

Exploring logical connectors in journals with different indexing levels: A comparison between international and national indexed journals

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ABSTRACT

Research to date has witnessed the mounting significance of logical connectors in writing including scientific journal articles; however, little is known as to whether the usage of such connectors may correspond to a varying degree of journal quality. This qualitative study fills in the void by exploring the use of logical connectors in journals with different indexing levels, national and international. Sixty articles were collected from two journals, thirty articles from each. Implicit behind this study is an assumption that differing journal indexing entails differing journal quality. Nineteen connectors that belong to the most frequently used conjunctive adverbials in academic prose were searched using Laurence Anthony's concordance program (AntConc). The findings reveal that the top-two most frequently CAs used in both corpora are adversative *however* and causal *therefore*. Based on these results, the analysis is centered on these two CAs by investigating the coherence relations in order to see the underlying logical relationships between two sentences. The findings show that the illogical uses of CA *however* and *therefore* were equally found in both corpora although the percentages for the illogical use in the international journal articles are less than those in the national ones. In conclusion, not only do articles in the two journals share the same tendencies in the logical use, they also evince the same patterns of problem, namely failure in recognizing logical relationships and overuse of connectors. Of importance is that the purported relationship between journal indexation and logical use of connectors may be at best weak, and at worst absent, for both journals in question dominantly exhibit a logical usage of connectors. Pedagogical implications are also discussed.

Keywords: Conjunctive adverbials; international; journal indexation; logical relationships; national; research articles

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INTRODUCTION

Indexation of journals is considered a window to high-quality research and publication. It is mostly known to be an efficient and objective database for literature researchers (Chadegani et al., 2013). Journal indexation is a common indicator that a journal is standard (Nagoba, Selkar, Mumbre, Davane, & Suryawanshi, 2016). The essentials of being indexed are, more or less, similar to a domino effect: since the indexed journals

will be accessible to a wide audience, they will have a fat chance to have a high reputation as the increase of readership (Rajagopalan, 2015). Indexed journals, then, are regarded as the world of research with higher scientific quality than non-indexed journals, besides being authoritative sources of scientific information (Balhara, 2012; Rajagopalan, 2015). Thus, with such benefits, no wonder academicians aspire to have their research articles published in indexed journals.

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With the income of readership, internationally indexed journals certainly gain more visibility than local ones. Not merely on the scope of readers, international indexation also influences researchers' opportunities to collaborate with international researchers and of the article having additional citations, and therefore, that contributes to the community of the specific fields (Holland, Duncombe, & Meester, 2018). With these profitable advantages come strict requirements for the publication: a research study should be the most up-to-date and have the highest quality of interdisciplinary content. To ensure only the best quality of content in their publication, international research databases, for example, Scopus has a panel of independent, international board of journal editors, librarians, and bibliometricians (Rew, 2014). With such strict requirements and selection from the board, internationally indexed journals may have greater credibility than locally indexed counterparts; thus raising a stereotype that internationally indexed journals are higher in status than local ones.

As part of academic writing, research articles also hold the same rules of academic writing style, which emphasizes formal tone and, most importantly, a logical flow of ideas to form a unity (Labaree, 2009). A unified whole of ideas will help readers to follow the logical arguments in research articles and make sense of the content that is being communicated. However, the use of connectors as a device to intimately link ideas has evidently been troublesome for second language learners, especially for advanced learners (Yeung, 2009). It is, therefore, of interest to gauge the extent of use of logical connectors in academic writing.

There are various studies concerning how ideas are connected logically in research articles, and generally, in academic writing. By considering a great use of subordinate clauses in academic writing (Biber & Gray, 2010), these studies mostly observe the use of logical connectors (conjunction—red) as a grammatical aspect in constructing the logical connection of ideas. Currently, research on logical connectors can be categorized into two major themes. First, there are those who investigated the use of logical connectors in relation to the linguistic background of the authors. These studies focus on the issue of L1 and L2 writing, investigating how Non-Native English Speakers (NNESs) build connection using connector tools (see Carió-Pastor; 2013; Chen, 2006; Esfandiari & Barbary, 2017; Granger & Tyson, 1996; Mur-Deñas, 2009, 2011; Rojanavarakul & Jaroongkhongdach, 2017; Uçar & Yükselir, 2017; Yeung, 2009). Their methods are varied; some of them compared NNESs to Native English Speakers (NESs) while others only looked into NNESs' writing with different L1s. The results of their observations mostly point to evaluating pedagogical approaches in teaching academic writing to NNESs.

