

Gender and number polarity in Modern Standard Arabic numeral phrases

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Abstract

Numeral phrases in Standard Arabic are known for gender and number mismatches¹ between the numeral and the enumerated noun. This article reduces these mismatches to two morphological deletion rules. The first deletes the feminine morpheme of the numeral when the enumerated noun is feminine, and the second deletes the plural morpheme of the enumerated noun when the numeral carries a plural morpheme. The first rule is further restricted to deleting only feminine morphemes that are underlyingly part of the numeral, and not inherited via agreement with a feminine enumerated noun via a syntactic agreement process. The analysis in this article is consistent with Sadiqi's (2006) claim that the feminine form in Arabic is the basic one from which the masculine was derived historically by reducing the feminine form. The deletion analysis here also finds support from Chomsky's approach of deriving the masculine from the feminine as theoretically less costly and more explanatorily adequate.

Keywords: morpho-syntax, numerals, gender, number, polarity, Standard Arabic, Distributed Morphology

Résumé

Il est bien connu que les syntagmes numériques en arabe standard peuvent attester l'absence de l'accord en genre et en nombre entre le numéral et la tête nominale. Cet article réduit ce non-accord à deux règles morphologiques de suppression. La première supprime le morphème du féminin du numéral quand le nom est féminin. La seconde supprime le morphème du pluriel du nom quand le numéral porte un morphème du pluriel. La première règle s'applique seulement aux morphèmes qui font partie du numéral en une forme sous-jacente; elle ne s'applique pas à des morphèmes qui résultent de l'accord syntaxique avec un nom. L'analyse soutenue dans cet article est compatible avec la proposition de Sadiqi (2006), qui voudrait que la forme féminine en arabe soit la forme de base et que la forme masculine soit dérivée diachroniquement par la

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réduction de la forme féminine. L'analyse présentée ici est également appuyée par l'approche de Chomsky, selon laquelle la forme masculine est dérivée de la forme féminine, dans la mesure où cette analyse est plus simple de point de vue théorique et qu'elle atteint un niveau supérieur d'adéquation explicative.

Mots clés: morphosyntaxe, numéral, genre, nombre, polarité, arabe standard, Morphologie distribuée

1 INTRODUCTION

The Arabic noun phrase (NP) is known for agreement in number and gender between the noun and the postnominal adjective. But Arabic also has construct-state NPs and compound NPs where this type of agreement is not attested between the nouns making them up. Surprisingly, the opposite of agreement in number and gender can be found in a particular construction that exhibits both the construct state and the compound NP construction in Standard Arabic. This construction is the numeral phrase. The numeral phrase exhibits what is known as 'gender polarity' and what I call by analogy 'number polarity'. The numerals 3–10 carry the singular feminine suffix only when the enumerated noun is masculine both in single-digit numerals, as in (1a) and (1b), and in double-digit numerals, as in (1c–f).

- (1) a. χ ams t^ʕaalīb-aat-in
 five student-F.PL-GEN
 'Five female students'
- b. χ ams-at t^ʕullaab-in
 five-F student.M.PL-GEN
 'Five male students'
- c. χ ams-a ʕašr-at-a t^ʕaalīb-at-an
 five-ACC ten-F-ACC student-F.SG-ACC.INDEF
 'Fifteen female students'
- d. χ ams-at-a ʕašar-a t^ʕaalīb-an
 five.F-ACC ten-ACC student-ACC.INDEF
 'Fifteen male students'
- e. χ ams wa-ʕišr-uun t^ʕaalīb-at-an
 five and-ten-M.PL student-F.SG-ACC.INDEF.
 'Twenty-five female students'
- f. χ ams-at wa-ʕišr-uun t^ʕaalīb-an
 five-F.ACC and-ten-M.PL student-ACC.INDEF
 'Twenty-five male students'

In contrast, the first and the second digit in the numerals 11 and 12 in (2a–d), and the second digit in the numerals 13–19 in (1c) and (1d) carry the feminine suffix *only* when the enumerated noun is feminine.

- (2) a. ʔahad-a ʔafar-a tʕaalib-an
 one-ACC ten.M-ACC student-ACC.INDEF
 ‘Eleven male students’
- b. ʔihda ʔaf-r-at-a tʕaalib-at-an
 one.F ten-F-ACC student-F-ACC.INDEF
 ‘Eleven female students’
- c. ʔiθna ʔafar-a tʕaalib-an
 two ten.M-ACC student-ACC.INDEF
 ‘Twelve male students’
- d. ʔiθna-ta ʔaf-r-at-a tʕaalib-at-an
 two-F ten-F-ACC student-F-ACC.INDEF
 ‘Twelve female students’
- e. ʔiṣr-uun tʕaalib-an
 ten-M.PL student-ACC.INDEF
 ‘Twenty male students’
- f. ʔiṣr-uun tʕaalib-at-an
 ten-M.PL student-F-ACC.INDEF
 ‘Twenty female students’

Moreover, the numerals 3–9 are always masculine when preceding ‘hundred’, but always feminine when preceding ‘thousand’, regardless of the enumerated noun’s gender, as illustrated in (3a) and (3b).

