

Iconicity of Sequence in Temporal Adjuncts in Academic Prose

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ARTICLE INFO	ABSTRACT
<p>Keywords: academic prose, applied linguistics, iconicity of sequence, temporal adjuncts</p> <p>DOI: http://dx.doi.org/10.21093/ijeltal.v10i2.2105</p> <p>How to cite: Wongkittiporn, A. & Kaewkasi, P. (2025) Iconicity of Sequence in Temporal Adjuncts in Academic Prose. <i>Indonesian Journal of English Language Teaching and Applied Linguistics</i>, 10(2), 321-335</p>	<p>This study tested a statistically significant relationship between the pragmatic principle concerning iconicity of sequence and temporal adjuncts. While previous studies focused on the qualitative studies of temporal adjuncts with the textual analysis of English for everyday use, such as cookbooks and novels in English, this study contributed to the field by examining reputable international journal writer's pragmatic competence concerning iconicity of sequence in temporal adjuncts. The data was collected from reputable international applied linguistics research articles in English published in <i>System</i> and <i>English for Specific Purposes</i>. They were published from 2023 to 2025. The data in the study were 30 applied linguistics research articles. They had 236 tokens of temporal adjuncts to study the pragmatic principle concerning iconicity of sequence. The data was analyzed by the inferential statistical program called SPSS version 29 via Pearson Correlation. The results of the study clearly showed a statistically significant relationship between iconicity of sequence and temporal adjuncts from reputable international journal writers. The p-value was reported at 0.02. It was concluded that the reputable international writers in the fields of applied linguistics had pragmatic competence concerning iconicity of sequence.</p>

1. Introduction

Information structure, sometimes known as *information packaging*, is a problem among academic writers (Aprilia, et al., 2020). Writing is one of the most difficult skills in English that requires a lot of practice and the practice of writing should come from a variety of topics (Moon, Chung, & Randolph, 2025). Many writers experience difficulty in linking one sentence to the other to have proper coherence and cohesion. Consider examples (1a)-(1b).

(1a) Tom hit *Jerry*. **He** laughed at him.

(1b) Jerry was hit by *Tom*. **He** laughed at him.

Sentences (1a) and (1b) show *grammaticality* and *meaningfulness*, referring to the accuracy of structures and the truth value according to the semantic principle of compositionality (Kearns, 2011). However, example (1a) lacks the appropriate link of givenness. It is theoretically known as *pragmatic discourse of givenness*, referring to providing information that links with the previous sentence before giving a new piece of information (Jiménez-Fernández, 2020; Smolka, 2017). The case marking, known as the pronoun, *he* in (1a) would be anomalous if the pronoun *he* is interpreted as *Jerry*. In (1b), the way the information is structured provides effectiveness and the least effort of requirement for the readers to understand a given piece of information. The pronoun *he* refers to *Tom*, which is attached to the closest adjacent area. This is considered as a challenge in structuring information in academic writing.

When creating a text, not only should the authors know their target audience, but it is also important for them to have the ability to write the text effectively and interestingly to capture their readers' attention. This is relevant to discourse analysis and text connectivity (Johnstone & Andrus, 2024) and Grice's (1975) *cooperative principle*, focusing on *maxim of relevance*. Many academic writers, including EFL learners are faced with this challenge (Al-Jarrah & Isma, 2018). Consider example (2).

(2a) *After Peter had his dinner*, he took a bath.

(2b) Peter took a bath *after he had his dinner*.

The italic sections in (2a) and (2b) are the temporal adjuncts in English which are grammatical and meaningful. The paradigmatic structures or *structural variants of finite temporal adverbial clauses* are part of *complex sentences*. They linguistically express the events in sequential order, or which event takes place before the other (Murphy, 2019). The structural variants of *finite temporal adverbial clauses* are the complements of temporal adverbial heads such as *before*, *while*, *when*, *after* and *until* (Radford, 2023). Studying temporal adjuncts is interesting because of their relocation. It is possible for the dependent clause of temporal adjuncts and the independent clause to be relocated, while the semantic denotations, referring to the truth value, of clausal relocations remain the same. The problem is that when the learners study an individual sentence, the adverbial clause can be relocated grammatically and meaningfully. However, in the context of paragraph writing and essay writing, the question is raised as to whether or not temporal adverbial clauses are relocatable.

