



MODELING OF PROPOSITIVE STRUCTURE AND SEMANTIC-SYNTACTIC ASYMMETRY

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ABSTRACT

This article analyzes the propositional structure of a sentence and the issue of semantic-syntactic asymmetry between syntactic form and content. The role of the proposition in forming the content of a sentence, the inconsistency between syntactic units and propositions, and its expression through models such as 1:1, 1:2, 2:3, 2:4, 2:5 are highlighted. Also, the role of Union fragments, adjectival and intelligible scrolls in expanding the propositional structure of the joint sentence is analyzed. The result is based on the theoretical significance of modeling semantic-syntactic asymmetry.

The relationship between the form and content of language units is one of the important theoretical issues of linguistics, and the inconsistency between them is explained by the phenomenon of asymmetry [1]. Semantic-syntactic asymmetry, especially manifested at the sentence level, reflects the differences between grammatical form and content structure, since lexical and grammatical units in a sentence can represent multiple substantive units as a result of entering into a syntactic relationship between them. Therefore, when determining the semantic structure of a sentence, it is necessary to take into account not only its grammatical components, but also the semantic relationships between them.



One of the important categories that make up the content of a sentence is the proposition. A proposition is a meaningful model of a specific situation, event, or state of affairs in objective reality, expressed through a sentence. Although the predicative relation in a sentence is one of the main structural features of a proposition, propositional content can be expressed not only through grammatically independent sentences, but also through sentence fragments and secondary predicative devices. In this regard, determining the relationship between the propositional structure and the syntactic structure is an important condition for studying semantic-syntactic asymmetry.

First, let's provide some information about modeling and its types: modeling is the process of creating a model of a real-life object, phenomenon, or process and studying it through that model in order to study its important characteristics. Simply put, modeling is creating a simplified representation of something to understand, analyze, or determine how it works.

Let us give simple examples of modeling in the cross section of Sciences:

In physics: creating a scaled-down mock-up of the globe.

In mathematics: expressing a problem using a formula or equation.

In linguistics: to indicate the composition of a word or the structure of a sentence through a scheme.

In Informatics: mimicking the operation of a process using a computer program.

A proposition is a substantive model of a particular event-event, state, or situation expressed through a sentence. It is usually formed on the basis of the predicate and its semantic arguments. However, propositional content is not always expressed through a separate grammatical sentence, but can also be expressed in the structure of adjectives, adverbs, and other secondary predicative devices. Therefore, determining the relationship between the propositional structure and the syntactic structure is important in revealing the nature of semantic-syntactic asymmetry.

The theoretical foundations of linguistic modeling are closely related to structural and formal linguistics, mathematical linguistics, and computational linguistics. While Ferdinand de Saussure interpreted language as a system composed of units in interaction [8], Noam Chomsky made a significant contribution to the description of the grammatical structure of language using formal rules [9]. In modern computational linguistics, mathematical and statistical models are used to analyze language data using computers [10]. On this basis, linguistic modeling includes structural, grammatical, semantic, statistical, cognitive, and computer models.

The essence of linguistic modeling can also be seen on the example of the Uzbek language. For example, the word from our books is analyzed in the form of book + -s + -imiz + -dan. In this case, the stem, plural, possessive, and case markers are separated, and the morphological structure of the word is modeled. In syntactic modeling, the components of a sentence, such as the subject, object, and predicate, and the grammatical relationships between them are determined. Such models allow us to interpret the structure of language units, study grammatical



patterns, and compare various linguistic phenomena. The scientific value of the model is determined by its verification based on various examples and reliable language materials.

Hence, linguistic modeling is one of the important methods of theoretical linguistics and Applied Language Research. It serves to systematically study the phonetic, morphological, syntactic, and semantic features of a language, test scientific hypotheses, and perform tasks such as automatic translation, speech recognition, and computer-assisted text analysis.