- (3) a. ʕams miʔat tʕaalib / tʕaalib-at
 five.M.SG hundred student.M.SG / student-F.SG
 ‘Five hundred male students / female students’
- b. ʕams-at ʔaalaaf tʕaalib / tʕaalib-at
 five.F.SG thousands student.M.SG / student-F.SG
 ‘Five thousand male students / female students’

Clearly, then, gender polarity is predominant in the numeral system, but it is blocked with the two higher numerals ‘hundred’ and ‘thousand’. The same thing can be found in number polarity. The enumerated noun carries the plural morpheme with the numerals 3–10, as shown in (1a) and (1b), but not with numerals 11 and above, as in (1c–f) and (2a–f). The numeral ‘hundred’ is singular when enumerated, but ‘thousand’ is plural when enumerated, as illustrated in (3).

These data raise the question of what kind of grammatical principle or mechanism produces these gender and number mismatches. What principle(s) or process(es) can produce such complexity? I take this up in sections 2, 3, and 4, arguing first that the feminine morpheme of the enumerated noun triggers the deletion of the feminine morpheme of the numeral, and second, that the plural morpheme of the numeral triggers the deletion of the plural morpheme of the enumerated noun.

It is worth mentioning that Arabic has the dual numerals *ʔθn-aan* ‘two-M’, the masculine dual, and *ʔiθna-taan* ‘two-F’, the feminine dual. However, as shown in (4), the enumerated noun simply carries the masculine and feminine dual suffixes *-aan* and *-taan* respectively. Unlike all other numbers above, in the dual,

the numerals *ʔiθn-aan* and *ʔθna-taan* do not appear. They are therefore irrelevant to the discussion of gender and number polarity in this article.

- (4) a. (*ʔiθn-aan) tʕaalib-aan
 (*two-M) student-M.DU
 ‘Two male students’
- b. (*ʔiθn-taan) tʕaalib-taan
 (*two-F) student-F.DU
 ‘Two female students’

In all the examples above of numeral phrases showing polarity, the numerals precede the enumerated nouns. In (5), the numerals instead follow the enumerated noun. In (5a) and (5b), numerals between 3 and 10 agree with the enumerated noun in gender, and in all of the examples in (5), the enumerated nouns are plural.

- (5) a. al-tʕaalib-aat-u al-χams-at
 the-student-F.PL-NOM the-five-F
 ‘The five female students’
- b. al-tʕullaab-u al-χams
 the-student.M.PL-NOM the-five
 ‘The five male students’
- c. al-tʕaalib-aat-u al-ʔiṣr-uun
 the-student-F.PL-nom the-ten-M.PL
 ‘The twenty female students’
- d. al-tʕullaab-u al-ʔiṣr-uun
 the-student-M.PL-NOM the-ten-M.PL
 ‘The twenty male students’

2 POLARITY (ANTI-AGREEMENT) AND IMPOVERISHMENT

Early Arab grammarians have described gender polarity in the numeral phrase using the term *muxaalafa*, which means ‘opposite’ and is the equivalent of polarity. With negation, the word polarity (or negative polarity) is used to refer to a dependency between a certain word and the negative marker, such that the word can occur in a domain containing negation. This dependency is also related to what is known in the literature as negative agreement or concord (cf. Zeijlstra 2004 regarding negative concord). However, ‘polarity’ in the term ‘gender polarity’ refers to the opposite, i.e., to anti-agreement. For example, the feminine ending of the numeral occurs only when the enumerated noun is masculine.

The first step in formalizing an analysis that captures the anti-agreement or gender polarity is to determine whether the feminine ending of the numeral is added when the enumerated noun is masculine or whether it is deleted when the enumerated noun is feminine. These are the two logical possibilities available, and I argue in favour of the second. I propose that the numerals 3–10 are underlyingly feminine (the default). Evidence for this comes from the pronunciation of these

numerals when counting, as shown in (6), and from numeral phrases that have a partitive interpretation, as in (7). The fact that these numerals are feminine when used without an enumerated noun, as in (6), suggests that the feminine morpheme they have is not added as a result of syntactic agreement. I therefore assume that the numeral is specified with FEM before it enters the syntactic derivation.

- (6) θ alaa θ -at, $\text{?arba}\text{?}$ -at, χ ams-at, sitt-at, sab ? -at, θ amaaniy-at, tis ? -at, $\text{?a}\text{?r}$ -at
 3-F.SG, 4-F.SG, 5-F.SG, 6-F.SG, 7-F.SG, 8-F.SG, 9-F.SG, 10-F.SG
 ‘Three, four, five, six, seven, eight, nine, ten’

- (7) a. $\text{?a}\text{?ar}$ -aat al-mudarris-i:n
 ten-F.PL the-teacher-M.PL
 ‘Tens of male teachers’
 b. mi ? -aat al-mudarris-i:n²
 hundred-F.PL the-teacher-M.PL
 ‘Hundreds of male teachers’

Similarly, for number polarity, I contend that the enumerated noun is plural by default. There is distributional and cross-linguistic evidence for this. First, recall that the enumerated nouns are always plural when the numeral follows the noun, as in (8).

