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Analysis of Noun Phrase and Verb Phrase Structures in Modern Standard Arabic by using X-bar Approach

Khamael Sabeeh Abedalemmam
Department of English / College of Education / Islamic University, Babylon campus
Corresponding Author: Khamael Sabeeh Abedalemmam- Khamael76alnassery@gmail.com

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ABSTRACT

This research demonstrates the existence of nominal and verbal phrases in Arabic. The presence of nominal phrases is revealed through grammatical evidence. The Arabic form considered is Modern Standard Arabic, and X-bar theory is used to explore these phrases. Arabic structures are presented in phonetic transcripts, assigned morpho-syntactic features, and given English translations. The analysis covers NP and VP, verb features, VP ellipsis, and the application of X-bar theory to Arabic. It has been shown that complements and adjuncts stand in different syntactic relations to the head noun within the NP. A complement constituent in Arabic is a sister of the head noun and must be adjacent to the head and precede the adjunct category. The complement and adjunct positions spell out syntactic processes such as preposing, postposing, questioning, and pronominalisation. These processes provide empirical evidence for the complement/adjunct distinction, leading to the conclusion that Arabic has a hierarchical three-level phrase structure and an intermediate X′ level. This study shows that NP and VP categories in Arabic fit into the X′ schema proposed for universal syntactic structure. Arabic data also show that head words are projected into phrases, which are projected into sentences. Sentences in Arabic, as in other languages, are structured from phrases, and phrases are grammatical categories filling syntactic positions within sentences.

KEYWORDS: X-bar theory; Modern Standard Arabic; NP; VP; complement–adjunct; adjacency; ellipsis.

1. Introduction

This research is interested in the analysis of Noun phrase (NP) and Verb Phrase (VP) structure in Modern Standard Arabic (MSA) within the X-bar (X) approach. The X theory is discussed in almost all modern textbooks of syntax, and it is routinely assumed as a theory of phrase structure in a variety of otherwise widely differing schools of grammatical thought [1]-[4], such as Lexical-functional grammar (LFG) and generalised phrase structure grammar (GPSG), etc. This study suggests that NP and VP are constructed from a head (X^0), an intermediate projection (X′), and a maximal projection (XP). Therefore, it provides a preliminary explanation for the division of complements, adjuncts, and specifiers. According to [5]–[8], X' is defined as a set of universal constraints (as constraints on phrase structure rule systems) holding for all languages at deep structure (D-structure). This study is concerned with MSA. When mentioning Arabic throughout this research, it primarily means MSA, which is a simplified version of classical Arabic (classicalized form). Classical Arabic, which was widely used in pre-Islamic times, stands out from the diverse dialects spoken in the Arab world as the official language of journalism, news reporting and academic circles. It is the written language understood by the educated.

Atiya explained [1, pp. 48-67] that modern standard Arabic is characterised by structural features that make it suitable for grammatical analysis within a generative framework.

1-Arabic texts are written from right.

2-The Arabic language is characterised by its flexibility in writing, which is due to its rich inflectional system. Moreover, besides the marked sentence structure of verb, subject, and object (VSO), Arabic has a predication sentence structure of a subject phrase and a predicate phrase, with no explicit verb or copula (non-equational sentences). e.g. (1)

1. ʔæl - walad-u sadiq - i

def- boy -Nom freined-1sg po ‘

The boy is my friend’.

3. Arabic has multiple inflexions depending on tense, gender (masculine/feminine), and time, in addition to containing consonants that cannot be pronounced without vowels.

4. Arabic is characterised by the presence of interconnected sentences, which are small parts added to a word but carry significant grammatical and morphological meaning. These are sometimes called prefixes and suffixes (such as conjunctions, prepositions, and object pronouns). e.g. (2)

2. ðahab-a -t

went -3sg- f

‘ she went’.

1.2 Phrases and Constituency in Arabic

Carnie describes a phrase as a component that revolves around a certain word; for example, a noun phrase includes a noun along with all the words which modify it [3]. As a general note, we use the term phrase to describe a set of elements that are a part of a sentence – at times this may be a standalone word like ‘students’ at other times a series of words such as ‘excellent university students. Also, a single noun can do the same job in syntax as a full noun phrase, which means that at times we can replace that noun with a longer NP to show that the noun in question functions as an NP. Words can, therefore, expand into full phrases when additional elements are added to them. Thus, a noun can project into a noun phrase (NP), a verb into a verb phrase (VP), an adjective into an adjective phrase (AP), an adverb into an adverb phrase (AdvP), and a preposition into a prepositional phrase (PP). As Radford explains, sentences are built not only from individual lexical categories but also from the larger phrasal categories projected from them; for

example, in the sentence John is a professor of chemistry, the expression a professor of chemistry constitutes an NP headed by the noun professor [9].

Two general methods may be used to demonstrate constituency. The first shows that a sentence is composed of smaller units arranged in a hierarchical phrase structure, typically represented using tree diagrams. The second method identifies constituents by examining the structural positions that words occupy within the sentence, revealing how they combine into larger meaningful units [4], [5].

Nelson asserted that the grammatical function of a word in Arabic determines its position. For example, adjectives may form adverbial phrases (APs) when they play a central role in the sentence [10], [11].

In generative syntax, a phrase is defined as a constituent centred around a lexical head, a principle central to X-bar theory [12], [13]. Thus, nouns project into NPs, verbs into VPs, adjectives into APs, and so on. Constituency may be represented either linearly or by hierarchical tree structures. Radford demonstrates that expressions such as *a professor of chemistry* form an NP headed by *professor* [9].

Arabic behaves similarly. Single words may function as full phrases (*students*), while more complex structures may contain nested phrases, such as *excellent university students* or *some very pleasant times in Baghdad*. Holes explains that Arabic also contains *construct phrases* (ʔiḍāfa), in which two nouns form a genitive relationship, for example:

kitāb-ul-walad-i
book-Nomdef-boy-Gen
“The boy’s book.”

Such structures provide a clear environment for examining complement–adjunct distinctions, adjacency requirements, and internal phrase hierarchy, core predictions of X′ theory [9], [12], [13].

