

The Categorical Status of Numerals and Quantifiers in Persian: A Minimalist Approach

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ABSTRACT— This paper explains the categorical status of numerals and quantifiers, the distribution of Numeral Phrases or here Cardinal Phrases (CardIP) in Persian. This paper follows the Minimalist framework of Chomsky (1995) and shows that considering quantifiers as a functional head can indicate optional word order variation and an economical derivation for quantifiers. Also, despite Gebhardt's (2009) argument, it will be argued that quantifying determiners just belong to the functional projection QP, and the lower QP in Giusti's (1992) analysis can be replaced by a projection of functional category CardIP which a numeral occupies its head. Contrary to Hamedani (2011), I will point out only one feature, [+Numerable], is realized on Classifiers (Cls) and separates them from number morphology. Thus, Persian plural marker -hâ has a [-Numerable] feature, whereas innumerability is realized on Cls and it is considered as a syntactic issue that separates Cls from number morphology. The key insight is that plural marker is a phrasal head with the associated features, [+plural] and [+definite]. Further, findings indicate that numerals behave as adjectives, whereas quantifiers are different from adjectives.

KEYWORDS: The Minimalist Program, Quantifier phrase, Numeral phrase, Classifier phrase, Number phrase, The categorical status.

Introduction

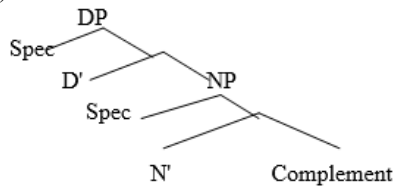
The grammatical feature of number in a language has to be recognized in the absence of numerals or other quantifiers (Kibort and Corbett, 2008). Therefore, the number system should not be confused with the numeral system in a language. English number marking is required not only in numeral constructions but also with other determiners like *many*. In contrast, Persian, for example, does not use the number marking. Numerals occur between demonstratives and the head noun. However, quantifiers represent the quantity of the individuals named by nouns.

Therefore, the aim of this paper is to provide the answer to the following questions: (1) Are Persian numerals and quantifiers categorically different? ; (2) Does the functional category quantifier project in Persian? ; (3) Are classifiers in Persian in complementary distribution with plural marking? ; (4) Can numerals (cardinals) head a projection, CardIP, within Persian noun phrases? In connection with these research questions, I will propose the following points in this paper: (1) quantifiers and numerals are separate phrases, and numeral quantifiers are considered as a projection of functional category CardIP in Persian when a numeral occupies the head of a CardIP ; (2) quantifier is a functional head with its own specifier and complement, and assuming it as a functional head can illustrate an economical derivation for quantifiers, and for optional word order variation; (3) classifiers and the plural marker belong to separate functional categories, and only one feature, [+Numerable], can indicate that Persian CIP and NumP project separately, (4) quantifiers behave differently from adjectives, whereas numerals are adjectives, although sometimes they may be used as nouns.

The Internal Structures of DP in Persian

Moinzadeh (2001) assumes that a head-initial analysis for DP is necessary in order to utilize the head-to-head movement in Persian nominal phrases. He indicates a Persian DP as shown in (1).

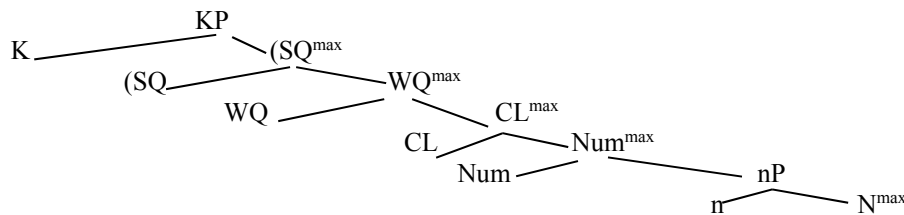
(1)



As this configuration illustrates DP is the projection of the head D' selecting an NP as its complement to the right and with its Spec to the left. N' subcategorizes for its complement to the right and then project a NP with its Spec to the left of the head N'. Both Spec and Complement are maximal projection. Then, the head of the NP overtly moves to D', to produce the N'+D' order. Furthermore, according to Chomsky (1995) ordering applies to the output of morphology as part of the phonological component. Thus, adopting Chomsky's argument, I argue that the internal structures of Persian noun phrases are head-first in tree diagrams in which heads such as Numb, D, Cl and Q appear in the left node and take a complement to the right. However, contrary to Moeinzadeh (2001), I suggest that plural noun is not chosen from the lexicon together with its plural marker, and there is a projection of the functional category NumP in Persian, and the Plural marker occupies the head of NumP.

Furthermore, under the DP-Hypothesis, Gebhardt (2009, p.54) illustrates a universal DP structure as shown in (2).

(2)



However, with regard to quantifiers and numerals, in the following I will show that the analyses sketched above do not hold up, and a Quantifier Phrase and Numeral Phrase can in principle be projected separately.

Number Phrase and N-Raising

Under the DP-Hypothesis, Ritter (1992) suggests that there are a Number (Num) as a functional head and a Number Phrase (NumP) as the complement of D in DP. She argues that either a numeral quantifier or the plural suffix -Vk is in Num, and N-to-Num raising happens only when the plural suffix is in Num. Since the plural suffix in Num is dependent, and thus it has to be morphologically attached by N-raising. On the other hand, numeral quantifiers are independent words and thus they do not have to be attached by N raised to Num.