Aside from the positions of adverbial clauses, the temporal adjuncts have different structural variants at the same positions, such as *finite adverbial clauses*, *non-finite adverbial clauses* and *verbless adverbial clauses*. It is intriguing to know if different positions have their own variant preferences. While previous studies focused on the EFL learners' writing difficulties in terms of lexical semantics (Al-Jarrah & Isma, 2018), no one has focused on the study of structural variants (forms) and information structures (positions) of EFL learners' temporal adjuncts in English. Therefore, the current study contributes to the field in terms of observing the iconicity of sequence of temporal adverbial clauses in academic prose.

Iconicity of sequence is a pragmatic principle of information structure. The information in each clause and sentence should be arranged according to the situations happening in real world

events (Ji, 2010; Jiménez-Fernández, 2020; Smolka, 2017). This shows how information is structured in complex sentences, emphasizing how finite temporal adverbial clauses are merged with their independent clauses.

A temporal adverbial clause is a subordinate clause, interchangeably known as *temporal adjunct*. Omitting this adjunct does not affect the grammaticality of the sentence (Radford, 2023). However, it may pragmatically affect the *cooperative principle* known as *the maxim of quantity*, referring to providing inadequate information for the hearers' understanding (Kearns, 2011). However, structuring temporal adjuncts with the temporal connectors *after*, *before*, *until*, *when*, and *while* with their independent clauses can be interchangeable, such as (3a)-(3b).

(3a) Peter took a bath *after he cooked his dinner*.

(3b) *After Peter cooked his dinner*, he took a bath.

Examples (3a) and (3b) are complex sentences. They are merged between independent clauses and temporal adjuncts. The positions of temporal adjuncts are not fixed, so they can be relocated in either the initial or final positions of the sentence. Despite having the same semantics between example (3a) and (3b), they are pragmatically different regarding information structure called *iconicity of sequence*. Example (3a) violates the pragmatic principle concerning iconicity of sequence as its linguistic expression does not comply with the real-world events. The first situation is cooking dinner, whereas the second situation is taking a bath. Example (3b) shows the two events written sequentially.

In a previous study regarding *iconicity of sequence*, Antika, Wahyuni and Melvina (2020) studied temporal adverbial clauses, such as *before*, *after*, *since* and *when*, whereas the adverbial clause of reason contains the adverbial head of reason *because*. The data collection was derived from 30 third-year students from an Indonesian university. The test was multiple choice. The participants were asked to complete a GJT task about the tense of temporal adverbial clauses. The results showed that the participants had some problems using the tense in temporal adverbial clauses. Their confusion about the issue of time in writing temporal adverbial clauses in English impacted how they ordered temporal adjuncts in English. Durrant et al. (2020) created their own corpus to study the adverbial clauses in children's writing. The textual analysis in their study was books for six-year-old children. *Finite adverbial clauses of reason* in children's writing comply with iconicity of sequence in that it is commonly formulaic for a reason to be expressed at the final position of the sentence to explain the cause. Sumardi and Said (2021) studied adverbial clauses in the novel *The Secret Garden*, a British novel. The data collection in this study was 245 extracted tokens of adverbial clauses. The data analysis was descriptive statistical data via frequency and percentage. The results showed that temporal adverbial clauses in this British English novel occur the highest at 63 percent. The adverbial head *when* was productively used to describe temporality. The researcher discussed that the expressions of time were important in writing novels because they avoid the readers' confusion about which event occurs before the other. Wongkittiporn (2021) applied a qualitative research method to study how temporal adjuncts are used in the genre of writing recipes. The results showed that the creative writers in cookbooks followed iconicity of sequence in explaining the cooking process to avoid the readers' confusion as in *boil chicken for 15 minutes until cooked, add vegetables*. This is because cooking is a process where required steps should be followed to make the food eatable and for tastiness. Martínez

(2023) studied temporal adverbial clauses from a cross-linguistic perspective. The results showed that African and Australian writers mostly preferred the use of adverbial clauses in English. Wongkittiporn (2023) investigated the use of temporal adjuncts in English novels. Not only did he find that temporal adjuncts in English novels outweighed other types of adverbial clauses, but he also found that they were written sequentially. This reflected that time is crucial in narrative writing to run a story. Most scholars in previous studies have focused on the study of temporal adjuncts and the principle of iconicity in semi-formal genres, such as cookbooks, novels and children's books. However, a little attention has been paid to the formal genre of writing. The current study sheds light on applied linguistics research articles to examine how temporal adjuncts are written by reputable international research writers. This information leads to the following objectives of the study.

