Examining Textual Cohesion in Articles of Environment Discipline Written by English and Persian Authors

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ABSTRACT

Systemic-Functional Linguistics (SFL) is a theory of language that is one of the theoretical approaches to linguistics as opposed to formal linguistics. In this approach, the social and contextual roles of language are emphasized. The design of the study was corpus-based and qualitative research regarding SFL (Halliday, 2014). In this study, seven types of cohesive devices (i.e., euphemism, passivization, collocation, reiteration, deletion, substitution, references) were analyzed to examine the coherence of English for specific purposes (ESP) of environment discipline articles in Persian and English articles. The research was to discover the significant difference between cohesive devices in the ESP texts of environment written by Persian and English authors. From among 173 articles in two languages in the last ten years, 100 articles (50 Persian and 50 English) were randomly selected and the number of words in each category was taken into account. The corpus-based data was used and the words in each text type were counted in articles. There were 45791 words in Persian articles and 44918 words in English articles. The Word count was used to collect a homogeneous sample. The results showed that in Persian environment texts, the highest frequency belongs to references and the lowest one addresses substitution. In English texts, the highest frequency was in references and the lowest one refers to reiteration. There was a significant difference between Persian and English cohesive devices regarding euphemism, passivization, collocation, reiteration, and references were significantly different but there was no significant difference was observed in the use of the deletion.

INTRODUCTION

The systemic functional grammar proposed by Halliday and Hassan (1976) focused on the role of textual devices as a set of linguistic features and markers that relate sentences in the text (Molla Ebrahimi & Rezaee, 2020, p. 9). The research problem that was raised in the present study aimed to address factors of textual coherence in terms of usage and frequency in Persian and English articles of environment ESP texts. Moreover, there is a need to discover the difference between Persian (Non-Native) and English (Native) authors to find out the reason why these structures have very high or low frequency in the text of Persian and English articles (Heid & Couws, 2006). On the other hand, the frequency of these structures may be effective in the type of writing and understanding of environment texts (Amiri Khorasani & Alinejad, 2015, p. 30).

Environment crises of any kind are communicated in the form of language. The environment is polluted under the influence of various factors, and as a result, it will affect the life and health of humans. When environmental crises

harm the creatures on the planet, including humans, they find a linguistic expression in the form of spoken language or written language, especially in scientific articles. When the issue of environmental crisis is raised in speech or writing, linguistics may analyze the format of the texts to discover linguistic structures. The reports presented about environmental crises, whether spoken or written, show the idea behind it, which is in the mind of the author who is behind a society or culture in the form of words, terms, phrases, sentences, and paragraphs, and finally in the form of a report or an article that is presented (Freebody & Anderson, 1983; Golparvar et al, 2024). The linguists, with the help of the correct use of vocabulary, words, terms, and expressions, move towards culture building and help the environment so that the general public and officials have a responsible attitude towards the protection of the environment (Stibbe, 2015).

TEXTUAL COHESIVE DEVICES IN ESP TEXTS

In this research, seven types of textual cohesive devices (euphemism, passivization, collocation, reiteration, deletion, substitution, references) that are involved in the coherence of ESP environment texts are investigated.

Euphemism is a powerful cohesive device that is so deeply embedded in our language that even the few people who can communicate without using it. Sekertin (2000) states that language users are used to avoid mentioning the main incident or event that may cause concern, insult, or accusation to the audience. Persian and English examples such as:

1. The forest near the highways in the north has been damaged. (Verb "damaged" instead of "ruined")

2. There is a problem in raising cattle near oil refineries. (A "problem" instead of a "disaster")

3. This winter, migratory birds have not been seen in Shadgan wetland yet. (The word "yet" instead of "never").

4. The shortage of water threatens crops in the field. ("Shortage" instead of "lack")

A passivization cohesive device is used when the subject is not clear or the doer is not mentioned intentionally. In these structures, the target is the action and the agent does not appear in the sentence for three reasons. One is not being important, being anonymous, and not mentioning the agent on purpose. For example, anonymization is a linguistic strategy to hide the main subject. Persian and English examples such as:

1. Trees are planted in this garden. (It is not important to mention the agent because the presence of trees is important).
2. Oil is spread on the coast of the Persian Gulf. (The name of the oil tanker or agent is not intentionally known).
3. Caspian coasts have been destroyed. (Not mentioning the factor due to the intention, which is either land grabbing or lack of supervision by the officials)

Lexical collocation is the occurrence, and they are in a direct syntactic and semantic relationship with each other (Hoey, 1991). In this research, a large number of scientific terms are context-bound because of their neutral meanings. "Sustainable development" and "sustainable growth" are examples of these scientific terms. For instance, in the following examples. The collocated words are in boldface.