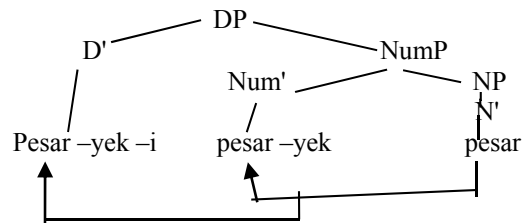
However, Moinzadeh (2001) refutes Ritter's (1992) proposal for generating NumP as the complement of D'. He suggests that whenever there is Num' in a nominal phrase it appears in the specifier position of Persian DPs, since generating NumP as the complement of D' yields ungrammatical strings for Persian nominal phrases. See the following example from Moinzadeh (2001, p. 62).

(3) yek pesar- i

one boy –indefinite determiner

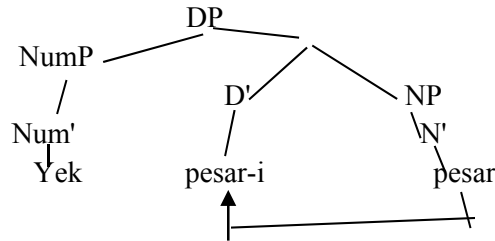
'one boy '

(4)



He argues that as (4) illustrates NumP between DP and NP generates the string *pesar-yek-i* 'boy one' which is ungrammatical. However, assuming NumP in the specifier position of DP produces grammatical results. His analysis for (3) is shown in (5).

(5)



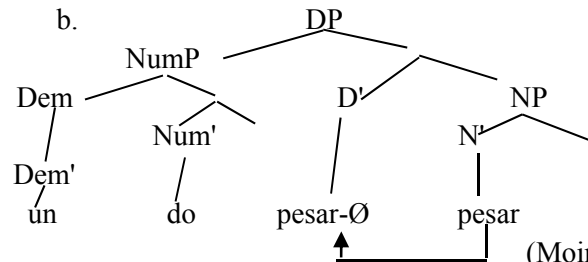
(Moinzadeh, 2001, 63)

(Moinzadeh, 2001, 63)

Nevertheless, there are several reasons not to prefer Moinzadeh's analysis. First, he claims that if N moves to Number, it yields an ungrammatical structure, whereas according to Ritter (1992), N-to-Num raising occurs only when the plural suffix is in Num, and N-raising is blocked when Num is occupied by the numeral quantifiers. Further, he argues that if a demonstrative precedes the Num', the specifier position of the NumP is occupied by the head of DemP. He supposes that the specifier position of the NumP, in turn, is the specifier of DP whereas, assuming NumP in the specifier position of DP seems to be against his argument. Since he states that "the constituent in Spec DP may be one of the following maximal projections: a Demonstrative Phrase (DemP), a Quantifier Phrase (QP), or a Number Phrase (NumP) (Cardl P)" (p.59), whereas he locates both DemP and NumP in Spec DP as shown in (6b) for (6a).

(6) a. un do pesar

That two boy
'those two boys'



(Moinzadeh, 2001, p. 63)

Consequently, adopting Ritter's (1992) argument, I suggest that a noun phrase can contain two kinds of functional heads, D and Num that is the locus of a number feature, and N-to-Num rising occurs only when the plural suffix is in Num. However, contrary to Ritter's proposal that number marking and numeral quantifiers are alternative expressions of number and her concomitant prediction that they therefore should not appear in the same construction, I argue that some languages utilize numeral quantifiers and number together, as the Persian example in (7) shows.

(7) se tâ miz-hâ

Three Classifier tabl-Pl
'The tree tables'

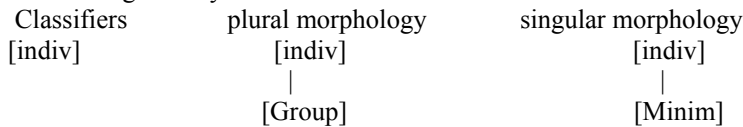
Further, the number system should not be confused with the numeral system in a language. For example, English number marking is required not only in numeral constructions but also with other determiners like *many*.

As a result, the Persian plural morpheme behaves as a phrasal affix in syntax since it heads a functional category. In fact, in Persian, grammatical number, in the form of plural marking, occupies the head of NumP. Moreover, the plural morpheme has two features: [+plural] and [+definite]. Since according to Ghomeshi's (1996) argument, the co-occurrence of the plural marker with overt numeral shows that it is [+definite], that is, N moves to Num to get a definite feature, but in other contexts, when it happens on indefinite nouns, or without a numeral quantifier, N moves to Num to get a number feature or [+plural]. Thus, plural marker in Persian is a phrasal head.