1.3 Aims of the Study

1. To establish the phrasal constituency of the NP and VP categories in Modern Standard Arabic (MSA) within the X′ (X-bar) theoretical framework. The analytical model adopted here may also be extended to other phrasal categories in future research.
2. To identify and analyse these phrasal categories as constituents of the Arabic sentence within the X′ (X-bar) theoretical framework.

1.4 Research Questions

In pursuit of these aims, the study addresses the following research questions:

1. What syntactic evidence demonstrates the existence and constituency of NP and VP in Modern Standard Arabic when analysed within the X-bar framework?
2. How do Arabic NPs and VPs display complement – adjunct asymmetries and ordering constraints which support the need for an intermediate X’ projection in MSA?

1.5 Significance of the Study

While many studies explore classical Arabic and its morphology, recent research focusing on systematic analyses of MSA within contemporary syntactic theory is lacking, particularly using established theoretical diagnostics of X', such as adjacency, coordination, pronouns, and genitive constructions.

This study offers empirical data on the structural organisation of Arabic. Additionally, the findings show the viability of constructing NP-VP phrase classes in Modern Standard Arabic and their grammatical roles within sentences. The second challenge is seen in the application of the X' approach, especially regarding concentricity and the asymmetry between complements and adjuncts.

In general, this study advances the theoretical understanding of Arabic sentence structure, proposes a model relevant to comparative grammar, and expands functional tools for educators and researchers in the field of Arabic grammar.

2. Literature Review

2.1 Overview in Linguistics

Linguistics is a field in which there has been constant growth in conceptual debate and analysis. Such denotative insights have led to the revision of fundamental methods and theories in the analysis and explanation of language structures. Recently, these analytical approaches have recognised that each language has its peculiarities and idiosyncrasies, given the pattern in which lexical units are combined. But differently, every language has its own grammar [14].

When we say we know a language, we are, in effect, laying a claim to being aware largely unconsciously of the rules that combine the sounds, words, and phrases towards sentential derivation in a given language. Syntactic theories seek to reveal the intricate structural organisation of natural languages; also, the Syntactic theories clarify the meaning of dependency grammar for the reader items. The words in each sentence connect syntactically, despite their distinct grammatical positions, and depend on each other to form the basic meaning of the sentence.

Recent research has put forth the importance of putting Arabic in today's syntactic models, which has been done, where Arabic shows structural features that interestingly differ from other languages which used to develop generative syntax. A recent study by Ohod et al. [15] on the application of the X' (X-bar) framework to compare Arabic and English noun phrase structures. It was mentioned that Arabic's morphological richness, its case marking, gender agreement, definiteness, and the ʔiḍāfa construction all play an important role in the internal organisation of nominal sentences. Despite this study's focus on comparisons within NPs and VPs, the question remains whether a broader analysis using modern generative tools is necessary for Arabic.

In this study, the X' formal theory was applied to both NPs and VPs in MSA, as in classic works of Radford [9], Jackendoff [12], Kornai [13] and Speas [16], emphasising the internal structure of Arabic rather than comparing it to another language.

To account for the VSO and SVO word sequence in Arabic, we assume that the verb is base-generated in [V] and NP is also generated from spec-VP. To get the VSO order, the verb moves from [V] to [I] (Head-to-Head) to collect the required Phi-features, i.e., in Spec-VP; hence, partial Spec-Head agreement is instantiated.

To obtain the tropicalised SVO word order (i.e., mubtadaʔ wa xabar), topic-comment structure, the verb assumes [V-to-I] movement and the subject moves from [Spec-VP] to [Spec-IP] where full Spec-Head agreement is triggered. In English, a sentence begins with a subject, not a verb. The subject moves to the specifier of IP, the verb goes up to the I position, where Subject–Verb agreement is spelt out on the third singular person (Spec-Head agreement) [17].

2.2 Principles of the X′ Theory

In every language, certain patterns of words are permissible and meaningful, and others are not. Syntax is the way words are put together to form phrases and sentences, i.e. word order. Arabic allows both SVO and VSO orders, whereas English permits only SVO [18]. Grammar traditionally distinguishes morphology, the internal structure of words, from syntax, which governs how words form phrases and clauses. Highly inflectional languages such as Arabic and Latin express grammatical relations morphologically, whereas English relies more on linear ordering [19]. Derivational morphology creates new lexical items, while inflectional morphology contributes directly to syntactic interpretation at the morpho-syntactic level.

To model these structural relations, the X′ theory offers an explanatory framework consisting of three projection levels: X⁰ (head), X′ (intermediate), and XP (maximal) [9], [12], [13], [16]. In this model, adjuncts attach recursively to X′, complements are sisters to the head, and specifiers occupy Spec-XP. Movement is constrained to Head-to-Head and Specifier-to-Specifier chains [20]. Subjects originate in Spec-VP, verbs in V, and inflectional categories such as Tense, Aux, and φ-features are base-generated in I [21]. Subject–Verb agreement is licensed through the Spec–Head configuration within IP.

For Arabic, VSO arises when the verb moves from V to I to check φ-features (person, number, and gender agreement features), with the subject remaining in Spec-VP; SVO results when the subject moves to Spec-IP, producing full agreement [22], [23], [24]. In Yes/No questions, auxiliaries in I raise to C to establish Subject, Aux inversion [25]. These patterns demonstrate that MSA conforms to the structural predictions of the X′ framework.