1. Industrial **fishing vessels** have caused the loss of rare **marine species** in the **Oman Sea**.

2. The US **buried radioactive** materials on the **seabed** in **Alaska**.

The words that are in a direct syntactic and semantic relationship with each other are observed in the above sentences. In this research, a large number of scientific terms are context-bound because of their neutral meanings. "Sustainable development" and "sustainable growth" are examples of these scientific terms. For instance, in the following examples. The collocated words are in boldface.

The southern shores of the Persian Gulf have been **polluted** with oil, chemicals, and industrial effluents, and these **pollutants** will lead to water, air, and soil **pollution** in the future.

Deletion is usually in sentences where words are not repeated and its deletion does not have structural use due to empty category or unnecessary repetition (Hassan, 1985). After pronouns, the process of removing one or more words can be considered as a factor for non-structural grammatical coherence (Halliday, 1994, p. 74). Deletion is the omission of one or more words in a sentence and the reader of the text can notice the absence of the desired words and look for a word in the previous sentences that matches the missing word or words. If the reader succeeds in finding the right word or words to fill the blank, then he can connect the mentioned sentences and this ability makes the sentences coherent. In such a situation, removing by analogy can be effective and efficient, just like repeating words or using pronouns. However, understanding the process of omission by analogy, and finding the appropriate reference for the word or words that are omitted by analogy, is relatively more difficult than understanding the process of repeating words or finding the reference of pronouns. Therefore, the application of this process should be done with full awareness and caution. The phrases that are placed in brackets in the example are omitted in the sentence. The examples are as follows:

1. Whenever a [one of the members of the society] or a group of individuals suffers pain or [whenever a member of the society or a group of the members of the society] faces an obstacle in the path of his excellence that he is not able to solve by himself, a general problem occurs.

2. Australian forest fires have damaged thousands of homes (...), animals (...), and trees ("have damaged thousands" is omitted).

3. Air pollution makes a disaster in the Middle East, (…) Far East, and (…) Europe (air pollution is omitted).

Substitution refers to words that come in place of another word and cover it. This structure works like the repetition structure but replaces a word to avoid repeating it (Morris, 2004).

1. The flood took away all the **bridge**s, but this **one** resisted.

2. **Air pollution** makes the weather terrible but this **one** is destructive.

References are pronouns that define the subject or object in terms of meaning. The choice of pronouns is not determined by the grammatical rules of the sentence, but rather by the speaker's choice of where he wants to place himself and others. Muhlhausler (2003) states that a pronoun that is used to address an animal is different from the one that refers to the masculine "he" or the feminine "she". For instance:

Forest roads in the north caused the death of **cattle**. **They** fell victim to the development of roads in the forest.

In some texts, the situation is not like this and the readers have to make a lot of effort to understand the connection between different parts of the text. Sometimes the lack of understanding of texts causes people to be confused and they become unmotivated to continue reading. Thus, the cause the reader receives a text as a set of unrelated sentences is due to the lack of coherence of the sentences of that text as a whole. Morris (2004) mentioned it as an important linguistic factor that text coherence is one of the characteristics of texts and plays an essential role in understanding the content of ESP texts. The current study followed the principles of comparative linguistics. The benefits of this research are directly effective for graduate students in the field of environment and environmental linguistics (Azadnia, 2023). In addition, the results of this research can be used for teaching ESP texts and writing articles about environmental issues in Persian and English (Mirzapour & Ahmadi, 2011).

The significant of the study is to explore cohesive devices that are used to gather to deviate the readers' attention regarding the intended meaning of the text. The other important advantage of the study is to evaluate and compare the use of cohesive devices in Persian and English texts of environment disciplines. This may shed some light on the role of scientific criticism in understanding environmental texts. By knowing the cohesive devices of these texts and comparing them with each other, it is possible to help the readers' understanding of the content and provide the ESP students with valuable services to write environment texts (Gholamlou, 2010). In sum, the general objective of this research includes the analysis of textual cohesive devices in Persian and English ESP articles of the environment from the perspective of Halliday's systemic functional grammar linguistics. Cohesive devices are linking markers and their

impact on the coherence of environment texts was regarded in this study. The special goal was to examine the frequency of coherence tools in environment texts and compare English and Persian articles to discover text comprehensibility (Abdulhay, 2024).

