

Correlation between end-weight principle and adjective clauses in English: Q1 SCOPUS applied linguistics articles and Thai EFL learners' essays

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ABSTRACT

The researcher in this study applied the notions of quantitative method, theoretical linguistics and applied linguistics to examine the correlation between the linguistic theory of end-weight principle and English adjective clauses in Q1-SCOPUS applied linguistics articles and Thai EFL learners' descriptive essays. The significance of this study is that structure and use in writing should be learned simultaneously. This current study also innovatively supports Thai EFL learners to examine their linguistic competence in structuring information in their English writing. The data collection in this study was divided into two datasets. The first dataset was 20 Q1-SCOPUS applied linguistics articles published between 2022 and 2024. Approximately 200,000 words provided 117 sentences containing adjective clauses in the final position or VP-postmodifiers. On the other hand, the second dataset was 67 descriptive essays written by Thai EFL high-school learners from both public schools and private schools under the supervision of the Ministry of Education, Thailand. The original theory of the end-weight principle proposed by Quirk et al. (1972) is followed in this study. The syntactic structure of adjective clauses follows Radford (2009) who analyzed adjective clauses as complementizer phrases (CP). The inferential statistical analysis of correlation follows SPSS 29. The results showed that there was a statistically significant relationship between the datasets of applied linguistics articles and EFL learners' descriptive essays where the p-values were reported at 0.01 and 0.02, respectively. Not only do these statistical relationships show that English is an end-weight language, but also Thai EFL learners can follow the norm accurately. This is due to the positive effect of the mother tongue interference since the Thai language is an end-weight language. The pedagogical implication of the study to EFL learners is that information structures should be contributed to grammar classes. For future studies, it is recommended to test the hypothesis of the end-weight principle with reduced adjective clauses in the medial position of sentences.

Keywords: Adjective clauses, applied linguistics articles, descriptive essays, end-weight principle, Thai EFL learners.

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INTRODUCTION

Information structure is an important linguistic aspect of arranging information into clauses, sentences and paragraphs (Birner and Ward, 2009). It is viewed as similar to that of building constructions that connect everything. However, most English language learners are

apt to ignore studying information structure. They seem to pay more attention to the study of vocabulary and grammar in writing (Wongkittiporn, 2024). Although the notion of vocabulary and grammar could help them write to communicate, the way information is linked to creating

the smoothness of reading seems problematic.

The English Language is heavy-ended. This means that the head is short, while the longer part is left for the final position of the sentence. In other words, writing a long subject is not uncommon in English, such as (1a).

- (1)
- (a) To swim for 50 minutes every day is good.
- (b) It is good to swim for 50 minutes every day.

Examples (1a)-(1b) are *arbitrary control constructions*, which are factual or habitual information applicable to everyone. Even though both examples are semantically the same, the way the information is structured is different between the two examples. Example (1a) shows the heaviness of the subject. On the other hand, example (1b) shows that the expletive *it* is the shorter DP which is dropped at the Spec T or the subject position (Radford, 2009). When making a comparison, this explains why example (1b) is a more common structure in English due to the end-weight principle.

Since theory plays an important role in English writing, literature shows that there are three main camps of researchers who applied the end-weight principle to study written texts in different materials. The first group of researchers used the theory to study the written texts of novels and poems (Nofal, 2012). The long and heavy information on VP-postmodifiers in novels gives a climax to the story. The second group of researchers applied the theory to study ditransitive verbs in international corpora (Arnold et al., 2000; Ottmar, 2015). The results showed the NP shift to the final position mostly at 70 percent. The third group of researchers applied the end-weight principle to study EFL learners' writing (Lozano and Mayamendikoetxea, 2009). This group is so interesting as the results show that only advanced EFL learners, or about C1 level, applied the end-weight principle correctly. Whilst previous studies focused on the end-weight principle to study novels, international corpora, and advanced EFL writing, this study innovatively contributes to the field by using SCOPUS-Q1 applied linguistics research articles and Thai EFL learners' descriptive essays.

The ways that information structures in applied linguistics articles are structured are regarded as effective examples for novice researchers and graduate students in the field. Today, research is a part of education in every

degree. We are taught what research is, but not everyone is taught how to write research. Consequently, both native and non-native English students struggle to structure information in their research writing. This study provides guidelines and examples of information structures for new researchers entering the field. This study also innovatively encourages Thai EFL learners to examine their linguistic competence in structuring information in English. This information leads one to the following objective of the study.

