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1 Conjunctions in English scientific articles: an analysis on conjunctive adjuncts linking sentences

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1 Abstract

This study focuses on the use of conjunctive adjuncts that link one sentence to another in 20 English scientific articles published in four different journals. Text analysis is employed to investigate the use of conjunctive expressions, the most frequently used categories and forms of conjunctive adjuncts, and possible patterns in the use of conjunctions based on Halliday and Hasan's (1976) framework. 221 items of conjunctive expressions are found covering 24.69% of the total number of sentences written. Additive conjunction is the category which is the most frequently used, while 'however' is the form which is used in the highest frequency. Unfortunately, this study is quite far from sufficient to draw a conclusion regarding the possible patterns of the use of the conjunctions in the subject journals.

Keywords: Cohesive devices, conjunction, conjunctive adjuncts

Introduction

Cohesion is always seen as one of important aspects of text quality from which readers, when specifically taking written texts into account, are able to comprehend texts being read easily and pleasantly. However, this is clearly not the only important aspect due to the fact that other aspects such as morphology and syntax are also essential to contribute to composing well-written texts. Halliday and Hasan (1976:2) state that cohesion is an aspect that helps create texture of texts that distinguish them from non-texts. What it means by texture is the property of 'being text'. Tanskanen (2006:27) supports the notion by explaining that cohesion 2 essential to produce discourse and interpretation, even though there are, still, always debates about how powerful the aspect is in creating unified texts.

According to Halliday and Hasan (1976:4), cohesive devices used within a text are needed to create relations of elements which are dependent to one another; one element that presupposes, as well as is presupposed by, the others should be integrated as a whole unit of ideas. Nevertheless, as stated previously, the use of cohesive devices within a text does not the mere aspect that will lead to easy understanding especially when a writer does not compose a text by using proper cohesive ties. The following example shows how, when used inappropriately, cohesive devices are not the only ones that contribute to comprehensible piece of writing:

“The boy is playing with a little girl. She is the woman who just bought a new car. When buying a new car, people in the neighborhood should have had a garage at home. A garage is a part of home where we can make use as a storage space.”

As seen above, the underlined words and phrases in the example are several instances of cohesive devices based on Halliday and Hasan’s framework. In the second sentence, the word “she” is known as a reference while “a new car”, “a garage”, and “home” are considered as repetitions of the same items. However, since they are used inappropriately, it is somewhat easy for any readers to state that the piece of writing is not cohesively written. The cohesion is not fulfilled even though the writer uses several cohesive devices, even without any syntactical issues within the text. Obviously, the ideas within the text themselves should be integrated to one another while the cohesive devices are the elements that help to construct coherence.

Halliday and Hasan (1976) classify cohesive devices into three main categories: grammatical, lexical, and conjunction. The grammatical cohesion is divided into three types including reference, substitution, and ellipsis. Lexical cohesion, according to Halliday and Hasan (1976:274) is related to the use of a selection of vocabulary items in text in order to achieve cohesiveness. In this case, the lexical cohesion falls into four categories including repetition, synonym as well as near synonym, superordinate, and general word. Regarding the last type of cohesive device, conjunction, Halliday and Hasan (1976:226) explains that this one is different from the other types because of following reasons: 1) this does not perform as an anaphoric relation; 2) this creates cohesion indirectly; and 3) this expresses meanings that presuppose the existence of any other text components. There are four categories of conjunctive elements as cohesive devices namely additive, adversative, causal, and temporal.

Dealing with the current study, it is essential to pin point that various studies on related topics have been conducted recently. Cho and Shin (2014), for instances, examined the use of cohesive devices in English writing textbooks and pieces of English texts written by Korean students. Using text and corpus analyses, they found that the three English writing textbooks being examined did not cover full range of cohesive devices. The textbooks which are used in Seoul only focused on sentence transitions and conjunctions. Interestingly, when being connected to the focus of current study, Cho and Shin found that the students’ overused, and even misused, the sentence transitions and conjunctions in their writings.

Adiantika (2015), in another study, investigated the use of cohesive devices in students’ writings, specifically expository texts. He focused on types of cohesive devices used by the students and how they contribute to students’ writing quality. From nine students’ expository writings, Adiantika found that there were only four types of cohesive devices used by them covering reference, substitution, conjunction, and lexical cohesion. Almost in line with what Cho and Shin (2014) found, conjunction appeared to be the second most frequently used by the students that covers about 32.6% of the total numbers of cohesive devices used. The researcher found that the students overused, also misused as well, the conjunctive devices which leads to the appearances of incoherence in the written texts.

