

## Phi-features, definiteness, and Case in Standard Arabic adjectival agreement: A feature sharing approach<sup>1</sup>

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### ملخص :

تهدف هذه الدراسة الى الإجابة عن السؤال الآتي : كيف يمكن تحليل التوافق اللغوي وتفسيره في العبارة الوصفية بين الاسم والموصوف في النوع (التذكير والتأنيث) ، التعريف والعلامات الإعرابية في العربية الفصحى ؟ ومن خلال البحث والدراسة في تطبيق النظريتين في اللغة الانجليزية : نظرية نوم تشومسكي (2000 ، 2001) الخاصة بتقييم السمات و نظرية فمتن – جتمن (2006) و بستسكي – ترجو (2007) الخاصة بمشاركة السمات اللغوية تبين بأن النظرية الأولى لتشومسكي غير قادرة على تحليل التوافق اللغوي وتفسيره بين الصفة والموصوف ، بينما تقدم النظرية الأخيرة تحليلاً وتفسيراً علمياً مبسطاً لظاهرة التوافق اللغوي بين الصفة والموصوف في النوع (التذكير والتأنيث) ، التعريف والعلامات الإعرابية. كما أوضحت الدراسة أن المشكلة في نظرية تشومسكي تكمن في الافتراضات النظرية لعملية التوافق اللغوي والتي تمت إعادة صياغتها وتعديلها بشكل مبسط في نظرية (فمتن – جتمن و بستسكي – ترجو) القائمة على أساس عملية مشاركة السمات اللغوية الموحدة في عملية التفسير والتحليل في دراسة الصفة والموصوف من حيث النوع (التذكير والتأنيث) ، التعريف والعلامات الإعرابية في اللغة العربية وأظهرت نتائج الدراسة أن هناك توافقاً لغوياً بين الصفة و الموصوف في النوع (التذكير والتأنيث) ، التعريف والعلامات الإعرابية.

### Abstract:

The objective of the study is to provide an answer to the following question: How can phi-features, definiteness, and Case in Standard Arabic adjectival agreement be accounted for in minimalist syntax? The study explores different morpho-syntactic models of adjectival agreement and feature valuation and points out their empirical predictions; more particularly, it examines Chomsky's the Agree model and the feature sharing approach of Frampton & Gutmann and Pesetsky & Torrego. Moreover, it shows that the Agree model of Chomsky could not offer a satisfactory account of phi-features, definiteness, and Case in Standard Arabic adjectival agreement while the feature sharing approach of agreement advocated in Frampton & Gutmann and Pesetsky & Torrego provides a unified treatment of the subject under investigation. It demonstrates that the feature sharing approach creates a permanent link between the two agreeing nodes in the syntactic analysis of phi-features, definiteness, and Case in Standard Arabic adjectival agreement; it is in this framework that the Agree operation is viewed as a *feature sharing* operation assumed to unify two feature occurrences into two instances of one shared formal object. It has been found in this study that the proposed formulation of Agree operation shows that Agree creates a permanent link between two agreeing nodes, thus resulting in forming a single formal object rather than two independent objects. Interestingly, it is shown that Standard Arabic postnominal adjectives agree with the noun they modify in gender, number, definiteness, and Case.

**Key words:** Feature sharing, feature valuation, adjectival agreement, phi-features, definiteness, Case.

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## 1. Introduction

The morpho-syntax of phi-features, definiteness, and Case in Standard Arabic adjectival agreement is a topic that has received relatively little attention in the linguistic literature, in general, and Standard Arabic, in particular. The present study focuses primarily on the phi-features, definiteness, and Case in Standard Arabic in postnominal adjectives and seeks to provide a satisfactorily unified account on the subject under investigation within the feature sharing framework of Frampton & Gutmann (2006) and Pesetsky & Torrego (2007). In other words, it develops an analysis of phi-features, definiteness, and Case in Standard Arabic adjectival agreement that builds upon the views of Frampton & Gutmann and Pesetsky & Torrego of agreement, valuation and interpretability. Let us consider the following examples to demonstrate the agreement phenomenon in the Standard Arabic adjective phrase: there is agreement in phi-features (gender (1a, b) and number (1c, d)).

- 1a. rajul-un      ʔariyy-un  
man.Nom      rich.M.SG.Nom  
'a rich man'
- b. ʔimraʔat-un      ʔariyy-at-un  
woman.Nom      rich.F.SG.Nom  
'a rich woman'
- c. riǰa:l-un      ʔaʔria:ʔ-un  
men.Nom      rich.M.PL.Nom  
'rich men'
- d. nisa:ʔ-un      ʔariyya:at-un  
women-Nom      rich-F.PL-Nom  
'rich women'

Standard Arabic adjectives also agree with the noun they modify in Case, as demonstrated in (2) below.

- 2a. qa:bal-tu      rajul-an      ʕaDi:m-an  
met.I.Nom      man.Acc      great.M.Acc  
'I met a great man.'
- b. jalas-tu      ʕala      kursiyy-in      khashabiyy-in  
sat.I.Nom      on      chair.Gen      wooden.Gen

‘I sat on a wooden chair.’

Moreover, the definite article does not inflect for gender and number in Standard Arabic, as demonstrated in (3) below.

- |                               |                    |                   |
|-------------------------------|--------------------|-------------------|
| 3a. walad-u-n                 | muʔaddab-u-n       |                   |
| boy-Nom-indef                 | polite-Nom.indef   |                   |
| ‘a polite boy’                |                    |                   |
| b. al.walad-u                 | al-muʔaddab-u      |                   |
| the.boy-Nom                   | the.polite-Nom     |                   |
| ‘the polite boy’              |                    |                   |
| c. katab-at                   | risa:lat-a-n       | qaSi:rat-a-n      |
| wrote.she.Nom                 | letter.F.Acc.indef | short.F.Acc.indef |
| ‘She wrote a short letter.’   |                    |                   |
| d. katab-at                   | ar-risa:lat-a      | al-qaSi:rat-a     |
| wrote.she.Nom                 | the.letter.F.Acc   | the.short.F.Acc   |
| ‘She wrote the short letter.’ |                    |                   |

As exemplified in (3), the contrast between an indefinite and a definite noun is observed in (3a,c) and (3b,d). An adjective has the same definiteness marker as the noun it modifies; the prefix *al-* is used to mark definiteness while the suffix *-n* is used for indefiniteness.

