HOW THE PREPOSITIONAL PHRASE AROUSES AMBIGUITY IN THREE ARTICLES PUBLISHED ON SEARCH.EBSCOHOST.COM

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Abstract:
This research is entitled How the Prepositional Phrase Arouses Ambiguity in Three Articles Published on Search.ebschost.com. The purpose of this research is to discuss some sentences containing prepositional phrase which enables the author to find its ambiguity and its solution. This prepositional phrase analysis is done by studying some previous articles found in Search.ebschost.com. The preposition phrase chosen to be analyzed refers to the preposition phrase which begins with the preposition "with". The result that can be taken from this research shows that (1) the prepositional phrase may attach only to VP in particular sentence, while on the other hand, (2) it may attach both to VP and to NP so that the meaning of the sentence may be ambiguous. To avoid the ambiguity, the possessive determiners and the relative clauses may be used instead. The qualitative method was employed since it referred to the theoretical frames which consists of previous researches, findings, and theories.

INTRODUCTION

Some linguistic information may be applied to make the meaning of the sentence. A number of linguists might inevitably agree that words contribute to the meaning of the sentence. Linguistic theories even anticipate that the primary of sentence meaning belongs to the verb itself. However, other constituents may additionally contribute the meaning of the sentence, for instance the prepositional phrase (PP) which begins with the preposition *with* that may syntactically attach either to the verb phrase (VP) or to the noun phrase (NP). This kind of prepositional phrase may contribute ambiguity in its interpretation. Thus, the writer cited some prepositional phrases from three articles written by Nadh & Huyck (2012) in "A neuro-computational approach to prepositional phrase attachment ambiguity resolution." Neural Computation, 24(7), 1906-1925, Baldwin & Villavicencio, A. (2009) in "Prepositions in applications: A survey and introduction to the special issue." Computational Linguistics, 35(2), 119-149, and Merlo & Ferrer (2006) in "The notion of argument in prepositional phrase attachment." Computational Linguistics, 32(3), 341-378.

Ambiguity resolution is defined as a major challenge in natural language processing. This may have implications for syntactic or semantic ambiguity that complicate the parsing of sentences into symbolic representations. It is argued that one type of ambiguity refers prepositional phrase (PP) attachment ambiguity. This happens when a PP follows a verb phrase (VP) and a noun phrase (NP)) as in "I saw a girl with a telescope" (Nadh & Huyck, 2012). They emphasize the phrases (VP saw), (NP the girl), and (PP with the telescope) can be united in two ways: The PP can be attached to the NP which can be semantically interpreted that the girl has the telescope (VP saw (NP the girl (PP with the telescope))), or the PP can be attached to the VP

that can be alternatively interpreted that the telescope is the instrument of the verb saw (VP saw (NP the girl) (PP with the telescope)). Creating the correct attachment is incalculably important to acquire the correct meaning of the sentence. Incorrect attachment decisions can lead to a cascade of parsing errors.

According to Baldwin and Villavicencio, the prepositional phrase "Kim eats pizza with chopsticks" contributes syntactic ambiguity. The prepositional phrase "with chopsticks" might be dominated by either the noun pizza (as part of NP pizza with chopsticks) or the verb eats (as a modifier of the verb). Meanwhile, Merlo and Ferrer suggested that the correct attachment of prepositional phrases is necessary to build a syntactic tree that supports correct interpretation of sentence constituents as in "I saw the man with telescope." They found it significant to decide whether the PP "with the telescope" should be attached as a sister to the noun "the man" or it might be properly attached to the verb to confine its interpretation. Therefore, it clearly indicates that the instrument of the main action is described by the sentences. These three illustrations together with other optional examples, including their syntactic illustrations, will be discussed in the Results and Discussions, included its solution to avoid the prepositional ambiguity. Khan and Hamdan (2018) divided the ambiguity into three types: lexical ambiguity, syntactic ambiguity, semantic ambiguity and pragmatic ambiguity. In this article, the author merely conducts the research regarding syntactic and semantic ambiguity since they are commonly discussed in a number of research studies, whereby a group of words can be structured in more than one way hence resulting in more than one interpretation.