Statement of the Hypothesis

There is a statistically significant relationship between the pragmatic principle concerning iconicity of sequence and temporal adjuncts in the writing of reputable international research writers in the field of applied linguistics.

Research question

Is there a statistically significant relationship between the pragmatic principle concerning iconicity of sequence and temporal adjuncts in the writing of reputable international research writers in the field of applied linguistics?

2. Literature Review

It is generally agreed that English language learners should be taught form, function and use of the English language at the same time. Most English learners are taught the form and function of English in their classrooms. However, the actual use in context is rarely experienced. This research study realized the importance of this point. The researchers of this study would like our English language learners to study English in academic context to prepare them as an academic writer. Study of the system of language used in applied linguistics research articles would help prepare them to be proficient academic writers in the field.

2.1 Temporal Adjuncts in Generative Linguistics

Generative linguistics is the study of the system and consistency of how language is used (Culicover, 2005; Radford, 2023). According to *X-bar theory*, a clause has the head and its complement (Radford, 2023). The head P, which is filled with the lexical item, is merged with TP tense projection which is known as its complement or *a sister*. The whole finite adverbial clause is syntactically analyzed as a *temporal adjunct*. Omitting it does not affect the grammaticality of the sentence (Radford, 2023; Robert, 2023; Wongkittiporn, 2025). It is a special feature of temporal adjuncts to be placed in different positions, either the initial position or the final position in the sentence.

According to generative linguistics, language use is explanatory, consistent and systemic. Researchers seek to understand the system of a language and explain the way a language is used to form rules and principles. *System* refers to the form and function of how certain linguistic patterns are used in language. For example, the subject in English is required to have *no-null-subject parameter* (Radford, 2023). Generative linguists classified adverbial clauses as

adjuncts, which modify place, manner and time. When an adjunct modifies time, it is known as a *temporal adjunct* (Radford, 2023). Omitting this clause does not affect the grammaticality of the sentence (Radford, 2023). The pragmatic principle concerning iconicity of sequence refers to the sequence of events as described by the writers (Jiménez-Fernández, 2020; Smolka, 2017). This principle supports how information is linguistically structured based on the facts in the real-world events. In other words, what happened first is supposed to be expressed first, whereas the subsequent event should be described sequentially. The pragmatic principle concerning iconicity of sequence is the system in descriptive linguistics to examine whether information was arranged according to the rule or not.

2.2 Structural Variants of Temporal Adverbial Clauses

Temporal adjuncts focusing on temporal adverbial clauses could be actualized by a variety of variants. The structural variants of temporal adjuncts in this study are *finite adverbial clauses*, *non-finite adverbial clauses* and *verbless adverbial clauses*.

One of the variants is *finite adverbial clause*. The structure of finite adverbial clause contains the adverbial head, the subject and the predicate (Murphy, 2019). However, if the subject is the same agent as the main clause, it is likely that the case marking of the subject would be replaced accordingly, such as (4).

(4) **When Peter was young**, he liked swimming. (Finite adverbial clause of time)

When Peter was young is a finite adverbial clause of time. *When* is the adverbial head. The pronoun *Peter* is the subject. The predicate of the clause is *was young*. The subject of the temporal adjunct is *Peter*, which is the same person as the experiencer in the main clause. Therefore, the pronoun *he* is substituted to give the case marking of the same gender and the same number. For example, *Peter* could be replaced by the pronoun *he*.

The second variant of temporal adjuncts in this study is *non-finite adverbial clauses of time*. The agents of non-finite adverbial clauses are omittable. In generative linguistics, an omitted the agent in non-finite adverbial clauses is replaced by a covert subject known as *PRO*. It is coreferential with the agent in the matrix clause (Radford, 2023), such as (5).