THEORETICAL FRAMEWORK OF THE STUDY

One of the important approaches in text-linguistic studies is Halliday's systemic functional grammar theory regarding textual cohesion. Coherence of a text includes a set of textual relations that connect an element of a sentence to the elements of previous sentences through lexical, grammatical, or semantic relations. In 1976, Halliday and Hassan divided text coherence in the language into three categories, which include: grammatical devices including reference, substitution, and ellipsis. These devices consist of conjunctions and lexical categories (i.e., reiteration and collocation. Halliday and Hassan (1985) in their joint work called "An Introduction to Functional Grammar", expanded the cohesion factors and classified them into five categories (i.e., reference, substitution, deletion, lexical collocation, and logical connection of sentences (Zowqi, 2014, p.160). The theoretical framework of this research is based on textual coherence following SFL considers textual coherence as the basis for the formation of any text. Textual coherence in Persian and English articles of environment discipline focused on seven categories such as euphemism, passivization, reiteration, collocation, deletion, substitution, and references. The categories of textual devices were selected based on recent work (Halliday, 2014) that focused on these seven categories in text cohesion. The application of these categories in Persian texts is reported in several studies that are reviewed in the Literature Review section.

REVIEW OF THE RELATED LITERATURE

Eco-linguistics reveals the realization of a new field of meaning and tries to clarify the role of language in the current environmental crisis. Haugen (1972) addresses language as a biased tool, not a purely neutral tool, and concludes that a critical examination of the tools that humans use to analyze nature is a prerequisite for achieving a better understanding of the complexities of human environments (Muhlhausler, 2003). Halliday (1994) makes a connection between language use and environmental degradation. He takes a functional approach to linguistic research, and in his view, the anthropocentric nature of human language makes it at least partially responsible for non-ecological human behavior. Environment discipline is defined by the International Society for Eco-linguistics as a field of study that is related to ESP. The study of text structures of environment and ecology texts is called eco-linguistics. Language ecology was later proposed with new aspects by Muhlhausler (2003). Ecological thinking can be based on several factors such as awareness of the limitations of natural and human resources that cause ecological crises (Haugen, 1972).

Modern linguistics and its object of inquiry can be studied separately from all other phenomena, because the ecology in which language is embedded does not provide an explanation of its nature, and language in turn does not affect the environment. Ecological language criticism was not evident when other forms of linguistic criticism were widespread. The development of language ecology began with Haugen's ideas, followed by Halliday's (1990) theory of systemic functional grammar. Language ecology was later introduced with new aspects by Mühlwasler (2003). Ecological thinking can be defined in terms of several parameters, awareness of the danger of monoculture, awareness of the limitations of natural and human resources, and awareness of those factors that cause the health of ecologies. Chawla (1991: 253) believes that "there are linguistic and philosophical roots to our environmental crisis". Muhlwassler (2003) has argued that language contributed to the prolongation of the crisis in ways that linguists have traditionally defined.Environmental linguistics reveals the realization of the new field of meaning and tries to clarify the role of language in the current environmental crisis. He sees language as a biased tool, not a purely neutral tool, and concludes that a critical examination of the tools that humans use in analyzing nature is a prerequisite for achieving a better understanding of the complexities of human environments (Mulhwassler, 2003).

Fallahi and Houshmandi (2016) examined the textual coherence in special magazines for children and teenagers according to the textual coherence Halliday and Hassan's (1976) model after an analysis that explored factors of textual coherence like lexical and grammatical categories in stories of children's magazines. Their study found that the highest percentage of cohesive factors used in the stories were related to factors with a low percentage concerning grammatical cohesion.

Ramezani et al. (2013) analyzed the written narratives of students with and without learning disorders in the fourth and fifth grades and displayed frequency of references and collocational words was the highest and conjunction, deletion, and substitution were the lowest. In conclusion, they have noted that the growth trend of the use of grammatical coherence markers in Persian language children aged four to seven years tends to use a greater use of references. Aghaei and Rajabi (2019) used Halliday's framework to compare the study of the correlation of partial coherence with the simplicity or complexity of Persian reading and speaking texts. First, they categorized 27 reading comprehension texts and 27 speaking texts) and through mixed-methods research, determined that there was a meaningful relationship between the four elements of lexical cohesion, reference, deletion, and conjunction. They also found that these cohesive devices were basic levels in understanding the texts. However, in spoken texts, only this relationship was significant for the two cohesive elements of conjunction and lexical cohesion, and the process of changes was also irregular. In general, deletion and substitution were the least frequent in the examined texts. They found that those texts had almost the same order pattern including lexical coherence, reference, conjunction, deletion and substitution can be discourse markers for evaluating educational standards of coherent texts.