Meanwhile, other researchers tend to focus on logical connector use in relation to varied issues (see Gholami, Ilghami, Hossein, & Tahoori, 2012; Karahan, 2015; Mahmoud, 2013; Martínez, 2015; Mohammed,

2015; Rahimi & Qannadzadeh, 2010). The perspectives of the studies are multifarious, such as from the quality of texts, the area of disciplines, and even authors' intelligence. The results of these studies raise a new point of view in seeing that the use of connectors may not always be seen explicitly from the linguistic background of the authors, but it may also correlate with other backgrounds.

From the comparison of two categories of perspectives in analyzing logical connectors in writing, it may be seen that researchers tend to see connectors from the perspective of authors' linguistic background. A significant number of studies concerning the linguistic background of the authors may be traced to the aims of the research themselves; they are mostly seeking for efficient methods to teach connectors, especially to NNESs, to enhance the EFL/ESL students' understanding regarding how to properly use connectors. On the other hand, analysis of connector use involving other perspectives remains scant. Apart from the interests in observing NNESs writing, this lack may be due to the connector tools that are seen as a grammatical aspect in writing, which instinctively correlates with linguistics.

Seeing these two categories of logical connector studies, the lack of research concerning other views in analyzing the logical connector use in writing is the starting point of this current study. This study, then, falls into the second category, namely the hybrid category. One of the views that has been observed is the relation between text quality and the use of connectors (see Mohammed, 2015). In this paper, the current study goes beyond the quality of texts to question how the writing quality of research articles may be related to the use of logical connectors. To address such a question, this study investigates how logical connectors are used in two journals with different indexation: one indexed internationally and another indexed nationally. The study uses a qualitative analysis to seek for the possible differences occurring in both journals taken as the sample data. By conducting the study, the question of whether the difference in indexation level is potentially reflected in how the article is written in terms of logical cohesion may be fractionally answered.

Logical connectors

Logical connectors, as introduced by Celce-Murcia and Larsen-Freeman (1999) also known as conjunctives, refer to "what are traditionally called subordinating conjunctions and conjunctive adverbials" (p. 519). Subordinating conjunctions or what a typical grammar or writing book refer to as "adverbial subordinators", embeds one clause with the other with the force of adverbials. This type of connector is divided into two parts: simple and complex. On the other hand, conjunctive adverbials have a different main function to adverbials subordinators. The latter functions as the subordinators of two clauses; it connects two independent clauses. Although Celce-Murcia and Larsen-Freeman have different terms for the notion

“conjunctions”, they still admit the four broad classifications of conjunctions or logical connectors by Halliday and Hasan (2014) as follows.

1. *Additive*
emphatic: in addition, moreover, furthermore, besides, also
appositional: that is, in other words, for instance
comparative: likewise, similarly
2. *Adversative*
proper adversative: however, nevertheless, despite this, in contrast
contrastive: in fact, actually, however, on the other hand, at the same time
correction: instead, rather, on the contrary, at least
dismissal: in any case, anyhow, at any rate
3. *Causal*
general causal: therefore, consequently, for that reason, thus
causal conditional: then, in that case, otherwise
4. *Sequential*
then, next, first, second, last, finally, up to now, to sum up
 (Celce-Murcia & Larsen-Freeman, 1999, p. 530)

Because Celce-Murcia and Larsen-Freeman adapt the broad classification by Halliday and Hasan (2014), the division of conjunctive adverbials above function the same. The term “additive” refers to those connectors that help add new information; “adversative” is used for

presenting two contrasting ideas; “causal” defines causes and inferences; and “sequential” presents a real-time or sequential relationship.