Objectives of the study

1. To investigate the correlation between the end-weight principle and English adjective clauses in Q1-SCOPUS applied linguistics articles
2. To investigate the correlation between the end-weight principle and English adjective clauses in Thai EFL Mattayom learners' descriptive essays

Hypotheses of the study

1. There is no significant relationship between the end-weight principle and English adjective clauses in Q1 SCOPUS applied linguistics articles.
2. There is no significant relationship between the end-weight principle and adjective clauses in Thai EFL Mattayom learners' descriptive essays.

LITERATURE REVIEW

Conceptual framework

This section shows the conceptual framework in this study. The conceptual framework in this study is divided into independent variables and dependent variables. The independent variable in this study is the theoretical framework of the end-weight principle (Quirk et al., 1972). On the other hand, the dependent variables are adjective clauses and the materials of applied linguistics research articles and Thai EFL learners' descriptive essays. Figure 1 shows how independent variables in this study were investigated using the end-weight principle as presented in concordance lines.

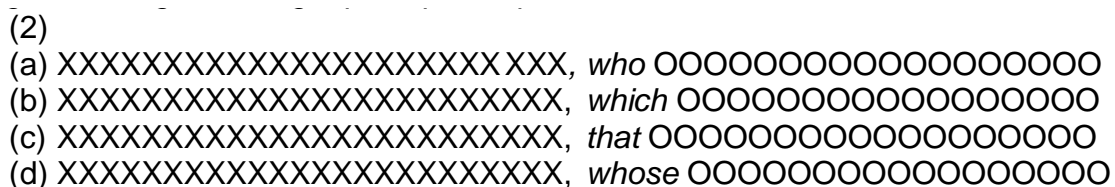


Figure 1. Concordance lines.

Figure 1 shows concordance lines of how information is keyed. The semiotics XXX is the main clause. On the other hand, the semiotics OOO represents adjective clauses. This study is interested in whether the OOO part is linguistically expressed with adjective clauses or reduced adjective clauses. English is a heavy-end language. It is assumed the adjective clauses are the structures of the final position of the sentence.

Theoretical background of the end-weight principle

Historically, *the end-weight principle* originated from the Prague School of Linguistics in the 1920s. The school integrated the philosophies of structuralism and functionalism into linguistic study (Pribylová, 2019). *End-weight principle*, sometimes called *grammatical weight* (Wasaw, 1997) or the *short-before-long ordering principle* is a theory in the branch of information structure (Aarts, 2011). The end-weight principle refers to the placement of shorter information at the beginning and the longer and heavier information at the final position of the sentence. Quirk et al. (1972) was the first scholar who termed the heaviness of constructions in the final position as end-weight as follows:

[...] One is the tendency to place new information toward the end of the clause, and another is the tendency to reserve the final position for the more complex parts of a clause or sentence. (Quirk et al., 1972, p. 766)

In English, a sentence usually conveys one main topic and the topic of the sentence is short and written in the subject position. In English, the topic, focus and important information are generally provided at topicalization or the syntactic position of spec T, referring to the subject position. On the other hand, the longer information is a post-verbal modifier, which is placed at the final position of the sentence, such as adjuncts, temporal adverbs and complements. This principle cognitively helps reduce the workload of the brain in remembering the information at the beginning of the sentence (Aarts, 2011). Basically, the topic should be given before elaborating.

If a sentence in the English language is divided into two parts which are *pre-verbal* and *post-verbal*, the pre-verbal position is the position of the subject. Although the subject carries the most important position of the sentence, the information in this position should be lighter, and less informative than the post-verbal section (Smolka, 2017).

(3) Running improves the metabolism, blood circulation and digestive system.

Example (3) shows how to structure information pre-

verbally and post-verbally. The pre-verbal position *running* is lighter and contains only the topic. The post-verbal position is the elaboration of this topic. When we elaborate, we are likely to give longer details to support the readers' understanding of the topic (Smolka, 2017). When compared with written language, the end-weight principle is more common than spoken register as the subject in this register tends to be short, such as the pronouns *I* and *you*.

End-weight principle supports the ease of reading the text (Nofal, 2012). Postponing the longer information, such as adjective clauses and adverbial clauses could help the readers to understand the text more easily.

Wasaw (1997) suggested that the end-weight principle is for the benefit of information preparation or information planning. Using the end-weight principle shows that the speakers prepare information effectively. To prove this statement, Wasaw (1997) analyzed approximately 800 sentences of the following collocation: *attribute... to, bring... to, and obtain... from, share... with*. The results show that approximately 55 percent are fixed colligations as in *obtain from* and *share with*, such as (4).