CLASSIFICATION OF COHESIVE DEVICES

Rostam Beyk et al. (2017, p. 179) have used Halliday's (2014) functional grammar theory to answer two questions: What effect does the age variable have on the frequency of grammatical and cohesive devices (reference, conjunction, deletion, and substitution)? And what is the effect of the age variable on the variety and distribution of these devices? Based on the questions, the hypotheses address: First, the frequency of using grammatical coherence tools increases with increasing age and educational level, and this difference is significant. Second, with increasing age, more diverse grammatical coherence tools can be seen in students' written discourse. They conclude that personal reference has the highest frequency, followed by indicative reference and comparative reference. There is the highest frequency among the cohesive devices in order. They are additives, opposites, temporal-spatial, conditional causal, and finally, descriptive markers. Between the cohesive devices of deletion and substitution, the highest frequency belongs to the deletion of the subject pronoun, and then the deletion of the object pronoun, respectively. Finally, they determine that the age variable affects the frequency and variety of using cohesive devices.

Comprehending a text may occur when they put the cohesive devices of the text together in such a way that they can easily understand the content and create meanings (Mollaei et al, 2022). This ESP text comprehensibility may be affected by the use of the appropriate number of cohesive devices that are used by the authors in scientific texts. Stibbe (2015) states in some texts, the situation is not like this and the readers have to make a lot of effort to understand the connection between different parts of the text. Sometimes the lack of understanding of texts causes people to be confused and they become unmotivated to continue reading (Nemati & Mohammadi, 2023). The lack of text coherence causes the reader to receive a text as a set of unrelated sentences and in another text to infer all the sentences of that text as a whole (Ghaseminezhad Bahramabadi & Heidari, 2023). Halliday (2014) mentions it as an important linguistic factor and believes that text coherence is one of the characteristics of texts that affect learners' understanding of the content of the text.

The literature of the study has shown that ESP of Environment discipline in Farsi and English articles has not been investigated to examine their design of cohesive devices comparatively based on systemic functional linguistics. In this research, seven types of lexical structures that are involved in the study of cohesive factors in the field of Environment were investigated. In addition, for the first time, two tools of textual coherence, including passivization and euphemism, were used in the analysis of English and Persian ESP of Environment articles in the framework of this framework. The findings of the study may have implications for ESP practitioners, and authors of specialized environmental genres. Furthermore, the students in this field get to know the principles of writing and text coherence. Among other results of this research, it may be effective for the individuals who protect and improve the environment.

Considering the literature of the research, the examination of textual and cohesive devices in the environmental discipline is in its introductory steps. Moreover, there is a necessity to compare similar texts in Persian and English languages and arrive at the answer of whether these two ESP genres are the same or different regarding their use of

cohesive devices making the texts coherent. Analytical examination of sentences about text coherence devices such as euphemism, reiteration, passivization, collocation, deletion, substitution, and references between Persian and English Environment texts can help ESP students to analyze and comprehend texts. This knowledge helps them to write Persian and English texts effectively (Hasannia, 2001). The benefits of this research are directly effective for graduate students in the discipline of Environment and Eco-linguistics. Therefore, this research formulates research questions as follows:

1. What is the significant difference in the frequency of lexical structures (euphemism, passivization, collocation, reiteration, deletion, substitution, and references) in the textual coherence of Persian and English in the discipline of Environment?

2. What is the role of lexical structures (euphemism, passivization, collocation, reiteration, deletion, substitution, and references) in the coherence of textual writing and understanding of Persian and English articles in the discipline of Environment?

METHODOLOGY

DESIGN

The method in this thesis was qualitatively corpus-based and followed Halliday's (2014) theory of textual cohesion to compare the use of seven categories of cohesive devices in Persian and English Environment disciplines. Thus, 50 English articles written by English-speaking authors and 50 articles written by Farsi-speaking authors about environmental crises between 2013 and 2023, related to the last 10 years, were analyzed. Based on the seven textual categories such as euphemism, passivization, collocation, reiteration, deletion, substitution, and references in the framework of textual coherence and the systemic theory of functional grammar. The seven cohesive devices were compared in two ESP text types based on their frequency in Farsi and English articles and through the Chi-square test.