This broad classification into four classes can solve a global problem, that is, to sort out the relations into types. This means that the categorization only works on a surface level, for example, the adversative class members are only used to counter the previous information. Further, Celce-Murcia and Larsen-Freeman (1999) argue that this categorization may result in a problem in relation to individual meaning. For example, despite belonging to the same class, writers cannot use *nevertheless* and *despite this* to the cases that should use *however*.

Highlighting this problem in their book, Celce-Murcia and Larsen-Freeman (1999) present some propositional frames in order to guide writers, especially ESL/EFL, to use conjunctive adverbials properly. The propositional frames for the adversative class as a signal for countering information can be summarized in Table 1.

Some adverbials that belong to the additive class as a signal for involving new information are roughly described in Table 2.

The conjunctive adverbials that belong to the causal class are used to invite readers/listeners to make an inference of the situations. The propositional frames for this class are shown in Table 3.

Table 1. Propositional frames for adversative class (ibid., pp. 531-533)

No.	CA	Use
1.	<i>in any case</i>	X implies Y, or not X implies Y
2.	<i>Nevertheless</i>	X implies Y, and X is true, but Y is not true (<i>nevertheless</i> requires a situation in which one is led to expect one thing but finds something different to be true)
3.	<i>in contrast</i>	X (a) in contrast Y (b) (Two different topics or subjects are different in at least one respect)
4.	<i>on the other hand</i>	X (a) on the other hand X (b) (It is only necessary to have a single subject or topic, which is then contrasted with respect to two contrasting qualities)
5.	<i>however</i>	Certainty versus uncertainty Semantic opposition Topic change marker

Table 2. Propositional frames for additive class (ibid., pp. 531-533)

No.	CA	Use
1.	<i>also</i>	<i>Also</i> is practically interchangeable with <i>and</i> , with a preference for identical subjects in the two clauses.
2.	<i>in addition</i>	<i>In addition</i> is practically interchangeable with <i>and</i> , with a preference for nonidentical subjects.
3.	<i>moreover</i>	<i>Moreover</i> is used primarily in arguments where several premises are used to support conclusion of some sort.
4.	<i>furthermore</i>	<i>Furthermore</i> is used like <i>moreover</i> , except that it tends to preface third or fourth premises where more than two premises exist.
5.	<i>similarly, likewise</i>	<i>Similarly</i> and <i>likewise</i> are used when there is some semantic similarity across two predicates and when the two clauses in some way support a conclusion as supporting examples. <i>Similarly</i> seems to occur across clauses with two separate subjects, while <i>likewise</i> tends to prefer just one.

Table 3. Propositional frames for causal class (ibid., pp. 531-533)

No.	CA	Use	Example
1.	<i>consequently</i>	<i>Consequently</i> is used to signal a real causal relationship between two events or conditions.	<i>Greta won the lottery; consequently, she bought a Ferrari.</i>
2.	<i>therefore</i>	<i>Therefore</i> , when used with causes, tends to be used when listeners/readers are in a much better position to come to the conclusion of their own. <i>Therefore</i> is also used in such a way as to invite listeners/readers to construct an inference of a non-causal type.	<i>She won the lottery; therefore, she was happy.</i> <i>The gun was under the bed; Smith had a guilty look on his face; therefore, it is likely that Smith committed the crime.</i>
3.	<i>Thus</i>	<i>Thus</i> is used much like <i>therefore</i> , but <i>therefore</i> tends to be used more often where there is a chain of premises in an explicit argument. <i>Thus</i> may be used for parenthetical “asides”, where no explicit argument is intended. It seems to be used in the same way as <i>so</i> , except that the register is more formal and the word is found mostly in written prose.	

These propositional frames can help to make a thin border among each conjunctive adverbial that cannot be seen mainly from the categorization of class the conjunctive adverbial belongs. In addition, bordering the function of each conjunctive adverbial may reduce the probability of problems arising from the misuse, such as inappropriate register, failing on showing cohesive ties, and overuse.