- (4)
 (a) Pat **brought** a box with a ribbon around it **to** the party.
 (b) Pat **brought to** the party a box with a ribbon around it.
 (Wasaw, 1997, p. 355)

Example (4b) shows the colligation of *brought to* or the use of verb and preposition in an adjacent area. The information *the party a box with a ribbon around it* was left at the final position in accordance with the end-weight principle.

Generative grammar of adjective clauses in English

Adjective clause in English is structurally known as a DP post-modifier. It gives additional or extra information about its head, which is expressed in the determiner phrase DP, such as the man, the animal and the object. These DPs could be either the subject or the object of the sentence (Radford, 2009).

- (5)
 (a) Mary, *who has nine cats in her house*, got married yesterday.
 (b) Peter got married to Mary, *who has nine cats in her house*.

The adjective clauses in (5) *who has nine cats in her house* are the DP post-modifier to modify the person. The examples presented show that adjective clauses can be placed in the medial position and final position. However, they cannot be positioned in the initial position of the sentence.

This point allows us to see that adjective clauses are

heavy-ended constructions. They are used to express supplemental information, such as numerical data, examples, classifications and details. However, adjective clauses can be reduced into reduced adjective clauses, such as (6).

- (6)
 (a) Mary, *having nine cats in her house*, got married yesterday.
 (b) Peter got married to Mary, *having nine cats in her house*.

The present participles *having* in (6a) and (6b) show that the adjective clauses were reduced.

Related previous studies

The literature review shows that the end-weight principle was examined using different materials, such as English novels and poetry, international corpora as in British National Corpus (BNC) and EFL learners' written texts. This section presents the similarities and differences in the results of the end-weight principle in different texts.

Novels and poetry in English

Mothibeli (2023) studied the different positions of *that*-nominal clauses in English novels, as exemplified in (7).

- (7)
 (a) I forgot ***that I was wearing iron shoes***.
 (b) We will teach this miserable traitor ***that he cannot undo our work so easily***.
 (Mothibeli, 2023, p. 37)

Although *that*-nominal clauses can be used in different positions, such as the subject and the object, the majority of the *that*-nominal clauses were usually found in the final position. The *that*-nominal clause in (7a) is the direct object of the sentence. It can be replaced by the pronoun *it* as in *I forgot it*. On the other hand, the *that*-nominal clause in (7b) is syntactically classified as an adjunct. Removing this information does not impact the grammaticality of the sentence. With this information, Mothibeli (2023) explained that the final position of *that*-nominal clauses was explained by the end-weight principle. Although the structure of *that*-nominal clause complements is applicable grammatically in the subject position, such as (8), Mothibeli (2023) said that this violates the principle of end-weight.

- (8) *That nothing of the kind existed in writing* was certainly true. (Mothibeli, 2023, p. 39)

Violating the end-weight principle does not mean that it is

wrong grammatically. However, there is another effective way to structure example (8) as in *it is certainly true that nothing of the kind existed in writing*. In addition, Nofal (2012) found that the relative clauses in poems were written in the final position, such as (9).

- (9)
 (a) I said to my soul, be still, and let the dark come upon you *which shall be the darkness of God*.
 (b) And smale foweles maken melody, *that slepen at the nyght with open eye*.
 (Nofal, 2012, p. 233)

According to Nofal (2012), not only do the relative clauses in poems comply with the end-weight principle but also the final position is kept for the most complex part. In addition, Leech (2007) also found that the end-weight principle is a common stylistic practice in English fiction. Heavy constituents follow light constituents, as in (10).

- (10) Ours was the marsh country. (Leech, 2007, p. 122)

The syntactic structure in (10) is subjective complement where the complement provides additional information about the subject. The two positions between the subject and complement could be swapped, while they denote the same semantically. However, the longer part is placed in the final position.

International corpora

Previous studies used international corpora to study the end-weight principle. Park (2002) employed corpus tools such as BNC and LOB to study the ordering of adverbial clauses in English. The results show that the majority of adverbial clauses are used in the final position to indicate adverbial clauses of time, place and manner. These are the additional information or details, which are considered the new piece of information. This complies with the pragmatic discourse of given and new information where new information is structurally placed at the end.

Not only does heavier information go to the end of the sentences, but also *complex structures* are placed at the final position. Complex structures are exemplified into adverbial clauses, adjective clauses, and noun clauses and the head of the clauses are under the CP nodes syntactically, such as (11).

- (11)
 (a) Add some salt ***if needed***.
 (b) James knows ***that this is a difficult job***.
 (c) GER 101 is an elective course, ***which is useful for first-year language students***.

Examples (11a) are adverbial clauses. The connector *if* is

a concessive adverbial connector, which is located under the branch of the complementizer phrase *if*. In (11b), *that this is a difficult job* is a noun clause. The relativizer *that* is located under the C node. In (11c), *which is useful for first-year language students* is an adjective clause. It provides the author's subjectivity concerning the elective course GER101.