On the other hand, some proposals on (in)definiteness have also been assumed in different morpho-syntactic frameworks, as seen in the works of Fassi Fehri (1999); Kremers (2003, 2005); Kramer (2010); Al-Qassas (2013); Al-Mamoud (2014); among others. However, what can be observed in their accounts is that they adopted different syntactic approaches which were neither economical nor satisfactory, as will be demonstrated below. Their analyses did not address the topic of phi-features, definiteness, and Case in Standard Arabic adjectival agreement in detail.

The objective of this study is to present a unified account which seeks to neatly describe and explain the morpho-syntax of phi-features, definiteness, and Case in attributive adjectives in Standard Arabic. It attempts to show that Chomsky’s (2000, 2001) Agree theory could not provide a satisfactory treatment of the topic in question as compared to the proposed analysis of feature sharing framework advocated in Frampton & Gutmann (2006) and Pesetsky & Torrego (2007) which has also been applied successfully to the Standard Arabic data. Having surveyed all the different accounts proposed for phi-features, definiteness, and Case in Standard Arabic

adjectival agreement, the present study proposes an analysis of the morpho-syntax of phi-features, definiteness, and Case in Standard Arabic adjectival agreement within the minimalist framework of feature sharing theory. On the basis of a more general theoretical perspective, this study aims to show that this topic presents empirical evidence in support of exploring natural language phenomena where the value of a feature on one node depends on the value of the same feature on another node as feature sharing. This, of course, contradicts the assumptions of the checking/valuation deletion approach advocated in the minimalist literature. It will also point out that the proposed feature sharing analysis makes use of the transitivity of the feature sharing operation to correctly grammatically derive the right structures in the syntax.

The paper is, therefore, organized as follows: Section 2 surveys the previous studies and approaches to phi-features, definiteness, and Case in adjectival agreement in Standard Arabic and other languages and provides some basic background on the question under study. It is argued that none of the analyses of these previous approaches presents a satisfactory treatment of phi-features, definiteness, and Case in Standard Arabic adjectival agreement. Section 3 is assigned for an analysis and discussion of postnominal adjectives in Standard Arabic. Section 4 proposes an alternative analysis based on the feature sharing framework; it presents a satisfactorily unified account of phi-features, definiteness, and Case in adjectival agreement in Standard Arabic. Section 5 concludes the findings of the study.

## **2. Literature Review**

### **2.1. Chomsky's (1995, 2000, 2001) analysis of predicative agreement**

In this study an attempt is made to present an analysis of adjectival agreement within DP which departs from Chomsky's (1995) accounts of predicative agreement. On the basis of Standard Arabic, it is argued that for attributive adjectives analyses such as Chomsky's (1995: chapter 4) adjectival agreement in copula constructions are not possible.

A closer look at the earlier version of the Minimalist Program shows that Chomsky (1995: chapter 4) proposes two different analyses of adjectival agreement in copula constructions, i.e., agreement between a DP and a predicative adjective. In the earlier version of the Minimalist Program, Chomsky indicates that predicative adjectives carry –interpretable features such as number and gender, i.e., nominal features, which are licensed in overt syntax. Licensing/checking takes place in a Spec-Head relationship. On the basis of Chomsky's (1995) minimalist analyses,

the interpretable nominal features of the adjectival head are eliminated before LF by means of overt movement of the DP to a Spec-position. According to Chomsky's (1995, p. 283) analysis, the predicative AP takes the adjective as its head and the noun as its subject. The AP is dominated by an AgrAP. The DP which moves to [Spec-IP] to license/check its Case-feature passes through [Spec-AgrAP]. Given this, the adjectival head moves to the head of [AgrAP] so that its –interpretable phi-features are checked and eliminated in the syntax via the Spec-Head relation with the DP in the [Spec-AgrAP] configuration. DP originates in the inner Spec-position and moves to the outer Spec-position where it enters into the checking domain of the adjective. Chomsky suggests that the adjective is assigned the feature [nominal-] as it is drawn from the lexicon. DP raises to the outer Spec required by the strong feature, entering the checking domain of the adjective. Given this, the problem of the overt raising of the adjective in spite of the weakness of Agr in English is avoided.

In his minimalist work on agreement analysis, Chomsky (2000, 2001) states that the functional heads T and v enter the derivation with unvalued phi-features, which are then valued and deleted when they enter an Agree relation with a noun phrase which bears a full set of valued phi-features. In Chomsky's minimalist analysis an important distinction is made between nodes that are phi-complete and those that are not; only an Agree relation having a complete set of phi-features can result in deletion of uninterpretable features of the probe. Chomsky stresses that if a T/v head agrees with a node unspecified for some phi-features, such agreement cannot delete the phi-features of the functional head.

The formalization of agreement in Chomsky's (1995) the Minimalist Program is significantly more explicit and restricted in this respect. However, the more recent Agree operation is defined in Chomsky (2000) as a relation involving two nodes- a Probe and a Goal:

Probe: a head that bears one or more uninterpretable features

Goal: the closest (active) node c-commanded by the goal which bears a matching interpretable feature.

## **2.2. Previous accounts on phi-features, definiteness, and Case**

A closer look at the phenomenon of definiteness spreading shows that it has attracted a great deal of attention and, over the years, a large number of analyses have been proposed to account for it. The literature illustrates that the previous analyses of definiteness spreading can be

classified into four accounts on the basis of the approaches adopted: (i) Agreement (Fassi Fehri 1999, Ritter 1991, Siloni 1997), (ii) Incorporation and word formation (Benmamoun 2003, Borer 1999), (iii) Reentrancy and constraint-based approaches (Falk 2006, Winter 2000), and (iv) Semantic composition (Dobrovi-Sorin 2000).

The most influential analysis of Construct State Nominals (CSNs) within the generative tradition is the one proposed by Ritter (1991), which discusses agreement. With respect to definiteness spreading in a CSN, Ritter (1991) argues that the phonetically null D head of a CSN is not inherently specified for a definiteness value. Hence, the head of NP enters into a Spec-head agreement relation with the genitive DP in [Spec, NP], which results in the N acquiring the definiteness value of its specifier.

On the other hand, Danon (2007) points out a structural problem to the analysis of definiteness in the adjectival construct state in Hebrew, which has to do with constructs that serve as modifiers. According to Danon (2007), the adjectival construct state in Hebrew is a modifier of the definite-marked noun. It can be noted that, like simple adjectives, the adjectival construct state in Hebrew agrees with the noun in number, gender, and definiteness (Borer 1999, Hazout 2000, Wintner 2000). Unlike simple adjectives, Danon argues that the agreement here seems to be ‘distributed’; while the adjectival head of the construct state overtly agrees with the modified noun in gender and number, definiteness agreement is overtly marked on the nominal phrase embedded within the construct state. It is important to note that this is indeed definiteness concord with the modified noun, and not independent definiteness marking that is semantically motivated.

