

## Applying Nanosyntax theory to isolate Vietnamese fragments

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**Abstract:** Nanosyntax is a syntax theory research direction that has received the attention of many modern grammarians. According to this theory, one of the critical points is that the decomposable syntactic units are much smaller than in the traditional view of syntax, and the linear relationships in syntactic order are much more precise than in previous research. A fragment is a sentence with a syntactic structure that does not follow the usual universal characteristics like other sentence types. Therefore, although it is of research interest and mentioned in many different works, this fragment syntax model and how to analyze this structure have not been fully understood yet. This article introduces some theoretical issues of nanosyntax from which to apply nanosyntax to isolate fragments initially. The author has observed (the corpus is collected from many texts) and statistically analyzed the microstructure to identify the nucleus, operator and related positions, thereby modeling fragment structures.

**Keywords:** nanosyntax; linear relationships; syntactic; fragment; the nucleus; operator

### I. INTRODUCTION

Nanosyntax (Caha: 2009; Starke: 2009, 2011a, 2011b) is a generative approach to studying language built in the spirit of Chomsky's Universal Grammar (1981, 1986). Besides, the nano-syntactic process is considered a direct descendant of cartography because of assumptions about the functional position diagram of components in sentences. This type of research, which takes advantage of the fundamental simplicity of its syntactic structure, holds great promise as a method for conducting detailed empirical research. At the same time, this theory is expected to be a creative syntactic theory capable of overcoming the limitations of grammatical semantics in the architecture of previously laid foundations.

A fragment is a sentence with a syntactic structure that does not follow the usual universal characteristics like other sentence types. Therefore, although it is of research interest and mentioned in many different works, it has not yet been fully explained. In particular, the fragment syntax model and the way to analyze this sentence structure are problems that still need to be solved.

This article introduces some theoretical issues of nanosyntax from which to initially apply nanosyntax to isolate fragment structures.

### II. THEORETICAL BASIS AND RESEARCH METHODS

#### 2.1. Nanosyntax theory and sentence structure isolation

Nanosyntax is a mapping approach to linguistic structure and the internal structure of morphemes. Like other mapping methods, nano-syntax concerns syntactic-semantic mapping based on the simplicity of syntactic projection.

Nanosyntax allows phrase-based analysis, focusing on observing the internal structure of morphemes, regulating the functions of morphemes, and thus providing accurate and complete lexical meanings of elements.

This theory's primary concern is determining precisely how syntactic structures are lexicalized by matching designs in the lexicon. More broadly, nano-syntax views syntax, morphology, and formal semantics unified in a single module, the SMS computing system. The SMS module merges the atomic features as the main body in the order imposed by fseq. This fseq is considered universal, belonging to the Language Principle, while this language-specific fseq is divided into lexical items across languages that form the Parameters of language variation. Starke calls this "the nano-syntactic view of the Principles and Parameters framework" (Starke: 2011a). In this way, nano-syntax contributes to the continuing search for what is universal and particular in language and how both properties interact.

The syntax is made up of a set of elements (localized) organized into a single, universal sequence (fseq). Regarding empirical research, researchers within this framework adopt a comparative approach, aiming to map out fseq universal and characterize cross-linguistic variation carefully and in detail.

The goal of nano-syntactic modeling of grammar (Caha: 2009, 52; Starke: 2011) is stated by Rizzi as drawing "as accurate and complete a map as possible of the syntactic configuration" (Rizzi: 2013, first). Therefore, according to this theory, one of the critical points is that the decomposable syntactic units are much smaller than in the

traditional view of syntax, and the linear relationships in the syntactic order are much more precise than with previous thoughts. This general concept is proven through element decomposition as a method (empirical and theoretical) in outlining universal grammar (UG), which is also a prominent feature of the nanosyntax method.

