

COGNITIVE PROCESS IN COMPREHENSION OF SENTENCE PROPOSITIONS AMONG THE UNDERGRADUATE EFL STUDENTS

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ABSTRACT

English acquired by EFL learners is categorized as interlanguage, which means that their English is developing towards native like competence. In Indonesian context, the EFL learners' vocabulary and sentence structure mastery is insufficient. Comprehending main propositions or sentence meanings require cognitive process of both semantic and structural construction. Within such insufficient mastery of English, the researchers intend to uncover the cognitive process EFL learners applied to comprehend main propositions of complex sentences. For this purpose of the study, the researches obtained the main propositions that the learners comprehended from three complex sentences assigned to them to read. Soon after completing the comprehension, the learners were assigned to write their retrospective introspection (mental process they were experiencing during the comprehension). The two types of data were analyzed qualitatively. The research findings show that 65.24% of the EFL learners applied semantic construction, 25.24% used discourse analysis, and 9.52% applied syntactical construction. This indicated that in comprehending sentence meaning, 90.48% EFL learners relied more on words and discourse meanings rather than on sentence structure or on their combination.

Keywords: Cognitive Process, Proposition, Comprehension, Sentence, Semantics, Syntax

INTRODUCTION

Research on cognitive process uncovers invisible mental operation underlying language behavior and describes behavior evidenced by the mental operation (Haselow, 2020). The insights on the cognitive process - that is: the understanding of what mental process is taking place while producing and comprehending language – are valuable for many programs related to language, such as language teaching, interpreter education, etc. Cognitive process takes place at word, phrase, sentence, and text levels (Patrie, 2000). Word, phrase, sentence, and text comprehension is resulted from mental operation underlying the language behavior. Comprehension is building meaningful and coherent representation of its conceptual content (Patrie, 2000). Proposition is meaning or thought that a declarative sentence expresses; proposition is not the sentence itself, because two different declarative sentences may express the same proposition (Gaskin, 2008). Proposition is a smallest unit of meaning of a sentence realized in a predicate (verbal unit) of the sentence. Proposition can be united with a process of modification (relativization and nominalization) and by using of connectives (Combining proposition) used to form a unity of meaning as an entity (Clark and Clark, 1977; Gaskin, 2009; Ding, 2017). A sentence having two or more propositions unites its meaning by assigning one of the propositions as main proposition while the others as supporting propositions (Clark and Clark, 1977). Identifying number and functions of propositions in a sentence and analyzing how the propositions relate to each other is the target of cognitive process operated to comprehend the meaning of the sentence. Competence to analyze propositions and their relations is labelled by Bogdan (2009) as predication, which is conscious, deliberate, and explicit and language based human thinking. This predicative thought is the motor of higher mental thinking enabling the creation of science and technology. In line with the idea, Kozak (2023) said that thinking is propositional which means that thinking is intended to find and evaluate the truth value of propositions and their relations in logical structure.

Due to the era of 21st Century, critical thinking is taken as the ultimate goal of education including the goal of teaching of English to EFL Learners. To achieve this objective, educators practice two popular approaches, they are problem based learning as explained in Baden (2004) and project based learning as in Kraus (2013). Both of these approaches emphasize the importance of solving the problems and developing projects of real life situation developing critical thinking without specifying its suitability to specific subject or discipline teaching. Baden (2004) acknowledges that problem based learning is not a particular method of teaching; rather it is a way of teaching that should be designed to meet the nature of a discipline.

To support education to develop students' critical thinking, the teaching of English should be directed not only to English proficiency but also to the development of critical thinking. For this purpose, experts on English teaching should make adaptation of the two approaches or search for different effective method. Research based on theories of propositional thinking (Bogdan, 2009) and predicative mind (Kozak, 2023)

lead to better insights of cognitive process underlying language user behavior, including behavior in comprehending the proposition of sentences. Such insights leads to better way of the two approach adaption or to a new method of teaching. Within this background, research problems are formulated as (1) how the students comprehend sentence propositions and (2) why they comprehend them the way they do.

Review of Related Literature

Comprehension of Sentence Proposition

Comprehension of sentence proposition is the ability to identify main proposition a declarative sentence. Such ability is resulted from one's ability to identify number and functions of proposition. Proposition is expressed in one of verbal units of (1) transitive verb + noun, (2) intransitive verb, (3) transitive verb + noun1 + noun 2, (4) be + adjective, and (6) be + preposition, therefore Clark and Clark (1977) define proposition as a unit of meaning expressed in a verbal unit a sentence. These verbal units function as predicates of declarative sentences and they express a unit of meaning of a declarative sentence. The smallest unit of a meaning of a declarative sentence lies in its predicate and therefore Bogdan (2009) claimed that proposition is a unit of meaning resulted from predication.