Unlike these accounts, the present study will not make use of any movement operations or morphological incorporation mechanisms; instead, it will argue, later on in this paper, for an implementation of feature sharing that uses nothing but an independently motivated notion of agreement.

### **2.3. Phi-features and Case in Standard Arabic: an overview**

With a closer look at the existing syntactic literature, we can find that various proposals that account for the assignment of Case and agreement have been made. For instance, Chomsky (1991) proposes that different projections are responsible for the two types of features. Case is assigned when a DP moves to [Spec-TP], while agreement is established when a DP moves to

[Spec-AgrP]. By contrast, Agree divorces feature checking from movement (Bobaljik and Wurmbrand 2005). Furthermore, Case and agreement are assigned under c-command via the same Agree operation. A head, T, checks the Case of a DP with a matching Case feature and, in turn, that DP checks the agreement features on T. Therefore, the prediction is that Case and agreement should necessarily pattern together: verbs should agree with DPs that are in a Case relationship with T.

Moreover, Ussery (2011) indicates that Case-agreement asymmetries can be found in a number of languages. For instance, in Icelandic constructions with Nominative objects, the verb optionally agrees with the Nominative subject, as shown in (4). Moreover, finite verbs in Standard Arabic agree in person, gender, and number with pre-verbal (Nominative) subjects. However, verbs agree in person and gender only with post-verbal subjects in Standard Arabic.

4. Mér líkuðu/líkaði þessar hugmyndir *Icelandic*  
 me.Dat liked.3pl/3sg these ideas.Nom  
 ‘I liked these ideas.’

Ussery (2011) argues that Case and phi-features on T probe independently. In (4), there are two possible derivations. It can be observed that in (5a) both [Nom] and [Number] features probe the object, which results in agreement. By contrast, in (5b) the [Nom] feature probes the object, while the [Number] feature does not, which results in the default verbal form.



Ussery indicates that as the current formulation of Agree requires a c-command relationship it can be assumed that the Agree relation can hold either under c-command or in a Spec-head configuration. He stresses that the difference between (5a) and (5b) arises because the features [Nom], [Person], and [Gender] may probe in either configuration while the [Number] feature can probe only the specifier. According to Ussery, the standard minimalist account is that Case and agreement are assigned via the same Agree operation under the c-command configuration. T is merged with a valued [Nominative] Case feature and unvalued [ $u\Phi$ ] phi-features. On the other hand, DPs are merged with an unvalued Case feature and valued phi-features. The probe, the functional head T, values the Case of a DP goal with an unvalued Case feature and, in turn, that DP values the phi-features on T. Since T is also in an Agree relation with V, the verb exhibits the

phi-features of the DP to which T assigns Case. T, then, mediates the relationship between the Nominative DP and the verb in the syntax.

Concerning Case-agreement asymmetries and word order effects, Samek-Lodovici (2003) points out that, in languages that allow the subject to appear either preverbally or post-verbally, agreement either remains the same or agreement in the postverbal configuration is impoverished with respect to agreement in the preverbal configuration. Interestingly, preverbal agreement is not impoverished with respect to postverbal agreement. For instance, in Standard Arabic SVO word order, finite verbs agree in person, gender, and number with pre-verbal (Nominative) subjects, as shown in (6a). However, in Standard Arabic VSO word order, verbs agree in person and gender only with post-verbal subjects, as shown in (6b).

6 a. al-banaat-u      darab-na / \*-at                      al-ʔawlaad-a

the-girls-Nom hit-past-3fem.pl./\*3fem.sg the-boys-Acc

‘The girls hit the boys.’

b. Darab-at / \*-na                      al-banaat-u      Zayd-an

hit-past-3fem.sg / \*3fem.pl the-girls-Nom Zayd-Acc

‘The girls hit Zayd.’

(Samek-Lodovici, 2003, p. 5)

Building on the proposal that Case and phi-features are individual probes on T, it has been assumed that the individual features can probe independently. The difference between (6a) and (6b) arises because the [Nom], [Person], and [Gender] features may probe either [Spec-TP] or the c-command domain, while the [Number] feature can probe only [Spec-TP]. In (7a), the subject moves to [Spec-TP] for EPP and all of the features on T Agree with it. By contrast, in (7b), the subject does not move to [Spec-TP] and the directionality restrictions on [Number] prevent it from probing the subject.



There is another way to look at the asymmetries that hold between different types of features. In Standard Arabic, for instance, perhaps Agree simply holds under c-command in the syntax. T probes the Nominative DP and the DP either moves to [Spec-TP] for EPP or remains vP-internal. While descriptively, a post-syntactic proposal captures the facts, it does not provide a motivation for deriving these facts. We do not have a reason for why preverbal agreement tends

to be more fully expressed than post-verbal agreement. What we observe, though, is that probing of a specifier is less restricted than probing under c-command. In Standard Arabic, [Number] can only probe the specifier, and in Icelandic, [ $u\Phi$ ] necessarily probes the specifier.

In short, attempts have been made to show that Case and phi-features are not indivisible feature bundles. In an attempt to account for the asymmetries between Case and agreement and the asymmetries between individual agreement features, Ussery (2011) assumes that phi-features on T probe independently of the Case feature on T. Furthermore, he offers the evidence that probing is not restricted to a c-command relation and in turn proposes a revised definition of Agree which allows for probing to take place either under c-command or in a [Spec-head] configuration. The reason, according to Ussery, why Case and phi-features are allowed to probe independently is that a feature may be deleted without being checked, while other features remain active and enter into Agree relations.

Moreover, Fasih (2015) explores the syntax of structural (nominative and accusative) Case assignment in Standard Arabic and attempts to provide a unified account of structural Case assignment in VSO structures, verbal copular sentences, and SVO structures introduced by the complementizer *?inna* in SA. Fasih's analysis demonstrates that the features (nominative Case and phi-features) of the subject (as the Goal) can be valued either under a long-distance Agree relation when the subject remains in situ in VSO structures or by raising the subject DP from [Spec-vP] to [Spec-TP] in SVO structures in Standard Arabic. The study shows that in VSO structures the nominative Case feature of the subject DP is valued postverbally in [Spec-vP] and that it does not derive syntactic movement, because the head C of the CP phase lacks an edge feature (i.e., tense feature) which initiates subject movement.