(5) **After PRO_i taking a bath**, Peter_i went to bed. (Non-finite temporal adverbial clause)

When spelling out, the temporal adjunct is subjectless for the non-finite adverbial clause. However, the covert subject is coindexed with the agent in the main clause (Radford, 2023). Applying the structural variant of non-finite adverbial clauses as temporal adjuncts complies with *economy principle*, as the agent in the Spec T is not spelt out twice. It is coreferential with the matrix subject. Apart from that, the third variant of temporal adjuncts is verbless adverbial clauses where the agent and verb of the clause are omitted. The temporal adverbial heads are colligated with prepositional phrases or adjective phrases (Swan, 2015), as in (6a)-(6b).

(6a) **When in trouble**, please call 911.

(6b) Submit the assignment by 11.50 PM **if possible**.

Examples (6a) and (6b) represent the structural variants of verbless adverbial clauses of time in English. The adverbial head *when* is merged with the prepositional phrase PP *in trouble*. In

contrast, the adverbial head *if* is analyzed as a CP. It is merged with the adjective phrase (AdjP) *possible*. It is thought that this structural variant is a common pattern in a spoken register, such as cookbooks (Wongkittiporn, 2021), conversational dialogues in English novels and colloquial language.

2.3 Previous Studies of Temporal Adverbial Clauses in Genres

Since there are various syntactic structures of temporal adjuncts in English, as addressed in the above section, different genres such as formal and informal texts may have their own syntactic structural preferences in actual usage. *Genre* refers to types of text (Anthony, 2018; Biber & Conrad, 2012). The concept of genre was originally considered by (Biber & Conrad, 2012). It was normally used for the textual analysis in linguistic studies, especially in the study of move analysis and discourse analysis. However, the genre in this study is academic prose, focusing on English applied linguistics research articles.

There have been numerous qualitative studies about temporal adverbial clauses in different genres. Wongkittiporn (2021) examined the structural variants of temporal adjuncts in British cookbooks. He found that the frequency of temporal adverbial clauses occurred the highest at 84.65 percent. The explanation for this phenomenon was that time was an important factor in cooking because it could affect the taste and texture of food, such as meat and vegetables. For example, a well-done steak could be too chewy. As such, the inflectional morpheme and lexical items to indicate time are important in these genres of writing. Moreover, the arrangement of information in English cookbooks complies with the pragmatic principle concerning iconicity of sequence, such as (7).

(7) *Once the skin is crispy*, move it to sit on top of the salmon. (Further Reading, See Wongkittiporn, 2021, p. 87)

The temporal adjunct *once the skin is crispy*, which is a temporal adverbial clause of time is placed in the initial position of the sentence. It is the prior event. This way of describing information allows new cooks to follow the recipe more easily. This is because cooking is a process where required steps should be followed to make the food eatable and for tastiness.

Another study focused on the qualitative research study of adverbial clauses in the English novel, *Naked Lunch*. Temporal adjuncts were frequently found in English novels. The pragmatic principle concerning iconicity of sequence was applied in writing novels, or narrative writing. Linguistic expressions of time and location are key elements in narrative writing. Stories that are sequentially set by time can support the readers' understanding and help the readers follow the stories from the start until the end of the story enjoyably and understandably.

Durrant et al. (2020) developed their own corpus to study the adverbial clauses in children's writing. The textual analysis was the academic textbooks concerning English, Sciences and Humanities for six-year-old children. The results in the study showed both the structural variants and semantic denotations of adverbial clauses in children's writing. The structural variant of finite adverbial clauses was the unmarked variant in children's writing. The semantic denotations of adverbial clauses of reason, with the adverbial heads *because*, *since* and *as* occurred more productively. Most adverbial clauses in the genre of children's writing were used for justification, which is filled in the structural variant of finite adverbial clauses in English, such as (8).

- (8) This is worse than aspirin *because the platelets mainly stop platelets gathering together in the blood and may not have such a detrimental impact at an open wound.* (Durrant et al., 2020, p. 441)

Finite adverbial clauses of reason in children's writing comply with the pragmatic principle concerning iconicity of sequence in that it is commonly formulaic for a reason to be expressed at the final position of the sentence to explain the cause.

Rezaee and Golparvar (2016) investigated the adverbial clauses in academic texts that were written by native English speakers. The results showed that temporal adverbial clauses were usually placed at the final position of the sentence at 64.8 percent. On the other hand, the use of temporal adverbial clauses in the initial position was only 35.2 percent. The structural variants with the temporal adverbial heads *when* and *after* were productively used at the final position. However, if the two events happened coincidentally, the longer expression was usually placed at the final position. This linguistically complies with the *end-weight principle*, referring to the placement of heavier pieces of information at the final position of the sentence.