A simple sentence structured with subject and predicate (S - P), or subject, predicate, and object (S - P - O) has only one unit of meaning or one proposition. One proposition can be used to modify other proposition through the linguistic process of relativization. The proposition modified by the other is called main proposition while the one which function as modifier is called supporting proposition. A proposition can also take the function of a noun either as the subject or the object of a predicate through the process of nominalization. The proposition taking the place of subject or object of predicate is called supporting proposition, while the unit of meaning expressed by the predicate is labelled as main proposition. Two propositions can be combined by using coordination in a declarative sentence and they both function as main propositions. So according to Clark and Clark (1977) a declarative sentence can have only one proposition as expressed in simple sentence, two or more as expressed in compound sentence and one main and supporting propositions as expressed in a complex sentence. Such unity of thought, considered as proposition, and the relationship among the propositions form unity of proposition or unity of thought (Gaskin, 2008). So comprehension of sentence propositions, based on Gaskin's (2008) ideas is the ability to identify the unity of thought in a sentence.

Cognitive Process in Comprehension of Proposition

Cognitive process is a mental process underlying one's verbal behavior while producing and comprehending language (Kamppinen, M.,1993). This process determines language production and comprehension behaviors. In coming message, in written or oral mode, is processed by the mental system thorough cognitive process. In the case of language interpretation by an interpreter, this cognitive process of language comprehension takes place in his mental before coming to the second stage, that is speech planning and production (Patrie, C.J. (2000).

In comprehending the proposition, as the smallest unit of a sentence, some syntactic analysis can be conducted, and one of them is called parsing (Rodríguez, C.G. 2010). Parsing is syntactic analysis to identify meaningful smallest parts of a sentence. Information obtained from each constituent can be used to extract the meaning of the sentence (Rodríguez, C.G. 2010). Based on Clark and Clark (1977) perspective, the ideas provided by Rodríguez, C.G. (2010) is similar to the ideas of supporting and main proposition. Through the information provided by the identified constituent and its smaller parts, meaning of a sentence can be extracted. This similar to the process of identifying propositions and its function enabling the comprehension of sentence meaning, expressed in its main proposition. This indicates that the cognitive process underlying the comprehension sentence propositions is resulted from the application of syntactic analysis, or by applying the syntactic rules of the language.

Cognitive Process and Sentence Processing

Cognitive process taking place in sentence comprehension as described by Rodríguez, C.G. (2010) involved background knowledge of syntactic rules. Van Gompel, R.P.G. (2013) state that sentence is a special unit of language because its meaning is expressed both in semantic and syntactic unit. Based on semantic point of view, a sentence can be defined as the smallest group of words expressing complete thought. Syntactic point of view perceives sentence as the largest independent unit of language structure. However, the meaning of a sentence does not reside in the meaning of the words; it has specific meaning as resulted from

the sentence structure used to organize the words. Sentences using the same words with different structure, known as ambiguous sentence, requires different length of cognitive processing time as found in garden-path theory. Sentence which is not ambiguous, but with complex structure also requires longer cognitive processing time than that with simple structure (Gompel, R.P.G., 2013). On the other hand, a sentence with the same structure but with different words can express the same proposition or meaning. Therefore, in comprehending a sentence, cognitive process is directed to the structure which build the words of the sentence because the meaning of a sentence is not the totality of its words meaning.

Lexical Construction Model

Ibanez (2014) stated that how lexical information is used to proceed sentence meaning is clearly explained in lexical construction model. The model describes lexical meaning construction in three aspects, they are:

1. The first is layers or levels explanation or description.

Explanation or description has four levels, they are: (1) argument structure layer, as level one. In this level, lexical construction is based on even structure that is expressed by a verb and other predicates of the sentence. In level 2, lexical construction is based on situation intended to construct implicated meaning. In level 3, lexical construction is based on illocutionary interpretation and in the last level, lexical construction is based on semantic relations comprising of elaboration, extension, and enhancement relations.

2. Interaction of the layers or levels.

The four levels interact in *amalgamation process* and *subsumption*. In *amalgamation process*, interaction within a level allows a judgement of a speaker to a listener about something, like in the construction of *X should Y* and verb *find*, as in *Mary should find a job*. While in the *subsumption* process, lexical construction may resulted from interaction between two levels, as *what are you doing* and *what do you think of X* can interact and become *what do you think you are doing* and *what do you think you are*. This interaction allows a speaker to implicate that he is bothered by the behavior of the listener.