In more recent studies on the assignment of structural Case and the syntax of word order derivation in Najrani Arabic, Fasih and Al-Sharif (2016) stress that Case in Najrani Arabic is abstract. That is, Case is not overtly morphologically realized in the language, similar to that of English. The study examines structural Case assignment in VSO and SVO structures in Najrani Arabic within Chomsky's (2001, 2002) Agree theory and demonstrates that structural Case in Najrani Arabic is assigned via an Agree relation between a probe and a goal within a c-command domain. In VSO structures, for instance, nominative Case is assigned by the C-T complex via an Agree relation established between T and the subject in [Spec-TP] while accusative Case is a reflex of an Agree relation between the light v and the object DP. Moreover, Fasih and Al-Sharif





generated on the lexical host via definiteness agreement with abstract D (Fassi Fehri 1999). Given this, Alqassas (2013) argues for a hybrid account on the basis of Kramer (2010), in which NP determiners realize a [DEF] marked D head, whereas definiteness agreement markers for adjectives realize a [DEF] feature added at PF. It should be mentioned that Alqassas's (2013) analysis avoids, what he calls, extra feature sharing Agree proposed by Frampton & Gutmann (2006) and Pesetsky & Torrego (2007).

### 3. Analysis and discussion of postnominal adjectives in Standard Arabic

The common tradition in Standard Arabic grammar is that postnominal adjectives follow the noun they modify and agree with it in gender, number, definiteness, and Case. It should be mentioned that postnominal adjectives are more commonly used than prenominal adjectives in Standard Arabic daily life uses. To illustrate how postnominal adjectives are used in Standard Arabic grammar, let us consider the examples in (13).

- 13 a. waSala            rajul-u-n            kari:m-u-n  
       arrived.M.SG    man.Nom-indef    generous.M.SG.Nom.indef  
       ‘a generous man arrived.’
- b. waSal-at            ?imra?at-u-n            kari:mat-u-n  
       arrived.F.SG    woman.Nom.indef    generous.F.SG.Nom.indef  
       ‘a generous woman arrived.’

From the sentences in (13), it can be clearly pointed out that the APs follow syntactically their modifying NPs. A closer look at these sentences reveals that postnominal adjectives show full agreement with their preceding nouns, respectively, in phi-features (gender [masculine] and number [singular]), Case, and (in)definiteness. What is really interesting in Standard Arabic is the syntactic position of the adjective and its agreement relation to the head noun within the DP structure. It can be observed that adjectives in Standard Arabic follow the noun they modify and show full agreement with it in gender, number, definiteness, and Case; this can be attributed to the fact Standard Arabic has a rich inflectional paradigm. However, there are some cases in which this adjective order is reversed, where the adjective phrase precedes the noun phrase. Such adjectives are known as prenominal adjectives. This is demonstrated in (14) below.

14. Determiner Phrase (DP) + **Adjective Phrase (AP)** + Noun Phrase (NP)

For the sake of illustration, the order in (14) can be further exemplified in the following example in (15).

15. taḍawwaq-tu    laḍi:ḍ-a            al-ṣaSi:r-i  
       tasted-I.Nom    delicious.Acc    the.juice.Gen  
       ‘I tasted the delicious (of the) juice.’

It is obvious from (15) that the prenominal adjective *laḍi:ḍ-a* ‘delicious’ precedes the NP *al-ṣaSi:r-i* ‘the juice’. It can also be observed that in the construction in (15) the adjective is heading a synthetic genitive. While this prenominal adjective *laḍi:ḍ-a* ‘delicious’ receives external structural Case, the nominal complement receives Genitive Case. This phenomenon is known in Standard Arabic grammar as prenominal adjectives. However, this is not our concern in this study; the focus is only on postnominal adjectives here.

#### 4. Alternative analysis: a feature sharing approach

The question, then, is what alternative analysis can be formulated under current Minimalist assumptions. Our proposed alternative analysis on phi-features, definiteness, and Case in Standard Arabic adjectival agreement is based on Frampton & Gutmann’s (2006) and Pesetsky & Torrego’s (2007) framework which modifies Chomsky’s (2000, 2001) notion of agreement in order for this agreement to create two instances of the same formal object instead of having two distinct objects which match in value. This proposed framework is more economical and satisfactory.

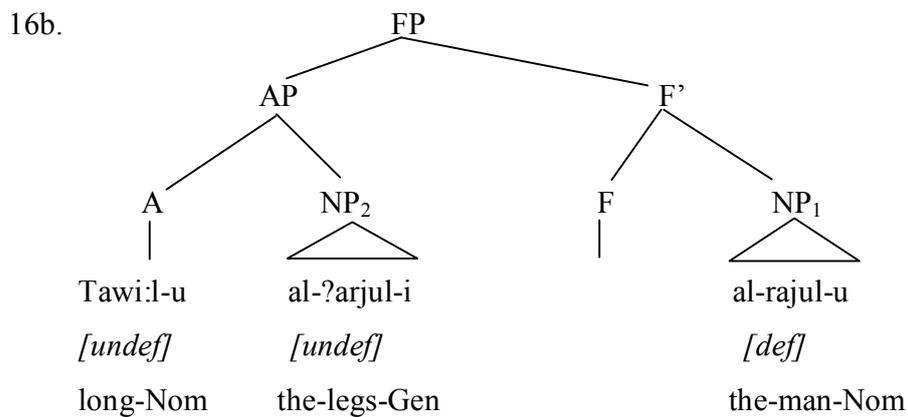
##### 4.1. Phi-features, definiteness, and Case in SA adjectival construct state

Given the preceding sections on feature sharing, let us now consider how phi-features, definiteness, and Case in Standard Arabic adjectival agreement in the construct state interact with the assumptions of feature sharing operations and how to provide a satisfactorily unified account of the subject under investigation. To illustrate the point, let us consider the following example from Standard Arabic.

- 16a. al-rajul-u            Tawi:l-u            al-ʔarjul-i  
       the-man-Nom    long-M-SG-Nom    the-legs-Gen  
       ‘the long-legged man.’

Before proceeding further to analyze the Standard Arabic data in (16), let us assume the following:

- The head of the adjectival phrase is lexically specified to enter the derivation with an unvalued [def] feature.
- The nominal head of the construct state internal NP also enters the derivation with an unvalued [def].



As shown in the Standard Arabic clause structure in (16b), there is a problematic issue here. The modified NP *al-rajul-u* ‘the man’ carries a valued definiteness feature and the embedded NP of the adjective construct state (NP<sub>2</sub>) carries an unvalued one, we do have the c-command relation required for the Agree operation to hold between the probe NP<sub>2</sub> (or its head) and the goal NP<sub>1</sub> *al-rajul-u* ‘the man’. The problem is this as AP does not c-command NP<sub>1</sub>, this assumption, given the standard analysis of the Agree operation, may not result in valuing the definiteness feature on NP<sub>2</sub> but may be confined to the feature on the AP. As illustrated in the clause-structure (16b) above, the standard view of Agree does not create a permanent link between two agreeing nodes. The other problematic issue is that the standard Agree might not even hold between A (or AP) and NP<sub>2</sub>, for the reason that this would be a vacuous operation, because it involves two unvalued features, where none of them can be valued because of this agreement.