The generalised phrase-structure representation of X′ projections can be outlined as the figure below, based on the formulations presented in Radford [9] and Haegeman [25]:

(iv)

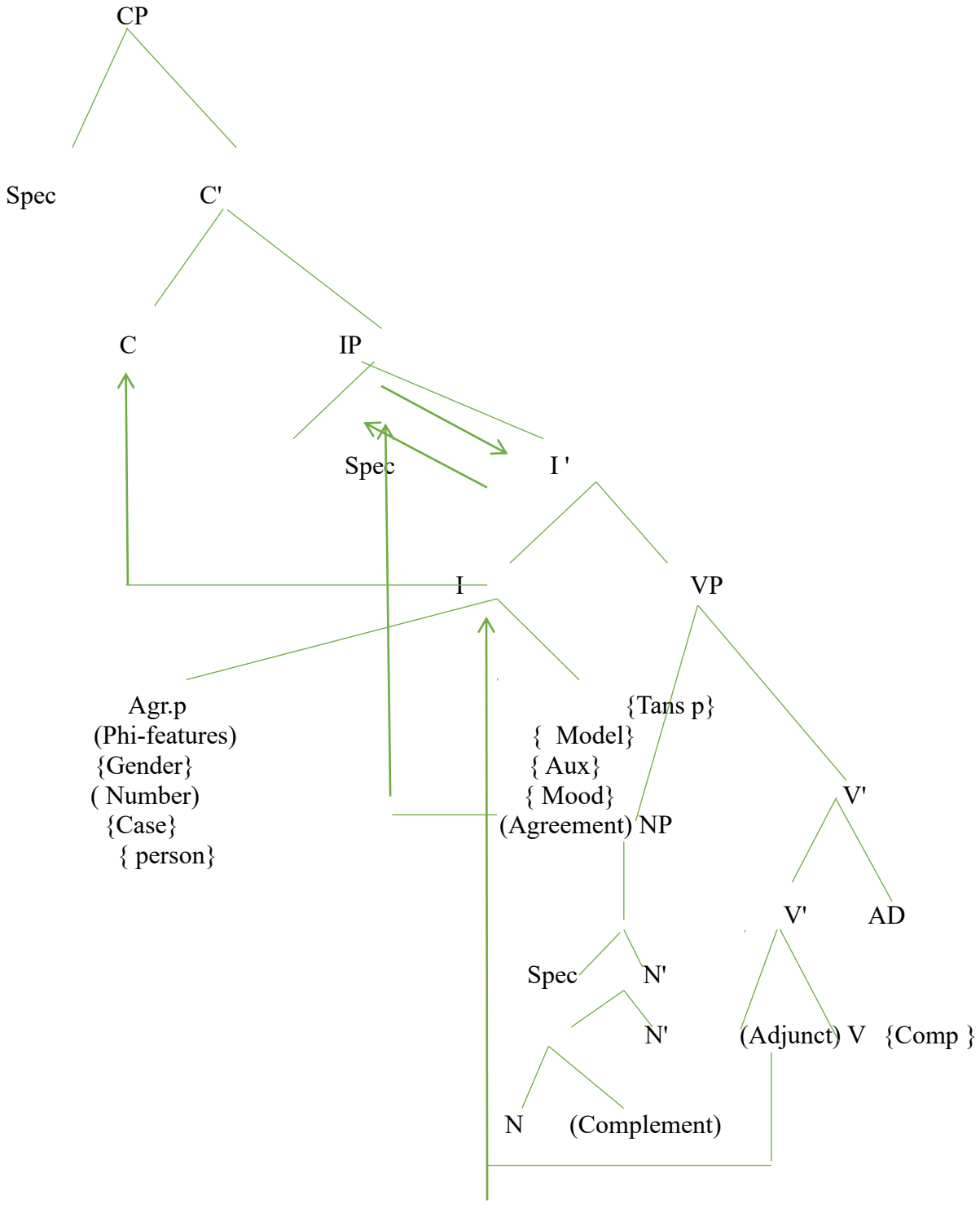

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Figure 1: The generalised phrase-structure representation of X′ projections presented by Radford (1988) and Haegeman. (1991).

Under this framework:

(1) The intermediate X' level is postulated in the theory to receive adjuncts modifying categories at the X' level (recursive application).
(2) X is the Head of the phrase, X' is an intermediate level, and XP is a maximal projection. Every sentence is a Complementiser phrase (CP) category.
(3) Adjuncts are the sister of X' (recursive application).
(4) Complements are daughters of X' and sisters of heads.
(5) Spec-complementiser accommodates nominal categories such as tropicalized, relativised or questioned NPs(Wh-phrases) .
(6) The theory in question is constrained by a set of principles:
    (a) Only head–to–head or spec–to–spec movements are allowed.
    (b) Subject NP is vase-generated in [Spec-VP].
    (c) The verb stem is base-generated under [v] node.
    (d) Tense, Aux, Modal, Mood, etc end Agreement phi-features are base-generated in [I].
    (e) Spec – Head relation trigger Subject-Verb Agreement.

To account for Subject–Verb agreement: The verb moves from [V] to [I] (Head-to-Head) to be checked / to collect the inflectional phi-features. In any sentence containing a VP or NP, a transition occurs to an IP specifier. This transition is necessary because a match between the specifier and its head only occurs within the IP range.

To account for Yes/No question structure, the Modal Auxiliary or the Aspectual Auxiliary, which is base-generated in [I], moves to [C] (Head-to-Head) for Subject–Aux inversion with the Subject NP being in Spec-IP.

To account for the VSO and SVO word sequence in Arabic, we assume that the verb is base-generated in [V] and NP is also generated from spec-VP. To get the VSO order, the verb moves from [V] to [I] (Head-to-Head) to collect the required Phi-features, i.e., in Spec-VP; hence, partial Spec-Head agreement is instantiated.

To obtain the tropicalised SVO word order (i.e., mubtadaʔ wa xabar), topic-comment structure, the verb assumes [V-to-I] movement and the subject moves from [Spec-VP] to [Spec-IP] where full Spec-Head agreement is triggered. In English, a sentence begins with a subject, not a verb. The subject moves to the specifier of IP, the verb goes up to the I position, where Subject–Verb agreement is spelt out on the third singular person (Spec-Head agreement) [17], [22].

