Knot Semantic Logic and Deep Structure of Statements

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Abstract. This article aims to analyze the deep structure of sentences by applying the knot semantic logic principle in the surface structure of the sentences. This article will help to judge some controversial statements that have legal and social effects. The knot semantic logic theory is a novel approach to explaining a literature’s symmetry structure. Chiasm, parallelism, and concentricity are all examples of symmetry structure. This new theory introduces a new method for detecting symmetry in words, sentences, verses, essays, chapters, and entire books. This analysis will use Knot semantic logic point of view. The methodology used in the analysis has two main procedures: (1) classification of the structure and (2) analyzing some examples from some official/formal statements and controversial statements using Paltridge’s classification of thematic progression and knot semantic logic. The result of this research is that the valid argument has surface and Deep Structure. Some fallacies statements such as presumption, generalization, distortion, and deletion have a deep structure that forms ring composition (Type I of knots semantic logic) and parallelizations (Type III of knots semantic logic). This research results generate a new idea about perspective truth, Original perspective domain, and Response perspective domain.

Keywords: Knot semantic logic, deep structure, surface structure, perspective truth

1. Introduction
Knot Semantic logic is mathematics’ area of expertise in studying sentence patterns. Analyzing sentence structure, understanding the rhythms of speech and patterns of individual speakers will help some experts realize a hidden sentence message. While they speak, the patterns in the speech reveal a possible hidden message in a statement by using the knot semantic logic. The intricate process of people conversing will have influenced their pattern. For example, if someone always speaks in the ABCDCBA pattern, their other speech will be influenced. So, if she or he creates another pattern, it implies that they have broken the pattern, and we examine the “hidden message” in the breaking pattern.

If we can describe speaking or writing patterns as a new branch of mathematics separate from other branches of mathematics logic, we can find some intriguing things in the sentences of people talking. We derive one theory, Knot semantic logic, from this pattern.

Knot semantic logic is one concept for analyzing the Pattern of an entire sentence or Pattern of oral or written literature. The principle of this pattern will be applied to the literature’s theme, sentence, or
words. The knot semantic logic is influenced by knot theory and symmetry law composition or symmetric law pattern.

In Indonesia, many simple statements such as "We can" or "Reading is relaxing" affect some people. Even some controversial statement that has a profound impact on the person who states them. The statements show their surface structure; however, to fully understand the statements, we need to find the deep structure of the statements.

Many controversial statements can be assumed as that against the law or hoax that has law and social effect. In the statement such as "Aku baik-baik saja (I am okay)," the context he/she is patient in the hospital can be assumed as "a lie" or not. Or another statement that "ditangan saya ada uang 11.000 T rupiah (I have 11,000 T Rupiahs in my hand) " can be assume as “fraud” or not. We need to make some theory of judging the statement. By analyzing the structure, we can understand the “controversial” statements and give a fair judgment.

This article will provide an analysis of some categorization of a statement by Knot semantic logic. The article will analyze valid arguments such as Syllogism, modus ponens, and modus tollens in knot theory. A similar way is applied to some statements categorized as fallacies statements, such as ones containing deletion, distortion, and generalization.

2. The analytical framework and methodology
The methodology used in the analysis has two main procedures.

- Analyze the surface and deep structure of some statements by using knot semantic logic concepts.
- Construct a model of the surface and deep structure of statements in the following manner. This means that the theory will be constructed using knot semantic logic. Corley and Gioia [1] define a theory as a concept statement that explains why and how a phenomenon occurs. It is a collection of propositions connected by a logical framework and related assumptions [2]. A strong theory is built on the foundation of perception; whatever is related to one's perception becomes a good theory [3]. Generalizable theories should be capable of generating hypotheses and models in addition to applying them to other disciplines. "Formal theoretical definitions, theory domain, theory relationships, and predictions" are four characteristics of a good theory [4]