However, the present study argues that the solution to this problem can be found in the proposals proposed by Frampton & Gutmann (2006) and Pesetsky & Torrego (2007), who stress that the operation Agree establishes a permanent link between two instances of the definiteness feature. They indicate that this permits valuation of one instance by valuation of the other. This is carried out by a future Agree operation with an additional instance of the definiteness feature. To

illustrate the point let us closely examine how the derivation of (16a), represented on the clause structure in (16b), proceeds further as follows: first, it is assumed that what happens in (16) is that the head of the adjectival construct state probes for the unvalued definiteness feature of NP<sub>2</sub>. Consequently, the two unvalued occurrences of the [def] feature become two instances of a single shared feature. This analysis differs from that of standard Agree of Chomsky's (2000, 2001), which needed either the adjective or the NP<sub>2</sub> to bear an interpretable definiteness feature to show agreement between these two nodes to be possible. Second, having merged the whole adjectival construct state into a functional projection dominating NP<sub>1</sub>, an additional Agree operation takes place between AP and NP<sub>1</sub>. As the feature on NP<sub>1</sub> is valued, this leads to the valuation of the [def] feature on AP, being also shared by the embedded NP<sub>2</sub>. Third, it is assumed that the D head of the whole modified NP (not shown in the clause structure in (16b)) enters Agree with the [def] feature on NP<sub>1</sub>. Given all this above, the result is a single valued feature with four instances. Hence, all unvalued features are valued by the computational system. Moreover, concerning the interpretability of the definiteness feature, the thesis of radical interpretability demands that it must be interpreted somewhere in the course of derivation. According to the minimalist proposal of Pesetsky & Torrego (2007), the current study argues that the definiteness feature needs to be interpreted in the right position in order for the derived structure to show convergence; it can be interpreted on the main DP, being the only DP here. Furthermore, it cannot be interpreted on either AP or NP<sub>2</sub>, thus matching the observed semantic facts. Let us conclude that the following agreement operations take place in the syntax:

- i. Definiteness in the adjectival construct state: The unvalued definiteness feature on *Tawi:l-u* 'long' agrees with the unvalued feature of NP<sub>2</sub> *al-arjul-i* 'the man'.
- ii. Definiteness agreement: The unvalued feature on AP agrees with the one on NP.
- iii. Phi-features agreement: The unvalued gender and number features on AP agree with the ones on NP.
- iv. Case agreement: The unvalued nominative Case feature on AP agrees with the one on NP.

On the basis of the argument above, what can be observed eventually here is that the derivation leads to a single definiteness feature shared by all four nodes.

In conclusion, the feature sharing framework provides a satisfactorily unified account for the grammaticality of phi-features, definiteness, and Case in Standard Arabic adjectival in the

construct state, which constitutes a morpho-syntactic and semantic problem to the formulation of the Agree operation assumed in Chomsky (2000, 2001). The major issue to semantics can be attributed to the fact that definiteness and phi-features are interpreted on an agreeing head outside the adjectival construct state.

#### **4.2. The DP-Internal distribution of phi-features and adjectival agreement with N and with D in SA**

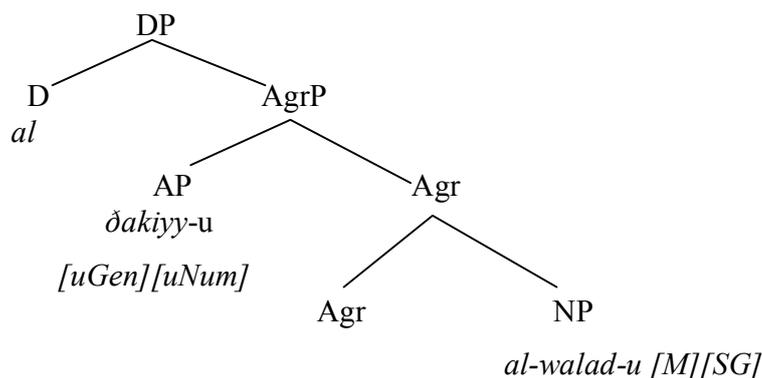
In the existing literature on linguistics, phi-features are viewed as the semantic features of person, number, and gender, as encoded in such words as nouns and pronouns which are said to consist only of phi-features, containing no lexical head. In addition, several other features are included in the set of phi-features, such as the categorical features  $\pm N$  (nominal) and  $\pm V$  (verbal), which can be used to describe lexical categories and Case features.

Following the hypothesis that the locus of the various interpretable phi-features is not a single head, let us look at some of the issues relating to implementing agreement in such features in light of minimalist analysis. Danon (2010) indicates that a closer look at the DP-internal agreement reveals that the same phi-features appear on more than one head with the same DP. Let us illustrate this issue in Standard Arabic and exemplify it in (17). The objective is to show that definite articles and adjectives in Standard Arabic (as in many other languages) agree with the noun in the following phi-features: gender and number.

- 17a. al-walad-u                      aḏ-ḏakiyy-u  
       the.boy.M.SG.Nom    intelligent. M.SG. Nom  
       ‘the intelligent boy’
- b. al-bint-u                         aḏ-ḏakiyy-at-u  
       the.girl.F.SG.Nom    intelligent.F.SG. Nom  
       ‘the intelligent girl’

The question is this: how is this DP derived, given Chomsky’s (2000, 2001) minimalist framework? Let us assume that the DP in (17) enters the derivation with valued gender and number features. The features on the adjective have to enter the derivation unvalued, as illustrated on the clause structure in (18). Both the examples in (17) have the same clause structure representation in (18), in which the only difference between them is gender agreement, that is, masculine and feminine.

18.



As shown in (18), *[uGen]* and *[uNum]* are used for unvalued gender and number features on AP. According to Cinque (1994), among others, the AP in (18) is projected in this position in the clause structure as a specifier of an agreement projection. Following Carstens (2000, 2001), let us argue that the DP-internal agreement does not need a specialized mechanism, and is the result of the same formal operations that give rise to other instances of agreement. Since the probe has to search for the goal in order to value the unvalued features in the syntax, the unvalued features of the adjective probe for the features of the N/NP and hence the Agree relation is established here where Agree values and deletes the unvalued features on the adjective *aḍ-ḍakiyy-u* ‘intelligent’.