LITERATURE REVIEW
Syntax
Syntax derives from Greek consisting of two words *sun* and *tattein* which refers to a verbal noun, and it literally means "arrangement" or "setting out together". It can be argued that "syntax traditionally refers to the branch of grammar dealing with the ways in which words, with or without appropriate inflections, are arranged to show connections of meaning within the sentence" (O'Grady, 2008, p. 58).

Syntax has something to do with sentence constructions, and human languages users exert a staggering variety of possible arrangements of the elements within sentences. One of the most obvious and important differences refers to the order of the major elements within a sentence. For example, in English, the subject comes before the verb and the direct object follows the verb (Robert, 2004, p. 1). On the other hand, Thomas (1993) emphasized that syntax attempts to describe how words are combined to form sentences or utterances, while semantics and pragmatics examine the meaning. These components overlap and interact with each other; some, however, can be considered and described separately.

Syntactic Function and Category
According to Chaer (2012), the syntactic category consists of eleven types: nouns, verbs, adjectives, adverbs, pronouns, numbers, prepositions, conjunctions, articular, interjections, and particles. Meanwhile, syntactic functions have something to do with subjects, verbs, objects, complements and adverbials. From those functions, the verb is a central and the others are considered as pairs. The subject might be just one word, a noun or a pronoun. It may be a noun phrase which refers to a group of words (made up of a head noun and any modifiers, determiners and/or complements), while the object can be anything from a single word to a phrase. It in each case directly follows the verb, and might refer to someone or something which is involved in the subject's "performance" of the verb. The object itself consists of two types, direct and indirect objects. Another function is complement which gives additional information about either the Subject or the Object. The last syntactic function is the adverb telling us more about a verb. It qualifies or modifies a verb; however, the adverbs might modify adjectives and modify another adverb.

According to SIL International (2004), lexical categories are considered as syntactic categories of items that are part of lexicon of any languages. These elements are also known, at the word level, as part of speech, word class, grammatical category and grammatical class. The categories are divided into two types: major and minor categories. At least, every language has two major categories which are nouns and verbs, and many languages also have other major categories: adjectives, and pronouns. In addition, the minor lexical categories belong to many languages. They are conjunctions, particles and prepositions.

Verb Phrase

A verb phrase is a phrase which consists of at least one verb and the dependents of verb. The verb itself functions as the head word of the phrase, or in another word it can be stated that the verb *assist* is the head of the phrase *assist you,* and hence that *assist you* is a verb phrase labelled as VP (Radford 2004, p. 58). The structure of the resulting phrase can be illustrated as follows:

- [**vp** [**v** assist] [**PRN** you]]

The head of the verb phrase may be followed by some constituents such as N *noun*, PRN *pronoun,* AP *adjective phrase,* NP *noun phrase,* AdvP *adverb phrase,* and PP *prepositional phrase.* These constituents may occur in terms of the classes of verb whether they are Transitive, Intransitive, Ditransitive, Intensive, Complex-transitive or Prepositional.

Noun Phrase
In a sentence, a noun phrase which is commonly represented by noun, can function as a subject or as an object. It refers to a phrase that is built upon a noun functioning as the headword of the phrase. The words that may replace the noun phrases are all nouns or pronouns (Robert 2021, p. 29). Robert stated that "constituents modifying the head noun may precede and follow them. Those which appear before the head noun are called PRE-MODIFIER, while appear after the head noun are called POST-MODIFIER". The constituents pre-modifying nouns are determiners, adjective phrases, and nouns as in '*dubious jokes*'. Thomas (1993) argued that the constituents post-modifying the nouns are Prepositional Phrase as in '*the dog chased the cat with three legs',* and Relative Clause as in '*The cat which is lying on the mat hates dogs'.*

