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Economy in the Minimalist Theory: A Syntactic Analysis of English Sentences

Remy Nsimambote Zola

Professor at the University of Kinshasa
Kinshasa, Democratic Republic of the Congo
Email: remynsimambote@unikin.ac.cd
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Abstract: *Five English sentences were examined in both previous Chomsky's theories and the minimalist one to account for economy. A contrastive analysis of the two theories in the examination of the five sentences revealed that rules, applied in the previous Chomsky's theories, were reduced into binary merging operation of constituents. This radical shift denoted economy in the minimalist theory.*
Keywords: *rules, economy, merge, binary, constituents.*

INTRODUCTION:

The minimalist theory introduced by Chomsky (1995) represents a radical shift from rule-based models to principle of economy in syntactic derivation. Horstein (2005) and Laskin and Lohndal (2013) pointed that the property of economy in the minimalist theory are one of the features.

The researcher taught English syntax to graduate students. He observed that many of those learners were not able to underscore the property of economy in the minimalist theory. They were stuck to the previous rule based models of syntax drawing the binary tree diagram up-bottom instead of bottom-up. They had difficulties distinguishing the radical shift from the previous rule based models to the minimalist theory.

The above situation compelled the researcher to write this paper serving as a pedagogical support that will help readers who interested in the minimalist theory to distinguish the radical shift from construction specific rules to principled economy.

Five English sentences constituted the data of this study. In fact, these sentences were drawn from an example sentence that a graduate student employed to draw a binary tree. The sentence is extended to other forms for the sake of investigation.

a. Kubu loves Matondo.
b. Does Kubu love Matondo?
c. Who loves Matondo?
d. Who does Kubu love?
e. Matondo is loved by Kubu.

A contrastive approach allowed the researcher to examine each sentence in both models in order to sort out differences that attested the property of economy.

I. RULE BASED MODELS AND THE MINIMALIST THEORY

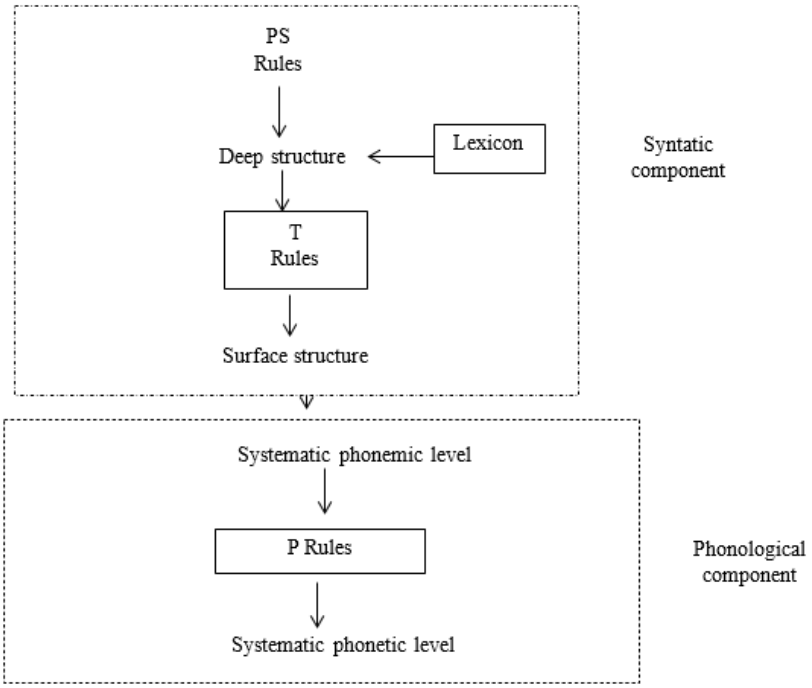
Both Standard theory and extended one are the rule-based models of syntax developed by Chomsky. In 1957, Chomsky described two levels of structure. They are deep structure and surface one. The deep structure is made of two base components, namely categorical and lexical one. In the same version, the sentence had the following string: S- NP VP while in the 1965 version, AUX and an optional (AdvP) were inserted to the sentence string. This optional (AdvP) did not make part of VP as they were sister nodes with the latter.