- (8) a. al-t^cullaab-u al- χ ams
 the-student.M.PL-NOM the-five
 ‘The five male students’
 b. al-t^cullaab-u al- $\text{?i}\text{?r}$ -uun
 the-student.M.PL-NOM the-ten-M.PL
 ‘The twenty male students’
 c. al-t^cullaab-u al- χ ams-a $\text{?a}\text{?ar}$ -a
 the-student.M.PL-NOM five-ACC ten-ACC
 ‘The twenty male students’

Second, there is cross-linguistic evidence from several languages representing different language families that the enumerated noun is plural (English, French, Russian and other Slavic languages, Dravidian languages, and Yoruba, among others, as discussed by Corbett 1978a, 1978b).

Therefore, the enumerated noun enters the syntactic derivation fully specified for the number feature: singular, dual or plural. This is consistent with the fact that the enumerated noun in numeral phrases with numerals three and above has a plural referent. It is also consistent with the fact that the enumerated noun does not even co-occur with the dual numerals in (9) below. In other words, the number feature of

²The numerals in both examples do not undergo feminine morpheme deletion when the enumerated noun is feminine (*mudarris-aat*), presumably because the morpheme *-aat* is needed for the partitive reading, which depends on the plural morpheme – a syncretic morpheme fused with gender. In other words, *-aat* is both feminine and plural, and cannot be divided into two morphemes, one denoting feminine and the other plural. The partitive construction might even underlyingly contain the partitive preposition ‘*min*’, which can be overt in the paraphrase *?a?ar-aat min af-^cullab*.

the enumerated noun is spelled out as the dual suffix *-aan*. Put differently, the fact that a noun specified for a dual number feature is the only specification of quantity in the examples below, and that no dual numeral is used, suggests that the number feature of the enumerated noun is essential.

- (9) a. (*ʔiθn-aan) tʰaalib-aan
 (*two-M) student-M.DU
 ‘Two male students’
- b. (*ʔiθn-taan) tʰaalib-taan
 (*two-F) student-F.DU
 ‘Two female students’

Further support for the second approach comes from the theoretical economy that deletion exhibits. As Sadiqi (2003: 103) points out, under the generative approach, deriving the masculine from the feminine is theoretically superior, since it is “less costly” and is explanatorily adequate given that the outcome of deletion as opposed to addition is predictable (cf. Chomsky 1965; Lightfoot 1979). Moreover, in analysing gender in Arabic from a sociolinguistic perspective, Sadiqi (2006) claims that the feminine is the basic form in Arabic and the masculine was derived by reducing the feminine.

I adopt a distributed morphology (DM) view on this topic following proposals by Embick and Noyer (2001, 2007) on impoverishment in the morphological structure at PF. In DM, impoverishment involves the deletion of certain morphosyntactic features from morphemes in certain morphological environments. For example, see Embick and Noyer (2007) on impoverishment in the Standard Arabic case system. This deletion process applies at PF, and guarantees blocking of Vocabulary Insertion for the deleted morphemes.

The idea that anti-agreement can be explained by impoverishment is not new. Fuß (2005: 51) suggests that ‘impoverishment rules may perhaps also be used to account for a number of apparently syntactic anti-agreement effects. For example, the absence of verbal agreement in the context of *wh*-subject extraction, which can be observed in a number of Northern Italian dialects (cf., e.g., Brandi and Cordin 1989) may result from an impoverishment rule that deletes agreement features in the presence of a *wh*-feature, leading to the insertion of the default 3SG ending’. Since gender and number polarity is basically an anti-agreement phenomenon, the deletion of the feminine and the plural morphemes leads to the insertion of the default, i.e., the masculine and the singular respectively. Figure 1 shows the order of operations on the PF branch, as articulated by Embick and Noyer (2001). Impoverishment takes place immediately before vocabulary insertion.

To reiterate, this article is concerned with numeral phrases in their canonical form, where the numeral precedes the enumerated noun, which exhibit number and gender polarity. The syntactic structure of these numeral phrases is based on three things. First, the numeral assigns case to the enumerated noun. The numerals 3–10, ‘hundred’, and ‘thousand’ all assign genitive case, as in (10a) and (10b), while other numerals above 10 assign accusative case, as in (10c). While there is no direct relation between these case facts and polarity, it is worth mentioning them here to show that the numeral is the head of the numeral phrase.