Classifier Phrase

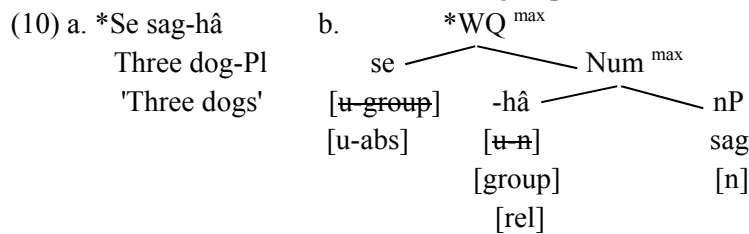
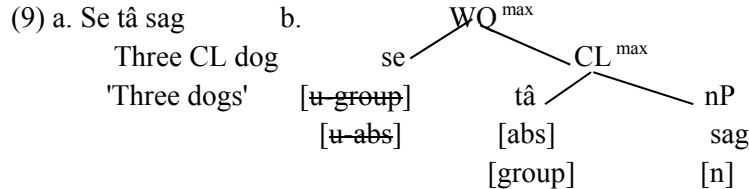
A classifier appearing in numeral + noun constructions heads a Classifier Phrase. Gebhardt (2009) applies Harley and Ritter's (2002) feature geometry for pronouns to number, and presents that there are three versions of number: classifier, singular and plural. All involve the basic feature [individuation] that presents only that number is involved. However, singular and plural are further specified for [minimal] and [group] respectively. The features are as in (8).

(8) Partial feature geometry for number items



(Gebhardt, 2009, p.99)

Although a classifier is considered as a number morphology, it only appears in a numeral + noun construction, not any quantifying determiner and in classifier languages, the numeral just occurs in a CL + noun construction. See the following examples from Persian.



In (10b) for (10a), all features are not checked and this structure is ungrammatical. In short, according to Gebhardt, Persian CIP and NumP project separately due to the variation in features.

However, Hamedani (2011) assumes that the classifier appears in the NumP head, and plural marking is in complementary distribution with classifiers in indefinite nominal phrases, since there is no classifier in an indefinite nominal phrase combination of [N + PL], as in (11a), and thus an indefinite nominal phrase combination of [cardinal + classifier + PL + IND] is ungrammatical as shown in (11b).

- (11) a. dânešju-hâ-yi sæbt-e-nâm=kærd-ænd.
student-PL-IND register-EZ-name=do.PAST-3PL
'Some students got registered.'

- b. *do tâ dânešju-hâ-yi sæbt-e-nâm=kærd-ænd.
two CL student-PL-IND register-EZ-name=do.PAST-3PL (Hamedani, 2011, p.146)

Moreover, she states that classifiers in Persian have optional uses, whereas the use of classifiers in Chinese-like languages is not optional.

Contrary to Hamedani (2011), I point out that classifiers cannot occupy the head of NumP in

Persian. Since the NumP head is occupied by the plural marker, and also in Persian there is co-occurrence of classifiers and plural marking, and due to the presence of the plural marker, the sentence has a definite reading. Further, according to Chomsky (1995), derivational morphology is

part of the lexicon, whereas inflectional morphology is part of syntax. Therefore, plural marker is considered as an inflectional morphology and it just corresponds to a functional head. Furthermore, functional elements constitute a closed class, permit only one complement, and are usually inseparable from their complement (Abney, 1987). Thus, with regard to these criteria, number morphology constitutes a closed class, takes a unique complement, and is a bound morpheme. Consequently, number morphology is a functional head and projects a NumP, even though it optionally co-occurs with a classifier in a definite noun phrase.

In addition, adopting Ganjavi (2007), I assume that an indefinite nominal phrase combination of [cardinal + classifier + PL + IND] can be grammatical if it is followed by another sentence which provides more information about the object or the subject as in (12a) and (12b).

- (12) a. do tâ pesar-hâ-yi -ro entekhâb kard-and ke besyâr bâhush budand.
two CL boy-PL-IND -râ select do.PAST-3PL who_{Rlc} very clever were
'They selected two boys who were very clever.'
- b. do tâ pesar-hâ-yi sâbt-e-nâm kard-and ke besyâr shojâ ? budand.
two CL boy-PL-IND register-EZ-name do.PAST-3PL*who_{Rlc}very brave were.
'two boys got registered who were very brave.'

Therefore, the occurrence of a [cardinal + classifier + PL + IND] combination becomes grammatical, since plural marker and classifiers are not in complementary distribution. Moreover, classifiers in Persian have an obligatory occurrence due to the presence of the plural marker in a definite noun phrase as shown in (13).

(13) panj*(jeld) ketâb(-hâ)-râ khândam.

five *(CLvolume) book(-PLDEF)-OM read.PAST-1SG

'I read the five volumes of the books.'

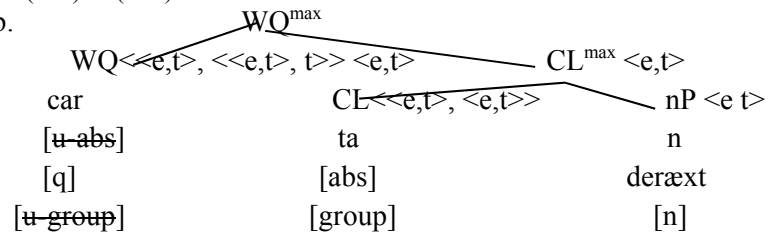
As a result, I agree with Gebhardt's (2009) argument for separate phrases for classifiers and number morphology, but I reject Gebhardt's syntax. Since his approach has a number of technical problems. He shows a derivation for (14a) in (14b).

(14) a .car ta deræxt

four CL tree

'four trees'

b.