Sumardi (2020) studied adverbial clauses in the novel *The Secret Garden*, a British novel. The study semantically focused on five types of adverbial clauses, including temporal adverbial clauses, adverbial clauses of manner, adverbial clauses of reason, adverbial clauses of concession and adverbial clauses of condition. The data collection in this study consisted of 245 extracted tokens of adverbial clauses. The data analysis was descriptive statistical data via frequency and percentage. The results showed that temporal adverbial clauses in this British English novel occur the highest at 63 percent. The adverbial head *when* was productively used to describe temporality. The researcher discussed that the expressions of time were important when writing novels because they avoid the readers' confusion about which event occurs before the other. While previous studies focused on adverbial clauses in different genres to study varieties of language use, the current study also focused on academic prose to bring the benefits of the study to Thai EFL learners in their English academic writing.

Most textual analysis of temporal adjuncts in previous studies applied a qualitative method to gain insightful information about each text type. In regard to their data collection, the average number of tokens to be studied was between 100-250 extracted tokens of temporal adjuncts in English. The current study follows the mainstream approach to gather approximately 250 tokens to study temporal adjuncts. However, the difference in this study was that the method was quantitative. Most previous studies focusing on creative writing materials like novels and cookbooks show the systematic use of iconicity of sequence in temporal adjuncts. However, the current study is a quantitative study to investigate if the system is significant statically in research article writing or not.

3. Research Methodology

3.1 Research Design

The purpose of this study was to test a statistically significant relationship between iconicity of sequence and temporal adjuncts in reputed international applied linguistics research articles. To test this hypothesis, the process of data collection is explained in the following section.

3.2 Data Collection

The data collection of temporal adjuncts in the pilot study covered five temporal adverbial heads *before*, *while*, *when*, *after* and *until*. The data were collected from Q1 SCOPUS applied linguistics research articles. To avoid subjectivity in selecting the data, the inclusion criteria were made up of three components. Two publications about applied linguistics research articles, which were indexed Q1 SCOPUS, were collected to study temporal adjuncts in English. A total of 15 applied linguistics research articles were collected equally from each journal. To avoid the subjectivity of the data collection, different topics were collected, such as teaching approaches, language use, technology in language teaching and evaluation. The selection criterion of 30 research articles followed Afros and Schryer (2009) who used this number of research articles for their textual analysis in their study. The second inclusion criterion was that the years of publication were from 2023 to 2025 for the sake of being up-to-date linguistically. As such, the results of language use in this study represented the temporal adjuncts in present-day English. The third criterion was about the reputability of publications of Q1 SCOPUS applied linguistics research articles. The publications in this study were *System* and *Journal of English for Specific Purposes*. These two journals have been indexed in Q1 SCOPUS for a decade. They have been subscribed to by well-known universities, academic institutes and researchers throughout the world. The whole complex sentence with adverbial clauses was extracted to be studied. One extraction was counted as one token.

- (9) **When the facilitator was in charge of reading**, it was also difficult to judge the extent to which the student could read the notes themselves. **(Temporal Adjunct; +Finite; Initial Position; +Iconicity)** (Havery, 2024, p. 81)

Example (9) shows the manual extraction of temporal adjuncts in applied linguistics research articles. The structural variants of temporal adverbial clause in (9) were interpreted as *+finite*, *+Iconic*, and *+Initial*.

3.3 Data Analysis

Since the research design in the pilot study is quantitative, the statistically significant relationship between the two variables was tested. The inferential statistical analysis called *Pearson Correlation* was calculated to seek a statistically significant relationship between the two variables (Illowsky & Dean, 2017). The inferential statistical analysis of Pearson Correlation was particularly suitable for this current study because it could test whether the reputable journal writers in applied linguistics *follow* or *violate* the rule. The correlation was shown via the following data analysis.