Closely related to this goal of outlining universal grammar is the tendency to “syntacticize” grammatical fields. In the generative framework, it is assumed that certain aspects of meaning, often called grammatical semantics, belong to proper grammar (i.e., syntax). In contrast, other meaning parts are called extra-linguistic or conceptual semantics, which lie outside of grammar. Typical examples of the first type are number encoding characteristics, spelling, and tenses.... On the other hand, aspects of meaning are seen as arising from social, cultural, or historical context.... Drawing the line between the two is an empirical question in that only concepts observed to have morphological encoding in languages can be considered grammatical (Cinque: 2010 ). The main goal of nanosyntax is to determine which parts of meaning are grammatical and need to be syntacticized. The level of syntacticized semantics in cartography can be described as a strict mapping between syntax and semantics. This means that syntax is seen as a means of expressing grammatical semantics, and it does so by way of abstract syntactic-semantic features arranged syntactically into a hierarchy.

The nano syntax is characterized by its “strictly modular” architecture, a rigorous way of establishing an order that highlights the direct and transparent (in fact, one-to-one) correspondence between the syntax (fseq) and morphology. Morphology is like syntax; it is constructed by merging abstract features as headers in fseq. Therefore, it is not that the morphemes are built first and incorporated into the syntax as its primitive building blocks but the opposite: Morphemes are built upon the syntax, and basic syntactic blocks (from the perspective of map and OFOH) are features.

A consequence of this idea of morphology as syntax is that there is no pre-syntactic vocabulary of pre-existing feature bundles because features cannot be combined before the syntax but only within the syntax.

Nanosyntax is a syntax research direction that has received the attention of many modern

grammarians. Among them are the works of Halle and Marantz: 1993; Marantz: 1997; Bobaljik: 2007, 2012, 2015; Embick and Noyer: 2007; Harley: 2014; Embick: 2015, which played an essential and influential role in developing nanosyntax. In particular, the efforts to establish syntactic semantics by Rizzi: 1997 ; Aboh: 2004a ; Belletti: 2004 ; Haegeman: 2006a , 2012; research on constructing precise structural positions for adverbs (Laenzlinger: 1998; Cinque: 1999), adjectives (Cinque: 2010), subjects (Cardinaletti: 1997, 2004), negations (Haegeman and Zanuttini: 1991; Zanuttini: 1991; Haegeman: 1995), quantifiers (Beghelli and Stowell: 1997 ; Szabolcsi: 1997 ; Puskás: 2000), tense/aspect/mood/state (Cinque: 1999), inflections (Pollock: 1989 ; Belletti: 1990 ), nominal domain ( Abney: 1987 ; Giusti: 1997), and detailed functional structures: Rizzi: 1997, 2001 , 2004a ; Aboh: 2004a), Cinque: 1999, 2006), (Larson: 1988 ; Hale and Keyser: 1993; Ramchand: 2008), (Szabolcsi: 1981,1984, 1987, 1994 ; Abney: 1987 ; Ritter 1991 ; Giusti 1997 ; Alexiadou, Haegeman and Stavrou 2004 7 ); studies aimed at improving the structure within tqd clusters ( Koopman 2000 ; den Dikken 2010 ; Noonan 2010 ) and AP ( Scott 2002 ; Laenzlinger 2005 ; Svenonius 2008 ; Leu 2015 ).... (adapted from Baunaz, Lena, and Eric Lander 2018).

There is a very satisfactory statement that: “Nanosyntax is not a revival of Generative Semantics, as is sometimes claimed, because syntax, morphology, and semantics are all the same module, while in Generative semantics (Lakoff, 1971) has a clear priority of semantics over syntax. As Cinque and Rizzi (2008, 53) put it: “There is a fairly limited set of universal properties that can be expressed by functional elements that go into different hierarchies related to the topics and phrases.” This limitation on what part of meaning is “grammaticalized” or “syntacticized” means that the universal hierarchy of syntax should not be reduced to semantics. Rather, the syntax prescribes “the patterns and seams that delimit meaning and use” (Shlonsky 2010, 14).