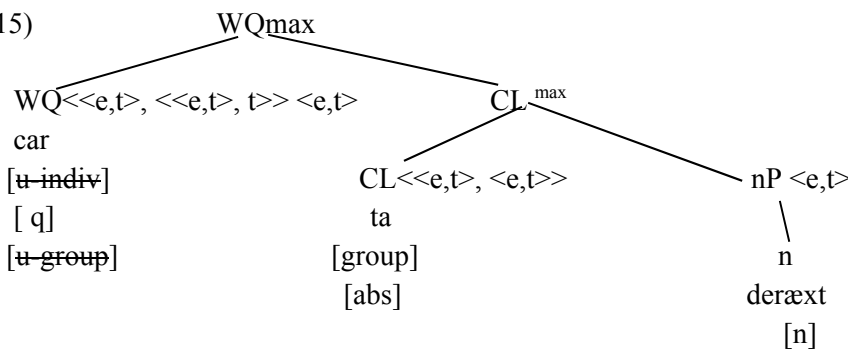


(Gebhardt, 2009, p. 109)

Then he states that the head of a CLP or NumP has a [u-n] feature. Persian classifiers are not featured as [u-n], when they have a NumP complement or an NP complement. However, NumP has a [u-n] feature that requires checking by [n] in nP, whereas *n* in nP does not take part in checking a [u-n] feature when it merges with a classifier. Therefore, I assume that classifiers as a null classifier should be featured as [u-n] when they have an nP complement in order to be checked by *n* in nP.

Furthermore, Gebhardt introduces numeral WQD (weak quantifying determiner) with associated features such as [q, u-group, u-abs] or [q, u-minim, u-abs] and mentions that "classifiers are only used with numerals, so we expect classifiers to be [abs] and numerals to be [u-abs]"(p.218). Then, in order to explain the derivation of the classifier construction, with a numeral, a numeral classifier and an uninflected noun, he merges CL^{max} with the numeral *car* 'four', and claims that in (15), the Persian numeral is [u-group] but not [u-abs] since numerals can also compose with plural nouns.

(15)



(Gebhardt, 2009, p. 215)

Nevertheless, (15) contrasts with (14), whereas they both show a derivation for (14a). As a result, a numeral cannot compose with a plural noun without a classifier as shown before in (10b).

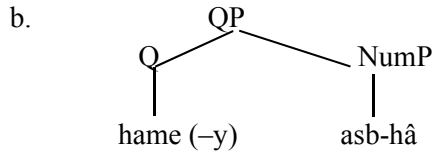
Moreover, Gebhardt argues that Persian CIP and NumP project separately due to the variation in features, whereas adopting Zhang (2012), I assume that only one feature, [+Numerable], can combine classifiers to numerals directly and indicate that Persian CIP and NumP project separately.

Since innumerability happens only with a numeral. It is not related to the contrast between singularity and plurality, or among integer, zero, and other numerals. In fact, the presence of Persian plural marker *-hâ* makes the noun unable to occur with any numeral since the suffix has [-Numerable] feature. Thus, it seems that innumerability is realized on CIs and it is considered as a syntactic issue that separates CIs from number morphology. To sum up, plural marker whether it occurs in a definite or an indefinite noun phrase is not in complementary distribution with classifiers.

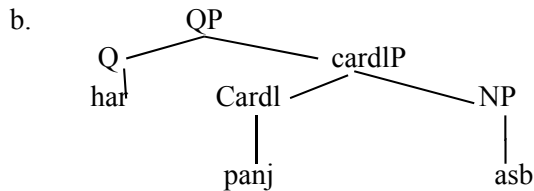
QPs

Giusti (1991) indicates that quantifier is a functional head, and selects either a DP or an NP as its complement. This is named the QP-Hypothesis. However, contrary to Giusti, I assume that QPs do not select only a DP or an NP as their complement, and Persian quantifiers are able to take phrasal complements such as CardIP and NumP, as the Persian examples in (16b) and (17b) show.

(16) a. hame (-y) asb-hâ
'all the horses' or 'all of the horses'

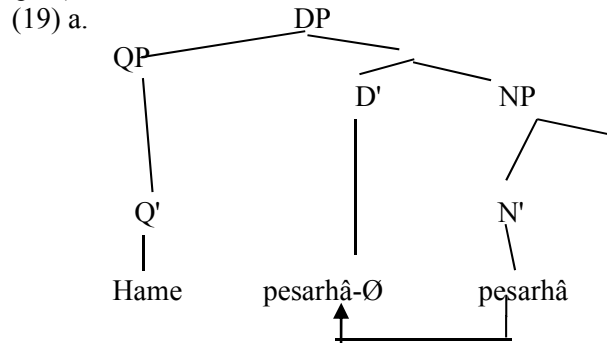


(17) a. har panj asb
every five horse
'every five horses'

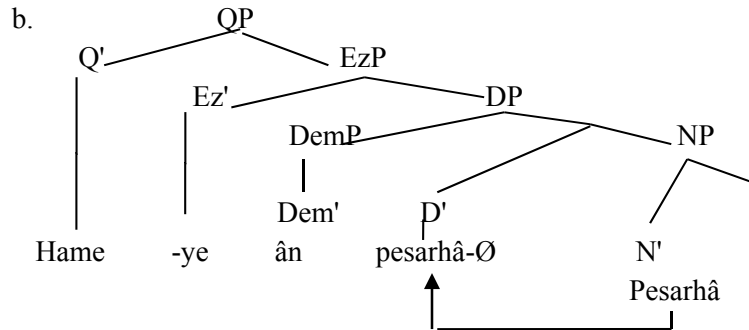


Moinzadeh (2001) argues that QPs can fill Spec DP and they are incomplementary distribution with DemP. Further, the quantifier *hame* 'all' can also be the head of the functional category QP which selects an EzP complement. See the following example from Moinzadeh (2001, p.61).