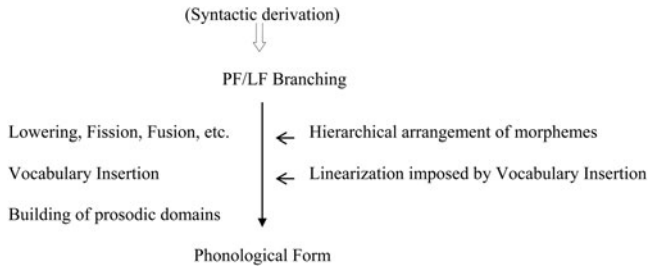


Figure 1: Order of operations on the PF branch

- (10) a. χ ams-u t^caalb-aat-in
 five-NOM student-F.PL-GEN
 ‘Five female students’
- b. miʔat-u / ʔalf-u mu'allim-in
 hundred-NOM / thousand-NOM teacher-GEN
 ‘One hundred / thousand teachers’
- c. χ ams-a ʕaʕr-at-a t^caalib-at-an
 five-ACC ten-F-ACC student-F.SG-ACC.INDEF
 ‘Fifteen female students’

Second, the numeral enters the derivation specified for gender. Third, the enumerated noun enters the derivation specified for number. The syntactic structure of these numeral phrases has the cardinal numeral as the head of the phrase CardP and the enumerated noun as its complement. This structure follows Shlonsky’s (2004) syntactic analysis of the Arabic numeral phrase:

- (11)
- ```

 CardP
 / \
 Card NP

```

For the purposes of this article, the syntactic terminals of the numeral and the enumerated noun are specified for gender and number. Taking the numerals 3–10 as an example, the numeral is Feminine [F] and the enumerated noun is Plural [PL]. The representation is as follows:

- (12)
- ```

      CardP
     /    \
    Card0  NP
   |         |
 [Numerals 3–10+[F]] [Enumerated noun+[PL]]
  
```

The impoverishment rules apply at this post-syntactic level, where the syntactic terminals of the numeral and the enumerated noun are specified for gender and number features, as will be explained in sections 3 and 4, respectively.

3 GENDER POLARITY

In line with our conception of impoverishment, the numeral in (13a) loses its feminine morpheme when followed by a feminine enumerated noun, as stated in rule (14).

- (13) a. χ ams t^ʕaalib-aat-m
 five student-F.PL-GEN
 ‘Five female students’
- b. χ ams-at t^ʕullaab-m
 five-F student.M.PL-GEN
 ‘Five male students’

(14) Digit 1 FEM Deletion:
 [F] → ∅ / [numeral] + ___ + [enumerated noun] + [F]

Table 1 gives the derivations for examples (1)a and (1)b.

Syntactic Terminals:	a.	Numeral-FEM	Noun-FEM	b.	Numeral-FEM	Noun
Rule (14):		Numeral - ∅			—	
Vocabulary Insertion:		χ ams	t ^ʕ aalib-aat		χ ams-at	t ^ʕ ullaab

Table 1: Derivations for examples (1)a, b

Interestingly, the deletion of the feminine morpheme carried by single-digit numerals is also attested in double-digit numerals, specifically in numeral phrases with the numbers 13–19, as in (15a–b), and numerals like 23–29, 33–39, etc., as in (15c–d). The trigger for this deletion, as with the single-digit numerals, is the presence of the feminine morpheme on the enumerated noun. Therefore, I revise the rule in (14) as in (16) below.

- (15) a. χ ams-at-a ʕašar-a t^ʕaalib-an
 five-F-ACC ten-ACC student-ACC.INDEF
 ‘Fifteen male students’
- b. χ ams-a ʕašr-at-a t^ʕaalib-at-an
 five-acc ten-F-ACC student-F.SG-ACC.INDEF
 ‘Fifteen female students’
- c. χ ams-at wa-ʕišr-uun t^ʕaalib-an
 five-F-ACC and-ten-M.PL student-ACC.INDEF
 ‘Twenty-five male students’
- d. χ ams wa-ʕišr-uun t^ʕaalib-at-an
 five and-ten-M.PL student-F.SG-ACC.INDEF
 ‘Twenty-five female students’

(16) Digit 1 FEM Deletion:
 [F] → ∅ / [numeral] ___ ([numeral])+[enumerated noun]+[FEM]

Table 2 gives the derivations for the examples in (15).

However, because the numerals 3–10 are underlyingly feminine, both digits in the numbers 13–19 are expected to carry a feminine suffix. In other words, the derivations for (15a–b) should have a feminine morpheme in the underlying

Syntactic Terminals:	a.	Nmrl-FEM Nmrl	Noun	b.	Nmrl-FEM Nmrl	N-FEM
Rule (16):	—				Nmrl-∅ Nmrl	
Vocabulary Insertion:	χams-at	ʕašar	tʕaalib	χams	ʕašar-at	tʕaalib-at
Syntactic Terminals:	c.	Nmrl-FEM wa-Nmrl	Noun	d.	Nmrl-FEM wa-Nmrl	N-FEM
Rule (16):	—				Nmrl-∅ wa-Nmrl	
Vocabulary Insertion	χams-at	wa-ʕišr-uun	tʕaalib	χams	wa-ʕišr-uun	tʕaalib-at

Table 2: Derivations for examples (15)a–d

representation for the digit *ʕašar*. Moreover, the derivation should explain why this feminine morpheme is deleted in example (15a), but maintained in (15b). If the feminine enumerated noun is the trigger for the deletion of the feminine morpheme carried by the first digit, it then makes sense to expect the underlying feminine morpheme of the second digit to survive. This is borne out in example (15b). But now the question is why the feminine morpheme of the second digit does not survive in (15a).