X′-syntax [29] begins with the principle that between words and full phrases there are small phrases, resulting in three levels of structure: full phrases, small phrases, and words. These are labelled respectively as X″ (X double-bar), X′ (X-bar), and X⁰ (any word category). In the early 1950s, intermediate X' was used. Harris' study' Immediate Constituents' and study Structural Linguistics [28], developed the structural hierarchy of the phrase category. The transformational model then rapidly evolved through numerous studies. Harris 'article introduces a three-level analysis of the phrase (Number-Notation) corresponding to the (Bar-Notation) proposed by Chomsky **[27],** and the (Prime-Notation) posited by Jackendoff [29]. These alternative but identical systems are the following:

Table 1: Phrase Structure Notational Variants:

Harris(1951)	Chomsky(1970)	Jackendoff(1977)
X (zero)	X	X
X(one)	X(bar)	X(prime)
X(two)	X(double-bar)	X(double-prime)

Being equivalent and in compliance with the general practice, Chomsky's X' system is commonly assumed. As well as Cowper's text (1992) analyses the phrase categories, i.e. NP, VP, AP, AdvP, and PP in terms of their constituent structures. Each phrase is specified by its syntactic positions and the grammatical relations holding among its positions. Accordingly, every phrase is specified in terms of a maximal projection, spec. position, intermediate bar position as a sister of adjunct, and head position as a sister of complement. All various phrase categories together with CP, IP, etc., are conflated into one generalised phrase marker where X is a variable. Symbols that represent (X, X′), each one can represent words/phrases, are used in a sentence like numbers in mathematics. Thus, X can be represented by N, V, A, P, or Adv. XP can be NP, VP, AP, PP, or Adv. P and X′ can represent N, V, A, P, or Adv. Similarly, XP can be NP, VP, AP, PP, or Adv. P also X′ stand for N′, V′, A′, P′, or Adv.

Some phrase structure rules

(a) cp → Specifier+ Complement

(b) Complement → Complementiser +Inflectional Phrase

(c) Inflectional Phrase (IP) → Specifier + Inflection phrase

(d) Inflection phrase → Inflection head (I) + VP

(e) VP → Specifier + the verb head (V')

(f) V' → V' + Prepositional Phrase (PP)
adjunct

(g) NP → Determiner+ Intermediate
projection of the noun

(h) Noun-bar (N') → noun **(**Prepositional Phrase**)**

(i) **PP** → Specifier + the preposition(P)

(j) P → P' + NP

Note : IP Complement of C , VP complement of I , NP complement of V

- X is located under X' and X' under XP .

- Complements lie below X′ in the same plane as X

The figure below was developed in a way that helps the reader comprehend the way of building both phrases and sentences [25]

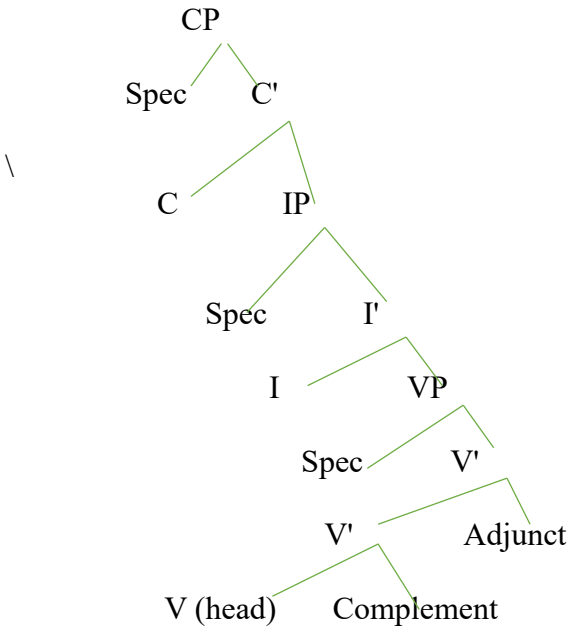

Figure 2: Structural development in a way that helps the reader comprehend the way of building both phrases and sentences presented by Haegeman (1991).

First, adjunct categories are recursive; hence, V' is recursive and appears on both sides of the arrows. Each head has one complement; hence, note recursively. The XP(CP,IP, VP,NP, PP) is the projection of X, which is the head of the phrase. Crucially, the head has an important function in highlighting elements. This advantage can be described as endocentricity, which specifies a head for every phrase.
Secondly, except for the noun in the NP rule, all the other elements in a phrase are non-heads.
Head X and its complement project the X' intermediate level. Adjuncts and their X heads project another X' level. X' and Spec project the overall XP maximum projection.

She is (a student of physics).

Student of physics = **immediate head (N') of the NP**.

Student = **ultimate head (N) of the NP.**

A student of physics is a maximal projection (NP).

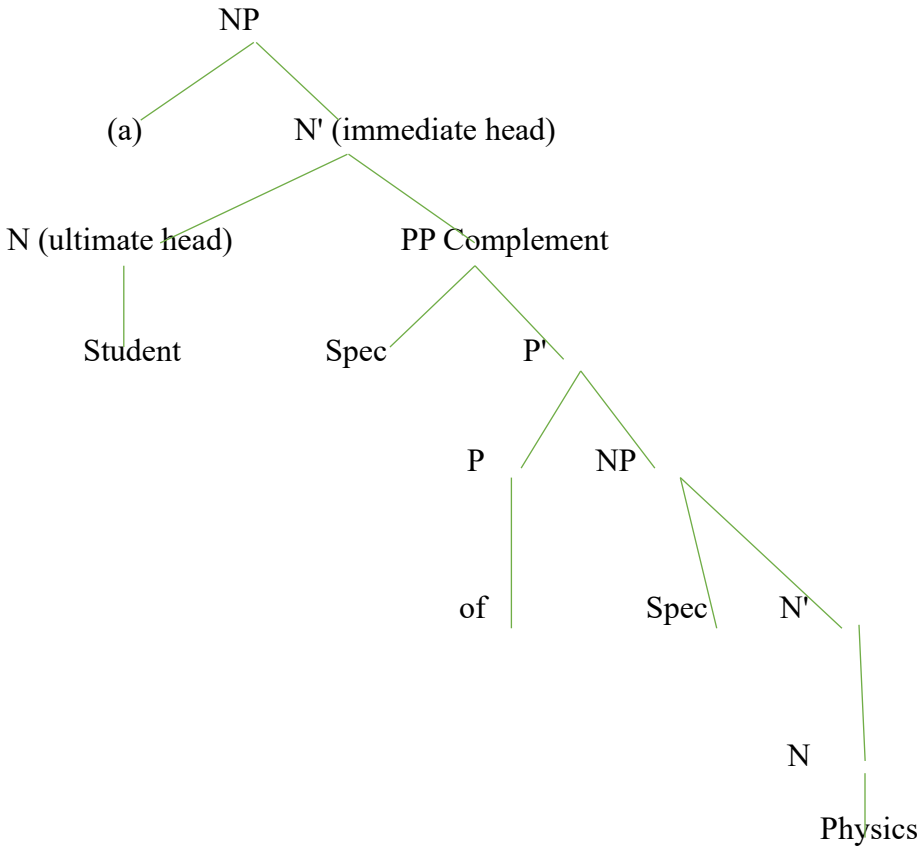

Figure 3: The structure explains that the phrase (A student of physics) is a maximal projection (NP).