(18) a. hame pesarhâ
All boy- PL
'All boys'

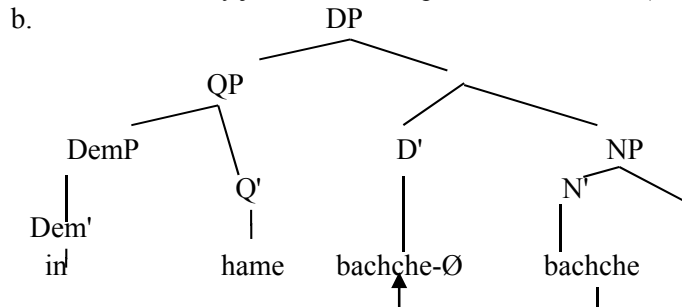


b. hame-ye ân pesarhâ
all Ez that boy -PL
'all those boys'



However, I reject Moinzadeh's analysis since his analysis of QPs failed to explain why a quantifier can appear with a numeral in Persian. In addition, he assumes that the specifier position of the QP, in turn, is the specifier of DP. But, it is against his argument that the Spec DP can be filled by just one of these phrases as shown in (20b) for (20a).

(20) a. in hame bachche



On the other hand, he suggests two different derivations for the quantifier *hame* as shown in (19a) and (19b), whereas according to Zwart (1998, p. 219) "the notion of economy of derivation applied is a 'global' one: various derivations are compared, and the most economical one is selected as the only one allowed". Therefore, I argue that assuming quantifiers as functional heads, with their own specifiers and complements can illustrate an economical derivation for quantifiers since they can take various complements. In addition, considering quantifiers as a functional head, we get a derivation indicating optional word order variation.

Gebhardt (2009, p.55) states that strong quantifying determiners such as *every*, *each*, and *the* head SQ^{max}, and weak quantifying determiners such as *some*, *a* and *numerals* head WQ^{max}, and they take NumP complements and are in turn selected by strong quantifying determiners.. Also, weak quantifying determiners are in complementary distribution with numerals, whereas strong quantifiers are not in the same position as numerals and it is possible to co-occur *the* and numerals.

- (21) a. *many three students
b. the three students

Thus, cardinals and weak quantifying determiners are in lower than the position for strong quantifying determiners. Consequently, I agree with Gebhardt (2009) in assuming that quantifiers and numerals are heads of phrases. But, contrary to Gebhardt, I assume that that weak quantifying determiners such as *some*, *a*, and numerals are not alternative expressions of Weak Quantifier Phrase and they therefore can appear in the same construction. Since, some languages utilize numerals and *a* together, as the English example in (22) shows.

- (22) A hundred birds

Further, *the*, as a strong quantifying determiner can occur with numerals as shown in (36).

- (23) The two boys

Therefore, Examples (22) and (23) support the idea that cardinals, weak quantifying determiners, and strong quantifying determiners are not in the same position. Thus, as a first hypothesis, the functional projection CrdIP takes the numerals as its own head. Moreover, it appears that weak quantifying determiners are in the same position as strong quantifiers. For example, weak

Quantifying determiners cannot occur with strong quantifiers (24).

- (24) a. *each many books/ many each books
b. *all few bags /few all bags

As in English, Persian weak quantifying determiners are in the same position as strong quantifiers. Thus, strong quantifying determiners cannot occur with weak quantifiers (25).

- (25) a. *cændtâ kol/ kol cændtâ parande
b. *hame kheyli / kheyli hame parande-hâ

Examples (24a), (24b), (25a) and (25b) illustrate that strong quantifiers and weak quantifiers occur in the same position. Also, assuming that pronouns are in the DP position, strong quantifying determiners cannot precede weak quantifiers. So, in (26) *mâ* is considered as a head of DP.

- (26) *mâ se tâ irani-hâ*
We three CL Iranian-PL 'We three Iranians' (Gebhardt, 2009, p. 310)