Saud (2015) who examined errors in the use of cohesive devices in students’ writings found that there were 325 cohesive devices errors made by the students from 620 which are identified. The highest number of errors found in the use of lexical devices followed by reference. The error in using conjunction was the next in percentage covering about 23.07%

from the total errors. Based on his analysis, the errors were made by students because they had difficulties in using the cohesive devices appropriately within the texts.

Another research conducted by Nugraheni (2016), who emphasized her study on the use of conjunctions in eight essays written by learners who had been studying 'Academic Writing' for about three months intensively, shows that there were 126 items of conjunctions found in the students' essays which were classified into 37 forms and 12 types. From those 37 forms, the coordinating conjunction 'and' appeared to be the most frequently used followed by subordinate conjunction 'because'. Further, Nugraheni (2016) also examined the inappropriate use of the cohesive devices in which the total numbers of 32 cases were found. The writer believed that the inappropriate use of the conjunctions is caused by the interference of learners' L1, which is Indonesian.

Based on the elaboration above, this study focuses on the use of conjunction, as a type of cohesive devices, in English scientific articles in different journals. Instead of investigating students' writings, this focuses on pieces of scientific works by academics which have been reviewed before the publications to investigate the types of conjunctions used, what conjunction that is used most frequently, and whether or not there is certain patterns in the use of conjunctions by different authors in different journals.

Method

In this descriptive qualitative research, text analysis was employed to answer the problems. Twenty articles written by different authors in four different journals, five articles from each, were analyzed by using Halliday and Hasan's (1976) taxonomy. The journals were categorized into: 1) reputable international journal, 2) journal which was accredited S1 by the Ministry of Research-Technology and Higher Education of Republic of Indonesia, 3) journal which was accredited S2 by the Ministry of Research-Technology and Higher Education of Republic of Indonesia, and 4) journal that had not been accredited at the time the study was conducted.

In analyzing the texts, content analysis was employed in order to identify the specific characteristics being investigated (Ary, et al., 2010:457). The analysis only focused on the use of conjunctive adjuncts that link one sentence to another within a text under four categories including additive, adversative, causal, and temporal. In this case, only the introduction part, as well as literature review, which was analyzed which means that the following parts, including method, findings and discussion, and conclusion, were not taken into account. Before starting the analysis, the researchers determined the categories (Fraenkel & Wallen, 2006:485) of conjunctions including additive, adversative, causal, and temporal.

Adapting the steps involved in content analysis explained by Fraenkel and Wallen (2006:485), the researchers, first, specified the unit of analysis, located the relevant data, developed a rationale, and determined the transcripts to be analyzed. Next, the researchers analyzed the selected transcripts by using simple coding categories, i.e. 'Add' for additive, 'A' for adversative, 'C' for causal, and 'T' for temporal. After finished analyzing the transcripts, the researchers presented the data descriptively in the findings.

In addition, it is important to remember that the frequency was counted by considering the numbers of sentences, not words, due to the fact that this study only focused on the use of conjunctive adjuncts that link sentences within the introduction of each article.

Findings

The data gathered from the analysis shows that a total number of 221 conjunctive expressions are found in the scientific articles and all categories of the cohesive device are used in the articles. Of course, with regard to the number of appearances of each category, the frequency varies. In total, additives are used most frequently with a total number of 95 items followed by causal conjunctions at 51 appearances. The next two temporal and adversative conjunctions that cover 41 and 34 items found.

Several forms seem to be quite well-known by the authors so that they appear frequently in the writings. In addition, it is also interesting to find out that there are a few uncommon forms, without any emphasis on whether or not they are used correctly, that exist within some pieces of the scientific works. ¹

Unfortunately, it is still problematic to draw any conclusion regarding the possible pattern in the use of the conjunctive adjuncts since the use of the cohesive devices seems to be, so far, personal to the authors. This probably is caused by various aspects, either intrinsic to this study or extrinsic regarding, for instance, the authors themselves.

The details of results of the data analysis in dealing with the research problems are presented below.

The conjunctive adjunct used in the articles

The analysis on 20 articles being the subject of this study shows that a total number of 221 items of conjunctive adjuncts are identified. This covers about 24.69% of the total number of sentences. It can be explained that 221 sentences are linked to others by the existence of the cohesive device. However, due to the fact that each article is different in the number of sentences written to another, while the use of conjunctive adjuncts varies as well, the percentage does not represent each. In other words, when taking into account the percentage of the cohesive items in each article, one shows different number from another.