X' theory with particular reference to the generalised phrase marker is assumed in most syntactic theories to account for syntactic relations within grammatical constructions. It is necessary to explain the distinction between the complement and the adjunct categories in Arabic. This grammatical contrast is used as proof for the presence of an X'-level in Arabic.

Coordination structures in the Arabic supply division prove to strengthen this claim. Additional place, placing something before and asking a question, ordered explain completer in Arabic are N'-sisters and Adjuncts are N'' sisters. Moreover, waaḥid in line from the verbal referring complex faʿaḷa ka- ðaaḷikaʿ did so in Arabic, is a verb substitute instead of a pro-N form. X′ theory explains how phrases and clauses are structured. One of the basic assumptions in the X' theory is that all phrases across languages are endocentric. This means the phrase and the head have the same category [24] for the morphological nature of the syntactic category of the head in Arabic. Each phrase has a head and a certain (transitive) head, such as (V)erb and (P)reposition take complements.

The four basic constituents of a phrase, of which only the head is obligatory, are the head, the complement, the specifier and the adjuncts. It is assumed in most current syntactic theories that the (deep-)structure configuration.

The relationship of the complement, spec and adjuncts to the head is identical across languages, while their (s) surface-structure ordering among languages is parametric variation. For example, Arabic may have a head-subject complement (VSO), but the X' theory requires that the complement stay next to its head. In traditional Arabic grammar, the structure consists of two parts: a word level e.g. (N)oun, (V)erb, (A)djective, (A)dverb, etc. and where words are organised through linear dependency connection through the sentence. Categorical terms for the notion's 'head' and 'phrase', therefore, seem not to be explicitly established in Arabic traditions. Some structural grammatical relations, such as c-command, were not recognised as well. Arab grammarians used the substitution test to classify words in the language. In this method, only elements of the same type can occupy the same position in a sentence. It is important to know that attributive adjuncts in NPs are pre-modifiers in Arabic and post-modifiers in English. Modifying (Relative) clauses in NP are post-modifying adjuncts in both languages.

3. Methodology

The analysis of Modern Standard Arabic (MSA) sentence structure in this study is grounded in the universal X′ (X-bar) syntactic module, a central component of the Government and Binding framework developed within the generative tradition by Chomsky [27]. The concepts of head, phrase projection, morpho-syntactic features and phonetic transcript are central to this study and are to be explicitly expressed; also, sentences are given an overall English interpretation. The model to be applied throughout this study is Cowper's generalised phrase structure schema [26]. Morpho-syntactic features are basically intended to provide the reader with the necessary inflectional information needed for sentence interpretation. Endocentric Projection, adjunct intermediate X' level and complement zero level are central Notions to the model assumed, drawing on the classical formulations in Radford [9], Kornai [13], Speas [16], and Jackendoff [29].

The generalised X' theory could be extended to account for clausal structure, but we will restrict our analysis to NP and VP structures. Clausal categories are analysed whenever needed. The generalised X' phrase marker shows the syntactic relations holding among the phrase constituents of the sentence. The different syntactic relations within a sentence sort out structural ambiguities within an NP.

The Arabic examples used in this study were based on MSA. Each example was reviewed and verified by three professors of English. The first works as a lecturer in the English Department at Al-Noor University (Mosul, Nineveh, Iraq), the second is a retired professor of English and Linguistics at the University of Benghazi (Libya), and the third is a professor of Arabic Linguistics at the University of Tripoli (Libya).

3.1 Method of Analysis

The analysis applies universal X′ projection principles to each example. Each structure is first transcribed phonetically to indicate accurate pronunciation and inflectional endings, and then annotated with its morpho-syntactic features (case, gender, number, definiteness, tense, aspect, and agreement). Furthermore, the head of the phrase (X^0) is identified as the basis for determining the intermediate projection (X′), and the maximal projection (XP). Complements are assigned to the zero level directly governed by the head, while adjuncts attach at the X′ level in accordance with the standard X′-theoretic hierarchy.
To confirm constituent structure and resolve ambiguities, standard syntactic diagnostics, including coordination, preposing, question formation, extraposition, and pronominalisation, are applied. Then, generalised X′ phrase markers are used to represent hierarchical relations among constituents, as well as to distinguish complement–adjunct configurations. This procedure ensures that all examples are analysed consistently and according to the principles of the X′ model.

4. Data Analysis

This study reveals that nominal phrase (NPs) and verbal phrases (VPs) function effectively within the comprehensive X′ (X-bar) structure developed within generative syntax [13], [21], [27], [29]. According to Ryding[30] in Modern Standard Arabic, nouns such as ', ʔal-ʔardu "the earth", may be made grammatical in two ways: firstly, by prefixing the definite article, /ʔal-/, which is never written as a separate word used to specify an individual entity, The other way to identify nouns in Arabic is through suffixes that can be added to the end of words: Noun – possessor, such as qaṣr-u -hu "his palace".

In other words, examples such as ʔal-ʔardu “the earth” and ʔal-qamaru “the moon” contrast with their indefinite forms ʔard-un “a land” and qamar-un “a moon”. Pronominal suffixes similarly supply definiteness (e.g., qaṣr-u-hu “his palace”; ziyārat-u-hu “his visit”). Proper nouns inherently denote specific entities and may appear with or without /ʔal-/ (e.g., al-ʕIrāq ‘Iraq’; ʿUmān ‘Oman’) [31].