Previous studies

The existing body of research on the usage of logical connectors can be categorized into two major themes. The first theme investigated the use of logical connectors in relation to the linguistic background of the authors, focusing on the use of connectors in L1 and/or L2 writing (inter alia Carió-Pastor; 2013; Chen, 2006; Esfandiari & Barbary, 2017; Granger & Tyson, 1996; Mur-Dueñas, 2009, 2011; Rojanavarakul & Jaroongkhongdach, 2017; Uçar & Yükselir, 2017; Yeung, 2012). With varying methods used and different groups of authors examined, the findings primarily point to the necessity to evaluate pedagogical approaches in teaching academic writing.

In some detail, Carió-Pastor (2013) observed the variation of connectors across different sections with different rhetorical moves in engineering RAs. The finding shows that the variation may exist as the interpersonal style is correspondence to the writers’ linguistic background. In another study, Chen (2006) conducted a quantitative and qualitative study of the use of conjunctive adverbials (CAs) in advanced Taiwanese EFL learners’ papers and prestige international articles. The quantitative study reveals that Taiwanese students overused connectors in word-level. Meanwhile, the qualitative analysis shows that they used certain CAs, such as *besides* and *therefore*, inappropriately.

Esfandiari and Barbary (2017) examined lexical bundles in psychology RAs from two corpora: English corpus (EC) and Persian corpus (PC), with a total of 4,370,630 words. This research was not directly related to analyzing logical connectors in RAs, however, it was found that the 4-word lexical bundles also function as transition signals. In a similar line, Granger and Tyson’s (1996) observed how connectors are used in NS (Native

Speaker) and NNS (Non-Native Speaker) essays. The finding is the case of overuse and underuse of connectors are mostly in NNS essays.

Mur-Dueñas (2009) observed logical markers in business research articles from three corpora, RAs in English (L1 and L2) and Spanish (L1). The result shows that there is no significant difference between the use of additive, contrastive, and consecutive markers in English and Spanish RAs. Thus, there is no transfer process from L1 (Spanish) to L2 (English). In 2011, Mur-Dueñas conducted a similar study focusing on metadiscourse features with twenty-four business management RAs in English and Spanish. She found that the English RAs have a higher number of logical markers in comparison to Spanish RAs.

Quite recently, Rojanavarakul and Jaroongkhongdach (2017) investigated randomly selected twenty Thai research articles and twenty international research articles in the field of applied linguistics to discover the validity of the claim that Thai researchers have a lack of logical thinking (p. 328). The overall finding showed that “because”, “thus” and “therefore” were the top three logical connectors used in both corpora. In addition, there was no difference in the number of logical and illogical cases between the two corpora. Therefore, proving that the claim may be invalid (p. 335).

Uçar and Yükselir (2017) narrowed their research to solely look at the logical connector “thus” in native speakers’ and learners’ corpora in the theoretical and applied linguistics field. The results indicate that “the Turkish English learners showed underuse in the use of connector “thus”” (p. 70), but they were advanced in discourse patterns of usage that they did not misuse the connector “thus”. In a similar vein, Yeung (2009) investigated the use of “besides” in several NS open-accessed corpora and Hong Kong learners’ corpus. The results from RAs across disciplines and abstracts corpora show no usage of connector “besides”. This finding contrasts the learners’ corpus that presents high usage of “besides”. Thus, formal writing tends to avoid the use of “besides” as a connector.

Meanwhile, other researchers tend to focus on logical connector use in relation to varied issues (see

Gholami et al., 2012; Karahan, 2015; Mahmoud, 2013; Martínez, 2015; Mohammed, 2015; Rahimi & Qannadzadeh, 2010). The perspectives of the studies are multifarious, such as from the quality of texts, the area of disciplines, and even authors' intelligence. The results of these studies raise a new point of view in seeing that the use of connectors may not always be seen specifically from the linguistic background of the authors, but it may also correlate with other backgrounds.