To answer this question, we must first verify the assumption that the second digit is underlyingly feminine. Remember that our analysis of the digit *ʕašar-at* as feminine is based on the observation that it is feminine when used without an enumerated noun. However, we find the digit *ʕašar* only in its masculine form in the double-digit numerals 13–19 when they are used separately without an enumerated noun, as in (17). This suggests that the second digit in the numerals 13–19 is underlyingly *masculine*. It also suggests that the second digit in (15b) carries the feminine morpheme as a result of agreement in gender with the enumerated noun:

- (17) a. χams-at-a ʕašar b. χams-at-a ʕašr-(*at-a)
 five.F-ACC ten five-F-ACC ten-(*F-ACC)
 ‘Fifteen’ ‘Fifteen’

The numerals 11 and 12 are another case where we find agreement in gender between the numeral and the enumerated noun. Both digits making up each of these two numerals agree with the enumerated noun in gender as in (18).

- (18) a. ʔahad-a ʕašar-a tʕaalib-an
 one-ACC ten.M-ACC student-ACC.INDEF
 ‘Eleven male students’
 b. ʔihda ʕašr-at-a tʕaalib-at-an
 one.F ten-F-ACC student-F-ACC.INDEF
 ‘Eleven female students’
 c. ʔiθna ʕašar-a tʕaalib-an
 two ten.M-ACC student-ACC.INDEF
 ‘Twelve male students’

- d. ʔiθna-ta ʕašr-at-a tʕaalib-at-an
 two-F ten-F-ACC student-F-ACC.INDEF
 ‘Twelve female students’

Once again, this pattern of agreement can be correlated with the observation that each digit of the two numerals 11 and 12 can be in the masculine form only when these numerals occur separately without the enumerated noun, as in (19) and (20) below.

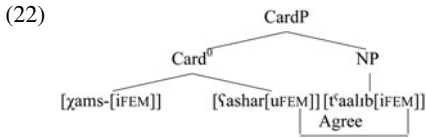
- (19) a. ʔahad-a ʕašar-a b. ʔiθna ʕašar-a
 one-ACC ten-ACC two ten-ACC
 ‘Eleven’ ‘Twelve’
- (20) a. *ʔiħda ʕašar-a b. *ʔiθna-ta ʕašar-a
 one.f ten-ACC two-F ten-ACC
 ‘Eleven’ ‘Twelve’
- c. *ʔahad-a ʕašr-at-a d. *ʔiθna ʕašr-at-a
 one-ACC ten-F-ACC two ten-F-ACC
 ‘Eleven’ ‘Twelve’

In generative syntax, an element that is feminine in its underlying representation, as in feminine nouns in Arabic, is classified as inherently feminine. In other words, these nouns do not receive the feature [FEM] as a result of entering into a dependency relation with some other element. Adjectives, on the other hand, are not inherently feminine. Their feminine feature arises from an agreement relation that adjectives have with the feminine noun they modify. The feminine noun in this case carries an *interpretable* feminine feature [iFEM] and the adjective an *uninterpretable* feminine feature [uFEM] (Chomsky 2000).

Accordingly, the fact that the feminine form of the second digit (*ʕašar-at*) in the double digit numerals in (17) and (20) can only occur with a feminine enumerated noun can be captured if these numerals have an *uninterpretable* feminine formal feature [uFEM], licensed by an interpretable feminine feature [iFEM] carried by the feminine enumerated noun. By the same token, the fact that the feminine numerals 3–10 can occur without a feminine enumerated noun suggests that they enter the syntactic derivation specified with an interpretable feminine feature [iFEM].

In compound numerals such as (21a), the numerals *χams-[iFEM]* and *ʕašar-[uFEM]* are sister nodes under the Cardinal head and the feminine enumerated noun *tʕaalib[iFEM]* is in the NP complement of the cardinal phrase:

- (21) a. χams-a ʕašr-at-a tʕaalib-at-an
 five-ACC ten-F-ACC student-F.SG-ACC.INDEF
 ‘Fifteen female students’
- b. χams-at-a ʕašar-a tʕaalib-an
 five.F-ACC ten-ACC student-ACC.INDEF
 ‘Fifteen male students’



The Agree relation between the feminine feature of the enumerated noun and *ʕaʕar* can value the uFEM feature of *ʕaʕar*. When the enumerated noun is masculine, as in (21b), the second digit *ʕaʕar* does not have a feminine feature.

The way to capture the contrast between numerals that are subject to the deletion rule and those that are not is by limiting the deletion rule to interpretable feminine features [iFEM], as in the rule in (23), the revised version of the rule in (16).

