQ were administered to the participants. The time allotted for each of the questionnaires was 40 minutes.

After the administration of the pilot study, it was found that there were some problems with the interpretation of some items in SEOQ. In some cases, the participants indicated that certain items seemed to be vague or duplicated. These items were adapted or changed to address the issues with the help of some linguists and psychologists who assisted the researcher in developing and revising SEOQ.

In the second phase, a reasonable number of Indian and Iranian senior English students were invited to answer the two research instruments in order to gather the required valid data from both EFL and ESL contexts.

And in order to have more reliable data, the ethical issues of data collection were also considered by the researcher. Babbie names some of these ethical issues such as participation, no harm to participants, anonymity and assurance of confidentiality, no deception of subjects and accuracy in analysis and reporting which are believed to be significant for data collection and usage in any study (444).

Finally, in the statistical phase, some statistical measures were taken through the computer program SPSS (Statistical Package for the Social Sciences) in order to draw inferences and decisions on the nine hypotheses of the study.
SPSS is among the most widely used programs for statistical analysis in art, psychology and social sciences.

First, in the analysis of the pilot study, the item facility (IF) and item discrimination (ID) of the structure section of the TOEFL test were analyzed. Initially, item analysis was applied to estimate the item facility/difficulty. Item facility of each item is the percentage of testees who got the item right, and item difficulty is the percentage of testees who got the item wrong (Farhaadi et al.). The formula to estimate item facility is:

\[ IF = \frac{C}{T} \]

*IF* = item facility

*C* = the number of students who answered the item correctly

*T* = the total number of students

Secondly, the item discrimination formula was applied to each item. Item discrimination is the discrimination power of each item. In other words, it is the difference between the number of the test takers in the upper group and the lower group who got the item right (Farhaadi et al.). The formula to estimate item discrimination is:

\[ ID = \frac{R_l - R_u}{\frac{1}{2}T} \]

*ID* = item discrimination

*R_<sub>l</sub>* = the number of students in the lower group who got the item right

*R_<sub>u</sub>* = the number of students in the upper group who got the item right

*T* = the total number of students
Then as the next step, the internal reliability of the complete TOEFL test and the TOEFL structure section were measured by KR-21 method. This method which is also known as Kuder-Richardson reliability coefficient provides a measure of internal consistency. “The KR-21 method is the most practical, frequently used and convenient of estimating reliability” (Mousavi 201). The following formula is used to estimate the KR-21 reliability:

\[
(KR - 21)r = \frac{K}{K - 1} \left[1 - \frac{\bar{X} (K - \bar{X})}{KV}\right]
\]

\(K\) = the number of items in the test
\(\bar{X}\) = the mean of the test scores
\(V\) = the variance of the test scores

Then a factor analysis was conducted so as to investigate the possible underlying constructs of the TOEFL test. Hatch and Farhady claim that “factor analysis refers to techniques for analyzing test scores in terms of some number of underlying factors” (255). In other words, factor analysis gives us some information on the factors underlying our test through examining the common variance among them. This factor analysis was conducted by using SPSS program, and Principal Component Analysis was implemented as the extraction factor analysis method.

In the second phase of analyzing the data of the pilot study, the focus was shifted to the second instrument of this investigation. As the initial step, the researcher correlated the total scores of SEOQ in the first administration with the total scores of EOQ in order to investigate and prove the validity of SEOQ through concurrent validity method. Concurrent validity, as a form of criterion related validity, is a parameter used in sociology, psychology, and other psychometric or behavioral sciences, and is demonstrated when a test correlates well with a measure that has previously been validated (Hatch and Farhady).

As the second step, the researcher correlated the scores of the eight sections of SEOQ with the scores of the eight sections of EOQ. This was done in order to
test the construct validity of SEOQ. Construct validity is interpreting any test performance in terms of its psychological traits (Hatch and Farhady). In order to justify this technique, a reference is made to what Murphy and Davidshofer propose as the most basic and practical method of studying construct validity of a measure. They believe that this basic method is correlating scores of any type of behavioral measure or test in question with scores on a number of other tests (119).

Then as the third step, in order to measure the reliability of SEOQ over time, the test-retest reliability method was utilized by the researcher. In this method the scores on two or more successive administrations of the test or questionnaire in question are correlated (Best and Kahn). However, as another proof, Cronbach’s alpha method was also implemented with the purpose of measuring the internal reliability and consistency of SEOQ. Alpha has a significant application as a measure of reliability of any psychometric instrument. It indicates the extent to which a set of test items can be treated as measuring a single latent variable (Cronbach). Cronbach’s a is defined in the following formula:

$$\alpha = \frac{k}{k-1} \left(1 - \frac{\sum s_i^2}{S^2}\right)$$

- $k$ = the number of components (items)
- $\sum s_i^2$ = the sum of the variances of the different parts of the test
- $S^2$ = the variance of the test scores