Gholami et al. (2012) investigated the use of conjunctions in two disciplines: biomedicine and applied linguistics. The finding is "biomedical articles had more instances of conjunctions as cohesive devices than did applied linguistics articles" (p. 307). This result led up to a new assumption that biomedical articles might be more cohesive than applied linguistics articles.

Mahmoud (2013) observed sixty English essays written by Arabic speaking second-year English major students using a performance analysis approach. He discovered that the errors did not determine how good or weak a student is in English; the good and weak students "used most of the connectors correctly" (p. 185).

Martínez (2015) conducted a study to observe the relationship between conjunction density and grade level. It was found that the fourth-grade students outperformed third-grade students in terms of using conjunctions. However, from the perspective of qualitative analysis, there was a small amount of variation in conjunctions used, especially for third-grade students. In another study, Mohammed (2015) compared the use of connectors in high-rated and low-rated English learners' texts in twenty essays about *The Whispering Trees* plot summary. From the study, it was found that conjunctive "and" is less used in high-rated texts, but no significant difference for other conjunctives.

Rahimi and Qannadzadeh (2010) probed a possible relationship between the use of logical connectors and logical/mathematical intelligence in Iranian EFL essays. The result shows that the students with higher logical/mathematical intelligence tend to use more logical connectors.

All these previous studies have explored some variations in data—data across disciplines, researchers' nature, and length—and various findings have surfaced. This study, then, aims to open a new variation to the data, that is, use of connectors in journal research articles indexed in Scopus and non-Scopus, to discover whether the quality of research necessarily reflects in the logical use of connectors in writing. Note that any scientific journal research articles may have undergone an editing process; however, it is not yet clear whether the editing process is concerned with the use of logical

connectors or predominantly focuses on the surface of linguistic corrections and writing formats.

METHODS

Introducing the corpora

The data were in the form of research articles collected from two journals with different indexation levels: one journal indexed in international indexation and one journal indexed in national indexation. Although they are different in terms of indexation levels, both journals are open-accessed, meaning that the archives are accessible for everyone. This made the process of data collection easier because the data are already computerized in the form of PDF (Portable Document Format). The similarity of both journals is also in terms of the area they cover, where both welcome papers on the area of linguistics, literature, and language education. Sixty English research articles were taken from both journals, thirty from each. This is considered a sufficient number because multiple sources are preferred to review, make sense, and organize into categories or theme.

Introducing the data

The sixty selected articles from two corpora were imported into Laurence Anthony's concordance program (AntConc), which is able to investigate almost any language patterns (Krieger, 2003). AntConc is also endowed with the feature of spotting a list of words in one search, rendering a search of CAs fast and easy. The academic prose list of CAs is adopted from Biber, Conrad, and Leech (2002), including nineteen CAs.

After removing concordance lines, the hits of the top-two CAs used in both corpora emerged. It can be noticed that the CA *however* surfaced with 305 hits, and the second-place CA *therefore* with 216 hits. Table 4 presents the top two CAs: *however* and *therefore*.

Table 4. The distribution of the top-two CAs

Rank	Conjunctive Adverbial	Concordance Hits (based on corpus)	
		INT	NAT
1	However	179	119
2	Therefore	123	79

Analysis

Since the top-two most frequently used CAs in both groups of data are *however* and *therefore*, the analysis was based on the exception and result relations. Conjunctive adverbial *however* is included in the resemblance relation group that shows the relation of exception between two sentences or clauses. The constraint and expression of exception relation are shown in Figure 1.

Constraint: $p(p_1)$ and $\neg p(p_2)$; $q_i(a_i) \subset q_i(b_i)$
Expression: Infer $p(a_1, a_2, \dots)$ from the assertion of S_1 and $\neg p(b_1, b_2, \dots)$ from the assertion of S_2 , where b_i is a member or subset of a_i for some i .