Now let's analyze the issue of modeling propositional structure and semantic-syntactic asymmetry in Uzbek. Proposition is understood as a unit that represents a meaningful model of a particular event or situation. It usually contains a predicative center and arguments that enter into a semantic relationship with this predicate [2]. For example, in the sentence The student read a book, the predicate read is the main predicative center, and the student and the book appear as its arguments. This sentence expresses a single situation – the situation of the student reading a book.

In this case, there is a relative correspondence between the syntactic unit and the proposition, which can be expressed through the 1:1 model. However, as the syntactic structure of the sentence becomes more complex, the ratio between syntactic units and propositions also changes. For example, if a syntactic device contains an adjective or adverbial form, they can add situational content to the main predicate. Although the sentence "The student read a book and wrote in his notebook" has one grammatical component in formal terms, semantically two situations can be distinguished: The student read a book. The student wrote in his notebook. This situation can be conditionally expressed through the 1:2 model. Thus, the propositional structure does not always correspond quantitatively to the grammatical-syntactic structure.

In the study of semantic-syntactic asymmetry, modeling the ratio between syntactic components and propositions is of significant methodological importance. In this case, the first number indicates the number of syntactic or grammatical components, and the second number indicates the number of semantically distinguishable propositions. These ratios can be summarized as follows:

- 1:1 – one syntactic unit, one proposition;
- 1:2 – one syntactic unit, two propositions;
- 1:3 – one syntactic unit, three propositions;
- 2:3 – two syntactic components, three propositions;
- 2:4 – two syntactic components, four propositions;
- 2:5 – two syntactic components, five propositions.

If the number of syntactic units and the number of propositions are equal, the relationship between form and content is relatively symmetrical. If the number of propositions exceeds the number of syntactic units, semantic-syntactic asymmetry occurs [3, 4]. However, these ratios should not be considered an absolute grammatical formula, but a conditional analytical model that visibly expresses the relationship between syntactic form and semantic content, since the



definition of propositions depends not only on the grammatical form, but also on predicativity, semantic relationship and context.

Semantic-syntactic asymmetry tends to have a more complex blind spot in compound sentences, since in addition to each predicative component of a compound sentence representing a separate proposition, the Union fragments, adjectival and eloquent Scrolls contained in it can also produce additional propositional content. For example: This young man showed Siddiqion a letter from his wife on the road, a photo of his wife and child, and he was sad. The sentence formally consists of two predicative components. However, in its content structure, the following propositions can be distinguished: This young man showed the letter. This young man showed the picture. This young man showed the letter. So, two syntactic components express three propositions. This case corresponds to the 2:3 model.

In this example, the letter and its image are organized fillers, taking a formally unified syntactic position. However, each of them enters into a separate semantic relationship with the predicate it indicates. As a result, two propositional contents are formed within one grammatical position [1].

Univariate determinants also play an important role in the expansion of the propositional structure. For example: a tall and beautiful White Castle buried in trees in a cool, peaceful park. In this sentence, the cool, quiet, and loud, beautiful, white units are the defining units. Formally, they are the attributive components of the sentence. Semantically, the following meanings can be distinguished: the park is cool; the park is quiet; the building is tall; the building is beautiful; the building is white; the building is buried in trees.

Thus, although the determiner is not formally the center of predication, it contains a predicative relation in its content. This phenomenon can be evaluated as implicit or secondary predication. On this basis, two different levels of propositional structure can be distinguished: the first is the main predication, which is grammatically explicitly expressed; the second is the secondary predication, which is hidden within the sentence [1].

Secondary predication is one of the important factors in the occurrence of semantic-syntactic asymmetry, since in such constructions the predicative content is expressed not in the form of a grammatically independent sentence, but as part of another syntactic unit. For example, adjective phrases: the horse is dead, the jug is broken, the food is finished, can formally come in the same complement function. However, in content, they express three propositions: the horse is dead; the jar is broken; the food is gone.