Nanosyntax is gradually shaping a new method of analyzing grammatical and lexical semantics. Although many functional properties are not mentioned, the assertion of the semantic value of even the most minor syntactic units is revealed in the position established on the developed mapped structural framework as a powerful language for the functional perspective in language communication.

## 2.2. Concepts and morphological characteristics of fragment

Fragments are grammatical objects mentioned by Vietnamese linguists in many early research works with different names, such as: "simple sentences" made up of one word or one primary-secondary phrase (Le: 1948), "sentence without a subject" (Emeneau: 1951), "single sentence" (Hoang, Le, Cu), "special simple sentence" due to a phrase, a group of words, made up of a word (Nguyen: 1964), "dependent sentence" created from a clause (Thompson: 1965), "partial sentence has only the rheme part (equivalent to the predicate), absent the theme part (equivalent to subject)" (Cao: 1991)... and many other works.

Overall, there are some main arguments about this type of sentence as follows:

- (1) A fragment is a type of independent, complete sentence;
- (2) Fragments satisfy its function;
- (3) The structural elements of a fragment include forms made from a word, phrase (including or not the subject phrase), sentence elements (according to the subject-predicate or topic - rheme), the result of the phenomenon of evasion, hiding information...

The above three arguments drawn from previous works have affirmed the separate existence of fragments in the list of Vietnamese sentence types and, at the same time, confirmed the structural completeness of fragments, or in other words, a fragment that satisfies the structural criteria of a sentence. A fragment in speech or text results from synthesizing connections and formations to convey the message of the communicating subject in a particular context. Therefore, a fragment structure is a complete and closed product and does not need and cannot add additional grammatical components to become a more comprehensive structure.

The form of expression in discourse is also the only form; there is no antecedent form or any action (such as elliptical and restoring, separating sentence parts, and putting them back together) to change that form. A fragment cannot be a grammatical element for any larger unit. In the overall text in which it participates, a fragment ensures cohesion and partial value, like any sentence in any structural form.

According to systemic functional grammar, language is a network of choices, either one option or another. Therefore, a fragment structure in the

form of a word or phrase is appropriate for the character communicating in a specific situation.

## 2.3. Research method

### 2.3.1. Methods of analysis and synthesis

This method provides results that reflect different aspects as a basis for discovering general trends or characteristics of the research object, thereby forming the foundation of the research problem.

### 2.3.2. Modeling method

This is a research method by building models of objects. The properties of the data are expressed through aggregates on the model. The interconnected visual blocks provide interaction between data sources in a reflection of the object of analysis. And the characteristics and nature of the problem are expressed more scientifically and observably.

In addition, deductive, inductive, and distributed methods and syntactic analysis operations are thoroughly used in the research process.

## III. RESULTS OF ISOLATING FRAGMENT SYNTAX STRUCTURES AND HIERARCHICAL ORGANIZATION OF OPERATORS

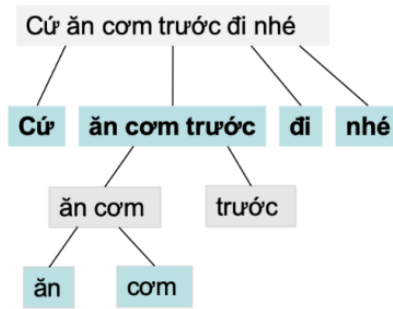
### 3.1. Results of decomposing fragment morphology

According to Nguyen Van Hiep: "A fragment is a type of sentence that cannot be analyzed according to the basic syntactic structure like other normal sentences. Consequently, it is impossible to say whether a particular sentence has only a subject or only a predicate, etc. Because fragments cannot be analyzed according to subject, predicate or any other component." (Nguyen:2009:270). Therefore, to decompose the structural morphology of fragments in Vietnamese, we are interested in the structural elements and the hierarchical separation of classes of structural aspects of fragments by establishing two hierarchical groups. It is necessary to distinguish between the nucleus and operator.