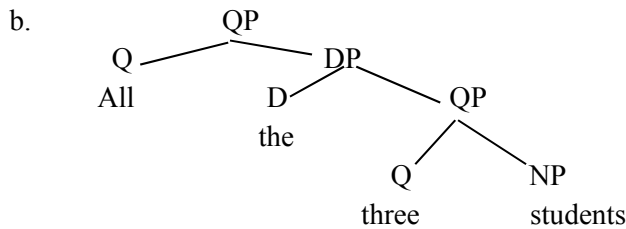
To sum up, strong quantifying determiners and weak quantifying determiners sound to me the same and just belong to the functional projection QP not to strong or weak. I also argue that DP is necessary for a nominal expression to be a definite or indefinite argument not a WQ^{max} for indefinites or an SQ^{max} for definites. Moreover, despite Gebhardt's argument, the indefinite weak determiners *cændtâ* (az), *xeyli*(az), and strong quantifying determiners *hame*(Ez), *bishtar*(Ez) can appear with a definite morpheme like plural –ha, since they are not in the same position. *Cændtâ* (az), *xeyli* (az) can be followed by an NP or a PP in partitive constructions, and *hame* (Ez), *tamâm* (Ez), *kol* (Ez) can be followed by an EzP or a NumP, whereas –Hâ occupies the head of NumP. Therefore, these distributional facts support the idea that in Persian, strong quantifying determiners and weak quantifying determiners are not in separate positions and that quantifying determiners occupy a position higher than numerals. Numerals are not in complementary distribution with *the* and *a*, and they occupy the head of a CardIP. Thus, in the following I will indicate that CardIP is in principle a distinct functional projection.

Cardinality Phrase

Landman (2000, p.96) argues that the numerals are a special category distinct from the quantifiers, since they can arrange with respect to each other; therefore a sentence like *Ten boys are playing* involves that *Nine boys are playing*, but it does not entail that *Most boys are playing*, and *Most boys are playing* does not entail that *Ten boys are playing*. More formally, we can characterize the distinction between quantifiers and numerals as follows.

Giusti's (1992) analysis of QPs provides two positions for Qs. The (27b) illustrates the structural configuration for (27a).

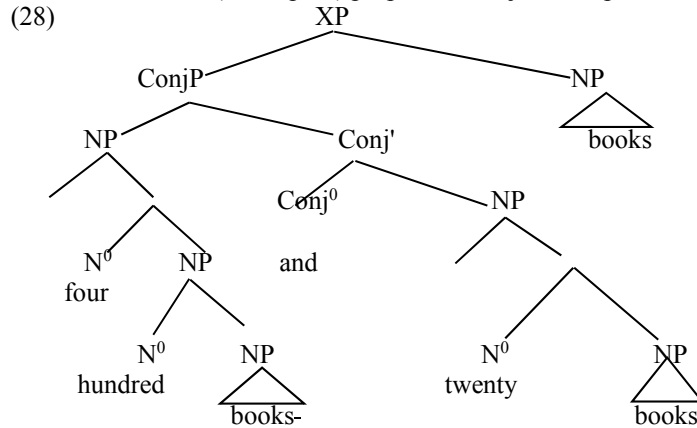
(27) a. [All the three students] have studied English.



However, I assume that the lower QP can be replaced by a projection of functional category CardIP. Consequently, the functional category CardIP is present in Persian when a numeral occupies the head of CardIP.

Further, According to Samiiian (1983) numerals cannot take their complements in a partitive structure, and, the presence of a cardinal in a nominal phrase in Persian requires the presence of a classifier or an NP. Thus, numerals and quantifiers must be separate heads since numerals take CIP complements and they are selected by quantifiers, Moreover, Moinzadeh (2001) mentions that when a Num' is followed by a classifier, it is the head of a ClassP which is chosen as the complement of Num' to the right. Thus, there are two heads for NumP, whereas every phrase requires just one head. Therefore, I assume that functional category CardIP cannot be located in Spec DP and it is a maximal projection distinct from QPs and DemP.

In addition, Zabbal (2006, p.22) proposes a conjunction phrase for complex compositional numerals as in (28).

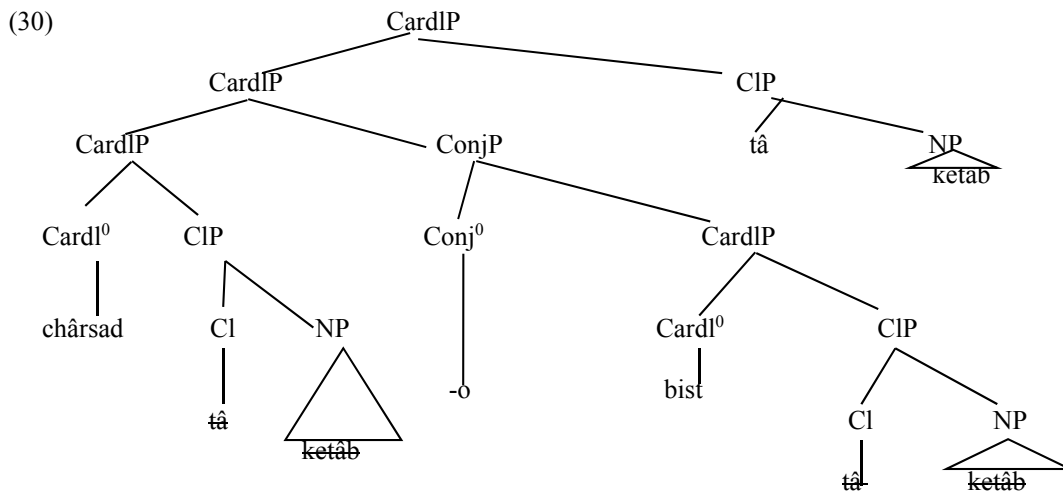


However, Gebhardt (2009) proposes that if we consider the numeral 401 as in (29).