A closer examination of agreement of the DP with an external functional head like T or v demonstrated that the functional head T or v would not be able to show agreement in gender and number with the DP whose uninterpretable features have been deleted in the syntax.

Moreover, even if we leave aside the issue of phi-completeness, other problems still arise here in the sense that intervention by the DP must block an Agree operation between the functional head T/v and NP: in spite of the fact that the gender and number features of DP have been deleted, they are still visible until the end of the strong phase, and hence DP must block Agree with NP. Based on Chomsky’s (2000, 2001) minimalist assumptions, there is only one way for the functional head T/v to value its gender and number features via Agree with the deleted uninterpretable features on D.

In short, the assumptions that all the different phi-features of nominal phrases do not all enter derivation, in the course of deriving the structure, as interpretable features of a single head constitutes a serious problem to the minimalist framework of Chomsky (2000, 2001). That is, even if we assume that a functional head like T or v should agree with a single nominal head, we may find that neither N nor D seems to be the right option. What can be predicted here is that every derivation with a DP with internal structure occurring in a subject or object position would

crash for the reason that the uninterpretable phi-features of T/v might fail to undergo deletion in the syntax.

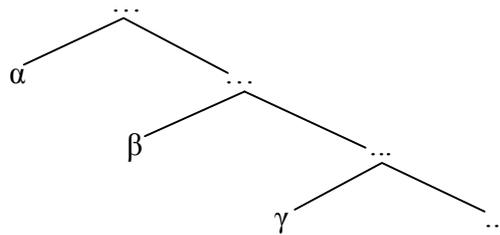
The preceding discussion reveals that as the DP encapsulation assumption is not accepted and DPs are not viewed as atomic elements but as complex structures in the sense that not all phi-features enter the derivation as valued features of the same head, the agreement approach advocated in Chomsky (2000, 2001) makes many wrong predictions. The problem with Chomsky's assumptions would be that for clausal syntax to be in a position to view a DP as a single entity, DP-internal syntax should have a way to accumulate all nominal features in one node within the DP as the derivation proceeds further in the syntax; but this is not permissible under the standard minimalist formulation of Chomsky's (2000, 2001) Agree operation; the reason why this is not possible can be attributed to the fact that Agree creates a one-time relation between features, rather than establishing a permanent link which can permit different levels of the DP to behave as a single entity for the sake of external agreement. In order to resolve the problem with this analysis would be to abandon the requirement for phi-completeness (as formulated by Chomsky's assumptions) as a condition for Agree operation to be a success in syntactic analysis. Besides, the view of agreement as an all-at-once operation should be abandoned and instead postulate that each of the different phi-features on the functional head T/v can act as a separate probe with gender, and number each shows agreement with a separate goal in the extended projection. Moreover, there are also other arguments against phi-completeness assumptions which have been presented by linguists such as Carstens (2001). On the other hand, there are other arguments that have been raised against an all-at-once operation by other linguists such as Béjar (2003, 2008). What is interesting in the morpho-syntactic analyses of both Carstens (2001) and Béjar (2003, 2008) is that both of them agree that there are several empirical problems with the standard formulation of Agree operation and indicate that this can be solved by weakening the theoretical role of the phi-feature set.

#### **4.3. Feature sharing, phi-features and definiteness analysis in SA**

The most recent influential works within the minimalist framework can be seen in the proposals presented by Frampton & Gutmann (2006) and Pesetsky & Torrego (2007) who question the assumption that the Agree operation creates a transient link between the two agreeing nodes. The argument posed by Frampton & Gutmann and Pesetsky & Torrego is that

they view the Agree operation as a *feature sharing* operation seeking to unify two feature occurrences into two instances of one shared formal object. The major difference between Chomsky's (2000, 2001) Agree operation and that of Frampton & Gutmann and Pesetsky & Torrego is that in the latter (i.e. Frampton & Gutmann and Pesetsky & Torrego) the goal does not need to carry a valued feature since the Agree relation between two unvalued features is permissible. Let us demonstrate this below in (19).

19.



The assumption is this  $\beta$  and  $\gamma$  enter the derivation with unvalued occurrences of the same feature whereas  $\alpha$  bears a valued occurrence. According to Frampton & Gutmann and Pesetsky & Torrego, following Agree between  $\alpha$  and  $\beta$ , the Agree relation between  $\beta$  and  $\gamma$  can result in a single shared feature with three instances: the feature on  $\gamma$  gets valued in spite of the fact that  $\gamma$  itself is not involved in an Agree relation with a node bearing a valued occurrence. In a similar fashion, when  $\gamma$  enters the derivation with a valued feature, such a valued feature can be shared with  $\beta$ , and then indirectly with  $\alpha$ , after  $\alpha$  searches for  $\beta$ 's feature which is also shared with  $\gamma$ . The other advantage of the proposal of Pesetsky & Torrego (2007) is that feature valuation is dependent of feature interpretability; their argument is that a head enters the derivation with an unvalued feature where this feature gets interpreted on it. They stress that the computational system is needed to value all unvalued features without caring about their interpretability. According to their view, interpretability is determined outside the computational system proper. This means that the 'goal' in an Agree operation does not necessarily bear interpretable features.

Following the view of Frampton & Gutmann (2006) and Pesetsky & Torrego (2007) that Agree is seen as feature sharing, DP-internal distribution of phi-features does not constitute a problem in the analysis of agreement, in general, and adjectival agreement, in particular. If we assume that D enters the derivation with unvalued gender and number agreement features, D can probe for the phi-features of lower projections; NP for gender, and either NP or NumP for number. The difference between Chomsky (2000, 2001) and Frampton & Gutmann (2006) and Pesetsky & Torrego (2007) is that in the latter these features on D would not be deleted at this

stage in the syntax for the reason that they will remain as instances of shared phi-features. To illustrate the point, let us consider the DP level where we can have the following features where sharing can be realized by co-indexation:

**N:** valued gender<sub>*i*</sub>, and valued number<sub>*j*</sub>

**D:** valued gender<sub>*i*</sub>, and valued number<sub>*j*</sub>

Since the DP, at this stage, has a complete bundle of phi-features, the derivation is allowed to proceed further in the syntax as assumed in Chomsky's (2000, 2001) minimalist analysis with the only exception that the Agree operation here does not lead to feature deletion in the course of derivation. To illustrate the point, let us consider the following examples from Standard Arabic in (20).