Figure 1. Constraint and expression in exception relation (Kehler, 2002)

From this constraint and expression, it can be seen that in using conjunctive adverbial *however*, one important thing to notice is that the entities b_1, \dots, b_n in the counter $p (\neg p)$ is a member of the entities a_1, \dots, a_n in the preceding clauses.

In discussing the logical use of conjunctive adverbial *however*, it should be noted that this conjunctive adverbial functions not only as a tool for exception information, but also for other purposes. According to

Celce-Murcia and Larsen Freeman (2016), there are three types of meanings signaled by *however* as exhibited in Table 5.

Meanwhile, conjunctive adverbial *therefore* belongs to the cause-effect relations to show the relation of result in two sentences. The constraint and expression in using the adverbial *therefore* are presented in Figure 2.

Table 5. Meanings signaled by *however*

Meaning	Example
Certainty versus uncertainty	We may go to Hawaii, or we may go to California. However, we have to find a way to escape the snow this winter.
Semantic opposition	Jill doesn't do well in school. However, her sister is a straight A student.
Topic change marker	I lost \$2,000 in Las Vegas last week. However, let's talk about something else.

<p>Constraint: $P \rightarrow Q$ Expression: Infer P from the assertion of S_1 and Q from the assertion of S_2, where normally $P \rightarrow Q$.</p>
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Figure 2. Constraint and expression in result relation (Kehler, 2002)

RESULTS

Logically used

Most of the conjunctive adverbial *however* and *therefore* in both corpora are used logically, meaning that the underlying logical relationships connected by either conjunctive adverbial *however* or *therefore* fulfill the requirements. The logical use of conjunctive adverbial *however* and *therefore* is summarized in Table 6 and 7.

Table 6. Logically-used *however*

Meanings	INT (%)	NAT (%)
Exception	1.6	1.1
Semantic Opposition	98.4	98.9
Certainty vs. Uncertainty	0	0
Topic Change Marker	0	0

Table 7. Logically-used *therefore*

Meaning	INT (%)	NAT (%)
Result	100	100

From the tables above, it can be seen that the logical use of conjunctive adverbial *however* mostly centers on showing the semantic opposition relation rather than the other functions. Meanwhile, the logical use of conjunctive adverbial *therefore* stresses only on inferring the cause-effect relation.

Illogically used

The illogical use of conjunctive adverbial *however* and *therefore* in both corpora lies on the same problems: the error in recognizing the logical relationships underlying the sentences and overusing conjunctive adverbials. Under the unrecognizable logical relationships, there is a branching problem named the interchangeability of connectors in the same group; meanwhile, under the overuse problem, there is an underlying problem termed as surface logicity (see Discussion). These problems appeared in both corpora are shown in Table 8 and Table 9 as follows.

Table 8. Illogically-used *however*

Problems	INT (%)	NAT (%)
Error in recognizing logical relationships	53.3	65.5
- Interchangeable connectors	12.5	0.00
Overuse	46.7	34.5

Table 9. Illogically-used *therefore*

Problems	INT (%)	NAT (%)
Error in recognizing logical relationships	63.3	68
- Surface logicity	27.3 of 63.3	25 of 68
Overuse	36.7	32

From the tables above, it can be noticed that the problem in using both conjunctive adverbials is mostly the failing in observing the underlying logical relationships between the sentences. Another point of interest in Table 8 is the fact that of the errors in

recognizing logical relationships, interchangeable connectors are quite frequent. In Table 9, under the same category of the error as in Table 8, surface logicity occurs fairly dominantly.

DISCUSSION

On account of the connectors being analyzed, the two journals under investigation instantiated the same trend of illogical uses of conjunctive adverbial *however* and *therefore*. This can be accounted for by referring to what Celce-Murcia and Larsen-Freeman (2016, 1999) have asserted concerning these two CAs: (i) studies concerning the use of connectors have identified adversative linking adverbs as one of the most difficult semantic categories; and (ii) conjunctive adverbial *therefore* is a frequently misused connector in students' writing. From the findings, it can be noticed that the percentages between the illogical uses of *however* and *therefore* show relatively insignificant differences. A number of plausible reasons behind this finding are deliberated as follows.