3. Result and discussion
The construction of the model is based on Knot semantic logic and some theory about the surface and deep structure of sentences. In the first part, we will introduce the knot semantic logic, and the second part is to explain some deep structure of some "fallacies statement," and finally, we will formulate some new theory about how to understand the deep structure of statements

3.1 Knot semantic logic
3.1.1 Characteristic. The knot polynomial and the abstraction of some symmetry phenomena in this world were the inspiration for the knot semantic logic, which was then used in sentences. Parallelism, chiasm, and ring composition are ways to express the law of symmetry. [5, 6, 7, 8]. In short, The characteristics of the sentences or essay can be categorized as Knot semantic logic: The Structure is mirrored or parallel to another; the first half will reflect the second half in the following pattern: The Parallelism between the correspondent parts consist of repeating words or phrases that are striking or evident and serve to provide closure

Knot point and knot logic are fundamental concepts of Knot semantic logic. A knot point is a character or word or sentence or theme or Chapter. Knot logic is words, sentences, themes, or Chapters that have parallel knot points. Parallelism in knot logic can be expressed in Synonyms, Antonym, similar meanings, or similar themes.

3.1.2 The basic model of knot semantic logic. There are three basic compositions in Knot semantic logic
Table 1. Model of knot semantic logic.

| Model  | Definition | Simple form | Generalization |
|--------|------------|-------------|----------------|
| Model I | The composition that has only Knot point | A | A |
| Model II | The composition that forms Chiastic | AB/B'A | $A_1, A_2, A_3, \ldots, A_n, A'_n, \ldots, A'_1$ for $2n$ knot Points, $n$ is a positive integer |
| Model III | The composition that forms parallelism | $AB/A'B'$ | $A_1, A_2, A_3, \ldots, A_n, A'_1, A'_2, A'_3, \ldots, A'_n$ for $2n$ knot Points, $n$ is a positive integer |

3.1.3 Type of composition. All combination of this Knot semantic logic model is divided into four types of symmetry structure, named Type 1, type 2, type 3, and type 4.

Table 2. Types of knot semantic logic

| Type  | Definition | Simple form | Generalization |
|-------|------------|-------------|----------------|
| Type I | The combination of model II and model I | $A$ or $AB/C$ or $AB/C/B'A'$ | $A_1, A_2, A_3, \ldots, A_n, A_{n+1}, A'_n, \ldots, A'_1$, Ring composition |
| Type II | The combination of model II and model II | $AB/B'A$ | $A_1, A_2, A_3, \ldots, A_n, A'_n, A'_1, A'_2, \ldots, A'_1$ for $2n$ knot Points, $n$ is a positive integer |
| Type III | The combination of model III and model I | $AB/C/A'B'$ | $A_1, A_2, A_3, \ldots, A_n, A'_1, A'_2, A'_3, \ldots, A'_n$ for $2n$ knot Points, $n$ is a positive integer |
| Type IV | The combination of model III and model II | $AB(CC'/A'B'$ or $AB(CC'/B'A'$ | $A_1, A_2, A_3, \ldots, A_n, A'_1, A'_2, A'_3, \ldots, A'_1$ for $2n$ knot Points, $n$ is a positive integer |

3.2 Deep and surface structure of statements

Surface structure refers to the words/language we use to represent the deep structure, while deep structure refers to concepts, thoughts, ideas & feelings [9, 10]

3.2.1 Knot semantic logic and valid argument. The mathematic logic can be expressed in Knot semantic logic. Below are some examples

- **Hypothetical Syllogism.** Syllogism, in Knot semantic logic point of view, is ring composition. The Structure of Syllogism is

  \[
  p \rightarrow r \\
  r \rightarrow q \\
  \therefore p \rightarrow q
  \]

  The knot semantic logic structure of this Hypothetical Silogisme is $A$, $A'$, with $A$ is $p \rightarrow r, r \rightarrow q$

  In terms of Knot semantic logic, $A$ can be expressed as $A_1, A_2, A'_2, A_3$

  And $A'$ is the conclusion that we can express as $A_3 = A'_1$

  $A$ is the deep structure of the statement; meanwhile, the $A'$ is the surface structure of the statement

  For example, Baco said," *If I went to Bone, I saw some magnificent Scenery*
The sentence is the surface of a statement, and if we just heard the statement, we will have a different opinion with Baco. But if we know what he means, we will agree with him. The illustration of Baco’s deep and surface structure of his statement is explained below.