(12)

- (a) I gave several historical research papers **to Mary**.
 (b) I gave Mary **several historical research papers**.

Ottmar (2015) indicated that the structure presented in (12b) rather conforms to the end-weight principle and sounds more English than (12a).

Arnold et al. (2000) studied heavy NP shift in the corpus in the Canadian parliament. The data was gathered from the spoken register. The two structures, (V+NP+PP) and (V+PP+NP), were compared. The results showed that the heavy NP was shifted to the final position. The explanation for this shift is fixed colligation as the VP and NP are formulaically used together, as in *bring to* and *take into account*.

EFL learners' writing

The end-weight principle is commonly investigated through L2 writing. Sung and Kim (2016) investigated the end-weight principle with non-native English learners. They used the Yonsei English Learner Corpus (YELC) which is the corpus of non-native English language learners to investigate the end-weight principle via the learners' argumentative essays. 39 essays were collected to be studied. The results of their study showed that most advanced English learners follow the end-weight principle in English, while lower proficiency users are likely to violate the rule.

Lozano and Mayamendikoetxea (2009) found in their experiment that L2 English language learners and native English speakers can apply the end-weight principle in their production process. This study is interesting as it points out the number of words to be judged as it is a long constituent.

[...] There is no agreement in the literature as to the most appropriate measuring instrument for syntactic weight. While word length, as measured by a number of words, is standardly used, it cannot tell us how long (or short) a constituent must be to be considered "heavy" (or "light"). [...] the most frequent lengths for the subject constituent in the learner corpora were 2 and 5 words, and the mean of all lengths was 7.5 words. (Lozano and Mayamendikoetxea, 2009, p. 483)

A constituent that is interpreted to be heavy and long contains between seven to eight words. Lozano and Mayamendikoetxea (2009) found that the mean score of length in the final position is 7.52, despite some

students creating a length of 13 to 19 words at the end.

(13)

- (a) In 1880, it begun *the experiments whose result was the appearance of television some years later*.
 (b) Thus began *the campaign to educate the public on how one contracts aids*.
 (Lozano and Mayamendikoetxea, 2009, p. 490)

Although both L2 English language learners and native speakers can apply the end-weight principle correctly, the average length of heaviness in the final position was reported to be different. The average range of the final position as produced by L2 English learners is longer than native English speakers. Okuyama (2015) found that engineering academic research papers used *by*-phrase agents with the long-expression for the information of mathematic calculation. This complies with the end-weight principle.

Applied linguistics articles

While previous studies used the materials of novels, international corpora and L2 learners' writing, this study contributes something new to the field by using the materials of applied linguistics research articles as indexed in the SCOPUS database to test the end-weight principle in the English language. Wongkittiporn (2023) addressed the advantages of using English-applied linguistics research papers to study. Firstly, the papers are written by academic people in the field of language. Some people have many years of experience in using language in the field, so the materials can be used as examples for learners. Secondly, the journal publication teams have editors and proofreaders. Not only do the editors screen the information in the articles to be published, but there is a team of reviewers to give feedback regarding the accuracy of the content. After that, the copyediting process allows the proofreaders to check the accuracy of the language used. Thirdly, most graduate courses provide courses in research methodology. However, the language used in writing research is not yet taught officially in the class. After studying the subject of research methodology, most students can figure out which methods are appropriate for their research papers. Nevertheless, they struggle to express their ideas linguistically according to the norms of research writing. This study provides examples for novice researchers and new scholars who are just entering the field to structure their research writing accurately and appropriately.

METHOD

Unlike previous studies, the current study is a quantitative

study to test the hypothesis of the end-weight principle. The experiments were divided into two phases. The first phase is the experiment of the end-weight principle on applied linguistics articles from the SCOPUS Q1 database. After that, the end-weight principle was tested with Thai EFL learners' descriptive essays.

Participants and materials

For the first experiment, the data collected in this study was 20 academic research articles from the Q1 SCOPUS database, consisting of approximately 200,000 words. There are a total of 117 sentences containing adjective clauses in the final position. The data were collected for *System* and *Journal of English for Specific Purposes* from 2022 to 2024. These two journals were selected because they are applied linguistics journals that have been indexed in the Q1 SCOPUS database for longer than a decade. This ensures the validity and reliability of these two publications.