Failure in recognizing logical relationships

The study confirms a claim by Celce-Murcia and Larsen-Freeman (2016) that the failing in understanding of the logical relationships between sentences or longer texts may contribute to the error production. The meanings of some linking adverbs may be easy to identify, but the failure comes in identifying the logical relationships. This is also based on studies on ESL/EFL students, and this paper demonstrates the same type of case. Some misuses found in the current study are confusions of logical relationships that result in the illogical relation between the sentences connected by either *however* or *therefore*. The misunderstanding of logical relationships is evident in the following example:

[Exc. 20] Excerpt from INT-02 — Illogical Use

On the fairness criterion, the scores obtained by the respondents are quite varied with a range of 2 to 4, no one can reach the score

***However,** nine (30%) respondents scored 2, 16 (53%) respondents scored 3, and five (17%) respondents scored 4 respectively.*

In [Exc. 20], the initial sentence talks about the overall result taken from the scores of the respondents; meanwhile, the second sentence specifies the overall result. Seeing what these two sentences bring, the use of conjunctive adverbial *however* to connect both ideas is incorrect. Thus, this proves that there is a misunderstanding in seeing the logical relationship underlying the sentences.

'Misunderstanding' in using adversative CAs

Although the main issue in illogical use occurrences is the error in logical relationship comprehension, the current study also attests Celce-Murcia and Larsen-Freeman's (1999) statement that the errors in using connectors may also happen because of the "misunderstanding" that words and phrases under the same category are interchangeable, especially in adversative linking adverbs. This case is noticeable in the following example:

[Exc. 21] Excerpt from INT-11 — Illogical Use

*Many Indonesian speakers believe that almost all their national language vocabulary has been borrowed from foreign sources, and sometimes they seem to regret this situation, as if it were offending for their sense of national pride. **However,** this is not true.*

What appears in [Exc. 21] is that the second sentence contrasts the preceding sentence by rejecting the statement. On account of this, the use of CA *however* to connect both sentences is incorrect; it should be connected by *on the contrary*. CA *on the contrary* works to cancel out the previous statement (Crewe, 1990).

Surface-level fillers

Besides confirming the reasons for error production in using adverbial *however* and *therefore*, the findings of the current study also corroborate what Crewe (1990) states as the "surface logicity", that is "to impose surface logicity on a piece of writing where no deep logicity exists" (ibid., p. 320). In other words, the use of a certain conjunctive adverbial in connecting two clauses may not have a meaning in deep logicity. The surface logicity proposed by Crewe (1990) occurs in a considerable number of cases in both INT and NAT data. An instance of surface logicity is as follows.

[Exc. 22] Excerpt from INT-23 — Illogical Use

*On the other hand, the Philippines consists of 18 administrative regions; **therefore,** in order to conduct similar all-inclusive research study, convenience sample data of 139 subjects were taken from 5th semesters students in Philippine Women's University in the city of Manila and Southern Baptist College in North Cotabato.*

In [Exc. 22], it shows the initial clause talking about the number of administrative regions in the Philippines; meanwhile, the second clause specifies the data collection. Both clauses are connected by conjunctive adverbial *therefore*, which cannot encode the relation between the two clauses. Thus, the relation built by the use of *therefore* is nonexistent.

Logical leap

The study is also in line with Chen's (2006) that correlates her study with Crewe (1990), especially regarding the theory about surface logicity. The present study also discovered the similar cases in both INT and NAT data. Such an error is exemplified in the followings:

[Exc. 23] Excerpt from INT-23 — Illogical Use

According to Pennycook (2006), it is not that people use language varieties because of who they are, but rather people perform who they are by using different language varieties.