**Example**

*If Baco went to Bone, he went hiking in the Sumpa’labbu.*

*If Baco went hiking in the Sumpa’labbu, he saw some magnificent scenery.*

Therefore, *If Baco Went to Bone, he saw some magnificent Scenery.*

- **Modus Ponens.** Modus Ponens is an argument that forms

\[
p \rightarrow q
\]

\[
p
\]

\[
\therefore q
\]

*"if p then q is true and p is true, then q is true.*

In terms of Knot semantic logic, the model can be rewritten in parallelism A, A’ where A is \((p \rightarrow q, p)\)

Without the truth-functional connective symbols, A can be expressed as \(A_1, A_2, A_1’\) and \(A_2\) is the center of the statement

Meanwhile, \(A’\) is \(q\)

The deep structure of the statement is A while the surface is A’.

*example*

A man says, "I saw Bola Soba (Buginese traditional house)"

"I saw Bola Soba" is the surface structure of his statement, and after we investigated, we got the deep structure

*If Ja’far went to Watampone City, he saw Bola Soba.*

Ja’far went to Watampone City.

Therefore he saw Bola Soba.

- **Modus tollens.** Modus tollens is an argument in the form

\[
p \rightarrow q
\]

\[
\sim q
\]

\[
\therefore \sim p
\]

*If p then q is true, and \(\sim q\) is true, then \(\sim p\) is true.*

The model can be interpreted to Knot semantic logic in the form A, A’

A is \(p \rightarrow q, \sim q\), or in terms of Knot semantic logic forms, and we can rewrite the form A is \(A_3, A_2, A_2’\). With \(A_2’\) in the negation of \(A_2\). A is incomplete paralyzation.

And A’ is \(\sim p\)

In order to make the sentence become sentence logic, we can rearrange the model to become

\[
p, q \sim q, \sim p\]

Or \(A_1, A_2, A_2’, A_1’\)

*Example*

A man in a court told the judge

He said, "I am a good husband."

This is a surface structure of his statement

"A good husband" is a subjective statement

On possible of his assumption is

*Good husband does not hit his wife*  
*He hit his wife*

Therefore He is not a good husband.
3.2.2. Application of the knot semantic logic to explain the deep structure for fallacies.

- **Presumption.** Using knot semantic logic, we can identify the implication of the sentences. For example, the statement: *I raised my son*

| Surface Structure | Deep Structure | Knot semantic logic |
|-------------------|----------------|--------------------|
| I                | A              | A, B, A'           |
| raised           | A              |                    |
| My son           | B              |                    |
|                  | "A father or a |                    |
|                  | "mother"       |                    |
|                  | raised         |                    |
|                  | His/her        |                    |
|                  | son            |                    |

Table 3 shows that the deep Structure of the presumption is ring composition (Type I of knots semantic logic). This principle can be used to understand the presumption of the others.

- **Universal Quantifier fallacy** \((\forall x)G\). The formula of the Universal quantifier is \((\forall x)(A(x) \rightarrow B(x))\) [11]. To illustrate this, we have an example: *A woman does not want to have a relationship with any man, and Her reason is that two of her boyfriends (Baco and Beddu) have cheated on her. So she does not believe any man anymore. She expressed her feeling in one statement. She said, 'All men are liars."

| Statement | All | Men | (are) liars |
|-----------|-----|-----|-------------|
| Surface Structure | A   | B   | C           |
| Deep Structure | A' (how many men) | B' (who) | C' (what kind of lie) |
| Original Perspective | 2 man | Baco | They have |
| Domain | Beddu | another girl |
| Response Perspective | 1 man | I am | I haven't lied |
| Domain | Man (who) | Lie |
| Mathematical symbol | \((x)\) | A (x) | B (x) |
| Knot semantic logic | (parallelization) | A, B, C, A', B', C' |

Based on Table 4, the generalization for in words "All" for the terms "liars." So the domain of the statement as the formula is only two mans. However, the new domain becomes all men.