In the second experiment, the population in this study is Thai high-school EFL learners. In Thailand, this group of learners is called *Mattayom* learners. The participants in this study were gathered by the convenience sampling method. They willingly volunteered to join this writing activity. They studied in either Thai private or public schools under the supervision of the Ministry of Education, Thailand. The sample consisted of 67 students. 45 students came from public schools, whereas 22 participants came from private schools. In the process of recruiting the participants, a private university in Thailand organized an academic writing contest where the information about the event was posted on the internet and the university website. The participants register for the competition free of charge. It was a national competition and the winner received a trophy from the Ministry of Culture, Thailand. This ensured that the participants put in optimal effort and paid close attention when writing their essays. The essays were written in a controlled room at a private university in Thailand with five proctors to control the process of writing.

Data collection

For the first experiment, in order to analyze syntactic structures in academic research papers, the purposive sampling method was adopted in this study. The inclusion criteria of data collection in the study follow Okuyama (2015).

Condition A: The journal is highly ranked in the field.

Condition B: The university affiliation is the United States of America, the United Kingdom or Australia.

These criteria help refine the quality of the writers. Not only are they native American, British or Australian students, native lecturers, scholars or professors, but non-native students who can enter American, British and Australian universities are required to have the minimal requirement of either TOEFL or IELTS scores. Moreover, highly ranked journals usually have proofreaders to check the accuracy of language before the paper is published.

For the second experiment, the data collection came from Thai EFL learners' writing. They were asked to write a 250-word academic essay. The duration of writing was 120 minutes. The topic of writing was "Thai Soft Power", which is a campaign of the Thai government from 2023 to 2024. This topic is about descriptive writing and adjective clauses are likely to be used often in this type of essay. Approximately 17,000 words provided 36 sentences containing adjective clauses. In the writing process, the participants were asked to type their academic essays in Microsoft Word. Therefore, the tokens of adjective clauses were manually extracted and kept in Microsoft Excel for subsequent study. The grammatical errors found were kept as original.

Data analysis

In order to seek correlation as stated in the objectives of the study, this study was quantitatively designed. The theoretical concept of the end-weight principle originally follows Quirk et al. (1972) as elaborated in the section of the literature review. Adjective clauses in this study follow Radford (2009) who classified the adjective clauses as complementizer phrases (CP) structurally. The keys for the examination in this CP are *who*, *which*, *that*, *whom* and *whose*, such as (14).

(14)
 (a) XXXXXXXXXXXXXXXXXXXXXXXX [CP which
 000000000000000000000000].
 (b) XXXXXXXXXXXXXXXXXXXXXXXX, [CP which
 000000000000000000000000].

The objective of this study is to test the end-weight principle only. As such, restrictive relative clauses and non-restrictive relative clauses are not the main focus of this study. Both were gathered to study. With these patterns, the coding schema in this study is given in Table 1. (15)

After that, the code was put into SPSS29 in order to calculate the significant relationship of Pearson correlation. The p-value in this study is set up at 0.05. The P-value of two tails was chosen. In this study, the correlation was significant when the p-value was reported as equal to or less than 0.05 (Rasinger, 2013). The value of *r* is between 0 and 1 (Rasinger, 2013). If the *r* value is closer to 1, it is interpreted to have a higher correlation.

Table 1. Coding schema.

Condition A	Condition B
Compliance with end-weight principle	Non-compliance with end-weight principle
Code 1 when adjective clauses are placed at the final position. This was interpreted as compliance with the end-weight principle in English. Accordingly, code 1 was given.	Code 2 when reduced adjective clauses are placed at the final position. This was interpreted as violating the end-weight principle in English. Accordingly, code 2 was given.
Examples	Examples
Mary visited Schönbrunn Palace that is located in Vienna, Austria.	Mary visited Schönbrunn Palace located in Vienna, Austria.
Thailand is a tourist destination because of its own culture which attract people all over the world.	The vehicle itself is more of a bike than a car, having three wheels.

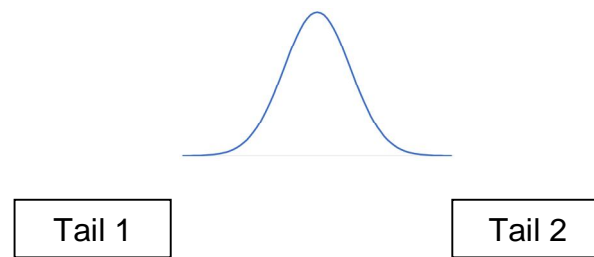


Figure 2. P-value of two tails.

The p-value of two tails is applied in this study (Figure 2). This means that the significant relationship can be reported with minus. With this methodology, the results of the study are given in the following section.

RESULTS

Results of Experiment 1

From a total of approximately 200,000 words, there were 117 tokens of both adjective clauses and reduced

adjective clauses occurring in the final position in applied linguistics research articles. Their statistical data is reported in Table 2.