Cognitive Semantics in Lexical Construction Model

In simple way, according to Ibanez (2014), lexical construction model can be defined as a process of pairing of form and meaning - in which meaning is accessible to form and form is the realization of meaning – established in speakers' mind and shared by speech community. Following this definition, Ibanez (2014) stated that lexical construction is not simply pairing of form and meaning, but a cognitive construct. Such cognitive construct is recognized by all community members and use the construct to comprehend the meaning of a sentence. This construct is also known as cognitive semantics which is different form linguistics semantics. In other words, it is this cognitive semantics which enable the cognition to reconstruct lexical to comprehend the meaning of a sentence. This depicts the contribution of lexical processing to sentence meaning comprehension. This also proves that syntactical processing in collaboration with semantics process that the meaning of a sentence to be comprehended does not reside merely in words forming the sentence but also in the structure used to order the words. Cognitive knowledge of both syntax and lexical is required to comprehend the proposition of a sentence.

Cognitive Process and EFL Learners

Cognitive process is enabled by cognitive construct of lexical and structural construction resulted from the syntactic and semantic knowledge of a language. Lack of knowledge of linguistics, such as knowledge of sentence structure and meaning (semantics), affect the cognitive constructs of the aspects of language, which in turns hinders mental process to comprehend the meaning of a sentence.

Currently, it has been noticed that there is significant advance in the population of researches on sentence processing. Recently, various population, such as children, older people, bilinguals, aphasic patients, healthy, adult, and monolinguals have involved in research on sentence comprehension. Their involvement in the researches aims at finding the difference between cognitive proses (mental) underlying sentence comprehension by the population (Van Gompel, 2013). This suggests that age, health, and number of languages used affect cognitive process in comprehending sentences.

English of EFL learners is known as interlanguage that is at its developing stage of which systems are acquired, through the process of transfer or interference. This means that the English acquired is still not perfect and insufficient acquiring of linguistic aspects that hinder them to use English communicatively. Researches on interlanguage still agree with such nterlanguage concept. Husseinali (2016), for example,

studied English interlanguage among Arabic speakers from the aspects syntactic sequences, agreement, and variation. Within this level of acquisition, the subjects of the study may have lack of cognitive syntactic and semantic constructs which hinder them to operate cognitive process to comprehend the proposition of a sentence. This study may uncover cognitive efforts of the subjects to comprehend the meaning of the sentences.

RESEARCH METHOD

This study was conducted to 70 students of the sixth semester of English education study program. To collect data of sentence meaning comprehension, the students were assigned to comprehend the main propositions of three sentences, as follows:

- A. In terms of leadership practices, the research primarily proposes administrative tactics to manipulate and cognitive principles to interpret an otherwise daunting system of shared authority (Morris, R.L. 2010).
- B. Her suggestion that it had characteristics that did not conform to established criteria and that a third file or group should be considered indicated some creative originality (Gregor, DM. 2007)
- C. This shared teacher disposition is conceptualized as the level of confidence a group of teachers feel about their ability to organize and implement whatever educational initiatives are required for students to reach high standards of achievement (Day, C., 2011).

To collect data of the cognitive process operated to comprehend the sentence meaning, *concurrent retrospective introspection* was administered to the students. With this technique, the students were assigned to write down what was going on in their mind soon after they had finished finding the main propositions of the sentences. The data were analyzed by using data analysis model by Miles, Huberman, and Saladana (2014).

Data Analysis and Research Findings

The data analysis shows that the students comprehension of the proposition of the sentence is based on the cognitive process in three ways, they are: (1) semantic or lexical construction (65.24%), (2) discourse analysis (25.24%), and (3) constituent analysis (9.52%), as in table 1.