To illustrate this, we can draw

![Figure 1. Fallacies illustration](image)
Table 4 shows that the deep structure of the universal quantifier fallacy is parallelization (Type III of knots semantic logic).

- **Distortion or Singular preposition fallacy.** A singular proposition is a particular individual word that does not have some specified attribute or property [11]. In this case, we name it distortion.
  
The mathematics model is $D(x) \cdot H(x)$
  
  For example, *Reading is relaxing*

| Statement | Surface Structure | Deep Structure | Original Perspective | Domain response Perspective | Mathematical symbol |
|-----------|-------------------|----------------|----------------------|---------------------------|---------------------|
|           | A                 | A' (According to who) | According to Student A | According to Student B | D(x) |
|           |                   |                 |                      |                          | H (x) |

Table 5 shows that the deep structure of distortion is parallelization (Type III of knots semantic logic).

- **Deletion fallacy.** Deletion is the statement that the part of the meaning is lost.
  
The symbol is $P \ast D(x)$
  
  An example of deletion is the statement "*I love this."

| Statement | I love | This |
|-----------|--------|------|
| Surface Structure | A | B |
| Deep Structure | A' who (specific) | B' (what does she/he love) |
| Original Perspective | Specific Specific subject | This book (an example) |
| Domain response Perspective | Specific Specific subject | This chair, this woman, this man, etc |
| Mathematical symbol | D(x) | H (x) |

Table 6 shows that the deep structure of the deletion fallacy is parallelization (Type III of knots semantic logic).

- **Perspective truth.** Based on the result, we can see that people make some fallacies to make simple predictions from particular cases to all instances. This led to new ide about the perspective truth.
  
  Perspective truth is the truth of fallacies based on the perspective view of someone that has value accepted or rejected. This means the truth depends on one person's perspective or community perspective of their criteria, and it is not a valid argument.
  
  The formal definition is given below
If \( P(x) \) is fallacies that has an original perspective domain

Let \( PD_n \) is the responses perspective domain, and \( x_{nm} \) is member of \( PD_n \); \( n, m \) are integers

So the quality of \( P(x) \) = \[
\begin{cases} 
  \text{if } P(x_{nm}) \in P(x), & P(x) \text{ is accepted} \\
  \text{if } P(x_{nm}) \notin P(x), & P(x) \text{ is rejected}
\end{cases}
\]

The diagram shows that the nature of fallacies is the original perspective domain. However, his/her fallacies will make other people interpret by using their domain which is defined as the response perspective domain. The statement will be accepted or rejected based on the unique response perspective domains of the listeners.

### 4. Conclusions

1. Some valid arguments can be expressed in Knot semantic logic. Which are:
   - The knot semantic logic structure of this Hypothetical Syllogism is A (A is \( p \rightarrow r, r \rightarrow q \)), A' (\( p \rightarrow q \)), while A is the deep structure of the statement; meanwhile, the A' is the surface structure of the statement
   - Modus Ponens has Knot semantic logic, which is A, A' where A is (\( p \rightarrow q, p \)) and A' is q as the conclusion. The deep structure of the statement is A while the surface is A'.
   - The model of Modus tollens can be interpreted to Knot semantic logic in form A, A', which A is \( p \rightarrow q, \sim q \). And A' is \( \sim p \)
2. The deep Structure of the presumption is ring composition (Type I of knots semantic logic), the deep structure of generalization, distortion, and deletion are parallelization (Type III of knots semantic logic)
3. the result also shows that people making some fallacies is to make simple predictions from particular cases to all instances.
4. The results lead to the new idea of perspective truth, Original perspective domain, and Response perspective domain
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