CORPUS

The corpus of the study included 100 articles of environmental genres in Farsi and English that were written by native (English) and non-native (Persian) authors. The articles were selected from among 200 articles published in the scientific journals. The simple random sampling method was used to select the corpus and one hundred articles were collected in Farsi and English in the country and abroad. This was done in consultation with the ESP professors and advisors. The data were transferred into the form of a Word file to ease the counting of cohesive devices in both text types. The data of seven cohesive devices were examined by three linguists and classified into seven categories euphemism, passivization, collocation, reiteration, deletion, substitution, and references. This was due to achieving the reliability of the data that were met at .95 percent of agreement.

In these two types of texts, the number of total words was counted to arrive at a homogeneous sample. Finally, in Persian texts, 45791 words and in English texts, 44918 words were obtained. The qualitative aspects of the study regarding frequency and description were based on Creswell and Creswell (2017, p. 201), and analyzing text cohesive devices was based on Halliday's (2014) functional grammar theory. The number of selected words was statistically homogeneous. Therefore, the unit of word was taken into account for analyzing cohesive devices in the two text types. Examples of cohesive devices were reviewed, classified, and validated by three linguists, and finally, the reliability of the data was confirmed with 90 percent among the experts. Then, the frequency and percentage of cohesive devices in both text types were compared with each other to determine the variety of these devices in the types of ESP articles.

DATA ANALYSIS

The frequency of cohesive devices was compared in two text types of native and non-native articles. Finally, the results were displayed in the statistical tables descriptively and inferentially. Data were measured to compare cohesive devices at the significance level in the articles. The data analysis was done qualitatively to examine the difference between the frequencies of the seven categories in English and Farsi texts. Then a Chi-square test examined the significant level of cohesive devices in both types of articles. The frequency of words was analyzed through statistical software (SPSS 24).

RESULTS AND DISCUSSION

In the examination of the frequency of cohesive devices the number of these devices used in Persian and English texts were counted in terms of frequency and percentage. Table 1 displays the results.

Table 1
Textual Cohesive Devices in Persian and English Environment Articles

Articles		Euphemism	Passivization	Collocation	Reiteration	Ellipsis	Substitution	References	Total
					Textual Cohesive Devices				
Persian	N	669	427	359	854	468	266	8407	11450 (58.04%)
	%	5.82	3.73	3.14	7.46	4.09	2.23	73.43	100
English	N	328	842	757	279	569	478	5025	8278 (41.96%)
	%	3.96	10.17	9.15	3.37	6.87	5.78	60.70	100

Table 1 indicates the number and frequency of words in two types of Persian and English texts. Lexical cohesive devices frequency in the two types of Persian and English texts is different from each other. Generally, cohesive devices are less used in English texts are less than the ones used in Persian texts. In the Persian text, cohesive devices are used with a frequency of 11450 words (58.04%) and in English with a frequency of 8278 (41.96%). In Persian and English texts, references have the highest frequency but substitution in Persian and reiteration in English texts have the lowest frequency according to Chi-square analysis (p=0.001>0.5, df=6, X=2.1127). Figure 1 shows the analysis and percentage of cohesive devices in the comparison of the texts of environmental disciplines in both Farsi and English articles.
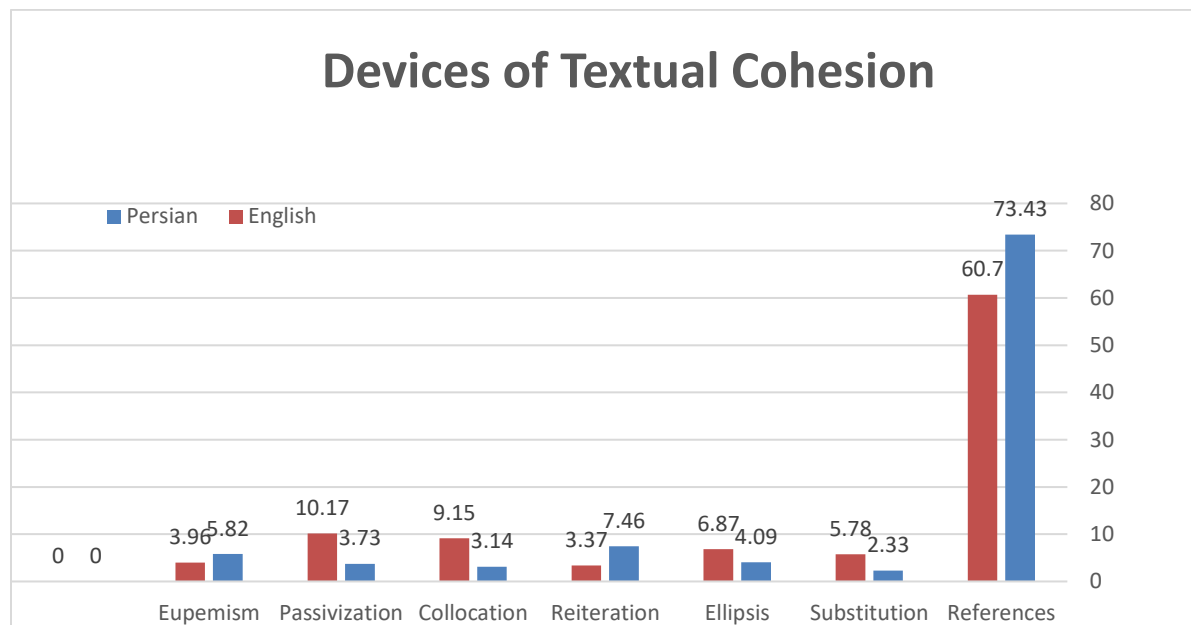
Figure 1. Textual Cohesive Devices in Persian and English Environment Discipline