Table 2 reveals the statistically significant relationship between the theory of end-weight principle and adjective clauses in applied linguistics articles as indexed in SCOPUS Q1 databases. The p-value was reported at .001, which means that there was a significant correlation between the two variables. In addition to a quantitative study, this section presents the qualitative results of the adjective clauses and reduced adjective clauses in applied linguistics research articles.

Table 2. Correlation between end-weight principle and adjective clauses in applied linguistics articles.

Correlations		Adjective clauses	Eng-weight principle
Tokens of adjective clauses in applied linguistics articles	Pearson Correlation	1	.297**
	Sig. (2-tailed)		.001
	N	117	117

** Correlation is significant at the 0.01 level (2-tailed).

Although the majority of adjective clauses were used in the final position, there were some cases where reduced adjective clauses were used in the final position. Some examples of adjective clauses and reduced adjective clauses in applied linguistic articles were given as follows:

(16)

(a) Additionally, the participants were confident about their communicative competence ($M = 3.83$, $SD = 0.68$), *which indicated that they were confident to communicate in Korean* ($M = 3.75$, $SD = 0.55$). (Kim and Yuzhu, 2024, p. 7)

(b) Building upon these studies, our research takes a novel approach by adopting the perspective of translanguaging as co-learning *which encourages participants to play fluid expert/learner roles during the exchange to investigate translingual and transmodal practices in teletandem from a social semiotics lens.* (Satar, Aranha, Cavalari and Almijawl, 2024, p. 1)

(c) This aligns with an influential view in cognitive psychology *which states that auditory processing can be considered domain-general and this ability forms the basis of multiple domain-specific phenomena.* (Ruan and Saito, 2023, p. 1)

(d) The engagement rate of tweets is a common way to measure interactions with social media posts; it is based on a post's "engagement actions," *which include replies, retweets (when another user simply retweets the original post), and likes.* (Tardy, 2023, p. 14)

The adjective clause in (16a) provided numerical data through a mean score standard deviation. The adjective clause in (16b) gave extra information about the advantages of co-learning. The adjective clause in (16c) is the definition of cognitive psychology. The adjective clause in (16d) provided the elements of engagement action. Therefore, adjective clauses provide supplementary data concerning numerical information, definitions, and explanations of terms and components. Despite having many examples of adjective clauses concerning form and meaning, reduced adjective clauses were also found in applied linguistics articles, such as (17).

(17)

(a) On the other hand, turbulences in international relations and the outbreak of a global pandemic have increased uncertainties, posing threats and disruption to people's daily lives, *leading to school closures, travel restrictions and precarious working prospects.* (Wu and Forbes, 2023, p. 2)

(b) The results showed that the three subtests were clustered as one single factor (explaining 75.5% of the variances), *suggesting that the three subtests may have tapped into one single aspect of participants' auditory processing ability.* (Ruan and Saito, 2023, p. 6)

The reduced adjective clause in (17a) denoted a consequence of a certain action. The reduced adjective clause in (17b) provided a recommendation of a certain result. Reduced adjective clauses were for the semantic denotations of consequences and suggestions.

However, after taking a closer look, the semantic denotation of consequences was also found to be used with adjective clauses, such as (18).

(18) Rather, the presented analysis focuses on the development of one interdiscursive trajectory, *which was the most consequential in terms of the evolving*

relationship between the researcher and participant. (Shahri, 2023, p. 3)

With this evidence, semantic denotations were the variable to manipulate the variance of adjective clauses and reduced adjective clauses in the final position. If English was an end-weight language where adjective clauses are not normally reduced at the final position, it would be interesting to establish why writers use the reduced adjective clauses in the final position in applied linguistic articles. Okuyama (2015) also found that engineering academic research papers used *by*-phrase agents with the long-expression for the information of mathematic calculation. This complies with the end-weight principle. The explanation was given in the discussion section.

Results of Experiment 2

This experiment of two alternative variances between adjective clauses and reduced adjective clauses confirmed the theory that English is an end-weight language. However, there was an exception in that the reduced adjective clauses in English in the final position could be used to avoid the horror-aequi principle. This first experiment shows that those writers of the SCOPUS Q1 database from well-known American, Australian and British universities strictly follow the principle of end-weight in their writing as it was an acceptable condition of information structure in standard English and academic writing.

Once the researcher linguistically understood the theory of end-weight and its exceptions, the researcher used this theory and exceptions to continue the experiment on Thai EFL learners who studied in Thai high schools, which are known as *Mattayom*. They were neither international students nor international schools. They were Thai *Mattayom* students who studied at either public or private schools in Thailand. The objective of the second experiment was to examine whether Thai *Mattayom* students had this principle embedded in their brains or not.