If such a device occurs in a compound sentence consisting of two more main predicative components, the number of propositions increases even more. Thus, the polypredicativity of a compound sentence is determined not only by its grammatical components, but also by its secondary predicative centers. Therefore, it is advisable to distinguish between primary predication and secondary predication when analyzing a propositional structure.

When modeling a propositional structure, it can be conditionally divided into three layers:



1. The main propositive layer. Situations expressed directly through the grammatical predicative centers of the sentence.

2. Secondary propositive layer. Additional situations expressed through adjectives, adverbs, attributives, and other devices.

3. Contextual-pragmatic layer. In addition to the direct grammatical form of a sentence, the content understood based on context and communicative situation [6].

Thus, the total semantic volume of a sentence can be expressed by the following conditional formula: $P_u = P_a + P_i + P_k$. Here: P_u – general propositional structure; P_a – basic propositions; P_i – secondary propositions; P_k – propositional content restored on the basis of contextual-pragmatic grounds.

This formula does not claim mathematical rigor; it is a conditional scheme proposed for theoretical modeling of the layered structure of the content of a statement.

The relationship between syntactic and propositional structures can be generally expressed using the following formula: $A = P / S$. Here: A is the semantic-syntactic inconsistency index, P is the number of propositions, S is the number of syntactic components. If $P = S$, then $A = 1$ and there is a relative correspondence between form and content. If $P > S$, then $A > 1$ and there is an expansion of semantic content relative to syntactic form. For example:

✓ $2:3 \rightarrow A = 3/2 = 1,5$.

✓ $2:4 \rightarrow A = 4/2 = 2$.

✓ $2:5 \rightarrow A = 5/2 = 2,5$.

Conditionally, the increase in this indicator indicates an expansion of semantic content against the background of syntactic conciseness. For example, in the 2:3 model, two grammatical components represent three propositions, and in the 2:5 model, two grammatical components represent five propositions. However, it is advisable to use this indicator not as an independent statistical criterion, but as a theoretical-analytical index that helps to characterize semantic-syntactic relations.

When determining the number of propositions, a number of criteria must be relied upon. First, the presence of a predicative relationship is determined. Second, it is checked whether this relationship expresses a particular situation. Third, attention is paid to the semantic relationship between the predicate and its arguments. Fourth, context helps determine whether a given content is an independent or component of a general situation.

Therefore, it is not methodologically correct to automatically consider each of the coordinated parts as a separate proposition. For example, in some cases, two adjectives may be an intensified expression of a single common sign. In other cases, each quality represents a separate predicative content. Therefore, determining the number of propositions should be based on semantic-predicative analysis, not formal counting.

In conclusion, modeling the propositional structure and semantic-syntactic asymmetry in Uzbek allows for a deeper understanding of the relationship between the grammatical form and



the semantic structure of a sentence. A proposition represents a semantic model of a particular event or situation and is formed on the basis of a predicate and its semantic arguments. However, the number of propositions is not always equal to the number of grammatical components of a sentence. In particular, subordinate clauses, adjectival and adverbial phrases, and secondary predicative devices can cause multiple propositions to be expressed within a single syntactic unit. In this regard, distinguishing between primary and secondary predications, as well as taking into account contextual-pragmatic factors, is important for a more complete description of the semantic structure of a sentence.

Propositional models with ratios such as 1:1, 1:2, 2:3, 2:4, and 2:5 serve to visually express the relationship between syntactic components and propositions. The formula $A=P/SA=P/S$ also allows us to describe this relationship through a conditional analytical indicator. However, when using these models, the criteria for identifying syntactic components and propositions must be consistently defined, and each content unit must be verified based on a semantic-predicative analysis. Hence, the modeling of semantic-syntactic asymmetry is an important scientific-analytical approach that reveals the multi-layered content structure of a sentence, hidden predicative relationships, as well as the semantic capabilities of language units, not limited to the knowledge of determining the discrepancy between form and content.

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