Regarding the terms used, there are 56 found in the articles. In this case, the 221 items are identified carefully because several forms occur in different syntactic chunks. For example, a sentence that starts with 'In addition, ' is considered as the same, in form, with another sentence that begins with 'In addition to' The pronoun 'to' was not counted because it is the conjunction 'In addition' that cohesively connects the elements in the text. The similar process of identification also applies to an item which seems to be misused like 'In the other hand'. For this, instead of considering the item as a new form, it is more reasonable to group it with 'On the other hand' items as one form.

Interestingly, there are several uncommon forms are identified in a few articles. The conjunctive expressions like 'In the other hand', 'Such as' which functions more like 'For instance' or 'For example', as well as an uncommon use of 'however' that does not successfully link two sentences with contrastive relations are found. However, because this is not an error analysis-based study, such misuses are simply ignored.

Discussing the use of the conjunctive adjuncts in articles of the subject journals, which are classified into four different categories, it is more appropriate to present the result in percentage, rather than the individual items, due to the fact that the journals vary in the sentence lengths. In Journal I, which is an international journal, the total number of conjunctive expressions used covers about 19.09% of the total number of sentences found. The items used in Journal II covers around 29.31% while Journal III shows the percentage of

24.05%. The last one, Journal IV, employs around 28.20% conjunctive adjuncts from the total number of sentences. At this point, it is clear that the last is the journal with highest use of the cohesive devices.

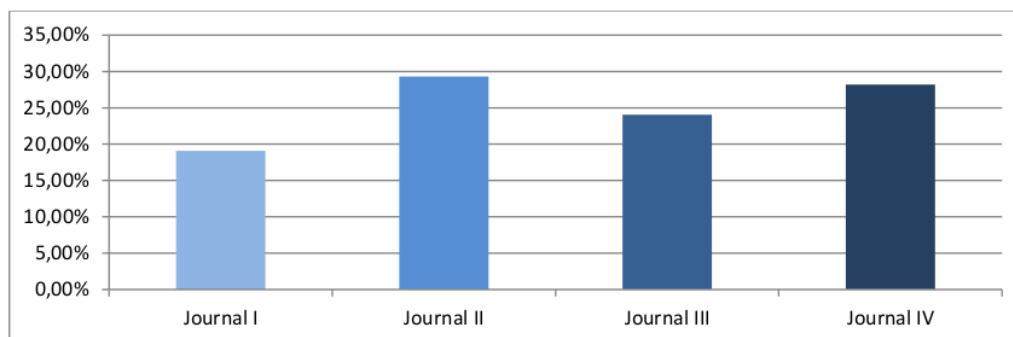


Figure 1. The Use of Conjunctive Adjuncts in the Subject Journals (in %)

From the figure above, it can be seen that Journal II employs more items of conjunctive expressions than the others. However, it is important to inform that the percentage comes from five articles with different contributions to the use of the conjunctions. For instance, one article in the journal employs 20 items while another only uses 8 conjunctive adjuncts in the introduction part. Such condition applies also to other journals. The implication is obvious; the number of the conjunctions used depends much on the author(s) of each article. It means that even in the same journal, different authors may use different number of conjunctive items which are related more to their individual choices, not because of certain norms or regulations applied in the journals.

The categories of conjunctive adjunct used in the articles

As explained, this study only focuses on the analysis of conjunctive adjuncts that link sentences in English articles written and published in four different Journals. The analysis is based on Halliday and Hasan's (1976) framework in which this type of cohesive device is divided into four categories: Additive, Adversative, Causal, and Temporal. The following figure zooms up the result of the analysis in brief.

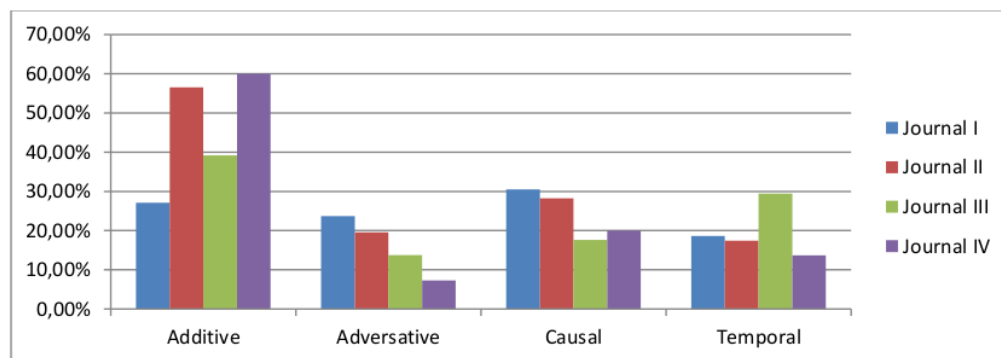


Figure 2. The Categories of Conjunctive Adjuncts Found in Subject Journals (in %)