20. al-rajul-u                      al-qaSi:r-u  
       the.man.M.SG.Nom    the.short.M.SG.Nom  
       ‘the short man’

If we ignore now Move operations and closely look at the relevant step in the derivation, we can find that the unvalued gender and number features as well as the definiteness feature of the adjective *al-qaSi:r-u* ‘short’ probes for that of its head noun. Since the probe has to search for the goal in order to value the unvalued features in the syntax, the unvalued features of the adjective probe for the features of the N/NP and hence the Agree relation is established here where Agree values and deletes the unvalued features on the adjective in (20). As the unvalued phi-features and definiteness of the adjective in (20) probes for the head noun, which is at this point, phi-complete, the phi-features and definiteness of the adjective are all valued in the syntax- not as a result of being interpretable but simply as a result of being instances of a shared, valued feature. It can be assumed that D and N all share a single gender and number (as well as definiteness) feature. It is assumed that the Agree operation seeks to match an unvalued feature of a probe with a feature of a c-commanded goal, and links them as two instances of a single formal object. It can be argued that it is the feature (gender, number, def, Case etc) and the value which is shared here. Furthermore, given the definiteness analysis in the construction in (20) above, it can be assumed that the operation Agree in Standard Arabic establishes a permanent link between two instances of the definiteness feature; this, of course, allows valuation of one instance by valuation of the other. This is carried out by a future Agree operation with an additional instance of the

definiteness feature. What happens in (20) is that the unvalued definiteness feature on the AP agrees with the unvalued feature of the NP. Given that, it can be assumed that in (20) the head of the adjective probes for the unvalued definiteness feature on the head noun. Consequently, the two unvalued occurrences of the [def] feature become two instances of a single shared feature; here an additional Agree operation takes place between the AP and the NP. As the features on the NP are valued, this leads to the valuation of the [def] feature on the APs. The present study assumes that the D head of the whole modified NP enters Agree with the [def] feature on the NPs; the result is, then, a single valued feature with three instances. Hence, all unvalued features are valued by the computational system. With regard to the interpretability of the definiteness feature, the thesis of radical interpretability demands that it must be interpreted somewhere in the course of derivation. It can be assumed that the definiteness feature can be interpreted in the right position in order for the derived structure to converge in the syntax; it can be interpreted on the main DP, since it is the only DP here.

Moreover, there are adjectives which precede the head of the DP and others follow it; the former are the prenominal adjectives while the latter are the postnominal adjectives in Standard Arabic. The prenominal adjectives are analyzed as heads in an AP which dominates the DP. The heads assign genitive Case to the NP. This can be demonstrated in (21).

21. Tawil:u     al-qa:mat-i  
       tall-Nom    the-height-Gen  
       ‘(He is) of a tall height.’

The postnominal adjectives have been viewed as specifiers in [Spec-NP] and the head of the NP moves higher to a NumP and incorporates with Num<sup>0</sup>. This can be illustrated in (22).

22. bayt-u            al-rajul-i            al-wa:siʕ-u  
       house-Nom    the-man-Gen    the-big-Nom  
       ‘the big house of the man’

Although the head *bayt-u* ‘house’ lacks morphologically the definite article *al* ‘the’ it is assumed to be definite because it is not grammatical in Standard Arabic to delete the definite article which shows up on the adjective *al-wa:siʕ-u*; the grammar of Standard Arabic does not accept the addition of the definite article to the head *bayt-u*. It can be pointed out in Standard Arabic that adjectives should carry the definite article whenever the modified noun is definite; this phenomenon is known as definiteness agreement in Semitic to which Standard Arabic belongs. It

is in Standard Arabic that the adjective shows agreement in phi-features (gender, number), Case, and definiteness with the noun it modifies.

Interestingly enough, though Standard Arabic has a rich inflectional system, the definite article does not inflect for gender and number. This can be illustrated in (23) and (24) below.

- 23a. al-muhandis-u                      ađ-đakiyy-u  
       the-engineer.M.SG.Nom    the.intelligent.M.SG.Nom  
       ‘the intelligent (male) engineer’
- b. al-muhandis-at-u                    ađ-đakiyy-at-u  
       the-engineer.F.SG.Nom    the.intelligent.F.SG.Nom  
       ‘the intelligent (female) engineer’
- c. al-muhandis-u:na                    al-ʔađkiyy-a:ʔ-u  
       the-engineers.M.PL.Nom    the.intelligent.M.PL.Nom  
       ‘the intelligent (male) engineers’
- d. al-muhandis-a:t-u                    ađ-đakiyy-a:t-u  
       the-engineers.F.PL.Nom    the.intelligent.F.PL.Nom  
       ‘the intelligent (female) engineers’
- 24a. muhandis-u-n                      đakiyy-u-n  
       engineer.M.SG.Nom.indef    intelligent.M.SG.Nom.indef  
       ‘an intelligent (male) engineer’
- b. muhandis-at-u-n                      đakiyy-at-u-n  
       engineer.F.SG.Nom.indef    intelligent.F.SG.Nom.indef  
       ‘an intelligent (female) engineer’
- c. muhandis-u:-na                      ađkiyya:ʔ-u-n  
       engineers.M.PL.Nom.indef    intelligent.M.PL.Nom.indef  
       ‘intelligent (male) engineers’
- d. muhandis-a:t-u-n                      đakiyy-a:t-u-n  
       engineers.F.PL.Nom.indef    intelligent.F.PL.Nom.indef  
       ‘intelligent (female) engineers’

We follow Danon’s (2010, p. 15) proposal of relativized phi-completeness:

- Relativized phi-completeness: An Agree operation leads to feature sharing iff the goal matches all the unvalued phi-features of the probe.

Given this proposal, it can be assumed that Agree between an adjective and a noun in Standard Arabic can be successful because the adjectival probe has no unvalued person feature. It can be mentioned here that some sort of relativized phi-completeness seems to be unavoidable if agreement is to be analyzed as an instance of Agree, regardless of the specific nature of the feature sharing mechanism. What seems unreasonable to assume, for instance, is that adjectives must agree in person in order to agree in gender and number, given that no evidence for such agreement exists, not just in English but also in Standard Arabic and in many other typologically unrelated languages in the world. Another advantage of relativized phi-completeness is that it may make it simpler to account for cross linguistic differences in the inventory of relevant phi-features; thus, for instance, as noted by Carstens (2001), gender is systematically missing from subject agreement in Indo-European languages, whereas it is part of subject agreement in many other languages. In a similar fashion, it can be noted that while definiteness agreement (in addition to gender and number agreement) is obligatory between nouns and attributive/postnominal adjectives in Standard Arabic and Hebrew, it would be somewhat odd to assume that definiteness is part of the universal set of phi-features needed for phi-completeness.