So far, the phases discussed above were the highlights of the measures undertaken in the pilot study. However, in the study’s main analysis, in order to draw inferences and decide on the nine hypotheses, the researcher implemented the Pearson product-moment correlation coefficient (PMCC) to correlate the eight psychological constructs of error orientation with structural competence separately and in combination in EFL and ESL contexts. It may be added at this point that all the correlational analyses done in the pilot study were also conducted based on the same method.
Pearson product-moment correlation coefficient is named after Karl Pearson who developed this correlational method in an agricultural study. Pearson product-moment correlation coefficient is defined as the measure of the correlation between two variables on the same object or organism (J. Cohen). Kaplan prescribes Pearson product-moment correlation coefficient to be used in the studies where both variables are continuous. He describes continuous variables as the ones which can take on any value over a range of values. In his classification variables can also be artificial dichotomous or true dichotomous. Dichotomous variables have only two levels. Some of them are naturally from two categories (e.g. gender) which are true dichotomous. And others are artificial because there is originally an underlying continuous scale. For example, passing and failing an examination can be artificial dichotomous due to the fact that beyond pass/fail dichotomy there is a range of scores (233-4). Based on this classification, both variables in this study are continuous, and Pearson product-moment correlation coefficient is applicable to them. Kaplan uses a table to show which methods of correlational analysis are appropriate between dichotomous and continuous variables:

### Table 3.6
**Appropriate correlations between dichotomous and continuous variables**

<table>
<thead>
<tr>
<th>Variables X/Y</th>
<th>Continuous</th>
<th>Artificial Dichotomous</th>
<th>True Dichotomous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous</td>
<td>Pearson $r$</td>
<td>Biserial $r$</td>
<td>Point Biserial $r$</td>
</tr>
<tr>
<td>Artificial Dichotomous</td>
<td>Biserial $r$</td>
<td>Tetrachoric $r$</td>
<td>Phi</td>
</tr>
<tr>
<td>True Dichotomous</td>
<td>Point Biserial $r$</td>
<td>Phi</td>
<td>Phi</td>
</tr>
</tbody>
</table>


In order to reassure the use PMCC for the present study’s data, J. D. Brown’s classification is also presented in Table 3.7 which prescribes Pearson product-moment correlation coefficient when the two variables are at regular intervals. Therefore, it can be concluded that Pearson product-moment correlation
The coefficient is the most appropriate method for the interval data existing in this study.

**Table 3.7**

**Brown’s classification of appropriate correlation coefficients**

<table>
<thead>
<tr>
<th>Type of Correlation Coefficient</th>
<th>Types of Scales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson product-moment</td>
<td>Both scales interval (or ratio)</td>
</tr>
<tr>
<td>Spearman rank-order</td>
<td>Both scales ordinal</td>
</tr>
<tr>
<td>Phi</td>
<td>Both scales are naturally dichotomous (nominal)</td>
</tr>
<tr>
<td>Tetrachoric</td>
<td>Both scales are artificially dichotomous (nominal)</td>
</tr>
<tr>
<td>Point-biserial</td>
<td>One scale naturally dichotomous (nominal), one scale interval (or ratio)</td>
</tr>
<tr>
<td>Biserial</td>
<td>One scale artificially dichotomous (nominal), one scale interval (or ratio)</td>
</tr>
<tr>
<td>Gamma</td>
<td>One scale nominal, one scale ordinal</td>
</tr>
</tbody>
</table>

Source: Brown, J. D. “Point-Biserial Correlation Coefficients.” 12-5.

Hatch and Farhady present the following formula for calculating the Pearson product-moment correlation using raw score data:

\[
r_{xy} = \frac{N(\sum XY) - (\sum X)(\sum Y)}{\sqrt{[N(\sum X^2) - (\sum X)^2][N(\sum Y^2) - (\sum Y)^2]}}
\]

\(X\) = label for one of the variables  
\(Y\) = label for the other variable  
\(N\) = number of pairs of scores  
\(\sum\)  = sum of

Thereafter, based on the statistical significance of the obtained correlation coefficients, the researcher decided upon the first eight hypotheses. These null
hypotheses denied the existence of any significant relationship between error orientation constructs and structural competence.

In order to crystallize the idea of statistical significance of a correlation coefficient and its relation to null hypothesis, Best and Kahn indicate that statistical significance is not a measure of the magnitude of a variable relationship, but it is merely an estimation of the probable influence of sampling error (408). In other words, an observed correlation may result from chance or sampling error which really calls for a test to determine the statistical significance of that correlation. One simple and practical test of significance is determined by comparing the r-observed with the critical value of r that can be read directly from tables which are usually available in statistical books. This can be done much more easily by using statistical computer programs. For instance, SPSS, which is used in this research, has an option for calculating correlation coefficients which flags automatically the significant amounts at 0.01 or 0.05 levels of significance in the result table.

Finally, the findings from the two EFL and ESL contexts were compared to spot the differences between India and Iran. This comparison was made in order to decide upon the ninth hypothesis which sought the difference between the obtained correlation coefficients between the eight constructs of error orientation and structural competence in the two contexts. The significant difference between these correlations was defined by the researcher as: (1) having a significant negative correlation in one context and a significant positive in another, or (2) having a significant positive or negative correlation in one context and an insignificant positive or negative correlation or no linear correlation in the other.