Adjective placement follows the noun and exhibits full agreement in case, gender, number, and definiteness. This is illustrated by contrasts such as ar-rajul-u al-ġabī-u “the stupid man” versus rajul-un ġabī-yun “a stupid man”. Human plurals trigger full plural agreement (rijāl-un ʔaqbiyāʔ-u-n “stupid men”; banāt-un ġabiyyāt-u-n “stupid girls”), whereas non-human plurals invariably take singular feminine adjectives (kutub-un qadīmāt-u-n “old books”; madāris-u-n qadīmāt-u-n “old schools”) [30]. Dual forms marked by -āni (Nominative) and -ayni (Accusative case/Accusative case) display corresponding dual agreement, as in rajul-ā-ni ġabiyā-ni “two stupid men”.

Case morphology plays a major role in identifying NP function: nominative (-u), accusative (-a), and genitive (-i) endings are overt and reliably track syntactic roles. NPs and pronouns can alternate in identical syntactic positions, as in al-bint-u fataḥat al-bāb-a “The girl opened the door” versus hiya fataḥat-hu “She opened it.” MSA further employs a rich pronominal system, personal, demonstrative, interrogative, relative, and reflexive, allowing precise referential tracking across discourse [30].

Within the verbal system, the basic sentence consists of a verb followed by its agent NP, as in qāma Zayd-un “Zayd stood up” [14]. Verbal mood is encoded morphologically: indicative (-u), subjunctive (-a), and jussive (-Ø). Tense categories (present, past, future) correspond to Comrie’s analysis of tense as grammaticalised temporal location [32]. Aspect distinguishes imperfective and perfective event structures [18], and interacts with tense to yield complex temporal, aspectual readings.

Ellipsis data show that Arabic speakers can sometimes leave out a full verb phrase when the meaning is clear from context [9],[33]. This is seen in sentences like:faʿala ka-ḏālika “He did so / He did the same thing.” Here, “did so” replaces an entire VP, not just the verb. In other words, the language allows VP-ellipsis (the deletion of a full phrase).

A central empirical focus is the complement–adjunct distinction within NPs. The structure fāris-un li-l-qaṣr-i bi-miftāḥ-in min ḥadīd-in “a knight of the palace with an iron key” shows that the PP li-l-qaṣr-i “of the palace” behaves as a complement: it must be adjacent to the noun and contributes essential meaning. The PP bi-miftāḥ-in min ḥadīd-in “with an iron key (of iron)” functions as an adjunct, attaching higher and allowing freer distribution. The ungrammatical order *fāris-un bi-miftāḥ-in … li-l-qaṣr-i demonstrates that adjuncts may not intervene between a head noun and its complement, consistent with X′ adjacency restrictions [9], [13], [29].

Syntactic evidence:

Coordination: This grammatical clue supports the distinction between the complement and adjunct in Arabic based on the facts of coordination. Since the complement is related to an N, they are related (and

dependent) at the N̄ level. This distributive constraint shows that only related elements at the same structural level are subject to cohesion. Thus, there are four possible logical constructions (Complement + Complement, Complement + Adjuncts, Adjuncts + Adjuncts, and Adjunct + Complement) [9].

Extra position: Another syntactic argument strengthening the complement/adjunct division in Arabic depends on the syntactic mechanism of extra-position, where prepositional phrase modifiers (1–2) below can be extra-posed from their heads (intervening VP category) more easily than prepositional phrase complements, as shown in (3–4) below.

In an organised structure, the more loosely aPP is connected to its head, the more freely it can be extraposed, for example:

1. fāris-un bi-dirʕ-i-n ḥadīdiyy-in haraj-a

knight-Nom.indef. with shield-Gen. indef. iron-Gen. indef. came in -

3msg

mina l-qaṣr-i

def – place - acc

'A knight with an iron shield went out of the palace'

2. . fāris-un haraj-a mina l-qaṣr-i. bi-dirʕ-i-n ḥadīdiyy-in

knight -Nom.indef. went in-3msg from def-palace-acc with shield -Gen. indef. iron-gen. indef.

'A knight went out of the palace with an iron shield'

3. ṭālib-un mina l-jāmiʕati daxal-a l-faṣl-a

student-Nom.indef. from def-university-f-gen came in-3msg def-class-acc

'A student entered the classroom from the university'.

4. * walad-u xaraj-a min al-bayt-a

boy-nom. indef. Went.out in-3msg def-office-acc from def-house-gen

'A boy left the house'

Pre-posing: The complement (PP) is essential because the verb needs it in (preposed and questioned) and is also flexible. The adjunct (PP), on the other hand, is optional because it provides less important information. Therefore, it is inflexible, and the noun within it cannot move easily. See the e.g. below :

1. ʔal-jaami'a-t-u qaabal-tu ʔustaað-an min - haa
def-university-f-Nom met-1sg professor-acc.indef from -3fsg

'The university met a professor'

Question formation: Complements restrict the semantic selection of their heads, as in ʔayy-u qaṣr-in huwa ʔamīr-un min-hu? "Of which palace is he a prince?" [6], while adjuncts impose no such restrictions.

1 . ʾayyu qassr-in huwa ʔamiir-un min - hu ?
which palace-Gen.indef. he prince-Nom.indef
'which palace is he a prince from?'

Pronominalisation: It's a general property of natural languages that they possess devices for referring to entities mentioned elsewhere in the same sentence or discourse, e.g. 1:

1. A: What do you think of the guy who wrote that unbelievably boring

book on transformational grammar?

B: I can't stand him.

The personal pronoun him substitutes for the full phrase the guy who wrote that unbelievably boring book on transformational grammar, because the antecedent of pronouns like him is not in fact a noun, but rather a whole noun phrase. The same argument holds for Arabic, as shown by the following e.g. 2

2. Hal raʔay-ta l-fatat-a l - karima-t-a ʔalla-ti

q.part saw-2msg def-girl-acc def-generous-face-acc that-3fsg

t-hadath-a-t ʔila ʔaxii -k-a ʔal ʔusbuɛ-a ⌊- maad-i

imp.spoke-3sg.f to brother-2msg(poss) –acc def-week-acc def-last-acc

naɛam raʔay-tu-ha

yes saw-1sg-3fsg

'Did you see the generous girl who spoke to your brother last week?'