The results showed that Thai *Mattayom* EFL learners followed the end-weight principle the same way as the writers in SCOPUS Q1. The quantitative results of this study are given in Table 3.

Table 3 reveals the inferential statistical results between the end-weight principle and the adjective clauses in Thai *Mattayom* EFL learners' essays. The p-value was reported at 0.02 and this means that there were statistically significant relationships between the two variables.

Although there were two variances between adjective clauses and reduced adjective clauses to select for the final position of the sentence, they knew that adjective clauses should be filled in the final position. However,

there was only one occurrence where an EFL writer used a reduced adjective clause in the final position. Both examples are given below.

(19)

(a) Thailand has one of the most beautiful temples in the world. People often travel there by the iconic *Tuk Tuk*, **which is a three-wheel mini car with open spaces for**

you to enjoy

(b) Some famous Thai dishes are Tom Yom and Som Tom, **which are found in almost every part of Thailand.**

(c) Thailand is a tourist destination because of its own culture **which attracts people from all over the world.**

(d) The vehicle itself is more of a bike than a car, **having three wheels.**

Table 3. Correlation between end-weight principle and adjective clauses in Thai EFL learners' essays.

Correlations		Adjective clauses	Eng-weight principle
Adjective clauses in Thai EFL learners' essays	Pearson Correlation	1	.385*
	Sig. (2-tailed)		.020
	N	36	36

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

Examples (19) showed the use of adjective clauses and reduced adjective clauses by Thai EFL learners. In (19a), the writer could use appositive NP while the relativizer *which* and the auxiliary *are* could have been deleted. However, the writer chose to use an adjective clause at the final position. Similarly, another option for (19b) and (19c) was the present participle and the past participle as in *found* and *attracting*, respectively. However, only one token was found to violate the horror-aequi principle as a reduced adjective clause in (19d) was used without any repetitive form in an adjacent area.

DISCUSSION

English as an end-weight language

The inferential statistical data in this study proves that English is an end-weight language (Quirk et al, 1972). Although there are two grammatical variances between adjective clauses and reduced adjective clauses, the writers selected the variance of adjective clauses, which are longer, to place at the final position. However, there are a few tokens that are contradictorily used with the theory. This means that the authors used reduced adjective clauses in the final position, such as (20).

(20)

(a) The results showed that the three subtests were clustered as one single factor (explaining 75.5% of the variances), *suggesting that the three subtests may have tapped into one single aspect of participants' auditory processing ability.* (Ruan and Saito, 2023, p. 6)

(b) Moreover, [...] reported that academic collocations were learned significantly better than technical

collocations, *suggesting that the type of collocations can also be a factor in learning through listening.* (Tuzcu, 2023, p. 4)

The writers used reduced adjective clauses together with adjective clauses to avoid the repetition of the same form in adjacent areas. This is technically known as *horror aequi principle* (Ruohonen and Rudanko, 2019). The repetition is modified in (21).

(21) Moreover, [...] reported that academic collocations were learned significantly better than technical collocations **which suggests that** the type of collocations can also be a factor in learning through listening.

Writers are often fearful of repeating the relativizer *that* twice in adjacent areas. Therefore, the use of the first *that* relativizer is deleted, while the verb *suggest* is modified into the present participle.

In addition to the end-weight principle, the topic or the spec T position in English is normally short and nominalized (Wongkittiporn, 2023). This is because the subject is an old piece of information that has already been elaborated on in the previous discourse. Once the writers want to link the topic with the previous discourse, they normally summarize it. For example, the nominalization of the sentence *the car is red* becomes *the red car*.

While most previous studies addressed this section with the errors that EFL learners made in their writing, this section addresses the causes of accuracy. The high correlation between the end-weight principle and adjective clauses in Thai EFL learners' essays is not accidental, but there are several reasons to explain

this phenomenon.

Avoidance of reduced adjective clauses

It is difficult for Thai EFL learners to produce reduced adjective clauses. Wongkittiporn (2024) investigated Thai EFL learners' use of reduced adjective clauses. The results showed that they have difficulty in using reduced adjective clauses at approximately 75 percent. To be able to use reduced adjective clauses correctly, EFL learners are required to have the notion of syntactic features of deletion and inflectional morpheme (Radford, 2009) as explained in (22).

(22)

(a) Thailand is a tourist destination because of its own culture *which attracts people all over the world*.

(b) Thailand is a tourist destination because of its own culture *attracting people all over the world*.