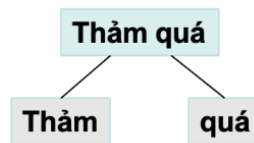
The nucleus, or maybe the core of the situation in a way that expresses the topic's meaning, is the fragment's center. This central core can be created from a word, or a phrase formed according to main-subordinate or isotopic grammatical relationships. This means that the nucleus of the fragment analyzed here is not the smallest element in its structure but the central core of the expressive meaning of this type of sentence.

Here are some examples referencing some fragment structure diagrams as follows:

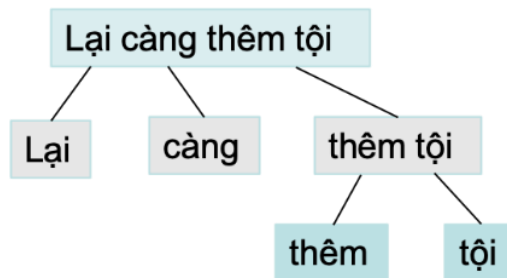
(1) *Cứ ăn cơm trước đi nhé.*<sup>1</sup> (*Go ahead and eat.*) (Nguyen Huy Thiep, The Ripper : 310)



(2) *Thảm quá!* (*How terrible!*) (Nguyen Cong Hoan, Thief: 63)



(3) *Lại càng thêm tội.* (*Even more guilty.*) (Nam Cao, Chí Phèo : 213)



<sup>1</sup> When translating Fragment into English, because of differences in language types and word order principles, many sentences cannot be conveyed completely or even approximately. Therefore, we will have to analyze the structure in Vietnamese and roughly translate it into English.

Considering the fragment aspect, the structure can be decomposed into two parts: the nucleus s, accordingly, the the nucleus are “ăn cơm trước” (eat first) (example 1), “thảm” (terrible) (example 2) and “thêm tội” (more guilty) (example 3). After isolating the nucleus s, the surrounding elements are in the front and back positions such as "cứ", "đi" “nhé” (example 1), "quá" (example 2), "lại", "càng" (example 3) is assigned the operator value.

From the two main concepts mentioned above, our segmentation diagram and structural model are limited to 2 levels: the nucleus (3.1.1) and operators (3.1.2).

3.1.1. The nucleus – the central of fragments

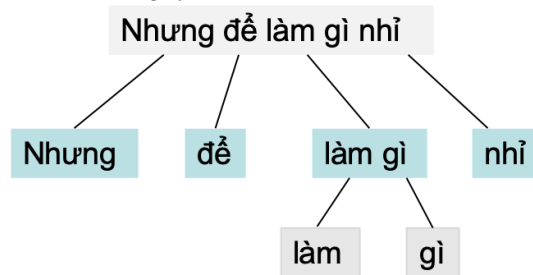
The operation of determining the the nucleus in a fragment is inspired by the arguments of the valence theory built in the 50s of the twentieth century under the name of Tesnière. According to valence theory, the organization of a sentence includes the central predicate and arguments. The arguments are further divided into two groups: mandatory statement and optional argument (following Nguyen:2009:47). This view was later further developed by Nguyen Van Hiep, the concept of predicate with the understanding that "predicate is the remaining element in the sentence after removing referential expressions" (Nguyen:2008:330). Thus, main predicate (main verb) is understood in the spirit of modern

semantics; it can be a noun, a predicate, a number word, an exclamation... Mandatory statement continue to be the components surrounding the predicate element, which help supplement and depict the content of the situation of the part in the syntactic expression of the sentence.