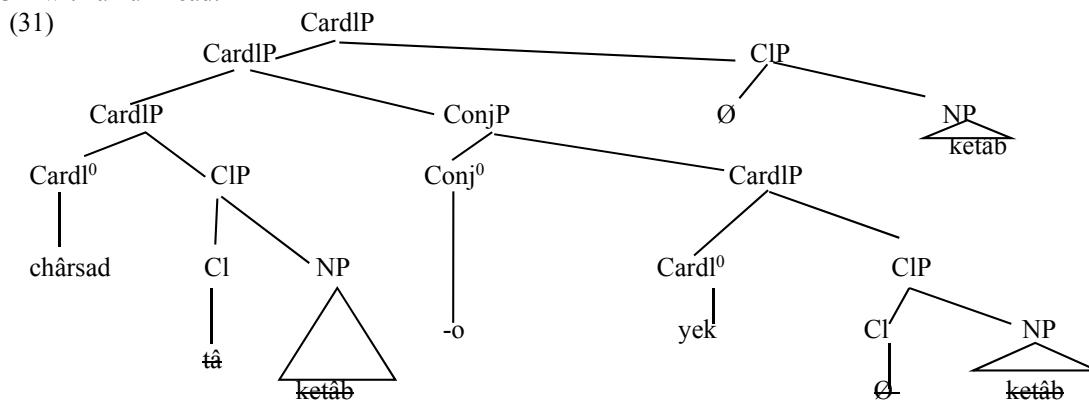
(29) *car sæd-o yek ta ketab
four hundred-and one CL book '401 books' (Gebhardt,2009 ,p.90)

For (29) Zabbal's two raising nodes are not identical. One is a classifier and an NP, while the other is just an NP. In addition, he argues that the nature of the root XP indicates another problem. " (The) merge of ConjP and NP has not resulted in a phrase labeled by one of its daughters" (p.92).

Thus, to avoid the weaknesses of Zabbal's analysis, we can maintain that complex numerals act as simplex numerals, and they are always heads of cardIPs. So, the XP in (28) is replaced with a CardIP. I adopt Kayne (2005) in assuming that [[Four hundred] books] seems to be a more natural structure than [Four [hundred [books]]]. Thus, in the simplest case, the structure of a complex numeral like *châr sæd-o bist tâ ketâb* '420 books' can be akin to the structure in (30).



Since right node raising requires that both nodes have identical material, and the Persian data present that the classifier *tâ* cannot be used with the numeral *yek* 'one', therefore a CIP with a null head is considered for the numeral *yek* 'one' as the structure in (31) shows. I assume that *tâ* and the null head are the same, since both of them occupy the head of a CLP. Therefore, when the numeral *yek* 'one' is utilized with the other numerals, the raising node is the CIP with a null head.



Consequently, the above discussion presents that numerals are always phrasal heads and distinct from QPs.

The Categorical Status of Numerals and Quantifiers

In traditional grammar, quantifiers generally have the categorical status of adjectives. But, analyzing quantifiers as adjectives in English indicates a number of serious descriptive problem (Abney 1987, Giusti 1997). Therefore, I claim that numerals are adjectives, although sometimes they may be used as nouns. To maximize the comparison between quantifiers, numerals and adjectives, all adjectives are considered as modifiers of nouns, and all nouns in noun-complement structures.

Quirk, Greenbaum, Leech, and Svartik (1972) argue that "four features are generally considered to be characteristic of adjectives:

1. They can freely occur in attributive positions.
2. They can freely occur in predicative position
3. They can be premodified by the intensifier *very*.
4. They can take comparative and superlative forms" (p.231).

As attributive adjectives, cardinal numbers, ordinal numbers and superlative adjectives come before the head nouns and modify a noun, a count noun, or a noun phrase. They belong to similar categories, since they are in complementary distribution. In Persian, ordinals are formed from numerals by adding the suffix *-om*, and they follow the noun linked by the *Ezafé* vowel. However, the addition of the suffix *-in* to these ordinals yields another set of ordinals which precede the noun and do not take *Ezafé*. Ordinals show a pattern that is very similar to adjectives. Take the following examples.

(32) a. Kelâs e chârom

class Ezafe fourth 'the fourth class'

b. châromin kelâs

fourth class 'the fourth class'

In (32a), the noun *kelâs* 'class' is modified by the ordinal *chârom* 'fourth'. Ordinals can also appear prenominal. With the ordinal in (32b), we have a prenominal adjective. Thus, when ordinal numbers occur, they indeed are adjectives often having the same word order in relation to the noun as an attributive adjective.

However, sometimes cardinals may be used as nouns e.g. count up to seven. Also, Payne and Huddleston (2002, p.351) point out that hundred, thousand, million and billion are nouns and do not behave like one, two, three, etc, since they can take the determiner *a*, e.g. a million trees; they are easily pluralized, e.g. millions of trees. The important thing to note is that the cardinal numbers, like adjectives, are heads that take the noun as a complement. However, cardinals can take other cardinals in the complement position, as well as nouns. This permits for the formation of complex numerals, such as multiplicative e.g. four hundred, which means four x hundred and additives e.g. hundred and six, which is hundred + six. The structure of multiplicative is akin to the structure of simplex numerals with nouns. In contrast, choosing an EzP complement by quantifiers presents that they behave like N', head of NP, and have a[+N] feature as shown in (33).