The deep structure had to go to different transformations before moving to SS. The fol-

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lowing figure provides a summary of different components.

Figure 1: Different components of Chomsky's rule based models



Linguists have noticed that the existing theory of syntax was not adequate handle some characteristics constructions in natural languages. An additional level of structure, called derived structure, was needed to provide a principled account of the syntax of these constructions. It is interrelated with the surface structure by a set of movements technically called as transformations. In this extended theory, these movements meant move alpha and beta (Radford 2009).

Regarding the minimalist theory, Laskin and Lohndal (2013) point that the minimalist program theory has incorporated properties of economy, simplicity and efficiency. The simplicity comes from reducing transformations to the single elementary operation, thereby reducing and eliminating the phrase structure rules. The property of economy is the main one. The fact that the theory is economical leads to simplicity and efficiency.

Zwart (1998) mentions binary merging operation as a feature of the minimalist theory. It consists of combining constituents to form the phrase, the phrase is combined with a clause, and the latter is combined with other components to form a sentence. He kept on saying that there is a good relation between merge and move alpha. Merge could be changeable according to the case itself. This operation leads to a new start for examples the sentences:

a. She is speaking.
b. Is she speaking?

The sentence (a) is an affirmative, which is converted to a question in (b) by merging.

In the standard /extended theories, one would have had recourse to Deep Structure and

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Surface Structure and moving the constituent to yield the sentence (b).

II. ANALYSIS OF THE PROPERTY OF ECONOMY

III.1 KUBU LOVES MATONDO

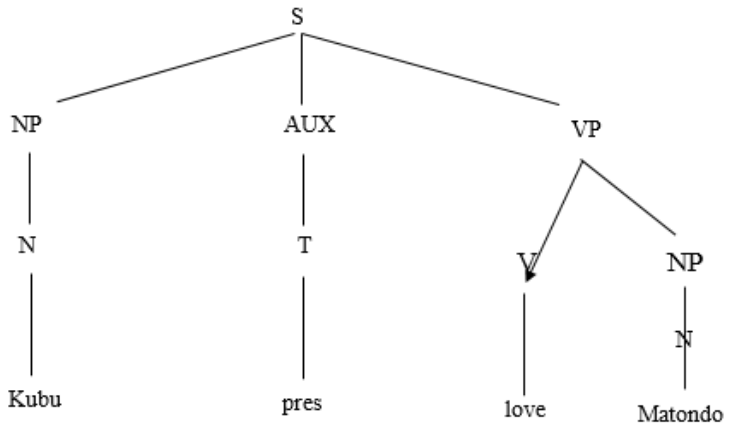
Basing on the standard theory, the phrase structure rules that helped to build the above sentence runs as follows:

1. S- NP AUX VP
2. NP- N
3. AUX-T
4. VP-VNP
5. NP-N
6. N-Kubu
7. N-Matondo
8. T-Pres
9. V-love

The nine strings of PS rules are divided into categorial and lexical rules. The categorial rules are numbered from 1 to 5 and from 6 to 9 are lexical rules where lexicons are inserted into categories.

Thanks to PS rules, the structural description is diagrammed below:

Figure 2: Tree diagram (Kubu loves Matondo)



The deep structure of the sentence is: # Kubu pres love Matondo #. To get to the surface structure, there is one transformation rule; a morphophonemic whereby the affix (pres) is attached to uts root, which is the verb (love). The rule is outlined as follows: # love+ pres # = loves, once this rule is applied to the deep structure, the output is the surface structure: Kubu loves Matondo.