- (23) Digit1 FEM Deletion:
 [iFEM] → ∅ / [numeral] ___ ([numeral])+[enumerated noun]+[iFEM]

Table 3 gives the derivations for the examples in (21):

Syntactic Terminals:	a. Nmrl-FEM Nmrl-iFEM N-iFEM	b. Nmrl-FEM Nmrl N
Rule (23):	Nmrl - ∅ Nmrl-iFEM	—
Vocabulary Insertion:	χams ʕaʕar-at tʕaalib-at	χams-at ʕaʕar tʕaalib

Table 3: Derivations for examples (21)a, b

Table 4 gives the derivations for the four examples in (18).

Syntactic Terminals:	Nmrl Nmrl N	Nmrl-iFEM Nmrl-iFEM N
Rule (23):	—	—
Vocabulary Insertion:	a. ʔahad-a ʕaʕar-a tʕaalib	b. ʔihda ʕaʕr-at-a tʕaalib-at
	c. ʔiθna ʕaʕar-a tʕaalib	d. ʔiθna-ta ʕaʕr-at-a tʕaalib-at

Table 4: Derivations for examples (18)a–d

Now moving to the higher numerals *mīʔat* ‘hundred’ and *ʔalf* ‘thousand’, we find an apparent challenge to rule (23). Rule (23) underapplies in (24) in Standard Arabic. The numeral ‘hundred’ carries a feminine morpheme, which is not deleted when the enumerated noun is feminine, contrary to what rule (23) predicts. Moreover, it seems that rule (23) overapplies in (25) and underapplies in (26).

- (24) mīʔat muʕallim-in/ muʕallim-at
 hundred teacher-M.SG/ teacher-F.SG
 ‘a hundred male/teachers/ female teachers’
- (25) χams mīʔat tʕaalib/ tʕaalib-at
 five.F.SG hundred student.M.SG/ student-F.SG
 ‘Five hundred male students/ female students’

- (26) χ ams-at ?aalaaf t'aalib/ t'aalib-at
 five.F.SG thousands student.M.SG/ student-F.SG
 'Five thousand male students/ female students'

However, the rule in (23) makes correct predictions for all of these examples if we consider the numerals 'hundred' and 'thousand' to be enumerated nouns, with 'hundred' specified as inherently feminine and 'thousand' as inherently masculine. The feminine morpheme therefore does not undergo deletion, but rather triggers deletion of the feminine morpheme carried by the first digit. Because 'hundred' is feminine, the numeral is always masculine in (25), and because 'thousand' is always masculine the numeral is always feminine in (26).

This means that these high numerals act as enumerated nouns in that they trigger the deletion of feminine morpheme of the other numerals, and the gender status they have is never influenced by the rules. They pattern exactly as enumerated nouns do when following the numerals 3–10: exactly what we would expect if they are nouns. Corbett (1978a) argues that high numerals in Slavic languages act like nouns. Under this assumption, rule (23) will not apply in (24) because there is no numeral. Both 'hundred' and 'teacher' are nouns. By the same token, the feminine morpheme carried by 'hundred' triggers the deletion of the feminine morpheme carried by χ ams-at in (25). Table 5 gives the derivations for (24), (25), and (26).

Before ending this section, I would like to give further evidence that gender polarity involves the deletion of the feminine morpheme of the numeral rather than the addition of a feminine morpheme when the enumerated noun is masculine. By looking at the gender in the numeral phrase in Jordanian Arabic (JA), we find that the numerals 3–10 are similar to Standard Arabic in being feminine underlyingly.³ In other words, they have an [iFEM] morpheme that is expected to be deleted if the deletion rule in (23) is operative in JA. Crucially, if the process that produces gender polarity in MSA is deletion and if JA overgeneralizes that process, we would expect the [iFEM] of the numeral to be deleted, not only when the enumerated noun is feminine but also when it is masculine. By the same logic, if the process behind gender polarity were the addition of a feminine gender, and if this process were to overgeneralize, the outcome would be that the feminine morpheme would be added to the numerals not only when the enumerated noun is masculine but

Syntactic Terminals	(24)		(25)		(26)	
	N-iFEM	N-iFEM	Nmrl-iFEM	N-iFEM	Nmrl-iFEM	N
Rule (23):	—	—	Nmrl-∅	—	—	—
Vocabulary Insertion:	miʔat	muʔallim-at	χ ams	miʔat	χ ams-at	?aalaaf

Table 5: Derivations for examples (24)–(26)

³The numerals 3–10 are consistent with the feminine morpheme *-eh* when used without the enumerated noun.

also when it is feminine. In fact, Jordanian Arabic exhibits the first of these patterns, as shown in (27).

- (27) χ ams-(*at) t^caalib-aat/ t^cullaab
 Five-(*F) student-F.PL/ student.M.PL
 ‘Five female students’

Rule (23) thus overapplies in Jordanian Arabic, deleting FEM even when the enumerated noun is masculine. The example in (27) can be produced by the rule in (28), according to which the feminine morpheme of the numeral is deleted whenever it occurs with an enumerated noun. Interestingly, there are cases where the MSA deletion rule as formulated in (23) seems to be respected in JA. This takes place in certain collocations where the feminine morpheme of the first numeral is kept when expected under (23) (i.e., when the enumerated noun is masculine, as in (29a–e), or when the numerals 13–19 are used separately). These cases provide evidence that JA once had the deletion rule in (23), and these cases are a residue of the earlier system. The feminine morpheme has been reanalyzed as a liaison in these very frequently used combinations. In other words, the *t*-segment has undergone resyllabification as in the examples in (29).