Based on the results of the analysis, additive conjunctions appear to be the most frequently used with 95 items found followed by causal with 51 occurrences. Temporal conjunction comes next with 41 items found while causal is the last with 34 conjunctive expressions identified. There are conjunction-like items that cannot be classified into one of the four categories because the authors, likely, misuse the items. For instance, an author in her introduction wrote, “*Listening has been assumed as a difficult skill. Listening comprehension, however, involves an active process that enables the listeners form meaning.*” In that case, the underlined conjunction is commonly used to demonstrate ‘but’ relations between sentences. Unfortunately, it is clear that, in the example above, the use of the item is problematic.

Furthermore, it is also essential to mention that the four categories are not always used in the same article. For example, temporal conjunction is not found at all in three articles. This also happens to other three categories. Interestingly, there is an article that only employs two categories: additive and causal. This fact supports the assumption, as mentioned in previous part, that the use of the cohesive devices is personal to the authors. In addition, since the analysis only covers the introduction, including the literature review, of the scientific works, it is safe to say that the non-existence in the beginning may occur in the following parts: method, findings and discussion, and/or conclusion. It means that an analysis on the whole parts of the writings may lead to different results.

The conjunctive adjuncts that are most frequently used

As Figure 2 suggests, related to the categories, additives are the most frequently used in the subject journals in which 95 items are found in various forms. The next are causal conjunctions with 51 items and temporal with 41 items found. The least used category is adversative with 34 occurrences. This finding implies that the ‘and’ relations dominate the constructions of the scientific works. Again, because this only focuses on the beginning part(s) of the texts that cover introduction, including the literature review, the data only captures this trend partially.

The highest frequency of the use of additives is found in Journal IV. 60% from the total number of items identified within the journal makes this category obviously dominant in use. The next journal which shows slightly similar trend is Journal II with 56.52% of additives followed by Journal III with 39.21% and Journal I with 27.11%. Figure 2 also shows that the least frequently used category is adversative conjunction.

Interestingly, the domination of additive conjunctions only occurs in three journals: Journal II, III, and IV. While in Journal I, the number of additive conjunctions is in the second place following causal conjunctions. In percentage, additives cover 27.11% from the total number of conjunctive expressions found within the journal, while causal conjunctions are used at around 30.50%.

When it comes to the individual use of certain forms, surprisingly, ‘however’ is the form that appears most frequently. This one is found 24 times in various articles follows by ‘therefore’ with 18 occurrences, and ‘moreover’ with 14 items found. What makes this interesting is the fact that the most frequently category is additive conjunction that mainly demonstrates ‘and’ relations, while ‘however’ is a form that is used to create ‘but’ relations between sentences. In this case, the most reasonable implication is because the authors use various forms of additive conjunctive adjuncts, besides ‘moreover’ such as ‘furthermore’,

'for example', 'on the other hand', and 'in other words'. The following figure sums up the use of conjunctive adjuncts by frequencies.

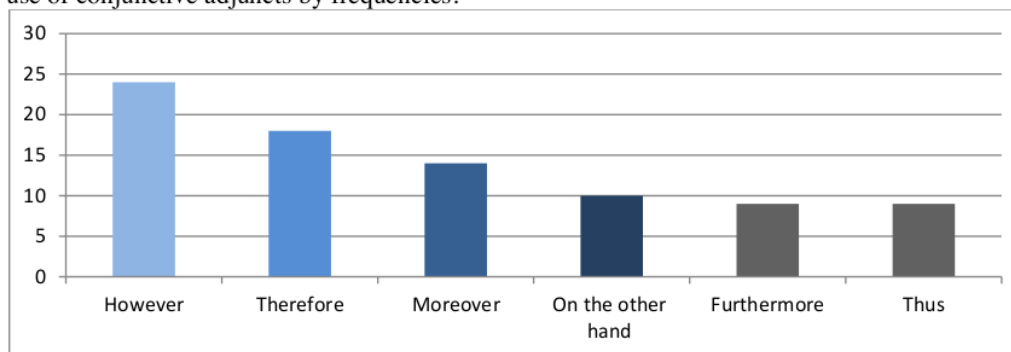


Figure 3. Most frequently used conjunctive adjuncts

Discussion

The result of the analysis shows that there are 221 conjunctive adjuncts found in the initial parts of 20 scientific articles published in four different journals. Those cover about 24.69% of the total number of sentences written. Four categories of conjunction, based on Halliday and Hasan's (1976) framework, are used by the authors in different frequencies. Additive conjunction is the category which is found as the most frequently used followed by causal, temporal, and adversative. Interestingly, 'however' is the form with highest frequency in use, followed by 'therefore', 'moreover', 'on the other hand', 'furthermore, and 'thus'.