In the extended version, there is an affix movement whereby the affix moves to the root leaving a trace as shown below:

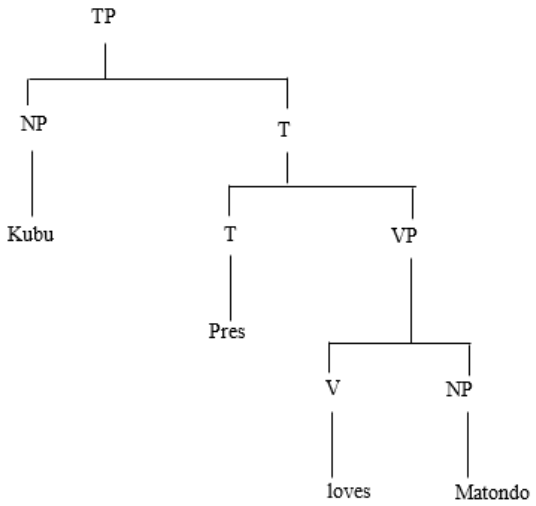
Figure 3: S [Kubu ti lovei Matondo]

Refering to the above tree diagram, the present is positioned before (love). As it is moved, it left a trace (ti) to be attached to (love) and becomes (loves).

In the minimalist theory, the diagram can presented without describing PS rules. The merging operation is done bottom-up. The merging diagram is presented as follows:

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Figure 4: Binary tree (Kubu loves Matondo)



Unlike the standard and extended standard theories, the above binary tree is drawn bottom-up with the merging of the constituents under specified constraints. The merging is numbered:

1.The NP (Matondo) merges with the verb help to make VP;

2. VP merges with T of the sentence representing the simple present tense form

3. T merges with NP (Kubu) to check the Case/Extended Projection Principle and then T gives a nominative case 'Kubu' to form TP.

Contrasting the above two tree diagrams, Aux and Ns nodes are deleted in the binary tree. Moreover, there is no affix hopping, which also occurs in morphophonemic rule.

There is economy in the minimalist theory since the above phrase structure rules with nine strings are not at work. The morphophonemic rule is not applied, either. The three numbered merging are at work.

III.1.2. DOES KUBU LOVE MATONDO?

The same PS rules and tree diagram and deep structure described in the sentence (III.1) are used in this sentence. In terms of transformation rules, there is a subject verb inversion transformation whereby (do support) is applied. Do support is the tense carrier and it is moved in front of the sentence as shown below:

SVI : # Pres Kubu love Matondo #.

After applying SVI rule, it yields the following surface structure: Does Kubu love Matondo?

The surface structure exhibits the tense / affix movement in front of the sentence; once moves it carries the tense and becomes (does) as shown below:

Figure 5: Affix movement

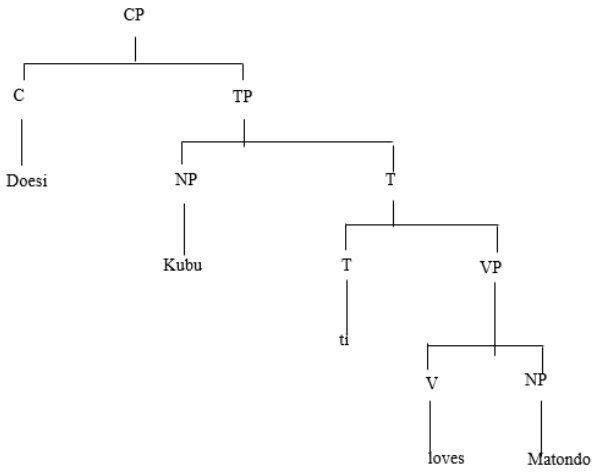
Does i [Kubu ti love Matondo]

Top S

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The minimalist merging tree had already prepared the landing site of the constituent which merges with the TP. It is the complementiser slot as shown below:

Figure 6 : Binary tree (Does Kubu love Matondo?)



In the minimalist theory, the following binary merging are mentioned:

1. NP (Matondo) merges with the verb to form VP,
2. VP merges with T trace moved to C to form T,
3. T merges with Kubu to form a TP,
4. TP merges with the C (does) to form a CP.

Contrasting the two diagrams, in the previous models, Aux and N nodes are maintained while in the minimalist theory, they are deleted. Rules such as Q transformation, affix hopping and Do support are not mentioned in the minimalist theory.