'Yes. I saw her'. The objective pronoun suffixed to the verb *raʔaytu* refers back to the whole NP [*⌊-fatat-a l-karima –t-a ʔalla-ti t-hadath-a- t la ʔila ʔaxii –k-a ʔal ʔusbuɛ l-mad-i*].

Pro-N' Status: It is generally accepted (Radford 1988 and Cooper 1992)* that the idiomatic present-tense form "one" is a present-tense form of N′ rather than a pronoun. This present-tense mechanism for N′ has been widely applied to estimate N′ levels across various languages. Arabic is identical to English in two respects: it does not have a present tense form for N, as evidenced by its lack of syntax in (1) below, and it does have a present tense pronoun form for N′, ʾaxara ("another one"), which indicates agreement.

hiya laqiyat ṭālib-an li-l-lughati wa
she met 3msg student-acc.indef. to def-language-gen and

wa ʾanaa laqiytu **ʾaxar-an** li – l - **ʾ ulum-i**
I saw-1sg one(msg)-acc.indef to def- education-gen
'She met a student of language and one of education, ' and I met another one of education. '

5. Ambiguity in the Construct Phrase (NP)

It is a theoretical diagnostic that explains why Arabic requires a three-level X′ structure and how NP/VP behaviour supports it.

It's important to distinguish between two types of ambiguity.

(1) Lexical ambiguity, e.g. *ball* is ambiguous as between a round object and a dance.

(2) Structural ambiguity, e.g. *visiting relatives can be boring, flying planes can be dangerous.*

The ambiguity in the second case might be argued to be structural, that is to say, how we interpret visiting flying depends on whether we take them to be gerunds or adjectives.

Structural ambiguity may rise when a construct phrase NP is modified by an adjunct or an attribute, because the modifying category modifies an N' at different levels.

1. ʔamiir-u l- qassar-i [l - jameel-i]
prince-Nom def-palace-gen def-beautiful-gen
'The beautiful prince of the palace'

2. ʔamiir-u [l - qassar-i ⌊ - jameel-i]

prince-Nom [def-palace-gen def-beautiful-gen]
'The prince of the beautiful palace'

In (1), the bracketed AP l–l-jameel-i 'beautiful' modifies the entire preceding construct–state N' (see ix below) while in (2) the bracketed AP l–l-jameel-i 'beautiful' modifies the N' second-term of the construct–state ⌊ - qassar-i. "The palace" (see ix below).
This structural relation can be expressed in terms of the following configuration:

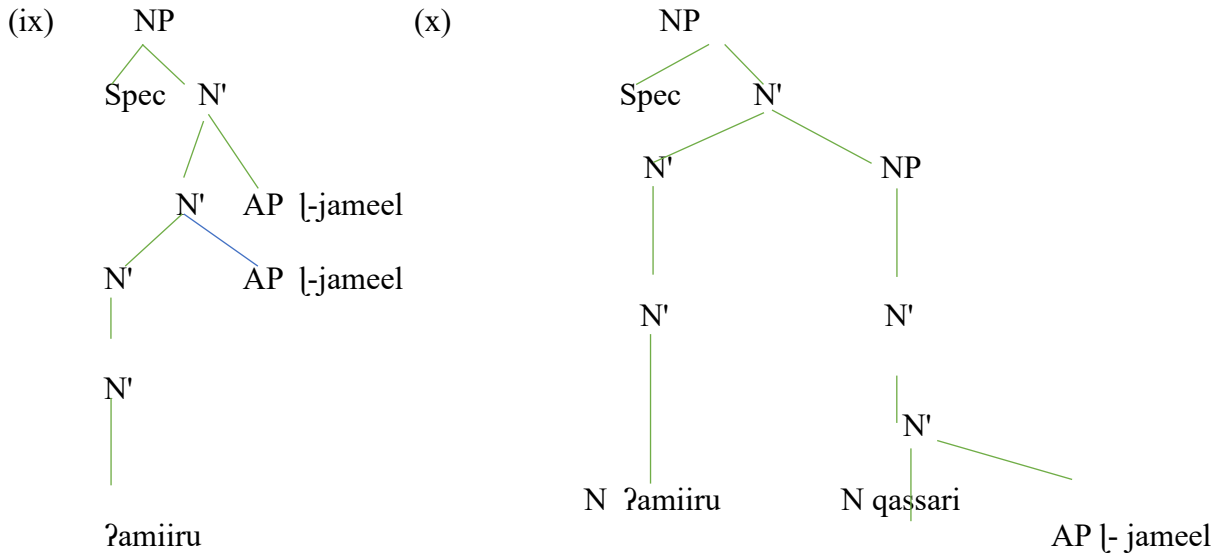

Figure 4: States the Ambiguity in the Construct Phrase

Hornstein and Lightfoot [34] claim that each N′ - specifies a semantic property. The fact that (ix) contains two modified N′-level constituents entails that it attributes two properties to the head N *ʔamiir-u* 'prince'; namely, that first he is a beautiful prince, the second he is a prince of the palace. By the same token, (x) contains only one modified N′ constituent; it follows that it attributes only one semantic property to the head N - N-*ļ-qassari* 'the palace', which is that it is beautiful.

6. Analysis of VP within X′

The VP structure in Arabic shows a symmetrical behaviour with the structure of the NP exhibits the same three X′ structural levels shown by the nominal phrases discussed and illustrated above. Thus, a VP, in line with the nominal phrase structure, is made up of a lexical head (verb). Arabic has pro-V' but not pro-V. The pro-V'-complex, in Arabic, is:

. 'fa ' al-a (ka) thaali - ka '
did-3msg (like / as) that-3msg
'He did so / likewise.'

This verbal complex may substitute for V' and VP categories but not for the head V as exemplified

by the following : (see gapping and ellipsis above).

V - level

. 'axī ḍaraba-a ļ-kalba-a wa ka-ṯhaalika
brother-1sg: poss hit-3msg def-dog-acc and so

fa 'alat 'uxt-i l-qiṭṭa-a
did-3fsg sister-1sg.poss def-cat-acc
'*My brother hit the dog and my sister did so the cat.'