#### **4.4. Case in SA adjectival agreement**

A closer examination of the dominant view of Case in current minimalism shows that Case features are valued as a ‘by-product’ of Agree between a DP and a phi-complete probe. Let us consider the question to what extent this model is compatible with the different solutions to the adjectival agreement problem discussed above; this relies, in part, on determining where exactly within the noun phrase Case features are located. Let us first look at the possibility that Agree does not require a phi-complete goal in order to value the probe’s features, and that T or v agrees in each of their phi-features separately. Given this line of analysis, there is a certain amount of vagueness in the hypothesis that Case is valued as a result of successful Agree with T/v. If these probes are assumed to enter several Agree relations (one per feature), then one has to determine which of these agreements, if any, is responsible for Case valuation. Danon (2010) indicates that this issue cannot be separated from the question of where exactly in the noun phrase Case features are located; it might be that some of these Agree operations do not value Case simply because some of the goals (DP, NumP and NP) have no Case feature to value. Given the general

view that sees Case as a licensing feature of the noun's extended projection, the most natural hypothesis is that it is the DP projection that carries a Case feature in the course of derivation.

In short, let us assume that if we abandon the hypothesis that only a phi-complete goal can value the features of a probe and assume that T/v agrees separately for each of their features, we then could no longer assume that Case valuation is an automatic by-product of Agree. Stipulating that Case is valued on DP when this DP enters an Agree relation with T/v, regardless of how many features are involved, means that infinitival T cannot be claimed to lack the ability to value a DP's Case due to such T's lack of number and gender features.

So, what is the alternative? Let us now explore the alternative analysis on Case. Let us assume that we adopt some variation on the feature sharing analysis discussed above. This permits us to entertain the idea that DP does, eventually, bear a full set of phi-features; as a result, it seems that no modifications are required to Case theory in the sense that Case can still be assumed to be valued as a result of Agree between T/v and a phi-complete DP, where the fact that DP becomes phi-complete only as a result of DP-internal feature sharing makes no difference with respect to Case.

Let us now explore how Case feature in Standard Arabic can interact with feature sharing framework. This can be demonstrated in (25).

- 25 a. ishtara    zayd-un    sayyarat-**a-n**    jadi:dat-**a-n**  
       bought    Zayd.Nom    car.F.SG.Acc.indef    new.F.SG.Acc.indef  
       ‘Zayd bought a new car.’
- b. katab-at    hind-un    risa:lat-**a-n**    Tawi:lat-**a-n**  
       wrote.F.SG    Hind.Nom    letter.F.SG.acc.indef    lon.F.SG.acc.indef
- c. \*ishtara    zayd-un    sayyarat-**a-n**    jadi:dat-**u-n**  
       bought    Zayd.Nom    car.F.SG.Acc.indef    new.F.SG.Acc.indef  
       ‘Zayd bought a new car.’
- d. \*katab-at    hind-un    risa:lat-**a-n**    Tawi:lat-**u-n**  
       wrote.F.SG    Hind.Nom    letter.F.SG.acc.indef    lon.F.SG.acc.indef

As shown in (25), with Case feature on N, in addition to the one on A, the derivation under the feature sharing approach proceeds just as discussed above. When D agrees with N in gender/number, it also agrees with it in Case, and therefore the two (unvalued) Case features become two instances of a shared feature; subsequently, both instances would be valued

simultaneously by Agree with T/v. This derivation is essentially the same as in the analysis proposed in Frampton & Gutmann (2006) for Case on participles in Icelandic. It can be clearly observed the adjectives *jadi:dat-a-n* ‘new’ and *Tawi:lat-a-n* ‘long’ modify the head nouns *sayyarat-a-n* ‘car’ and *risa:lat-a-n* ‘letter’ and agree with them in Case, phi-features (gender and number), and definiteness. Both the head nouns and the adjectives, in each example, carry accusative Case features, represented in the suffix *-a*. Case assignment is viewed as a reflection of agreement, this, of course, explains why (25c) and (25d) are ungrammatical in Standard Arabic grammar. In other words, the ungrammaticality of (25c) and (25d) can be attributed to the fact that the Case feature of the adjective is not in agreement with the Case feature of the head noun. The following examples can show that Case agreement between the adjective and its modifying noun can be seen in nominative, accusative, and genitive in Standard Arabic.

- 26a. ja:ʔ-at      fata:t-u-n      faransiyyat-u-n  
           came      girl.Nom.indef      French.Nom.indef  
           ‘a French girl came.’
- b. ja:ʔa      rajul-u-n      ajnabiyy-u-n  
           came      manNom.indef      foreign.Nom.indef  
           ‘A foreign man came.’
- c. marart-u      bi-rajul-i-n      ajnabiyy-i-n  
           came.I      man.Gen.indef      foreign.Gen.indef  
           ‘A foreign man came.’

## 5. Conclusion

The paper has presented a straightforward answer to the question: whether phi-features, definiteness, and Case in Standard Arabic adjectival agreement can be accounted for in minimalist syntax. This study has shown that Chomsky’s minimalist Agree could not provide a satisfactory treatment of phi-features, definiteness, and Case in Standard Arabic under the standard formulation of Agree operation because of the fact that Chomsky’s (2000, 2001) Agree operation creates, what is called, a one-time relation between features in the syntax, rather than establishing a permanent link which can allow different levels of the DP to behave as a single entity for the sake of external agreement. On the other hand, it has been pointed out that the feature sharing approach of Frampton & Gutmann (2006) and Pesetsky & Torrego (2007) solves

the problem encountered in Chomsky's theoretical formulation of Agree by creating a permanent link between the two agreeing nodes in the morpho-syntactic analysis of phi-features, definiteness, and Case in Standard Arabic; this approach sees the Agree operation as a *feature sharing* operation that aims to unify two feature occurrences into two instances of one shared formal object. Hence, the Standard Arabic data show that the feature sharing approach allows for a considerable simplification of morpho-syntactic analysis in minimalist syntax. The feature sharing analysis in the syntactic analysis of Case in Standard Arabic has shown that the goal does not need to carry a valued Case feature since the Agree relation between two unvalued features is permissible. In addition, this paper has demonstrated some empirical evidence in support of exploring natural language phenomena where the value of a feature on one node depends on the value of the same feature on another node as feature sharing; undoubtedly, this framework contradicts the assumptions of the valuation deletion approach assumed in the minimalist literature. Besides, it has been shown that Standard Arabic postnominal adjectives agree with the noun they modify in phi-features (gender, number), definiteness, and Case. It is under feature sharing framework that a satisfactorily unified treatment of phi-features, definiteness, and Case in Standard Arabic has been proposed which is meant to alleviate the difficulties encountered by Arab learners of English as a foreign language and non-Arab learners learning Standard Arabic as a foreign language.

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