It is important to mention that the tense moving to C to merge with the TP, is a simplified movement of topicalisation. It is economical.

III.1.3 WHO LOVES MATONDO?

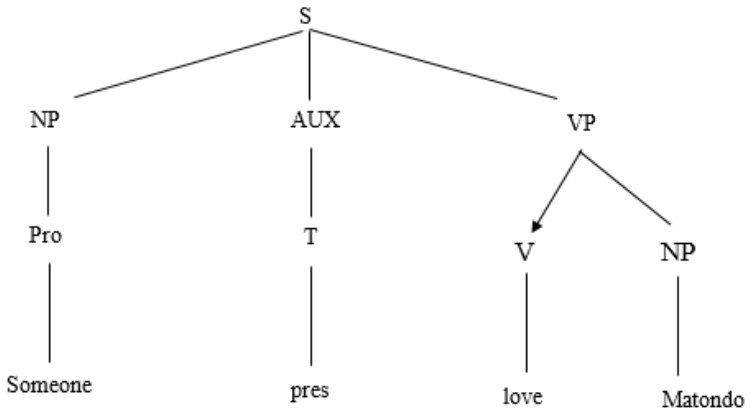
Basing on the standard theory, the phrase structure rules that helped to build the sentence runs as follows:

1. S- NP AUX VP
2. NP- N
3. AUX-T
4. VP-VNP
5. NP-N
6. N-someone
7. N-Matondo
8. T-Pres
9. V-love

It is quite similar with the PS rules of the sentence III.1. The only difference is the string (6) has (someone) as the inserted lexicon. This allowed to yield the following tree diagram:

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Figure 7: Tree diagram (Who loves Matondo?)



In terms of transformation rules, there are two rules: the first one is the morphophonemic rule: # help + pres # = loves

The second one is wh-transformation rule whereby 'someone' is replaced by 'who'. After applying the two rules, the surface structure yields: who loves Matondo?

In terms of movement, there are topicalization and affix movement rules as shown below:

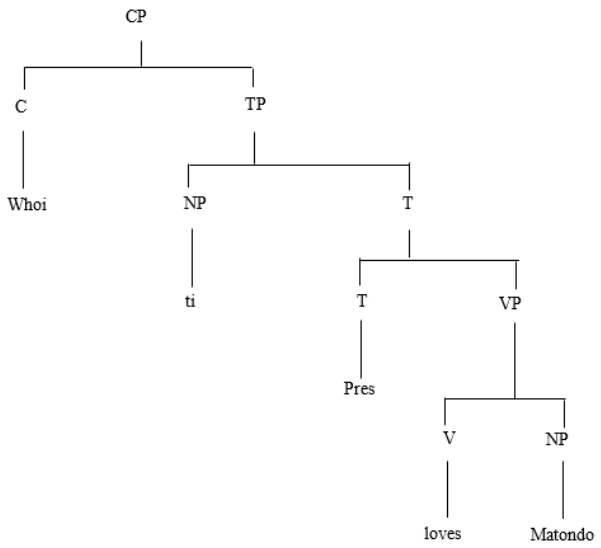
Figure 8: Topicalisation and affix movement

Who i [ti loves Matondo]

The left trace (ti) shows that the NP subject of the verb moved in front of the sentence as (who).

The binary tree in the minimalist theory runs as follows:

Figure 9: Binary tree (Who loves Matondo?)



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In the minimalist theory, the following binary merging operations are mentioned:

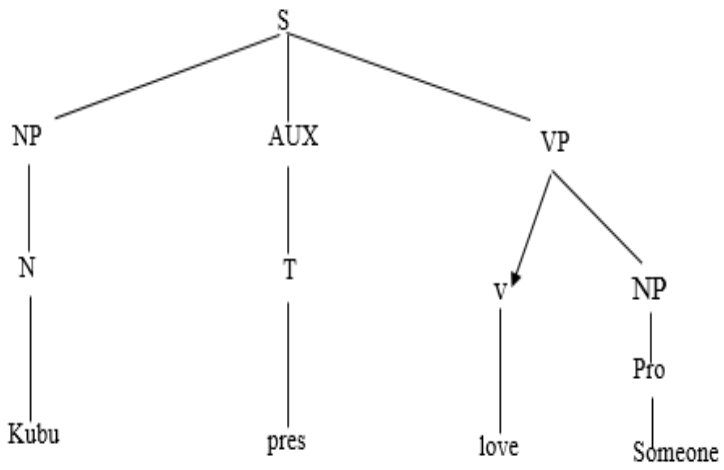
1. NP (Matondo) merges with the verb to form VP,
2. VP merges with T to form T,
3. T merges with NP trace to form a TP,
4. TP merges with the C (moved NP) to form a CP.

Contrasting the two diagrams, in the previous models, Aux and N, Pro nodes are maintained while in the minimalist theory, they are deleted. Rules such as topicalisation, affix movement are not mentioned in the minimalist theory. It is economical.

III.1.4 WHO DOES KUBU LOVE?

The structural description of the above sentence is quite similar to the one illustrated by the Figure 7. For this sentence, the NP object (Matondo) is therefore replaced by (someone).

Figure 9: Tree diagram (Who does Kubu love?)



In terms of transformation rules, two rules were at work. The first one is SVI where by the tense carrying by the do support behaving as a verb moved in front NP(Kubu) of S:

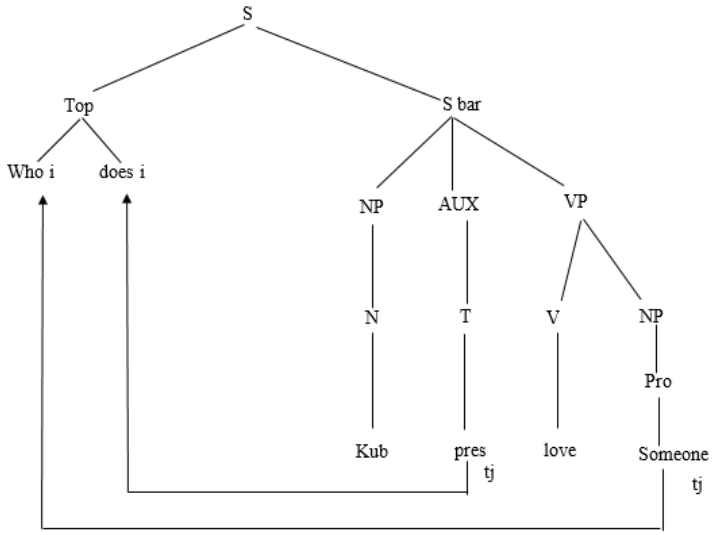
- # Pres Kubu love someone #
- # Does Kubu love someone #

Second, NP (someone) is moved and replaced by (who) as wh-transformation to yield the following surface structure: Who does Kubu love?

In the extended theory, two constituents are moved in front of S, they are topicalized. As mentioned above, the tense (pres) topicalized as C (does) and NP object (someone) topicalized as (who). They both leave traces (ti) and (tj). They are shown below:

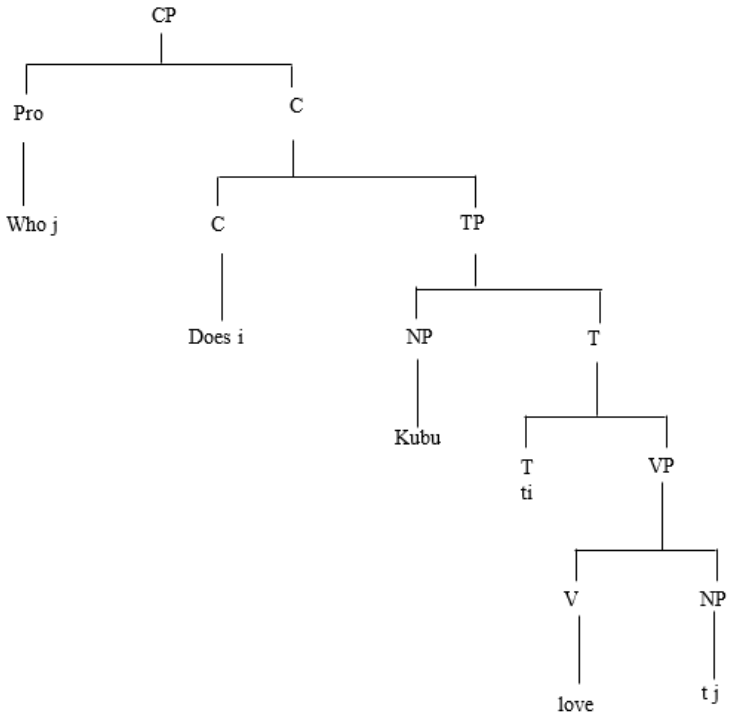
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Figure10: Tree diagram with different movement rules (Who does Kubu love?)



The binary merging tree proceeds in the following way:

Figure 11: Binary tree (Who does Kubu love?)



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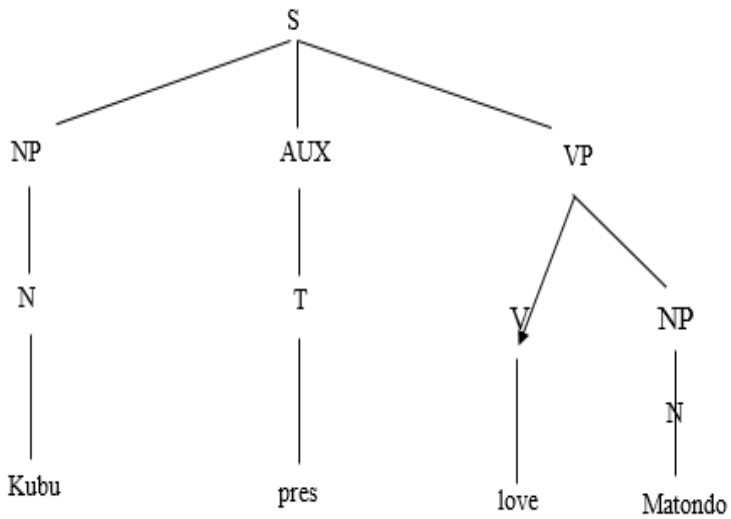
In the minimalist theory, the following binary merging operations are mentioned:

1. NP (trace) merges with V to form VP,
2. VP merges with T (trace) to form T,
3. T merges with NP to form a TP,
4. TP merges with the C (moved T) to form a C.
5. C merges with PRO (moved NP) to form CP

It is economical. Thanks to five binary merging, the sentence is analyzed adequately. The binary merge of the two traces has reduced the two movements identified in the previous models. Apart from the deletion of Aux, Pro and N and V nodes, the sentence has an embedded clause (Figure 11) with tertiary branching. This is one is avoided in the minimalist theory.

III.1.5 MATONDO IS LOVED BY KUBU

The same PS rules and tree diagram and deep structure described in the sentence (III.1) are used in this sentence. The tree diagram runs as follows:



The deep structure of the sentence is: # Kubu pres love Matondo #.
To get to the passive form, the passivisation rule is applied:

- NP1 AUX V NP2- X
- X= N2 Be + T+ love+ed by NP1

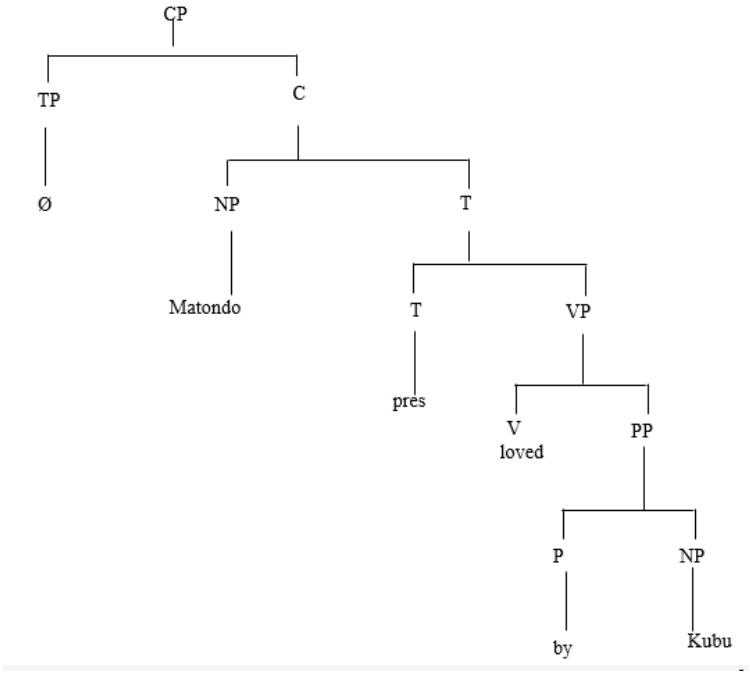
Whereby the morphophonemic rule yields the following:

- Be+T implies Be+Pres= is
- love +ed= loved (The past participle)

Applying those rules, the sentence becomes: Matondo is loved by Kubu.
In the minimalist theory, a binary tree can contain everything as shown below:

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Fig 12: Passive binary tree



In the minimalist theory, the following binary merging operations are mentioned:

1. NP (merges with P to form PP,
2. Vmerges with PP to form VP,
3. VP merges with T to form a T,
4. T merges with the NP to form a C.
5. C merges with TP (null) to form CP

The null TP implies that it must be filled by moving the internal arguments. They are, namely the four features mentioned in the passive predicate. The first one is related to the use of the auxiliary Be. The second one is the changing of the verb to the past participle. The third one concerns the agent is added within the preposition phrase. The fourth one is based on the moving the object of the sentence to the position before the auxiliary Chomsky, N. (2000); (2001) and Collins, C (2005).

Contrasting the two tree diagrams, the binary merging tree applies directly the passive sentence. The merging starts from the bottom upward. The C merges with a null TP whose internal arguments have been moved.

It is economical, as the passive mathematical rule is not employed. No use of morpho-phonemic rules which yielded (is) from (Be+ Pres) and the past participle from (love+ed). It is just a question of integrating the four features in the binary tree.

CONCLUSION

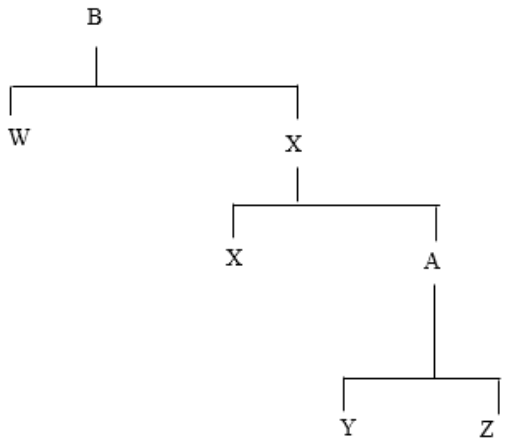
The paper aimed at sorting out features of economy in examining both Chomsky's previous models and the minimalist one. Five English sentences served as data that were examined in the two models attesting economy in the minimalist theory:

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Table no 1: Differences attesting economy in the minimalist theory

Previous models	Minimalist model
Phrase structure rules	Binary merging operation
Transformation and movement rules	
Rule based	Principled to economy

In sum, a sentence in the previous Chomsky's models is analyzed basing different rules while in the minimalist theory; the analysis is principled to economy by avoiding rules. Rules are replaced by the binary merge operations. An illustration of a hypothetical sentence made of (WYZ) constituents without a modal auxiliary verb is minimally processed as follows:



The variables A and B stand for respectively VP and TP. The X variable is a morphologically non-observable item, tense category. Beginners mostly confuse it. A further analysis conceptualizing the tense category in the minimalist theory is needed.

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