Prepositional Phrase
A prepositional phrase or shorted termed as "PP" is a phrase that starts with a preposition, in which the preposition functions as the headword of the phrase as in *to the pub.* In *an expedition the pub,* the head N is *expedition* and it is modified by the prepositional phrase *to the pub,* which consist of P+NP. In the prepositional phrase may function either, as the main subject that will be discussed by the author, as adverbials or as objects. The example of prepositional phrase functioning as object which modifies the head noun is illustrated as follows:

a. The woman chased the <u>cat with three legs</u>.
      S   *P*   *dO*

The prepositional phrase *with three legs* post-modifies the head noun in this case **cat** and all elements of the noun phrase including the prepositional phrase function as object of the sentence. It might be proven by substituting the pronoun *it* for the direct object of the sentence:

- The woman chased <u>it</u>.
   S   *P* *dO*

The following example is a prepositional phrase which functions as adverbial:

b. The woman threw the cat <u>with her bag</u>.
   S   *P*   *dO*   *A*

If we use the pronoun *it* to replace the direct object in this sentence we get:

- The woman   threw **it**   <u>with her bag</u>.
   S   *P* *dO*   *A*

Here *it* has only replaced the expression *the cat.* In this example, *the* cat and *with her bag* are separate constituents. However, the prepositional phrase which begins with preposition *with* may be ambiguous both syntactically and semantically. Consider these following examples:

c. The old woman hit   <u>the man with the wooden leg</u>.
     S   *P*   *dO*
d. The old woman hit   the man   <u>with the wooden leg</u>.
     S   *P*   *dO*   *A*

The prepositional phrase in sentence (c) functions as direct object since it post-modifies the head noun, *man.* In this case *the man* and *with the wooden leg* are considered as one constituent.

Semantically, this sentence refers to the man who had a wooden leg, hit by the woman by object unknown. In sentence (d) the prepositional phrase functions as adverbial since it does not post-modify the head noun, *man*, which functions as direct object. In this case, *the man* and *with the wooden leg* are clearly separate constituents. Semantically, this sentence refers to the old woman who used a wooden leg to hit the man with.

Possessive Determiner
English possessive determiners such as *my, your, his, her, our, its, our, their,* are regarded as obligatory elements of the noun phrases, the only other obligatory of which are the noun themselves. According to Babacar (2001), a noun may not appear by itself in an English sentence. At least it must be preceded by a determiner. It can be argued that determiner constitute some of the most frequent words in the language as every noun requires a determiner which contextualizes nouns in sentences. Thus, the determiner is required to avoid the prepositional phrase ambiguity in this article.

Relative Clause
Wan and Lee (2016) stated that relative clause plays a significant role to ensure semantic clearness between clauses and support syntactic maturity as well as a textual variety. Therefore, it is applied in this article to solve the prepositional phrase ambiguity. In addition, it is traditionally one of subordinate clauses modifying, describing or giving information about a noun. On the other hand, the point of relative clause is as previously mentioned post-modifying the head noun of noun phrase (Thomas 1993, p. 96). The example is illustrated as follows:

- The cat <u>that loves dogs</u>   is   mad.
        S   P   sC

The relative pronoun *that loves dogs* post-modifies the noun *cat*. The whole unit *the cat that loves dogs* is categorized as a noun phrase that functions as subject of the sentence. Shortly, the relative clause plays its role to join the main clause and the subordinate clause related by what we called relative pronoun such as *that, who, whom, which* and *whose*. The main clause is labelled S1 and the subordinate clause is labelled S2. The illustration is as follows:

- [S1 The cat [S2 that loves dogs] is mad].

The cat is mad is the main clause while *that loves dogs* is the subordinate clause.

METHODS
The method applied in this research is qualitative, and it is argued that in qualitative method there is a close relation between the researcher's goals and the researcher's theoretical frames. The theoretical frames involve all previous research studies, findings or theories; on the topics to be studied that are mobilized by the researcher. Methodological choices are another point for preparing a qualitative research study. These depend on which cases are chosen, how the information is collected, and how the data analysis is chosen (Crescentini & Mainardi, 2009).