Table 1. Cognitive Process Operated to Comprehend Sentence Main Proposition

No.	Tasks	Key Main Proposition	Cognitive Process		
			Sem.	Disc.	CA
A.	In terms of leadership practices, the research primarily proposes administrative tactics to manipulate and cognitive principles to interpret an otherwise daunting system of shared authority (Morris, R.L. 2010).	<i>The research proposes tactics and principles</i>	70	0	0
B.	Her suggestion that it had characteristics that did not conform to established criteria and that a third file or group should be considered indicated some creative originality (Gregor, DM. 2007)	<i>Her suggestions indicated originality</i>	35	21	14
C.	This shared teacher disposition is conceptualized as the level of confidence a group of teachers feel about their ability to organize and implement whatever educational initiatives are required for students to reach high standards of achievement (Day, C., 2011).	<i>Disposition is conceptualized as confidence</i>	32	32	6
Total			137	53	20
%			65.24	25.24	9.52

Note: sem: semantic, Disc.: Discourse, CA: Constituent analysis

Each of the ways of cognitive process operated to comprehend sentence proposition is described as follows:

1. Semantic Analysis (Lexical Construction)

Cognitive process operated with semantics or lexical construction is the students' cognitive effort to comprehend the main proposition of task A is shown in table 2. In table 2, the subject comprehended that the main proposition of task A is *leadership proposes administrative tactics* and based on the retrospective data, it is found that the main proposition of this sentence just by constructing the meaning of *leadership* and its relation to administrative tactics, as one of a leader's job. This means that, once the subject identify that the key word is *leadership*, this concept then activated all prior knowledge related to the word *leadership*.

Table 2. Cognitive Process Operated with Semantic or Lexical Construction

No	Comprehension Eliciting Task		
	In terms of leadership practices, the research primarily proposes administrative tactics to manipulate and cognitive principles to interpret an otherwise daunting system of shared authority (Morris, R.L. 2010).		
A	Key: Main Proposition		
	<i>The research proposes tactics and principles</i>		
No	Students' Comprehension	Cognitive Process	Interpretation
30.	Leadership proposes administrative tactics	The terms of leadership = the sentence is talking about leadership	Semantics: leadership (purpose)

2. Discourse Analysis

The second way of processing the main proposition of the sentence is by operating his cognitive construct of discourse analysis, as seen in table 3. In table 3, the subject found that the main proposition of task B is *Her suggestions indicated originality* which is the same as the key main proposition analyzed with syntactical construction. The subject can comprehend the main proposition correctly by identifying the topic of the sentence, that is *suggestion* and found related words to the topic, they are *discussion* and *originality*.

Table 3. Cognitive Process Operated with Discourse Analysis

B.	Her suggestion that it had characteristics that did not conform to established criteria and that a third file or group should be considered indicated some creative originality (Gregor, DM. 2007)		
	Key: Main Proposition		
	<i>Her suggestions indicated originality</i>		
No	Students' Comprehension	Cognitive Process	Interpretation
22.	Her suggestion indicated originality.	The subject of the sentences is only about her suggestion. It is the main discussion, then it explains that it indicated originality.	Discourse: topic: suggestion; discussion, originality. → lexical construction

3. Constituent Analysis

The third way of processing the main proposition is by operating cognitive construct of constituent analysis, that is by analyzing the smallest structural unit (constituent) as shown in table 4.

Tabel 4. Cognitive Process Operated with Constituent Analysis

C.	This shared teacher disposition is conceptualized as the level of confidence a group of teachers feel about their ability to organize and implement whatever educational initiatives are required for students to reach high standards of achievement (Day, C., 2011).		
Key: Main Proposition			
<i>Disposition is conceptualized as confidence</i>			
No	Students' Comprehension	Cognitive Process	Interpretation
13.	Shared teacher disposition is conceptualized the level of confidence teachers felt about ability	Because I think <i>the shared teacher disposition</i> is noun phrase <i>conceptualized</i> as verb and in this sentence I got the main word is shared teacher disposition	Constituent analysis : noun phrase and verb: predicates

In table 4, the subject identify the smallest structural unit (constituent), namely by identifying that *the shared teacher disposition* is **noun phrase**, and *conceptualized* is verb. By processing the sentence with such structural cognitive analysis, the subject can find the main proposition of the sentence.

CONCLUSION AND SUGGESTIONS

Cognitive process operated to comprehend sentence main proposition consists of three ways: namely by operating cognitive construct of semantic or lexical construction, discourse construction and structural construction. The students tend to operate their semantic or lexical construction (65.24%), the second is discourse (25.24%) and structural construction or constituent analysis, (9.52%). Semantic and discourse construction can be categorized as lexical construction of, therefore lexical construction can be totaled to $55.24\% + 25.24\% = 80.48\%$. It can be concluded that most of the subjects (80.48%) operate lexical construction to comprehend the main proposition of sentences; only 9.52% operate with structural construction. Theoretically, the main propositions of sentences are expressed both in the lexical meanings of words that form the sentences and in the sentence structure that order the words into sentences. The subjects should develop their cognitive constructs of both lexical and structural construction and trained to be skillful in operating these constructs to comprehend sentences, especially complex sentences.

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