In both texts with almost the same number of words, the coherence devices are displayed via percentage and frequency in both texts. They are ordered from the first to the seventh in terms of frequent use in both text types. The position of cohesive devices in Persian and English Environment texts is compared to give a better analysis of better findings.

Table 2
Comparative Use of Cohesive Devices in Persian and English Environment Articles

	Priority of Textual Cohesive Devices						
Text types	1	2	3	4	5	6	7
Persian	References	Reiteration	euphemism	ellipsis	passivization	collocation	substitution
English	References	Passivization	collocation	ellipsis	substitution	euphemism	reiteration

In Table 2, the cohesive devices of references and ellipsis are in the same row, but repetition, passivization, and euphemism are almost the opposite. Since the changes in devices affect the structure of the text, these changes are discussed as follows:

All the sentences in both Persian and English environmental texts have coherence both horizontally and vertically, and all the sentences are connected and coherent throughout the lexemes. furthermore, results show that English texts have similarities and differences in terms of textual cohesive devices. According to Table 1, references in both texts have the highest percentage in Persian (76.43) and English (60.70) and substitution has the lowest percentage in Persian texts (2.33) and in reiteration in English (3/37). This can be considered a close similarity in the references. Table 2 shows the other similarity regarding the priority of references and ellipses. However, there are significant differences in the devices of ellipsis with percentage (Persian, 4.09, English, 6.87), reiteration (Persian, 7.46, English, 3.37), and passivization (Persian, 3/73, English, 10/17). In Persian texts, the percentage of euphemisms (5.82) is higher than in English (3.96). The device of Persian collocation is (3.14) which is less than English (9.15). Substitution (2.33)

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is less used in Farsi than in English texts (5.78). In general comparison, in Persian texts, the percentage of references, euphemisms, and reiterations is more than in English but passivization, substitution, collocation, and ellipsis are used less. In short, it can be concluded that in two types of text, textual cohesion with high frequency in references has been used to make the text coherent with pronouns.

Among the cohesive devices in two types of texts, references are the most used, and this is consistent with Fallahi and Houshmandi (2016) who concluded that references are the most frequent cohesion tools in the written discourse of third-year high school students. Furthermore, Ramezani et al. (2013) also showed in research that referential coherence is the highest and deletion and substitution coherence is the lowest overall average. This point is also confirmed in this research because Ramezani et al. found that text coherence in Persian depends to a large extent on references, but deletion and substitution had the lowest frequency in Persian high school texts. The same result was shown in the study of Rostam Beyk et al (2017) since they evaluated the growth trend of the use of grammatical coherence tools in Persian speakers and concluded that all speakers had a greater tendency to use references.