- (28) Digit1 FEM Deletion: [iFEM] → ∅ / [numeral] ____ ((numeral))+[enumerated noun]

- (29) a. χ ams t-irbaaʕ b. χ ams t-iyyaam c. χ ams t-aalaaf
 five t~quarters five t~days five t~thousands
 ‘Five quarters.’ ‘Five days.’ ‘Five thousands.’
 d. χ ams t-ušħur e. χ ams t-ust^cur f. χ ams t^c-aaš⁴
 five t~months/ five t~lines five t~ten
 ‘Five months.’ ‘Five lines.’ ‘Fifteen.’

Finally, an anonymous reviewer points out that hallmark examples of impoverishment produce unmarked forms. The deletion rules in this article seem to run counter to this by producing polarity, a marked surface phenomenon. However, while it is true that Polarity produces marked ‘surface structures’, I have shown here that gender polarity is a grammatical relation that produces unmarked gender forms (the masculine). In the next section, I will show that number polarity also produces unmarked forms (the singular).

4 NUMBER POLARITY

As for number polarity, recall that the enumerated noun is plural by default. I propose a deletion rule that deletes the plural morpheme of the enumerated noun (EN), as in (30). It is motivated by economy and applies when the numeral carries a plural morpheme. Recall that the enumerated noun must be plural when the numeral is one of the cardinals 3–10, as in (31a). If the rule in (30) only applies to nouns enumerated by numerals that carry a plural morpheme, then the rule does not apply in (31a).

⁴The *t*-segment that used to be the feminine morpheme carried by the numeral assimilated with the pharyngeal *ʕ* in *ʕašar* resulting in the pharyngealized *t*, i.e., *t^c*. So the pharyngeal changed from being a primary articulation into being a secondary articulation.

But with the compound numerals 11–19 in (31b), the numeral triggers the deletion of the plural morpheme of the enumerated noun. This suggests that these compound numerals carry a plural feature. There is evidence that the second digit *ʕašar* in these compounds has a grammatical function rather than a lexical meaning corresponding to the numeral ‘ten’. This numeral in the compound numerals 11–19 is reduced to a suffix in many Arabic dialects such as Jordanian, illustrated in (32). But even in Standard Arabic, we saw earlier in section 3 that this numeral is underlyingly masculine *ʕašar*, and therefore distinct from the numeral *ʕašar-at* ‘ten’. Moreover, this numeral is not interpreted as ‘ten’. The whole compound is interpreted the same way the English teen numerals are. So the compound numerals 11–19 are marked with PL underlyingly by virtue of being compound. Now even more explicitly, with numerals indicating decades, as in (31c), the numeral carries the plural suffix *-uun*.

(30) EN PL Deletion: [+PL] → ∅ / [numeral]+[PL]+[enumerated noun] ____

- (31) a. *χams tʕaalib-aat-in*
 five student-F.PL-GEN
 ‘Five female students’
- b. *ʔahad-a ʕašar-a tʕaalib-an*
 one-ACC ten.M-acc student-ACC.INDEF
 ‘Eleven male students’
- c. *ʕišr-uun tʕaalib-an*
 ten-M.PL student-ACC.INDEF
 ‘Twenty male students’

(32) *χams-tʕaaš*
 five-ten
 ‘Fifteen’

If rule (30) applies in compound numerals and decade numerals, the plural morpheme of the enumerated noun is deleted, giving the singular enumerated noun. Table 6 gives derivations for the forms in (31).

Like the compound numerals 11–19, the compound numeral consisting of one of the numerals 3–9 and the numeral ‘hundred’ is marked with PL underlyingly, hence the singular enumerated noun, as in (33). On the other hand, in (34), the numeral *χams* does not form a compound with the numeral *ʔaalaaf*. Therefore, *ʔaalaaf* is pluralized as if it were an enumerated noun as in (31a) above. So, although the numerals in (34) do not form a compound marked with PL, the numeral *ʔaalaaf* is the plural

Syntactic	a. Nmrl	N-PL	b. Nmrl-PL	N-PL	c. Nmrl-PL	N-PL
Terminals						
Rule (30):		—		N-∅		N-∅
Vocabulary	<i>χams</i>	<i>tʕaalib-aat</i>	<i>ʔahada</i>	<i>tʕaalib</i>	<i>ʕišr-uun</i>	<i>tʕaalib</i>
Insertion			<i>ʕašar</i>			

Table 6: Derivations for examples (31)a–c

of *ʔalf* and therefore carries a plural morpheme, unlike *miʔat* in (33). This plural morpheme is the trigger for having a singular enumerated noun.