Based on the qualitative procedures, the author analyzes some sentences containing the prepositional phrases in three journals which are published on Search.ebschost.com. There are three stages in data collecting. First, the writer looked for prepositional phrases which begin with preposition with that arouse the ambiguity, and secondly the writer illustrates them syntactically so that he can determine whether the prepositional phrase will attach to VP or to NP instead. Finally, the author discusses some optional constituents to avoid the ambiguity itself.

RESULTS AND DISCUSSION
After collecting some sentences containing prepositional phrases which begin with preposition *with* in three journals publish on Search.ebschost.com, the writer found some prepositional phrases that can be ambiguously attached to VP which function as ADVERBIAL or to NP functioning as OBJECT. Optional constituents are also found to avoid the ambiguity itself.

DATA 1
PP Attachment Ambiguity by Nadh and Huyck

- I saw a girl <u>with a telescope</u>.

Nadd and Huyck described that three phrases (VP saw, NP the girl, and PP with the telescope) can be syntactically united in two techniques. The PP can be attached to the NP which can be semantically interpreted that the girl has the telescope (VP saw (NP the girl (PP with the telescope))), or the PP can be attached to the VP that can be alternatively interpreted that the telescope is the instrument of the verb saw (VP saw (NP the girl) (PP with the telescope)). They illustrated the tree structure as follows:

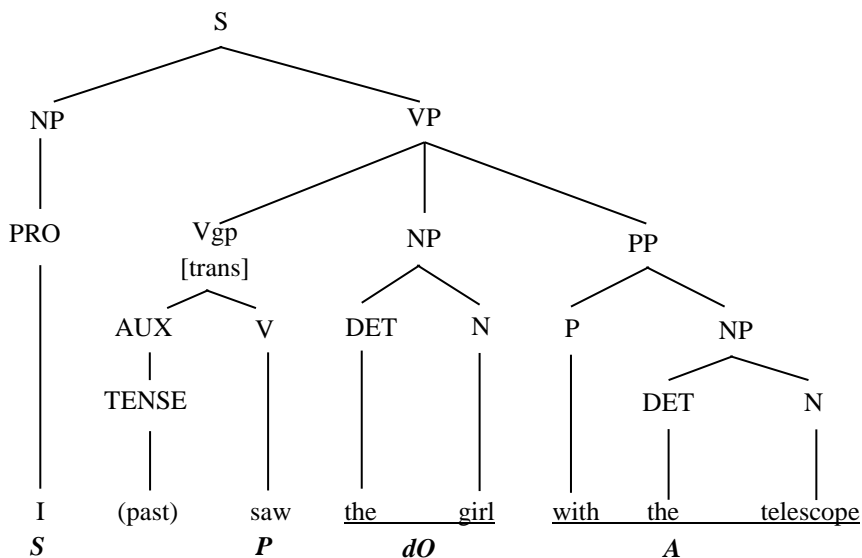A. **Prepositional Phrase Attached to Verb Phrases**
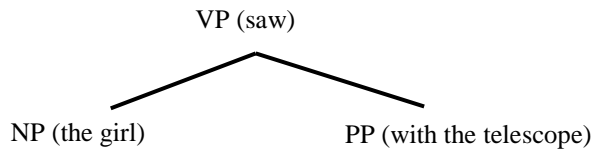
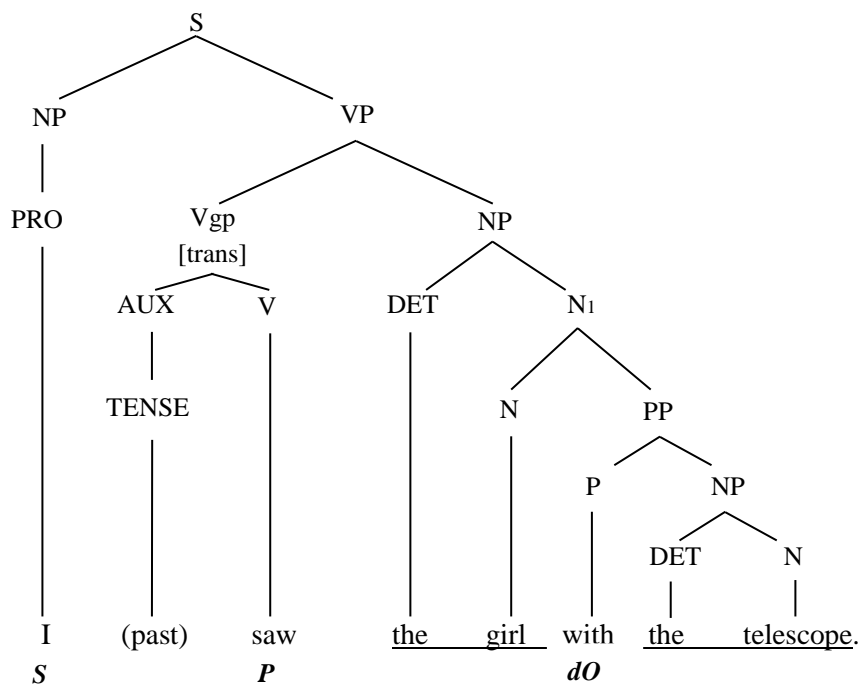B. **Prepositional Phrase Attached to Noun Phrase**
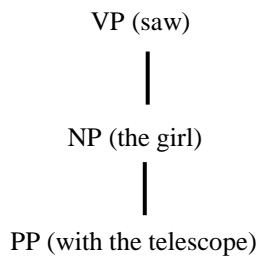
The tree diagrams of A and B can be illustrated as follows:

1. **A**

1. B

In the tree diagram (1A), it is obvious that the prepositional phrase *with the telescope* does not post-modify the head of noun phrase *girl* but instead it post-modifies the VP *saw*. Therefore, *the girl* and *with the telescope* are separate constituents. The prepositional phrase in this case functions as adverbial.

In the tree diagram (1B), the prepositional phrase *with the telescope* post-modifies the head of the noun phrase *girl* instead of post-modifying the VP *saw*. So *the girl* and *with the telescope* are considered as one constituent. In addition, *the girl with the telescope* is a noun phrase functioning as a direct object.

To avoid ambiguity, a replacement of determiner *the* by determiner *my* in sentence (1A) is required as in *I saw the girl with my telescope,* and to avoid the ambiguity in sentence (1B), the prepositional phrase *with the telescope* may be alternatively replaced by a relative clause *who has a telescope* or *who holds a telescope.* The tree diagrams of each optional substitution are illustrated as follows:

- **Determiner Replacement**
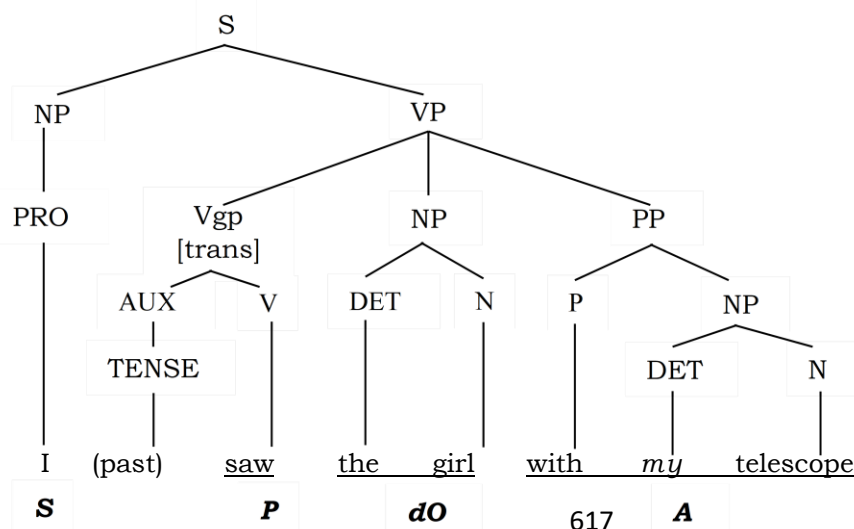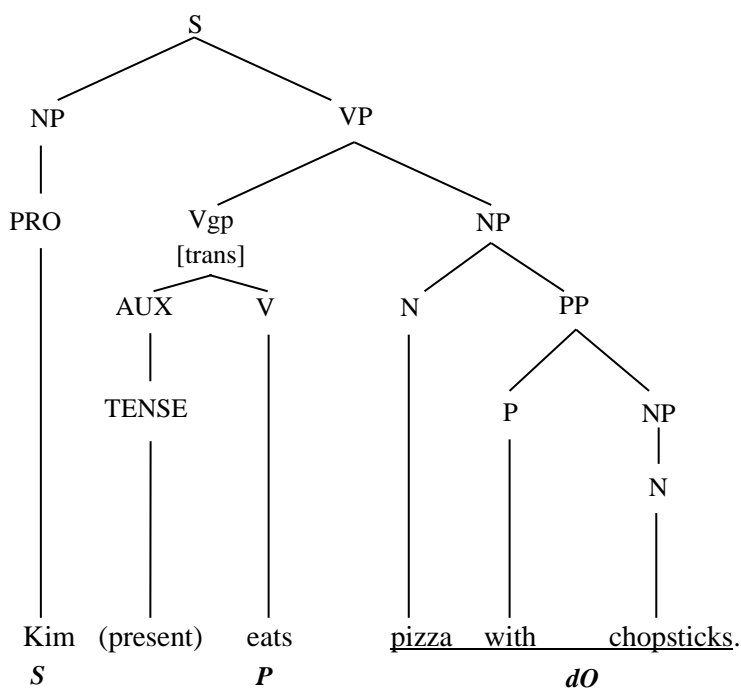
- **Relative Clause Attachment**
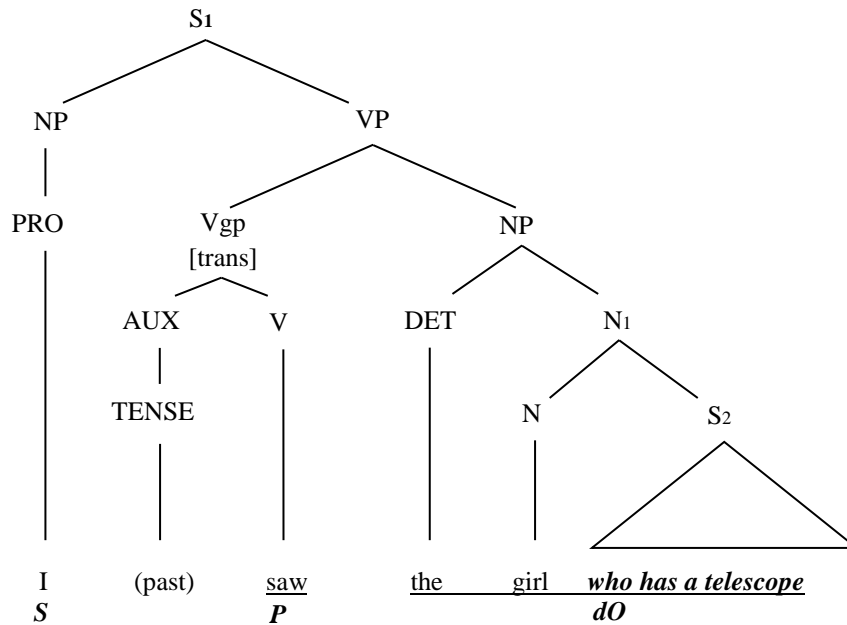
DATA 2
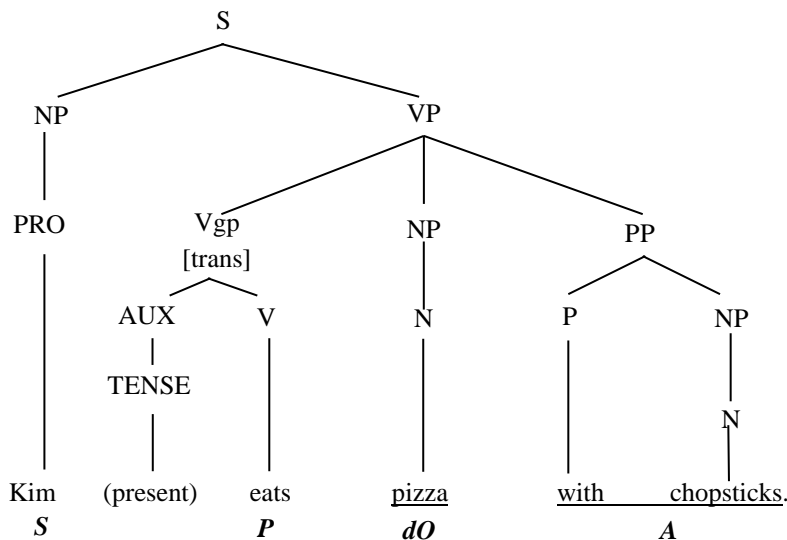**PP Attachment by Baldwin and Villavicencio**