The findings of Rostam Beyk et al. (2017) are also in line with the results of this research because they also concluded that personal reference has the highest frequency, followed by indicative reference and comparative reference. Among the coherent tools of ellipsis and substitution, the highest frequency belonged to the ellipsis of the nominal group. According to the findings, it can be said that references are the main tools of coherence that connect sentences and create grammatical and structural coherence in both English and Persian texts. The position of other tools such as deletion and substitution, which are again related to references or the nominal group, is less seen in Farsi than in English Environment texts. The place of cohesive devices in the structure of the text is not only for the beauty of writing, but the goal is to influence the audience and increase their understanding. Scientific texts such as Environment are different from literary texts such as prose texts in terms of language usage and content in using coherence tools, but in general, they need these devices to give the text grammatical and semantic coherence.

Findings reveal this line of research can help ESP teachers become aware of coherence tools and their role in understanding scientific or even literary texts and achieve a better understanding. This point is related to Halliday (2014) because he states that in some texts, the lack of proper use of coherence markers makes it difficult to understand the relationship between different parts of the text, and readers have to make a lot of effort to understand the text. Sometimes they even get confused in understanding the texts and lose their motivation to continue reading. The lack of coherence in the text causes the reader to have little understanding of unrelated sentences and not understand the connection between different parts of the text. From systemic functional linguistics, cohesive devices are important in cognitive linguistics and the function of text discourse (Chawala, 1991).

The findings have shown that cohesive devices of references and substitution in Persian and English Environment texts are in the same row, but reiteration, passivization, and euphemism are different. References, substitutions, and ellipses have almost a coherent and structural relationship with each other in sentences. Therefore, it can be concluded in both texts, that the authors of both languages were aware of this point. However, in English texts, the passive structures are used more than in Persian, and this has been determined in the analysis. Another factor is that references are used less in Farsi than in English due to the pro-drop subject that is used in Persian. The subject can be removed, but in English, this is not possible unless it is done in passive sentences. Academic texts in the English language use pasivization extensively. This is the nature of scientific texts in English but passivization in Farsi is used if the authors think the subject can be ignored intentionally due to pragmatic reasons like political, social, or cultural issues. These matters need future research since the Persian language is a pro-drop agent and the use of references should be less than English. On the other hand, Persian language authors use fewer subject pronouns but use active voice more than English authors. For this reason, references are less in English than in Persian, but passive sentences are more visible in English. Another point is the high frequency of euphemisms in Persian compared to English may be due to the non-use of the substitution tool appropriately in the Persian language. Thus, this cohesive device is placed in the sixth row. Unlike English texts, Persian texts have used euphemisms as a social and political tool and they used scientific terms with more caution in research texts. Maybe another reason is the lack of deep research and finding the facts. This method has made them use euphemisms more than English writers. For example, in research such as "This year Urmia Lake does not invite migratory birds." We find that this sentence may be used instead of "Lake Urmia has dried up this year and migratory birds cannot migrate to it." The author does not directly mention the creation of this problem

and the water policy that leads to the absence of migratory birds. Or in the sentence "The insecurity of animals in accidents on forest roads in the North is disturbing." Instead of saying "Killing or wasting animals on the forest roads of the North is destructive." Therefore, using euphemism is in third place in Persian texts and sixth place in English texts. A comparison of the two texts shows that English language authors are more explicit in researching environmental crises, they have deeper information about these crises, which raises the issue with more confidence and clarity.

CONCLUSION

The results of the statistical analysis showed the importance of cohesive devices in the environmental genres in both Persian and English articles. Therefore, students need to be aware of different linguistic devices that make the ESP texts cohere. In addition, this awareness helps them to comprehend or write Environmental articles in Farsi and English effectively. Understanding Persian and English Environment texts and structural differences in terms of textual coherence helps ESP learners to compare and discover these structural differences in Persian and English discourses and discover the way of thinking of the authors in the two cultures. This exploration may need future research to find out the relationship between discourse organization and culture. Researchers need to uncover the writing style of the speakers of those two languages and the appropriate use of cohesive devices to write ESP articles on environmental disciplines. On the other hand, the practical discovery of textual cohesive devices in Persian and English is effective not only in texts of environmental disciplines but also in the coherence analysis of other text types. The findings of this research are also advantageous for ESP language teachers since they can focus on structural analysis of texts for teaching ESP texts. Future research in scientific texts can be conducted on the effects of cohesive markers on text readability. The hypothesis can be formulated as the effectiveness of these markers in the text, and perhaps their impact on the readers' comprehensibility.

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