Table 1 Data Analysis

Code 1	Code 2
Code 1 was given if a token of temporal adjuncts followed the pragmatic principle concerning iconicity of sequence in English.	Code 2 was given if a token of temporal adjuncts violated the pragmatic principle concerning iconicity of sequence in English.
Example A For example, <i>after interviews</i> , applicants may feel like they failed to impress a potential employer or that the interviewer did not like them. (Trofimovich, et al., 2025 p. 1)	Example B For example, <i>the linking gap occurred after short and long conversations</i> . (Trofimovich, et al., 2025, p. 2)

Table 1 was the data analysis in this study. The coding schema had two codes. Code 1 was assigned when a token of temporal adjuncts followed the pragmatic principle concerning iconicity of sequence. On the other hand, code 2 was assigned when a token of temporal adverbial clauses violated the pragmatic principle concerning iconicity of sequence. In example (A), the action of interviewing occurs before the participants' failed feeling. As the action of interviewing occurs first and it was linguistically expressed in the initial position of the sentence, Code 1 was assigned. In contrast, the action of having a conversation in example (B) occurred before the linking gap. Therefore, the event of having the conversation occurred first, but it was written in the final position. Accordingly, the token in example (B) was assigned Code 2 because it violated the rule. After the codes were applied, it was the process of data analysis. In order to test whether there was a statistically significant relationship between the pragmatic principle concerning iconicity of sequence and temporal adjuncts as in Code 1, the p -value of a statistically significant relationship was set to be equivalent to, or less than 0.05 (Rasinger, 2013). For the inferential statistical calculation, SPSS version 29 was used to find the *Pearson Correlation* (Cronk, 2024). In scientific research in social sciences and humanities, the p -value that is equivalent or less than 0.05 shows a statistically significant relationship (Creswell & Creswell, 2022; Illowsky & Dean, 2017).

4. Results

4.1. The Quantitative Results

This section presents the quantitative results of the study as in Table 2.

Table 2 Correlation between the Pragmatic Principle Concerning Iconicity of Sequence and Temporal Adjuncts in Q1 SCOPUS Applied Linguistics Research Articles

Pearson Correlation		Iconicity of Sequence	Temporal Adverbial Clauses
Iconicity of Sequence	Correlation	1	.143
	Sig. (2-tailed)		0.02*
	N	236	236

*. Correlation is significant at the 0.05 level (2-tailed).

Table 2 reveals an inferential statistical analysis of Pearson Correlation between the pragmatic principle concerning iconicity of sequence and temporal adjuncts in Q1 SCOPUS applied linguistics research articles. The results in the pilot study showed a statistically significant relationship between the pragmatic principle concerning iconicity of sequence and temporal adjuncts in Q1 SCOPUS applied linguistics research articles. The p -value was reported at 0.02. According to Creswell and Creswell (2018), when the p -value is equivalent to or lower than 0.05 in the field of humanities and social sciences, the statistical relationship between the variables is significant. The hypothesis in the pilot study was accepted. Thus, it was concluded that reputable international writers in the field of applied linguistics had the pragmatic competence concerning iconicity of sequence in English.

4.2. Quantitative Results

Some qualitative results were added as empirical evidence to support this study. This section shows the qualitative results of the study. The qualitative results are the examples of adverbial heads *before*, *while*, and *after* (*pre-while-post*) in applied linguistics research articles.

(10) **Before data collection began**, participants were provided with consent forms detailing the research objectives and procedures. (Finite Adverbial Clause; +Initial; -Iconicity) (Aizawa, 2024, p. 23)

(11) Participant 7 agreed that reading a rewritten fairy tale that addresses social issues can be more interesting as it can make people think about the issues **while PRO enjoying the intriguing storyline.** (Non-Finite Adverbial Clause; -Initial; +Iconicity) (Lam & Putri, 2024, p. 11)

(12) **After they received feedback**, they made critical revisions accordingly. (Finite Adverbial Clause; +Initial; +Iconicity) (You & You, 2025, p. 56)

Example (10) shows the structural variant of finite adverbial clause. It violates the pragmatic principle concerning iconicity of sequence as the consent form must be signed before interviewing, so the temporal adverbial clause should be relocated at the final position to comply with the principle. After taking a closer look at the use of the temporal adverbial connector *before*, it is likely that the initial position of the sentence in academic prose prefers the structure of verbless adverbial clauses. On the other hand, the final position of the sentence prefers finite adverbial clauses and non-finite adverbial clauses. In academic writing, the structures of verbless adverbial clauses to indicate temporality is placed in the initial position. However, the structures of finite and non-finite adverbial clauses to indicate temporality is placed in the final position.