V′ - level

. ’uxt-i ba‘aṯa-t risālat-an ’ilā wālidat-ī wa
sister-1sg.poss sent-fsg letter-Ia to-mother-1sg.poss and

’ax-i fa ‘al-a ka-thaalika
brother-1sg.poss did -3msg likewise / so
‘Sister sent a letter to my mother and so did my brother.’

The grammatical phrase marker below illustrates the syntactic relations holding among the sentence constituents, more specifically, how NP and VP are related within a comprehensive syntactic construction expressed by e.g. below:

. ʔinnæ ʔæl walad-u wasal-a ʔilæ l-madrasa-t-i muta’axr-an
that def the boy-Nom arrived-3msg to def-school-f.gen late-acc
‘the boy arrived to school late’:

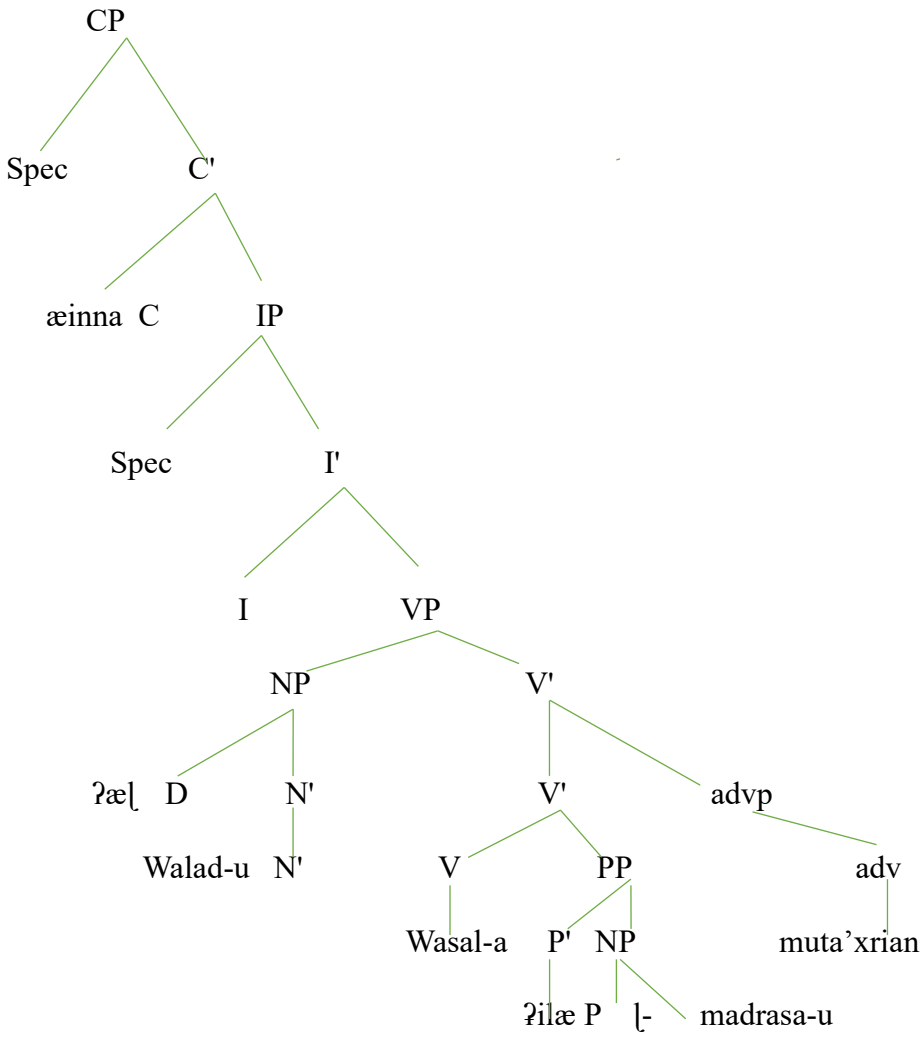

Figure 5: State the Analysis of VP within X′

7. Conclusion

The analysis of the Noun Phrase (NP) and Verb Phrase (VP) structures in Modern Standard Arabic (MSA) within the X′-theoretic framework posed two principal challenges. The first involved establishing NP and VP as independent phrasal categories in MSA and clarifying their syntactic functions within the broader architecture of the sentence. The second difficulty is reflected by using the X′ approach.

The findings of this study indicate the existence of phrasal categories as constituents of Arabic sentences; it is assumed that Arabic sentences are structured out of words, and these words are related linearly. However, the Arabic language has shown consistency with the syntactic theory of "X′" because it distinguishes between complements and adjuncts. It has been shown above that complements and adjuncts stand in different syntactic relations to the head noun within the NP. It is worth noting that the complement and the head noun are inherently adjacent and there is no space between them, while an adjunct usually follows the noun in Arabic. As explained previously, grammatical processes can be understood through complements and adjuncts. These grammatical processes provide empirical evidence resulting from the actions of both complements and adjuncts, leading to the final conclusion that the Arabic language is not linear but hierarchical.

The cumulative evidence strongly indicates that Arabic requires an intermediate X′ projection to account for its constituency patterns. The hierarchical behaviour of both NP and VP constructions supports a three-level phrase structure, rather than a flat or two-tier model. Furthermore, the analysis of VP ellipsis, pro-N′ phenomena, and construct-state configurations reinforces the claim that Arabic phrase structure is endocentric and projection-driven, in line with universal assumptions of X-bar theory.

Overall, the study concludes that Modern Standard Arabic conforms to the central predictions of X′ theory. Head elements in the Arabic project systematically form phrasal categories, and these phrasal categories in turn project to higher sentential constituents, creating a fully hierarchical structure. Consequently, Arabic sentences, like those of other natural languages, are best analysed as compositions of layered phrases that occupy well-defined syntactic positions. These findings directly achieve the study's aims by establishing NP and VP as independent phrasal constituents within MSA and by demonstrating that their internal organisation aligns with the structural assumptions of the X′ (X-bar) theoretical framework.

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