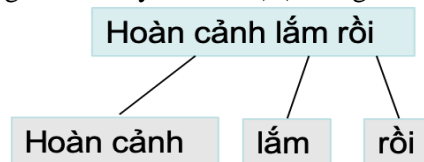
In the minimalist structure of a fragment, what appears on the surface of the sentence is a mandatory and valuable element that describes the situation, or in other words, the core of the problem is the central part that carries the information focus of the sentence type. Therefore, when applying Nanosyntax to study the structure of a fragment, you must pay attention to the order of the decomposition process to ensure the structural characteristics of this type of sentence and avoid breaking the standard's message connection of information point.

The decomposition should be divided into two stages. Stage 1 is to determine the semantic and grammatical values of the nucleus s and the operators. Stage 2 is determining the meaning of the sentence's topic by decomposing the central structure to the minor level of words or morphemes, which means the group cannot continue to deteriorate the meaning of the linguistic unit. Illustrated in the following example:

(4) Nhưng để làm gì nhỉ? (But what for?) (Nguyen Minh Chau, Reed :253)



(5) Hoàn cảnh lắm rồi. (Things have gotten really difficult.) (Hoang Lam, At Night: 143)



In example (4) the core "what for", expressing an action with unknown purpose or without any specific purpose. In example (5), the core "things" represents the speaker's assessment of the mentioned situation. This semantic value is determined based on the grammatical element that is the nucleus s.

3.1.2. Operator

Dik's discourse functional grammar theory suggests the concept of the operator in our research concerning the characteristics of Vietnamese. After establishing the nucleus s according to the semantic value that this grammatical element contributes to fragments, we



isolate the indicator element cells surrounding the position of the nucleus *s* in the sentence structure. Positional order is established on general linguistic linearity and segmental order in the word order grammatical method. The number of operators is counted from the center of the situation, moving toward left and right. Accordingly, the principle of typicality and grammatical function are the determining factors of semantic value. Operator's positions can be distributed sequentially according to the functional position isolation diagram in 3.2.

Notably, the decomposition shows that operators are optional elements, meaning the operator's positions can be completely missing. For example:

- (6) Đi. (Go.) (Kieu Bich Hau. Stranger: 128)
- (7) Tình yêu và cuộc sống. (Love and life.) (Duong Giao Linh. The song of the blue bird: 218)
- (8) Vụn vỡ. (Broken.) (Nguyen Van Hoc. Short flower: 255)

In fragments with operators, the number of operators' positions does not comply with structural rules but ultimately depends on the communication function in specific situations. The following examples illustrate the difference in the number of operators:

- (9) Vợ cũ kia. (Ex-wife.) (Tong Ngoc Han. Mountain flower season: 17)
- (10) Không được rồi. (No way.) (Nguyen Phu. Tuyet Dao: 126)

- (11) Chẳng phải tu tập gì đâu. (It's not any practice.) (Vo Thi Huyen Trang. One hundred years of appointment: 286)
- (12) Cũng không chữa được đâu. (It cannot be cured.) (Kieu Duy Khanh. Soul pieu: 278) 4

Examples 6-7-8 illustrate a special type of sentence with only the nucleus *s*, without an operator. In examples (9), (10), (11), (12), the given sentences contain 1-2-3-4 operators surrounding the core, respectively.

Each operator represents the position of a grammatical element, so the number of operators is flexible depending on the communication function in each situation.

**3.2. Diagram of functional location isolation**

*3.2.1. Operator location frame*

From the survey and statistics of fragments in the text, the structure is decomposed into two levels of grammatical elements: the nucleus and operator. We have established fragments with a maximum of 6 operator positions. The positions are set according to magnetic order, taking the core as the center, -3 is the position farthest to the left from the core, appears first according to linearity, and the furthest to the right is position +3. The operator position frame and order of appearance can be visualized as follows:

**Table 1:** Describe the position of operator

No.	Operator 1	Operator 2	Operator 3	Central core	Operator 4	Operator 5	Operator 6
Position	-3	-2	-1	L	+1	+2	+3

This model is built from the actual survey data. Based on the ability of operators to appear in conventional cell positions, we can classify the structural forms of fragments used. The operation is to locate the center, separate from the center to the left and right sides, to determine the location cells where operators appear to mark the model.