Example (11) shows the structural variant of non-finite adverbial clause where two events happened at the same time. In academic writing, the structure of finite adverbial clause with the adverbial head *while* is sometimes placed in the initial position. However, the structural variant of non-finite adverbial clause with the adverbial head *while* is always placed in the final position.

Example (12) is the structural variant of finite adverbial clause. The example shows that the functions of temporal adverbial clauses are placed sequentially. For example, the students get the feedback then they revise it. In academic writing, the structures of finite adverbial clauses, finite adverbial clauses and verbless adverbial clauses are placed in the initial position when used with the temporal adverbial connector *after*.

5. Discussion

The major results in this study showed that there is a statistically significant relationship between temporal adjuncts and iconicity of sequence by Q1 SCOPUS applied linguistics research writers. This showed the writers' linguistic competence to link information well with previous clauses. The novelty of the research found by the researchers is that academic writing in research papers is beyond grammaticality and meaningfulness. The writers could connect one event with others factually and sequentially. Not only does this show that conducting research studies must be systematic, but also it must be systematic when it comes the state of reporting information into written texts.

The results of this study where the *p*-value is 0.02 showed that iconicity of sequence is the significant linguistics principle in research writing. Although Zaragoza, Tula and Corona (2024) mentioned that AI have the ability to detect word choices and grammatical errors effectively, it is not yet guaranteed that AI has its own competency of iconicity of sequence

to help the researchers check whether their academic writing is sequential or not. Thus, having own iconicity of sequence remain important linguistic competence for academic research writers.

5.1 Theoretical Contributions

This section explains how pragmatic competence concerning iconicity of sequence in temporal adjuncts contributes to the genre of applied linguistics research articles in English. The discussion in this study sheds light on proficient academic researchers' pragmatic competence concerning iconicity of sequence. The structural variants and positions of temporal adverbial clauses in applied linguistics research articles will also be discussed. The discussion in this part explains the systems of temporal adverbial heads *before*, *when*, *while*, *after* and *until* in the genre of applied linguistics research articles. The results of the study are then compared with related previous research studies. Finally, the pragmatic pedagogical implications of the results in this study are given.

The current study followed pragmatic competence concerning iconicity of sequence to test the statement of hypothesis. The results of the study show that there is a statistically significant relationship between the two variables for proficient writers. As such, the hypothesis in the pilot study was accepted. As mentioned in the section of literature review, *iconicity of sequence* is the pragmatic principle that is used to express action in real-world events sequentially. The sequential orders of events means that the situation occurring first should be expressed first, linguistically. On the other hand, the event that occurs later should be placed subsequently (Jiménez-Fernández, 2020; Smolka, 2017). Pragmatic competence concerning iconicity of sequence was clearly found in the writing of applied linguistics researchers. Academic writing, especially in research writing, requires *systematicity* (Sword, 2011). Not only does the systematicity in academic research writing mean strong organization, including introduction, body and conclusion, but it also needs appropriate cohesion and coherence to tie one sentence to another. The results in this study proved that information structure is part of a system in academic writing. Academic writers need to ensure that one sentence flows into the next.

Apart from systematicity, the second point is that the genre of academic research writing is a process, which requires steps to be followed (Birley & Moreland, 2014). Following the process of designing the study, collecting the data, analyzing the data and reporting the results of the study, the researchers always report what was done in order. This is for the advantage of *repeatability* if other researchers would like to repeat the research study with different settings or different groups of participants. Therefore, the pragmatic competence concerning iconicity of sequence contributes to the systematicity, repeatability and the avoidance of confusion in applied linguistics research articles.

5.2 Proficient Academic Researchers' Iconicity of Sequence

As coined by Chomsky (2011), the term *linguistic competence* refers to language knowledge as stored in one's brain or mental representation. In cognitive approach, linguistic competence is developed according to the development of a child's age (Plonsky, 2024). Iconicity of sequence was found to be a pragmatic competence among proficient researchers. According to the results of this study, the Q1 SCOPUS researchers in the field of English applied linguistics have this LAD device called *iconicity of sequence* stored in their mental representation to support their fluent productive skills. They can express language fluently

and effectively according to real-world events. With the results in this study, if one desires to be called a proficient writer, aiming to have a paper published in SCOPUS indexation, it is necessary for them to have pragmatic competence concerning iconicity of sequence.