- Kim eats pizza <u>with chopsticks</u>.

    Baldwin and Aline Villavicencio illustrated tree diagrams for the above sentence as follows:

2. A

2. B

It is claimed that the syntactic ambiguity occurs since the PP *with chopsticks* might be governed by either the noun *pizza* as part of the NP *pizza with chopsticks,* illustrated in example (2A), or by the verb *eats* as a modifier, illustrated in example (2B). Baldwin and Villavicencio emphasized that the correct analysis is the example (2B).

The example (2B) might be claimed as the correct analysis; however, there is no need to argue that there is syntactic ambiguity in *Kim eats pizza with chopsticks* since the N *chopsticks* is not a kind of foods served together with pizza but as a tool for someone to eat the pizza. Thus, the prepositional phrase *with chopsticks* is obligatorily attached to the VP *eats* rather than to the noun *pizza,* or in another word *pizza* and *with chopsticks* are not one constituent. Obviously, the prepositional phrase may post-modify *pizza* if it is a kind of foods served together with *pizza*, for example *with anchovies*. Consider the following example:

- **NP Attachment**
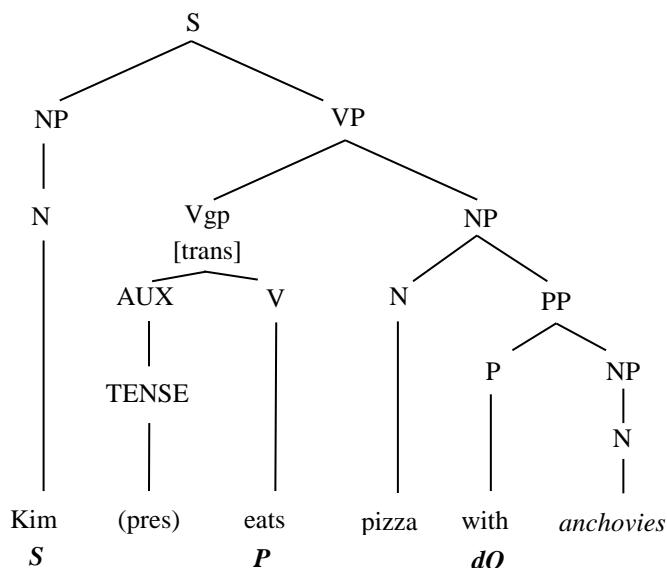
Noun *anchovies* are kinds of food properly served together with pizza. Consequently, the prepositional phrase *with anchovies* is obligatorily attached to NP *pizza* rather than to VP *eats.* The prepositional phrase *with anchovies* in this case post-modifies the noun *pizza,* so *pizza* and *with anchovies* is considered to be one constituent.

DATA 3
PP Attachment Ambiguity by Merlo and Ferrer

• I saw the man <u>with the telescope</u>.

Merlo and Ferrer argued that in order to limit the interpretation, the prepositional phrase (PP) *with the telescope* must be significantly considered whether it should be attached as a sister to the noun phrase (NP) *the man* or it should be attached to the verb *saw*. Therefore, it will clearly indicate the instrument of the main action which is described by the sentence. In this case, they formalized the problem of prepositional phrase attachment disambiguation as a binary choice, distinguishing prepositional phrase attachments to a specific verb or to direct object of the verb.