(33) aksariyat –e Irani-hâ

Also, unlike quantifiers, attributive adjectives may form a string of adjectives, more than one adjective, before a noun in different languages. Consider the Persian examples in (34a) and (34b).

(34) a. kasiftarin sholughtarin shahr 'The dirtiest busiest city'

b. * chand tâ kol-e pesar-hâ 'some all-Ez boys'

In predicative position, adjectives come after linking or special verbs like be, become, smell and seem. In Persian, adjectives can appear following a copula (predicate) as shown in example (35).

(35) kif-e man kouchak ast.

Bag-Ez poss small is. 'My bag is small.'

Numerals also can function as predicative APs, on par with other adjectives and as opposed to other quantifiers as in (36).

(36) madâd-hâ-i ke ruy miz gozâshtam se tâ bud.

Pencil- Pl -Ind that (I) on the table put-past1S three (classifier) was.

'Pencils that (I) put on the table was three.'

However, quantifiers cannot occur following a predicate as shown in example (37).

(37) *ketab-hay man hame ast.

Basically, since numerals are adjectives, then just like adjectives they can take other nouns as complements. Consequently, numerals are an adjective.

Adjectives in Persian can be modified by an adverb like *kheyli* 'very', e.g. *yek dokhtar-e kheyli qashang* 'a very beautiful girl', but quantifiers cannot be modified by an adverb, e.g. **kheyli meqdâri berenj* 'very some rice'.

Further, the two word classes are distinguished by morphological evidence, Persian adjectives- on oppose to quantifiers-always take *tar* and *tarin* endings as comparative and superlative markers. See the following examples from Persian.

(38) grân-tar / grân -tarin

Expensive -more / expensive -the most

(39) *hame-tar /hame-tarin, meqdari-tar/meqdari-tarin,

All – C / all - S, some- C /some -S

In Persian, nouns precede adjectives, but they are preceded by all quantifiers. Thus, adjectives

seem to have different distribution from quantifiers and to be categorically distinct, as in (40) and (41):

(40) khan-e bozorg

House-Ez big 'big house'

(41) hame-ye khâne-hâ / meqdâri shir

All houses / some milk

In addition, only superlative adjectives and quantifiers can be utilized together in order to modify a noun. This co-occurrence illustrates that they are not in complementary distribution and belong to different categories. In fact, any

superlative adjective modifying the noun has to be preceded by any quantifier modifying the noun as in (42) and (43).

(42) chand tâ az bozorg-tarin khâne-hâ
Some of the biggest houses

(43) * bozorg-tarin az chandtâ khâne-hâ
The biggest of some houses

Moreover, like nouns, Persian quantifiers can attach to the pronominal clitics expressing possession, e.g. *hame-shon* 'all of them' / *tamâm-esh* 'all of it'. Consequently, the above discussion indicates that quantifiers and adjectives have a different syntactical behavior in Persian. Therefore, I suppose that quantifiers behave as nouns, while numerals are an adjective.

Conclusion

In these pages, I have argued for a minimalist analysis of numerals and quantifiers in Persian based on the following key ingredients:

- Ritter's model makes some wrong predictions, but separating Persian plural morpheme as a phrasal affix from numerals can resolve some potential problems. So, I proposed that the functional category NumP projects in Persian and just the plural marker occupies the head of NumP. Numeral quantifiers are independent heads. They are considered as a projection of functional category CardIP in Persian.

- Contrary to Hamedani (2011), I claimed that Persian is a classifier language in which classifiers are not in complementary distribution with plural marking, and only one feature, [+Numerable], is realized on CIs and separates CIs from number morphology. I suggested that plural marker is a phrasal head with the associated features, [+plural] and [+definite]. In fact, Persian plural marker -hâ has a [-Numerable] feature, whereas numerability happens only with a numeral, and it is not related to the contrast between singularity and plurality. Thus, numerability is realized on CIs and it is considered as a syntactic issue that separates CIs from number morphology.

- Despite Gebhardt's (2009) argument, I concluded that strong and weak quantifying determiners are the same and just belong to the functional projection QP, and a DP is necessary for a nominal expression to be a definite or indefinite argument. Therefore, quantifying determiners occupy a position higher than numerals.

- I assumed that the lower QP in Giusti's (1992) analysis of QPs can be replaced by a projection of functional category CardIP. In addition, like quantifiers, numerals cannot take their complements in a partitive structure, and unlike quantifiers, they can take a classifier as a complement. Assuming that in Persian CardIP projects and its head is occupied by means of a numeral, I proposed that there is no distinction between simplex and complex numerals in Persian and they are always heads of cardIPs, but a CIP with a null head is applied when the numeral *yek* 'one' is utilized with the other numerals.

- Based on some morphological and syntactical criteria, I illustrated that numerals behave as adjectives, whereas quantifiers are different from adjectives.

These results present a comprehensive picture of the syntax of the numerals and quantifiers in Persian. However, they have consequence beyond the syntax of Persian as well. In particular:

- (1) They emphasize the role of head movement in syntax.
- (2) They confirm Agree-based approach to feature checking.
- (3) They emphasize the importance of null operators in the syntax.

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