Example (22a) represents adjective clauses, whereas example (22b) represents reduced adjective clauses. To transform the adjective clause in (22a) into the reduced adjective clause in (22b), the syntactic feature of *wh*-deletion must be applied at the same time as auxiliary *be*. The verb *attract* must be changed into a present participle via the deviation of the inflectional morpheme *-ing* as in *attracting*. Due to this complexity, the variance of reduced adjective clauses tends to be avoided by Thai EFL learners. This interpretation of EFL learners avoiding the use of reduced adjective clauses is relevant as this essay writing competition was a national competition. The structures used in their writing were thought about carefully as making mistakes led to a score deduction. Therefore, they were likely to avoid using complex structures with a lot of modification, which may have led to errors.

Mother tongue influence

The Thai language is an end-weight language. Although Thai is a null subject-parameter, where the subject of the sentence can be omitted without ungrammaticality, the sentences in Thai could be continued where the writers provide a number of modifiers at the final position (Timyam and Bergen, 2010). When the same principle between the two languages is shared in common between the first and the second language, it is likely to reduce the errors in the production of the second language. One prominent study to support this argument was written by Leenakitti and Pongpairaj (2019).

(23)

(a) (...) Mr. H. the person who had ordered Allan Mitchison's execution.

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ผู้สั่งฆ่าอัลลัน มิทชีสัน

(Black and Blue as cited in Leenakitti & Pongpairaj, 2019, p. 122)

(b) (...) had one tooth which overlapped another(...)

(...) มี ฟันสองซี่ เกยกันอยู่(...)

(Black and Blue as cited in Leenakitti and Pongpairaj, 2019, p. 122)

Although Leenakitti and Pongpairaj (2019) show the different strategies of English-Thai translation in novels, the end-weight principle is there, which has never been changed.

CONCLUSION

This study examines the theory of end-weight principle in English adjective clauses between the two different samples of publication of writers in SCOPUS Q1 databases and Thai EFL learners in order to answer the following questions. To answer research question one, there is a statistically significant relationship between the end-weight principle and English adjective clauses in applied linguistics articles indexed in the SCOPUS Q1 database. The author selected the variance of adjective clauses to be placed at the final position of the sentences although there is another variance of reduced adjective clauses, which can make the sentence shorter. The results of this study seem to suggest that post-verbal or post-VP position is where complex structures, such as adjective clauses are placed. Even though a previous study found that the end-weight principle is associated with advanced language learners, this might be true in some cases. However, this study suggests that the issue of the similarity of information structure between the first language and the English language is also relevant. The English language and the Thai language are the same in that they are both languages of end-weight. The results of this study show that it is possible for the first language to show positive interference with the second language, where Thai high-school students could apply the information structure of adjective clauses pragmatically, the same as SCOPUS Q1 writers.

The results in this study theoretically contribute to the end-weight principle, which is viewed as a significant notion in writing English. Previous studies gave examples of different texts relating to the end-weight principle in English. However, this study uses an inferential statistical approach to study this theory. This study is innovative methodologically in that the results gained by this study could provide both external validity and add more examples to the field. With this method, it seems fair to claim that English is a heavy-ended language.

Applying functional grammar or functionalism is recommended when teaching complex sentences. Complex structures, such as adjective clauses are encouraged to be taught at the same time as the end-

weight principle, or packaging structure. This allows English language learners to have the conceptual framework in their mind that a longer clause like an adjective clause is usually placed at the final position.

(24) *I like ice cream, which is creamy and custard-based.*

Example (24) shows that the subject of the sentence is DP and nominalization, which is short and subjective. On the other hand, the adjective clause is placed at the final position of the sentence as it is longer and more informative. Teaching this way allows English language learners to understand the concept that nominalization should be placed at the spec T or the subject position, but complex clauses are post-verbal structures. This helps to answer why the adjective clauses in English cannot occur in the initial position of the sentence as it will violate the end-weight principle. However, the results of the end-weight principle in this study can be generalized to only applied linguistics research articles and Thai EFL learners' essays. Generalizing the data in this study to other areas might not be applicable to optimal levels. In other words, the data in this study were specific to only two groups of the population, and the writing cannot be generalized to other writing styles of Thai EFL learners. It is recommended for future studies that the quantitative study of reduced adjective clauses in the medial position of sentences would contribute something new to the field.

As mentioned at the beginning of this study, this study pedagogically and innovatively contributes to EFL learners. English language teachers normally pay attention to teaching grammar and vocabulary to their students because they are important to support their learners' writing. This is true in some cases. However, only a few English teachers teach students how to combine clauses. Teaching this aspect could make your EFL learners different from others.

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