5.3 Comparisons of Temporal Adjuncts in Other Genres

The use of temporal adjuncts by reputable journal writers in this study shows similarities and differences to previous studies. The results of this study are different from Antika, Wahyuni and Melvina (2020) and Chuenchaichon, (2022) who studied temporal adjuncts with Indonesian and Thai learners of English as a Foreign Language (EFL) where writers with higher proficiency in written English had this linguistic competence (Wongkittiporn, 2024). Antika, Wahyuni and Melvina (2020) and Chuenchaichon (2022) reported in the same way that the lower proficiency EFL learners lack this cohesion. The non-English major writers are not sensitive to iconicity of sequence. This means that the order of their writing is not temporally sequential. However, the novelists, children's book writers and creative writers follow this code of practice (COP) as the norm of professional writing. Durrant et al. (2020) who studied written texts for six-year-old children found that reasons are given in the final position to back up what was said. Sumardi and Said (2021) who studied adverbial clauses in novel in English, reported that approximately 63 percent of the adverbial clauses in the novel complied with iconicity of sequence. Wongkittiporn (2023) who also studied adverbial clauses in a novel in English, reported that approximately 70 percent of the adverbial clauses in the novel in his study followed iconicity of sequence. Wongkittiporn (2021) who studied temporal adjuncts in recipes reported that over 75 percent of the writer followed iconicity or sequence. As mentioned previously, the actions that take place first are written first. On the other hand, the events that take place later are written subsequently. Not only did he find that temporal adjuncts were preferred to be used in this genre, but they also follow iconicity of sequence, as in *fry until golden*. There are some similarities of iconicity of sequence between the two genres. Both support the benefits of repeatability. The results of cooking and repeating the research study again and again should be the same. Misordering may affect the taste of the food and may affect the results of the study. Martínez (2023), who studied temporal adverbial clauses as written by Australian writers reported that this group of English writers always follows the principle. When it comes to reputable journal writers in this study, the temporal adjuncts follow iconicity of sequence where the p-value was reported at 0.02. The results of this study showed that the more academic writing, the more iconicity of sequence the writer follows.

To support EFL learners to have the linguistic competence of iconicity of sequence, English language teachers may ask questions before asking the student to write. According to deixis, Levison (1987) expressed there are relationships between structure and context. The types of deixis can be applied in interrogative forms. The first one is *temporal deixis*. The second one is *person deixis*. This includes the use of pronouns, such as *he* and *she*. The third one is *spatial or place deixis*. The fourth one is *social deixis*.

Scenario 1

1. When did the event take place? (Temporal Deixis)
2. What time did the situation take place? (Temporal Deixis)
3. Where did the situation take place? (Spatial Deixis)
4. How many people did you see in the event? (Agent Deixis)

Scenario 2

In the second scenario, the pragmatic discourse of givenness can be applied to ask the students:

1. Were they the same people in the first picture? YES or NO
2. How many people did you see in the first picture?
3. What time did the situation take place? (Temporal Deixis)
4. Where did the situation in the second picture take place? (Spatial Deixis)

After the learners are offered the pragmatic context, such as agents, places and time, the next step is that the learners are instructed to apply the two scenarios into a complex sentence including a temporal adverbial clause. As a result, they will know how to form clauses sequentially. The results in this study are limited to only temporal adjuncts in applied linguistics research articles, generalizing the results of the study to other material is not applicable to the optimum level. For the future study, it is recommended that studying temporal adjuncts that are produced by learners of English as a foreign language with different levels of English proficiencies would contribute something new to the field.

7. Conclusion

This study shows that the pragmatic competence concerning iconicity of sequence is crucial for academic writers. This claim is supported by the reputable journal writers as they could structure information effectively according to the theory of iconicity of sequence. This is supported by the evidence of statistical analysis where the *p*-value was reported at 0.02.

In cognitive linguistics, Chomsky (2011) addressed that different factors affect the acquisition of language. For example, the interdental bilabial sound could not be produced by a one-year old child as they have not yet developed frontal teeth. This sound comes later. A child can produce one-syllable words such as *pa* and *ma* first. Likewise, lower English proficiency level learners are likely unable to acquire the pragmatic principle concerning iconicity of sequence. However, this competence is acquired by academic English writers. Future studies could attempt to establish when learners start to acquire pragmatic competence concerning iconicity of sequence in English.

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