It was previously mentioned that *I saw the man with the telescope* may be ambiguously interpreted. Just recall to the first data, to avoid this ambiguity, if we would like to attach the prepositional phrase to the VP then we must replace the determiner *the* by determiner *my.* The following examples are given to illustrate the difference:

3A. *"I saw the man with *the* telescope" causes ambiguity.
3B. "I saw the man with *my* telescope" causes no ambiguity.

The example (3B) will not be ambiguous since the prepositional phrase *with my telescope* can be obligatorily attached to the verb phrase. Clearly, this adverbial refers to the tool (telescope) used to see the man rather than the tool that the man has or holds.
Regarding a recall of DATA I, to avoid the ambiguity, the prepositional phrase *with the telescope* may be alternatively replaced by a relative clause *who had the telescope* or *who was holding a telescope.* Consider the following example:

3C. "I saw the man *who had the telescope*" causes no ambiguity.
3D. "I saw the man *who was holding a telescope*" causes no ambiguity.

The tree diagrams are illustrated in DATA I to review the detail of this subject, including their syntactic functions.

CONCLUSION

The researcher may conclude that there are several fact findings in three journals found on Search.ebschost.com. The findings basically refer to the prepositional phrase which begins with the preposition with as analyzed by the three researchers who published them. The prepositional phrase which begins with the preposition with may arouse ambiguity. This occurs because the prepositional phrase may be attached either to VP or to NP.

Having knowledge of syntax involving syntactic function, category, and role is very crucial; however, the ability of sentence meaning interpretation and syntactic solution are also required to facilitate the syntactic analysis itself. They, somehow, must be integrated to achieve the best result in analysis.

REFERENCES
Aarts, B. (2018). English syntax and argumentation. Bloomsbury Publishing.

Babacar, S. (2021). A contrastive study of the possessive determiners in english and seeree-siin. Hmlyan Jr Edu Lte, 2(2), 155–160.

Baldwin, T., & Aline, V. (2009). Prepositions in applications: A survey and introduction to the special issue. Computational Linguistics, 35(2), 119–149.

Bogdan, R., & knopp Biklen, S. (2003). Qualitative research for education: An introduction to theory and methods (Fourth Edition). Ally and Bacon.

Burton-Roberts, N. (2022). Analysing sentences: An introduction to english syntax (Fifth Edition). Routledge.

C. Ferstl, E. (2019). Context effects in syntactic ambiguity resolution: The location of prepositional phrase attachment. In Proceedings of the Sixteenth Annual Conference of the Cognitive Science Society, 295–300.

Chaer, A. (2012). Linguistik umum. PT Rineka Cipta.

Chomsky, N. (1965). Aspects of the theory of syntax. Cambridge: MA: MIT Press.

Crescentini, A., & Mainardi, G. (2009). Qualitative research articles: Guidelines, suggestions and needs. Journal of Workplace Learning, 21(5), 431–439.

H.Khan, I., & H. Hamdan, M. (2018). An analysis of prepositional-phrase attachment disambiguation. International Journal of Computational Linguistics Research, 9(2), 60–80.

Merlo, P., & Ferrer, E. E. (2006). The Notion of Argument In Prepositional Phrase Attachment. Computational Linguistics, 32(3), 341–378.

Nadh, K., & Huyck, C. (2012). A neurocomputational approach to prepositional phrase attachment ambiguity resolution. Neutral Computation, 24(7), 1906–1925.

O'Grady, W. (2008). Contemporary linguistic analysis: An introduction. Person Longman.
Radford, A. (2004). English syntax: An introduction. Cambridge University Press.

Schwarz, F. (2012). Situation pronouns in determiner phrases. Natural Language Semantic, 20(4), 431–475.

Thomas, L. (1993). Beginning syntax. Blackwell.
Wan Cho, D., & Lee, K. (2016). English relative clauses in science and engineering journal papers: A comparative corpus-based study for pedagogical purposes. Ampersand, 3, 61–70.