- (33) *χams miʔat tʕaalib/ tʕaalib-at*
 five-F.SG hundred student.M.SG/ student-F.SG
 ‘Five hundred male students/ female students’
- (34) *χams-at ʔaalaaf tʕaalib/ tʕaalib-at*
 five-F.SG thousands student.M.SG/ student-F.SG
 ‘Five thousand male students/ female students’

Interestingly, the singular is ungrammatical as in (35a) below. An anonymous reviewer points out that if *ʔaalaaf* in (34) is an enumerated noun, it should take the singular form when it follows numerals greater than 10. Indeed, this prediction is borne out in (35b), where the numeral ‘eleven’ is followed by the singular form of ‘thousand’.

- (35) a. **χams-at ʔalf tʕaalib*
 five-F.SG thousand student.M.SG
 ‘Five thousand students’
- b. *ʔahad-a ʕašar-a ʔalf*
 one-ACC ten.M-ACC thousand
 ‘Eleven thousand’

Crucially, the reason the numeral *ʔaalaaf* must be plural in (34) is that it is enumerated by *χams-at*, and thus interpreted as plural. In the derivation of (34) the string composed of the two words *χams-at ʔaalaaf* is subject to rule (30), which clearly does not apply since *χams-at* does not carry a PL morpheme. Then, the rule applies to the string made up of *χams-at ʔaalaaf* as the numeral and *tʕaalib* as the enumerated noun. This suggests that *miʔat* in the compound numeral *χams-miʔat* gets its obligatory plural interpretation from being in the compound construction. In other words, being in the compound construction gives it the PL abstract morpheme. Tables 7 and 8 show the derivations for (33) and (34) respectively.

For the numerals ‘hundred’ and ‘thousand’ in (36), it is not clear why the enumerated noun is singular, since these numerals do not carry a plural morpheme. That is, *miʔat* is not part of a compound numeral, and *ʔalf* is not pluralized. The use of a singular enumerated noun in this context suggests that these higher numerals are treated as plurals. Interestingly, while neither the numeral nor the enumerated noun is marked as plural, the verb in (37) displays plural number agreement with the numeral phrase in preverbal subject position. This plural number inflection on the verb can be explained if the numeral phrase exhibited an abstract plural morpheme

Syntactic terminals	(33)	Numeral-PL	N-PL
Rule (30):			N-∅
Vocabulary Insertion:		<i>χams-miʔat</i>	<i>tʕaalib</i>

Tables 7: Derivation for example (33)

Syntactic Terminals	(34), step 1		(34), step 2	
	Nmrl	N-PL	Nmrl-PL	N-PL
Rule (30):	—			N-∅
Vocabulary Insertion:	χams-at	ʔaalaaf	χams-at ʔaalaaf	tʕaalib

Tables 8: Derivation for example (34)

in the syntax proper, which was deleted later in the derivation. Suppose that, consistent with the analysis of number polarity in this article, the higher numerals have an abstract plural morpheme that triggers the deletion of the plural morpheme of the enumerated noun.

(36) *mīʔat/ʔalf* *muʕallim-in*
 hundred/thousand teacher-GEN
 ‘One hundred/thousand teachers’

(37) *mīʔat/ʔal* *muʕallim-in* *šarak-u* *fi-l-ʔidʕraab*
 hundred/thousand teacher-GEN participated-3.M.PL in-the-strike
 ‘One hundred/thousand teachers participated in the strike’

Plural agreement on the verb is evidence that the numerals *mīʔat* and *ʔalf* are plural despite the fact that they do not carry a plural morpheme. This would be similar to collective nouns such as *al-naas* ‘people’ which is plural although it does not carry a plural morpheme. But this raises the question of why these numerals behave like collective nouns. Interestingly, there is cross-linguistic evidence that higher numerals are ‘nounier’ than lower numerals (Corbett 1978a, 1978b).

5 CONCLUSIONS

I have argued that gender and number morphology is derived through both syntactic and post-syntactic rules; that is, gender and number morphology is distributed over the two components of the grammar. The syntactic distinction between *interpretable* and *uninterpretable* features may feed and/or bleed the post-syntactic FEM deletion rule (impoverishment). Number polarity is derived by deleting the Plural morpheme of the enumerated noun, and of higher numerals when enumerated, when the numeral carries a plural morpheme or when it is a compound.

The basic form is the feminine form and the masculine is derived. From an anthropological perspective, this is in line with Sadiqi’s (2006) claim that the currently feminine forms in Arabic used to be the default from which the masculine was derived by deleting what is now a feminine morpheme. If this is correct, gender morphology in numerals presents us with relics of an earlier stage of Arabic. Another advantage to the analysis in this article is a theoretical one. Analysing the feminine as the basic form from which the masculine is derived is theoretically less costly and has more explanatory adequacy, according to Chomsky’s (1965) view, and as pointed out in Sadiqi’s (2006) sociolinguistic analysis of gender in Arabic.

ABBREVIATIONS

3M.PL	third person masculine plural
ACC	accusative
F/FEM	feminine
GEN	genitive
INDEF	indefinite
M	masculine
Nmrl	numeral
PL	plural
SG	singular
DU	dual

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