***Therefore,** the aim of this paper is to compare between Filipinos and Indians the preferred models of English for personal, national, and international communication.*

[Exc. 24] Excerpt from NAT-26 — Illogical Use

*Since creating a sound English curriculum is not an easy thing to do, a careful examination on English in the preschool curriculum needs to be performed. This study **therefore** aims to find out the goals of integrating English as an intra-school curriculum in a preschool in Bandung and the teacher's attempts to achieve these goals in terms of four basic components of curriculum taken from Cayadong (2011) and Tyler (Posner, 1992); the objectives, the materials, the methods and the assessments.*

[Exc. 23] and [Exc. 24] are the illustrations of “logical leap”. In [Exc. 23], this study leaps from the reason for performing language varieties to stating the aim of the paper. The argument in the first sentence (*it is not that people use language varieties because of who they are, but rather people perform who they are by using different language varieties*) is not the reason for the study to be conducted. The same case also happens in NAT data such as in [Exc. 24]. The condition shown in the initial sentence about a must to perform a careful examination is not the cause of the study.

Despite those illogical relations, the analysis of the uses of conjunctive adverbial *however* and *therefore* in INT and NAT data is in line with the semantic opposition function of *however* (Celce-Murcia & Larsen-Freeman, 2016) and Kehler's (2002) resemblance and cause-effect relations, as evidenced by the percentages of conjunctive adverbial *however* functioning as semantic opposition that almost reach a hundred percent. Besides, Kehler's (2002) adaptation of Hobbs's (1990) theory concerning coherence relations is also confirmed in the study. As a signal of exception relation, conjunctive adverbial *however* appears in some logical relations, showing the deep relation between the entities in S1 and S2. Kehler's (2002) theory also frames the use of *therefore* in the analysis, confirming that the semantic notation of result relation ($P \rightarrow Q$) works in the analysis, apart from the errors of logical relationships.

On the whole, from the analysis of top-two most frequently used conjunctive adverbials in two journals with different indexing levels, the findings reveal that while the articles in the two journals share the same tendencies in the logical use, they also evince the same patterns of problem, namely failure in recognizing logical relationships and overuse of connectors. This suggests that the purported relationship between journal indexation—in this respect, national and international—and logical use of connectors may be at best weak, and at worst absent, for both journals in question dominantly exhibit a logical usage of connectors. This claim, of course, warrants further inquiries.

CONCLUSIONS

This study has examined the use of logical connectors in two journals with different indexation levels: a national index and a scopus-index. The findings demonstrate the articles of the two differently-indexed journals exhibit

two main tendencies, i) the dominant usage of logical use of connectors, which results in the logical flow of ideas between the sentences; and ii) the same patterns of illogical use, namely failure in recognizing logical relationships and overuse of connectors. This is understandable to some extent because *however* is the most difficult connector to use and *therefore* is frequently misused (Celce-Murcia & Larsen-Freeman, 1999; 2016). These findings bear implications for the assumed relationship between journal indexation and logical use of connectors. Given the aforementioned patterns, such a relationship is called into question. Further examinations with a larger amount of data are needed to validate this claim.

From the findings of this study, a number of future studies in investigating the use of conjunctive adverbials in academic prose, especially in research articles may be proposed. For example, an in-depth analysis can be conducted in regards to the use of conjunctive adverbials from other classes. A future study may probe a claim by Celce-Murcia and Larsen-Freeman (2016) that adversative class proves as the most difficult one to use because of the members' interchangeability traits. This may be conducted by comparing the use of adversatives in NES' (Native English Speakers) and NNES' (Non-Native English Speakers) research articles. Another future study may look at the case of informal conjunctive adverbials that 'make way' into formal register, such as academic prose. Some studies, such as Field and Yip (1992), Chen (2006), and Yeung (2012), may become the base of the study. One may examine this case in relation to the linguistic background of the authors or across disciplines.

Pedagogically, it is advisable that grammar and (academic) writing courses take into account explicit teaching techniques such data driven learning in order to raise student awareness of the logical usage of conjunctive adverbials especially the connectors that share similarity and thus are often used interchangeably. This is so because, as alluded to by Uçar & Yükselir (2017), “conventional ways of teaching and conventional theories seem to be inadequate for gaining necessary knowledge of connectors” (p. 71).

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