As anticipated, the data demonstrate relatively similar trends with previous studies conducted under the similar topic. For instance, NaYoonHee (2011), who conducted a study with the focus on investigating the use of cohesive devices in CMC texts written by Korean EFL and American learners, found that all types of conjunctive expressions were found. The study revealed that the American learners utilized 25.55% of conjunctions from the total number of cohesive devices used while the Korean EFL students used more conjunction at 31.68%. In line with the result of current study, additive conjunctions were the most dominantly used by both groups.

Regarding the most frequently used type of conjunction, similar finding was also reported by Nugraheni (2016). In eight essays that she analyzed, additive was also the most frequently used by the writers and the most dominant item found was the coordinating conjunction 'and'.

Turning to the use of 'however' as the form with the highest frequency, the finding supports several data reported in previous studies. Gholami et al. (2012), for instance, found that 'however' was the most frequently used connector in sentence initial position in research papers written by Iranian authors. While Cho and Shin (2014), in their corpus analysis on cohesive devices used on English Writing textbooks and Korean learners' English writings, found that the sentences transitions which were used most frequently in learner corpora were 'however', 'therefore', and 'in addition'.

As also mention in the previous section, there are several items that are used in uncommon ways by the authors. Surely, this study actually does not take into account the errors made in the use of the cohesive devices, yet it is interesting to discuss. For instance, in one excerpt (Journal IV, Article 2) a conjunctive adjunct is used as follows:

Listening has been assumed as a difficult skill. Listening comprehension, however, involves an active process that enables the listeners form meaning.

From the example, it can be seen that the underlined connector 'however' is used illogically because this form is supposed to be an adversative that shows 'but' relation between sentences.

In another excerpt (Journal III, Article 3), another issue appears as well,

There is an impossible thing for the listeners to control the speed from source which cannot be controlled. Such as, the students is listening to a radio or television broadcast, here they cannot ask for a slower speed through the media.

'Such as' in the example above is clearly uncommon to be used as a sentence connector. In such case, conjunctive expressions like 'for instance' and 'for example' are clearly more acceptable.

Besides the issues in the uncommon application of the conjunction, it is also found that a few authors use conjunctive expressions excessively, not to mention inefficiently. The following excerpt (Journal IV, Article I) is good example to present:

However, the issue of English teachers' pragmatic knowledge slightly attracts the intentions of researchers, particularly Indonesian linguists. Most of the researches have concerned on investigating pragmatic aspects from the learners' point of views. Hence, following up some previous studies, the present study attempts to delineate the most frequently used request strategy by Indonesian ESP lecturers. Further, it examines how situational variables of social distance, power, and imposition influence their choice of request strategies. In addition, their reasons of using such strategies are also revealed. The participants' request strategies are classified based on Blum-Kulka and Olsthain's Cross-Cultural Speech Act Realization Project (CCSARP). This study, furthermore, is contributing to the enhancement of pragmatic theories in which the appropriate use of language is the main concern. Although the study is focusing on the acts of requesting, the findings are hopefully showing the portraits of Indonesian ESP lecturers' pragmatic knowledge. Finally, the findings are also expected to raise their awareness of the importance of pragmatic competence leading to their incorporation of this area in teaching practices.

As seen, the sentences connectors, in underlined, are simply everywhere in the paragraph.

NaYoonHee (2011) also found such problematic cases, including the misuse and overuse of conjunctions, and believed that, based on the prior studies, the problems were faced mainly by English non-native speakers.

Conclusion

This study reveals that, in scientific articles, authors make use of conjunctive expressions in to build the cohesion in the pieces of the works. In this case, various forms of conjunctions are used that can be classified under the four categories: Additive, Adversative, Causal, and Temporal. The additive conjunctive adjuncts are the most frequently used by the authors. In addition, the most used form is 'however' which is considered as an adversative conjunction that functions as the connector that connects two sentences with contrastive ideas.

Regarding the misuse and the overuse of the conjunctive expressions, it is interesting to investigate further in the next studies. Besides, conducting research under different topics such as the use of lexical cohesions in scientific articles will also be essential to give better insights into how cohesion is built in such scientific fields. For sure, considering the limitation of this study, bigger number of articles published in more scientific journals will lead to way better picture.

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