To verify this, we surveyed fragments to collect sentence samples for structural decomposition operations. The corpus is collected from many

texts (cited in the corpus section). The author has observed and statistically analyzed the microstructure to identify the nucleus and related positions, thereby modeling fragment structures.

*3.2.2. Diagram of fragment structure types distributed by position*

From the above convention of operator position, the translation of the operator position from the center to both sides creates fragment structures that can appear as follows:

**Table 2:** Location diagram and fragment structure types

Position No.	Operator 1 -3	Operator 2 -2	Operator 3 -1	Core L	Operator 4 +1	Operator 5 +2	Operator 6 +3	Sentence notation:
1.	-	-	-	+	-	-	-	L
2.	-	-	+	+	-	-	-	-1L
3.	-	+	+	+	-	-	-	-2L
4.	+	+	+	+	-	-	-	-3L
5.	-	-	-	+	+	-	-	L+1
6.	-	-	-	+	+	+	-	L+2
7.	-	-	-	+	+	+	+	L+3
8.	-	-	+	+	+	-	-	-1L+1
9.	-	+	+	+	+	-	-	-2L+1
10.	+	+	+	+	+	-	-	-3L+1
11.	-	-	+	+	+	+	-	-1L+2
12.	-	+	+	+	+	+	-	-2L+2
13.	+	+	+	+	+	+	-	-3L+2
14.	-	-	+	+	+	+	+	-1L+3
15.	-	+	+	+	+	+	+	-2L+3
16.	+	+	+	+	+	+	+	-3L+3

Based on the operator's position, there are 16 types of fragment patterns distributed according to the ability to appear and alternate combinations of operators, with (+) representing the position of appearance and (-) being the opposite. The location of the operator's presence is equivalent to marking that element in a fragment structure.

3.2.3. Types of fragments

Position diagram and fragment structure types with 16 forms in Table 6 are the maximum combinations according to position. We conducted a corpus survey to illustrate the types of sentence patterns established, and below are examples illustrating each type of structure:

- (13) Tiếc nuối. (Regretful.) (Le Thi Bich Hong. Emails not sent: 109)
- (14) Đúng thế. (That's right.) (Dan Thiem. People who stay awake waiting for the morning: 63)
- (15) Có lẽ rằm? (Perhaps today will be full moon?) (Hao Nguyen. Modigliani's heart: 150)

- (16) Cứ chứng minh xem! (Just prove it!) (Nguyen Huy Thiep. The Winds of Hua Tat: 32)
- (17) Đã gần hai giờ chiều. (It's almost two o'clock in the afternoon.) (Huu Phuong. Buffalo drum music: 44)
- (18) Biết rồi à? (Already know?) (Kieu Duy Khanh. The bird calls and sings: 213)
- (19) Ày dà, không được mà! (No, it's not.) (Nguyen Phu. Tuyet peach: 126)
- (20) Đã muộn quá rồi. (It's too late.) (Tran Thi Tu Ngoc. Deeply exploring the river shadow: 242)
- (21) Đừng có mà xúc phạm! (Do no insult!) (Tran Manh Hung. Space: 98)
- (22) Cũng không chữa được đâu. (It can't be cured.) (Kieu Duy Khanh. Soul pieu: 248)
- (23) Đừng có mà bi đát vậy. (Don't be so tragic.) (Nguyen Tri. Price of banh gio: 122)
- (24) Có con rồi kia à? (You got kids?) (Thach Lam, Child: 231)

To distinguish between structural types, we will isolate operator positions in the order they appear in table 3 below:

**Table 3:** Analysis of operator positions in order of appearance

Number of example	Sentence notation	Operator 1 -3	Operator 2 -2	Operator 3 -1	LỖI L	Operator 4 +1	Operator 5 +2	Operator 6 +3
13	L				Tiệc nuôi			
14	L+1				Đúng	thế		
15	-1L			Có lẽ	răm			
16	-1L+1			Cứ	chứng minh	xem		
17	-2L		Đã	gần	hai giờ chiều			
18	L+2				Biết	rồi	à	
19	-2L+1		Ấy dà	không	được	mà		
20	-1L+2			Đã	muộn	quá	rồi	
21	-3L	Đừng	có	mà	xúc phạm			
22	-2L+2		Cũng	không	chữa	được	đâu	
23	-3L+1	Đừng	có	mà	biết	vậy		
24	L+3				Có con	rồi	kia	à

**3.3. Semantic features of operator positions: different when laced in different positions**

When conducting a survey of sentence samples, we collected a list of operators according to each position, including operators with high frequency, frequently appearing in fragment structures such as: okay, really, ah, oh, so, right... However, depending on the situation and specific communication needs, operators are placed in different boxes. At the same time, when appearing in different positions, the modal meaning it contributes to the sentence is not the same. Not only do they act as operators, due to the isolated language characteristics of Vietnamese, words like "okay" can play the role of the "the nucleus " of a sentence, especially as in example number (26).

This once again proves the characteristic choice of position and grammatical function of elements in fragments.

It can be proven through examples from (25) – (30) with the appearance of “thôi” (in Vietnamese) and the position illustration is shown in table 4:

- (25) Thôi Điểu ơi. (Come on, Dieu. (Nguyen Huy Thiep. Salt of the forest. 117)
- (26) Thôi! (Stop!) (Nguyen Cong Hoan. The last step. 417)
- (27) Được thôi. (Okay.) (Nguyen Huy Thiep. Street legend. 72)
- (28) Phải đi tìm thằng Ổn thôi. (We have to go find On.) (Kieu Duy Khanh. Sunshine at the end of the forest. 230)
- (29) Khiếp thật thôi! (It's terrible!) (Vo Thi Hao. Earthly anchor. 75)
- (30) Thôi chả chừa nổi đâu. (Well, I can't give it up) (Vu Trong Phung. Mirror... blackmail.156)

**Table 4:** Distinguishing the value of an element based on cell position

Example	-2	-1	L	+1	+2
25		<b>Thôi</b>	Điểu	ơi	
26			<b>Thôi</b>		
27			Được	<b>thôi</b>	
28		Phải	đi tìm thằng Ổn	<b>thôi</b>	
29			Khiếp	thật	<b>thôi</b>
30	<b>Thôi</b>	chả	chừa	nổi	đâu

**IV. CONCLUSION**

From selectively applying Nanosyntax theory and referring to the research object of Vietnamese fragments, the article draws the following conclusions about their structure:

- A fragment is a type of independent sentence;

- Fragment structures are entirely organized and stratified and can be modeled into typical structural forms;

- The semantic value of a grammatical element will change when the grammatical function changes, in other words, appearing in different structural diagram positions.



To approach and thoroughly handle the problems of structure and function of fragments, we believe that it is possible to base on the theoretical framework of studying sentences according to functional grammar, which is understood that we need to pay attention to different aspects of sentences in functional relationships when doing research, reflecting the close connection between semantic and structural mechanisms in communication activities. Most importantly, the study is conducted from a practical perspective in the spirit of inheriting achievements in domestic and foreign syntax research and respecting the characteristics of Vietnamese.

From the above initial observations, the actual survey of the corpus within the research scope of this article shows that, from the general model, we collect 11 sentence samples corresponding to 11 fragment structure types. The survey results give us the structural forms of fragments according to the typical frequency of appearance in different texts.

To make accurate judgments about the semantic aspect of a particular sentence, Research on establishing the structure needs to be conducted on a more extensive range of documents. At the same time, it is necessary to continue the microscopic processing of each operator position to isolate elements and shape functions. Besides, fragments' semantic and pragmatic aspects also need to be studied.

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